

# LAN Emulation Sample Configuration

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## Introduction

This document illustrates how to configure LAN Emulation (LANE) services and clients on Cisco routers, Catalyst switches, and ATM switches.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

### Conventions

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

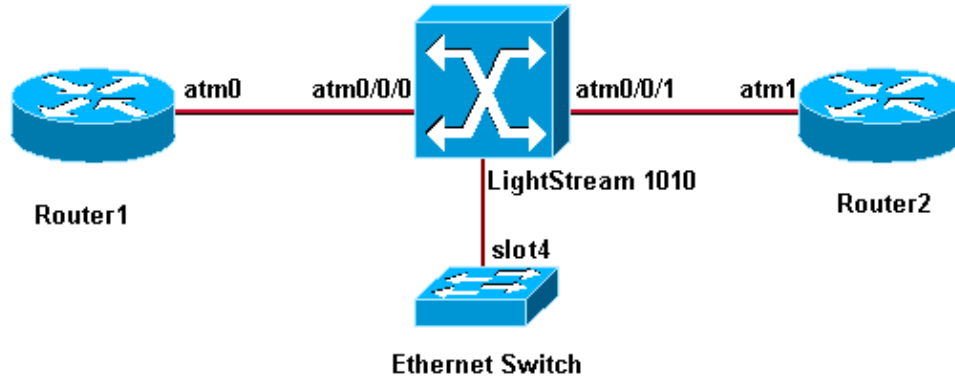
## Configure

In this section, you are presented with the information to configure the features described in this document.

**Note:** To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only) .

## Network Diagram

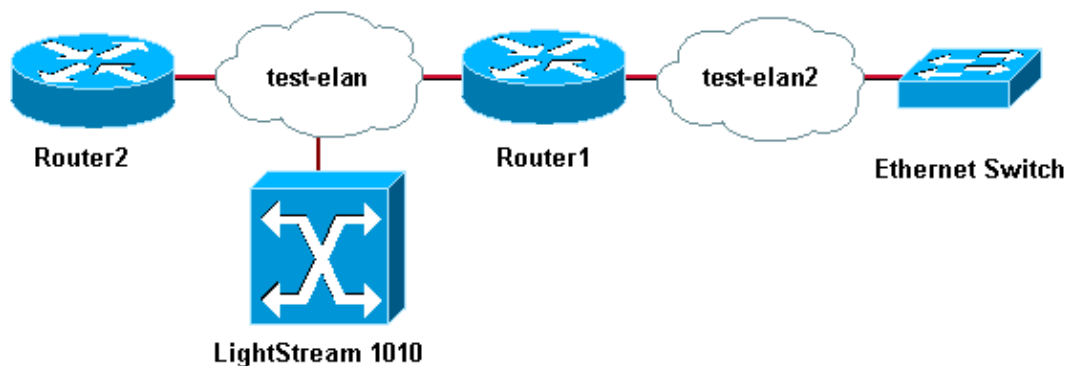
This document uses this network setup:



In that setup:

- Router1 and Router2 are Cisco 4500 routers running Cisco IOS® Software Release 12.1(4). Both act as LAN Emulation Clients (LECs).
- The LightStream 1010 is running Cisco IOS Software Release 12.0(10)W5(18b). It acts as a LAN Emulation Configuration Server (LECS).
- The Ethernet switch is a Catalyst 5000 with a LANE blade in slot4. This LANE blade acts as a LEC and as a LANE broadcast-and-unknown server (LES/BUS).
- The LANE services have been configured according to the LANE Design Recommendations.
- Two emulated LANs (ELANs) have been configured: test-elan and test-elan2.
- Router1 has a LEC in each ELAN. The Ethernet switch has a LEC in test-elan2. Router2 and the LightStream 1010 have a LEC in test-elan.
- On the Ethernet switch, the virtual LAN, VLAN2, is bound to test-elan2.
- Router1 is in charge of doing the routing between the two ELANs.

This is the logical setup:



## Configurations

This document uses these configurations:

- LightStream 1010
- Router1
- Router2
- Ethernet Switch LANE Blade

**Note:** Only the portions of the configuration commands that are relevant to LANE are included.

```
LightStream 1010

!--- Output suppressed.

atm lecs-address-default 47.0091.8100.0000.0060.705a.8f01.0060.705a.8f05.00

!

lane database test

    name test-elan server-atm-address 47.0091810000000060705A8F01.00E0B00B7031.01
    name test-elan2 server-atm-address 47.0091810000000060705A8F01.00E0B00B7031.02
!
interface atm2/0/0
no ip address
no ip directed-broadcast
lane config auto-config-atm-address
lane config database test
!
interface atm2/0/0.2 multipoint
ip address 20.0.0.2 255.255.255.0
no ip directed-broadcast
lane client ethernet test-elan

!--- Output suppressed.
```

The LANE database test defines the network service access point (NSAP) address of the LES/BUS for each ELAN. These addresses in the LightStream 1010 configuration point to the Ethernet switch LANE blade:

```
lane-blade# show lane default

interface atm0:
LANE Client:      47.0091810000000060705A8F01.00E0B00B7030.**
LANE Server:      47.0091810000000060705A8F01.00E0B00B7031.**
LANE Bus:         47.0091810000000060705A8F01.00E0B00B7032.**
LANE Config Server: 47.0091810000000060705A8F01.00E0B00B7033.00
```

**Note:** \*\* represents the subinterface number of bytes in hexadecimal format.

**Note:** Certain **show** commands are supported by the Output Interpreter Tool (registered customers only), which allows you to view an analysis of **show** command output.

Once you have defined the LANE database, apply it on the main interface of the LECS using the **lane config database database-name** command. This is an explanation of the three commands that are configured on the LECS:

- **atm lecs-address-default NSAP-address** Defines which address the switch advertises as being the LECS NSAP to its connected devices through Interim Local Management Interface (ILMI). In this case, the address configured is the NSAP address assigned to the ATM0 interface of the LightStream 1010. Issue the **show lane default** command to obtain this address:

```
LightStream 1010# show lane default

interface ATM2/0/0:
LANE Client:      47.0091810000000060705A8F01.0060705A8F02.**
LANE Server:      47.0091810000000060705A8F01.0060705A8F03.**
LANE Bus:         47.0091810000000060705A8F01.0060705A8F04.**
```

LANE Config Server: 47.0091810000000060705A8F01.0060705A8F05.00

**Note:** \*\* represents the subinterface number of bytes in hexadecimal format.

- **lane config auto-config-atm-address** Indicates whether the LECS responds to call setups made to its real NSAP address.
- **lane config database database-name** Defines which LANE database the LECS uses.

Once you have applied the configuration above to the main interface, the LECS is up and active.

## Checking the LECS Status

Issue the **show lane config** command to check the LECS status:

```
LightStream 1010# show lane config

LE Config Server ATM2/0/0 config table: test
Admin: up State: operational
LECS Mastership State: active master
list of global LECS addresses (49 seconds to update):
47.0091810000000060705A8F01.0060705A8F05.00
ATM Address of this LECS: 47.0091810000000060705A8F01.0060705A8F05.00 (auto)
vcd rxCnt txCnt callingParty
 46      1      1 47.0091810000000060705A8F01.00E0B00B7031.01 LES test-elan 0 active
 62      1      1 47.0091810000000060705A8F01.00E0B00B7031.02 LES test-elan2 0 active
ATM Address of this LECS: 47.00790000000000000000000000.00A03E000001.00 (well known)
cumulative total number of unrecognized packets received so far: 0
cumulative total number of config requests received so far: 608
cumulative total number of config failures so far: 601
cause of last failure: no configuration
culprit for the last failure: 47.009181000000FFFFF705A8F01.0050E2030602.01
```

### Router1

```
!--- Output suppressed.

interface ATM0

no ip address
pvc 0/5 qsaal
!
PVC 0/16 ilmi
!
no ATM ilmi-keepalive
!
interface ATM0.2 multipoint
ip address 20.0.0.1 255.255.255.0
lane client ethernet test-elan
!
interface ATM0.3 multipoint
ip address 21.0.0.1 255.255.255.0
lane client ethernet test-elan2
!
router rip
network 20.0.0.0
network 21.0.0.0

!--- Output suppressed.
```

## Checking the LEC Status

Issue these commands to check the LEC status:

- **show lane client [interface atm number[.subinterface-number]]**

```
router1# show lane client interface atm 0.2

LE Client ATM0.2  ELAN name: test-elan  Admin: up  State: operational
Client ID: 2      LEC up for 18 hours 9 minutes 42 seconds
ELAN ID: 0
Join Attempt: 1
Known LE Servers: 1
HW Address: 0060.837b.b3a2  Type: ethernet  Max Frame Size: 1516
ATM Address: 47.0091810000000060705A8F01.0060837BB3A2.02
VCD  rxFrames  txFrames  Type      ATM Address
  0         0         0  configure 47.0091810000000060705A8F01.0060705A8F05.00
  5         1         47  direct   47.0091810000000060705A8F01.00E0B00B7031.01
  6        145         0  distribute 47.0091810000000060705A8F01.00E0B00B7031.01
  7         0        4567  send     47.0091810000000060705A8F01.00E0B00B7032.01
  8       10221         0  forward  47.0091810000000060705A8F01.00E0B00B7032.01
```

Refer to Using the show lane client Command to Troubleshoot LAN Emulation Clients for more information.

- **show atm ilmi-status** Verifies whether the client has properly registered its NSAP address through ILMI.

```
router1# show atm ilmi-status

Interface : ATM0 Interface Type : Private UNI (User-side)
ILMI VCC : (0, 16) ILMI Keepalive : Disabled
ILMI State:      UpAndNormal
Peer IP Addr:    10.200.10.47      Peer IF Name:    ATM0/0/0
Peer MaxVPIbits: 8                Peer MaxVCIBits: 14
Active Prefix(s) :
47.0091.8100.0000.0060.705a.8f01
End-System Registered Address(s) :
47.0091.8100.0000.0060.705a.8f01.0060.837b.b3a2.02(Confirmed)
47.0091.8100.0000.0060.705a.8f01.0060.837b.b3a2.03(Confirmed)
```

Refer to these documents for more information on the **show atm ilmi-status** command:

- ◆ Understanding ILMI on ATM Interfaces
- ◆ ILMI Address Registration Problems: %LANE-3-NOREGILMI

```
Router2

!--- Output suppressed.

interface ATM1
 no ip address
 PVC 0/16 ilmi
 !
 PVC 0/5 qsaal
 !
 no ATM ilmi-keepalive
 !
interface ATM1.2 multipoint
 ip address 20.0.0.3 255.255.255.0
 lane client ethernet test-elan
```

```

!
router rip
network 20.0.0.0

!--- Output suppressed.

```

### Ethernet Switch LANE Blade

```

!--- Output suppressed.

interface ATM0

ATM preferred phy A
atm PVC 1 0 5 qsaal
ATM PVC 2 0 16 ilmi
no ATM ilmi-keepalive
!
interface ATM0.1 multipoint
lane server-bus ethernet test-elan

!--- Configuration of the Bus.

!
interface ATM0.2 multipoint
lane server-bus ethernet test-elan2
!
interface ATM0.3 multipoint
lane client ethernet 2 test-elan2

!--- Output suppressed.

```

The **lane server-bus ethernet *elan-name*** command configures this device as the LES/BUS for the ELAN named *elan-name*.

**Note:** There can only be one server-bus per multipoint subinterface.

## Additional Commands

These are some helpful commands to use when configuring LANE. It is not necessary to use these commands in order to implement LANE.

### On the LECS

```

interface ATM2/0/0
no ip address
no ip directed-broadcast
lane config fixed-config-atm-address
lane config auto-config-atm-address
lane config config-atm-address 47.0091810000000060705A8F01.000000000001.01
lane config database test

```

- **lane config fixed-config-atm-address** Indicates that the LECS responds to call setups made to the well-known NSAP address. The well-known NSAP address is 47.0079000000000000000000000000.00A03E000001.00.
- **lane config config-atm-address NSAP** Indicates that the LECS also answers to call setups made to the configured NSAP address 47.0091.8100.0000.0060.705a.8f01.0000.0000.0001.01.

## On the LES

```
interface ATM0.1 multipoint
  lane config-atm-address 47.0091810000000060705A8F01.000000000001.01
  lane server-atm-address 47.0091810000000060705A8F01.000000000002.01
  lane bus-atm-address 47.0091810000000060705A8F01.000000000003.01
  lane server-bus ethernet test-elan
```

- **lane config-atm-address** *NSAP* Forces the LES/BUS to connect to the LECS with the address of *NSAP*, instead of using the LECS address learned from ILMI.
- **lane server-atm-address** *NSAP* and **lane bus-atm-address** *NSAP* Allow you to statically configure the NSAP address of the LES and the BUS respectively.

Refer to Hard-coding ATM Addresses for LES/LEC/BUS/LECS for more information.

## On the LEC

```
interface ATM1.2 multipoint

  ip address 20.0.0.3 255.255.255.0
  lane fixed-config-atm-address
  lane client ethernet test-elan

interface ATM1.2 multipoint

  ip address 20.0.0.3 255.255.255.0

  lane config-atm-address 47.0091810000000060705A8F01.000000000001.01
  lane client ethernet test-elan
  interface ATM1.2 multipoint

  ip address 20.0.0.3 255.255.255.0

  lane server-atm-address 47.0091810000000060705A8F01.000000000002.01
  lane client ethernet test-elan
```

- **lane fixed-config-atm-address** Forces the LEC to connect to the LECS using the well-known NSAP address, instead of using the LECS NSAP address learned from ILMI.
- **lane config-atm-address** *NSAP* Forces the LEC to connect to the LECS with the address of *NSAP*, instead of using the LECS address learned from ILMI.
- **lane server-atm-address** *NSAP* Forces the LEC to directly connect to the LES with the address of *NSAP* without connecting to the LECS first.

## Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

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## Related Information

- [Understanding LE\\_ARP Verification in ATM LANE Environments](#)
- [ILMI Address Registration Problems: %LANE-3-NOREGILMI](#)
- [LANE Design Recommendations](#)
- [LAN Emulation Using the ATM Router Module](#)
- [Implementing HSRP Over LANE](#)
- [QoS over LANE](#)
- [Understanding the show lane client Command Output](#)

- **Hard-coding ATM Addresses for LES/LEC/BUS/LECS**
  - **Using the show lane client Command to Troubleshoot LAN Emulation Clients**
  - **Understanding the Naming Conventions of Catalyst 5000 and 6000 ATM Module Software**
  - **SSRP Sample Configuration**
  - **FSSRP Sample Configuration**
  - **Advanced LANE Setup – SSRP with Dual Phy**
  - **LAN Emulation Sample Configuration**
  - **Troubleshooting LAN Emulation Switching Environments**
  - **LANE (LAN Emulation) Support Pages**
  - **ATM (Asynchronous Transfer Mode) Support Pages**
  - **Technical Support – Cisco Systems**
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