



ATM LANE Fast Simple Server Replication Protocol

To improve the ATM LAN Emulation (LANE) Simple Server Replication Protocol (SSRP), Cisco has introduced the ATM LANE Fast Simple Server Replication Protocol (FSSRP). FSSRP differs from LANE SSRP in that all configured LANE servers of an Emulated LAN (ELAN) are always active. FSSRP-enabled LANE clients have virtual circuits (VCs) established to a maximum of four LANE servers and broadcast and unknown servers (BUSs) at one time. If a single LANE server goes down, the LANE client quickly switches over to the next LANE server and BUS resulting in no data or LE-ARP table entry loss and no extraneous signalling.

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Feature Overview

The FSSRP feature improves upon SSRP such that LANE server and BUS switchover for LANE clients is immediate. With SSRP, a LANE server would go down, and depending on the network load, it may have taken considerable time for the LANE client to come back up joined to the correct LANE server and BUS. In addition to going down with SSRP, the LANE client would also do the following:

- Clear out its data direct VCs
- Clear out its LE-ARP entries
- Cause significant signalling activity and data loss

FSSRP was designed to alleviate these problems with the LANE client. With FSSRP, each LANE client is simultaneously joined to up to four LANE servers and BUSs. The concept of the master LANE server and BUS is maintained; the LANE client uses the master LANE server when it needs LANE server BUS services. However, the difference between SSRP and FSSRP is that if and when the master LANE server goes down, the LANE client is already connected to multiple backup LANE servers and BUSs. The LANE client simply uses the next backup LANE server and BUS as the master LANE server and BUS.

Fast Switchover

With FSSRP, switchover to a backup LANE server and BUS is immediate. Unless all the LANE servers and BUSs go down, the LANE clients continue to stay up. As soon as a single LANE server and BUS is available, the LANE client comes back up. This is a significant advantage over SSRP functionality.

The only disadvantage is the number of VCs that are consumed to maintain the extra connections to the backup LANE servers and BUSs. See the Restrictions section later in this document.

Easy Enable

To activate the FSSRP feature, use a single interface configuration command, **lane fssrp** (see the description for this command in the Command Reference section later in this document.) This command affects every LANE component and hence all subinterfaces on an interface.

More Information

The **show lane client** command also has been improved. To display extra LANE server and BUS information in a LANE client pertaining to FSSRP, use the optional new argument *detail*. See the description for this command in the Command Reference section later in this document.

Seamless Operation

FSSRP is designed to interoperate seamlessly with SSRP. However, for you to receive full benefits from FSSRP, all participating network components must be running the same Cisco IOS version. Although the system will interoperate, the fast switchover benefits will not be realized if you use different versions of the Cisco IOS software on different network components. For Cisco IOS version prerequisites, see the Prerequisites section later in this document.

Benefits

Because the LANE client is joined to up to three additional LANE servers and BUSs, FSSRP speeds up LANE client recovery after a LANE server fails. When one LANE server goes down, the LANE client immediately switches over to the next LANE server. In addition, resource loads, such as LANE client signalling, are minimized.

Restrictions

Due to the increase in LAN client connections to all LANE servers in an ELAN, FSSRP increases the number of VCs in your network. On a per client basis, up to 12 additional VCs will be added. These include the additional control direct, control distribute, multicast send and multicast forward VCs (times the 3 extra LANE servers and BUSs), which totals 12 additional VCs.

Users should take care to calculate whether or not the number of existing VCs in their network can be maintained with additional VC connections to the secondary LANE servers and BUSs.

A LANE client may connect to up to only 4 LANE servers and BUSs at a time.

Related Features and Technologies

- ATM LANE SSRP

Related Documents

- Cisco IOS Release 12.0 *Switching Services Configuration Guide*
- Cisco IOS Release 12.0 *Switching Services Command Reference*

Supported Platforms

This feature is supported on these platforms:

- All router platforms with ATM interfaces
- Catalyst 5000 ATM LANE modules

Supported Standards, MIBs, and RFCs

MIBs

MIB support will be released in Cisco IOS Release 12.0(6)T.

For descriptions of supported MIBs and how to use MIBs, see the Cisco MIB web site on CCO at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

RFCs

None

Standards

None

Prerequisites

LANE

Configure LANE on your router.

IOS Versions

Upgrade network components running Cisco IOS versions as follows:

- 11.2 to 11.2(12) or higher
- 11.3 to 11.3(5) or higher
- 11.3WA to 11.3(8)WA4(11) or higher
- 12.0 to 12.0(4.0.1)T or higher

LANE Configuration Server Databases

Ensure that the LANE configuration server databases are identical before you bring up your network.

LANE Configuration Server Configuration

You must never bypass the LANE configuration server's configuration phase, by either explicitly configuring a LANE configuration server's address on subinterfaces or any other means, because the restricted ELAN feature will be seriously compromised.

LANE Client Status Changes

If you must change the status of a LANE client on your network, such as moving it from one ELAN to another ELAN, you must first bring the LANE client down before any changes to the LANE configuration server databases are made. Bring up the LANE client only after all the LANE configuration server databases are identical (as stated in LANE Configuration Server Databases.)

Configuration Tasks

See the following section for configuration tasks for the FSSRP. Each task in the list indicates if the task is optional or required.

- Configuring FSSRP (Required)

Configuring FSSRP

Follow these steps to configure the FSSRP feature:

Step	Command	Purpose
1	Router# configure terminal	Enters global configuration mode.
2	Router(config)# int atm 2/0	Enters ATM interface configuration mode.
3	Router(config-if)# lane fssrp	Enables FSSRP.
4	Router(config-if)# exit Router(config)#	Exits interface configuration mode.

Verifying FSSRP Configuration

Use the **show lane client** command to verify FSSRP configuration on a LANE client.

```
Router# show lane client
```

```

ATM# show lane client detail
LE Client ATM1/0.1 ELAN name:xxx Admin:up State:operational
Client ID:2 LEC up for 5 days 40 minutes 45 seconds
ELAN ID:0
This client is running in FSSRP mode.
Join Attempt:14
Known LE Servers:1
Configured Idle Time:5 seconds
Last Fail Reason:Config VC being released
HW Address:00e0.8fcf.d820   Type:ethernet           Max Frame Size:1516

ATM Address:47.0091810000000061705B0C01.00E08FCFD820.01
VCD  rxFrames  txFrames  Type      ATM Address
0    0          0         configure 47.00918100000000613E5A2F01.006070174823.00

LEC ID:2, State:LESBUS_ACTIVE

52   1778      3556     direct   47.00918100000000613E5A2F01.00000C5A0C59.01
53   1778      0         distribute 47.00918100000000613E5A2F01.00000C5A0C59.01
54   0         0         send     47.00918100000000613E5A2F01.00000C5A0C5A.01
55   0         0         forward  47.00918100000000613E5A2F01.00000C5A0C5A.01

LEC ID:3, State:LESBUS_ACTIVE

93   122       234      direct   47.00918100000000613E5A2F01.00000ABCD001.09
94   122       0         distribute 47.00918100000000613E5A2F01.00000ABCD001.09
97   0         0         send     47.00918100000000613E5A2F01.00000ABCD002.09
08   0         0         forward  47.00918100000000613E5A2F01.00000ABCD002.09

```

Troubleshooting Tips

Use the **show lane** command options “server” and “client” to check if FSSRP is enabled. The following is sample output from the **show lane server** command for an Ethernet-emulated LAN:

```

Router# show lane server

LE Server ATM2/0.2 ELAN name:elan2 Admin:up State: operational
type: ethernet           Max Frame Size: 1516
ATM address: 39.020304050607080910111213.00000CA05B41.02
LECS used: 39.020304050607080910111213.00000CA05B43.00 connected, vcd 51
control distribute: vcd 57, 2 members, 2 packets

proxy/ (ST: Init, Conn, Waiting, Adding, Joined, Operational, Reject, Term)
lecid ST vcd   pkts Hardware Addr  ATM Address
1  O  54       2 0000.0ca0.5b40 39.020304050607080910111213.00000CA05B40.02
2  O  81       2 0060.2f55.7940 39.020304050607080910111213.00602F557940.02

```

Use the **show version** command to check if you are running the correct version of Cisco IOS (see Prerequisites.)

Configuration Examples

This section provides an FSSRP configuration example.

- **lane fssrp**

```
Router# configure terminal  
Router(config)# int atm 2/0  
Router(config-if)# lane fssrp  
Router(config)# exit
```

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.0 command reference publications.

This section documents the new command that configures the FSSRP feature.

- **lane fssrp**
- **show lane client**

In Cisco IOS Release 12.0(1)T or later, you can search and filter the output for **show** and **more** commands. This functionality is useful when you need to sort through large amounts of output, or if you want to exclude output that you do not need to see.

To use this functionality, enter a **show** or **more** command followed by the “pipe” character (|), one of the keywords **begin**, **include**, or **exclude**, and an expression that you want to search or filter on:

```
command | {begin | include | exclude} regular-expression
```

Following is an example of the **show atm vc** command in which you want the command output to begin with the first line where the expression “PeakRate” appears:

```
show atm vc | begin PeakRate
```

For more information on the search and filter functionality, refer to the Cisco IOS Release 12.0(1)T feature module titled *CLI String Search*.

lane fssrp

To enable the special LANE features such that LANE components (such as, the LANE configuration server, the LANE client, the LANE server, and the BUS) become aware of FSSRP, use the **lane fssrp** interface configuration command. Use the **no** form of this command to disable the LANE FSSRP configuration.

```
lane fssrp  
no lane fssrp
```

Syntax Description

There are no arguments or keywords for this command.

Defaults

FSSRP is not enabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4c)W5(10a)	This command was introduced.

Usage Guidelines

You must execute this command on all ATM interfaces to enable FSSRP capability for all LANE components on that interface and hence all its subinterfaces.

Examples

The following example enables FSSRP on an ATM interface:

```
lane fssrp
```

Related Commands

Command	Description
lane client	Activates a LANE client on a subinterface.
lane server	Activates a LANE server on a subinterface.
show lane client detail	Generates additional FSSRP information about a LANE client.
show lane config	Generates information about a LANE configuration server.

show lane client

To generate additional FSSRP information about a LANE client, use the **show lane client detail** EXEC command. The information typically includes, but is not limited to, the extra connection information that may be available to the client as a result of being simultaneously connected to multiple LANE servers and BUSs.

show lane client detail

Syntax Description

detail Displays additional FSSRP information.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.0(5)T	Added <i>detail</i> option and command output line "This client is running in FSSRP mode."

Examples

The following is sample output from the **show lane client detail** command.

```

ATM# show lane client detail
LE Client ATM1/0.1 ELAN name:xxx Admin:up State:operational
Client ID:2 LEC up for 5 days 40 minutes 45 seconds
ELAN ID:0
This client is running in FSSRP mode.
Join Attempt:14
Known LE Servers:1
Configured Idle Time:5 seconds
Last Fail Reason:Config VC being released
HW Address:00e0.8fcf.d820 Type:ethernet Max Frame Size:1516

ATM Address:47.0091810000000061705B0C01.00E08FCFD820.01
VCD  rxFrames  txFrames  Type      ATM Address
0    0          0          configure 47.00918100000000613E5A2F01.006070174823.00

LEC ID:2, State:LESBUS_ACTIVE

52   1778      3556      direct   47.00918100000000613E5A2F01.00000C5A0C59.01
53   1778      0          distribute 47.00918100000000613E5A2F01.00000C5A0C59.01
54   0          0          send     47.00918100000000613E5A2F01.00000C5A0C5A.01
55   0          0          forward  47.00918100000000613E5A2F01.00000C5A0C5A.01

LEC ID:3, State:LESBUS_ACTIVE

93   122        234       direct   47.00918100000000613E5A2F01.00000ABCD001.09
94   122        0          distribute 47.00918100000000613E5A2F01.00000ABCD001.09
97   0          0          send     47.00918100000000613E5A2F01.00000ABCD002.09
08   0          0          forward  47.00918100000000613E5A2F01.00000ABCD002.09
    
```

Related Commands

Command	Description
lane fssrp	Enables FSSRP on an ATM interface.
lane client	Activates a LANE client on a subinterface.
lane server	Activates a LANE server on a subinterface.
show lane config	Generates information about a LANE configuration server.