CHAPTER 1

About LightStream 2020 Traps

This chapter provides an overview of trap messages generated by the LightStream 2020 multiservice ATM switch (LS2020 switch). It describes how traps are generated, the types of traps generated, their formats, and their relative priorities.

Traps inform you of network events. When a network event occurs, the LS2020 switch sends a trap message, or possibly a series of messages, to one or more user-specified destinations that may include the network management station (NMS), the switch's local console, a log file on the switch, or a terminal that is running the command line interface (CLI). A trap may notify you of a serious condition that requires immediate corrective action, or it may give you information that, while important, may not require any action. You can initiate further interaction with an LS2020 switch to determine the nature and extent of the event signaled by the trap.

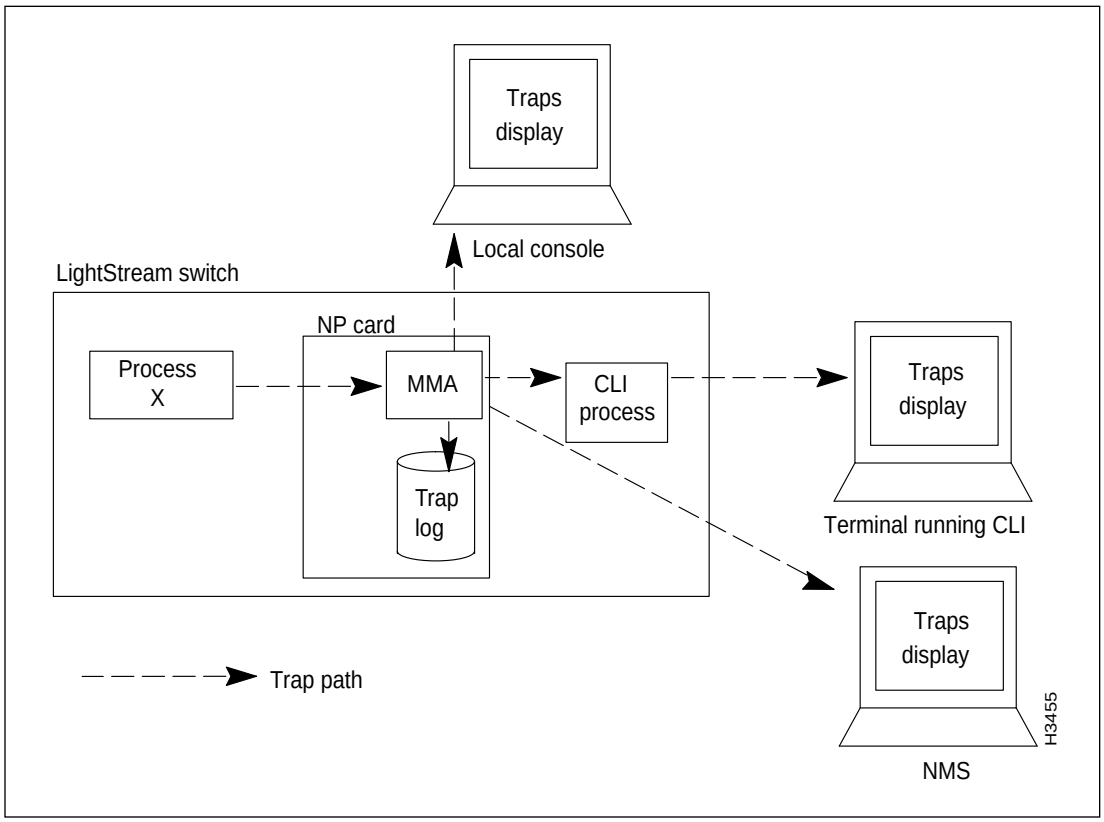
How Traps Are Generated

Figure 1-1 shows the flow of traps through the LS2020 system. Traps are passed from software processes to another process called the master management agent (MMA). Traps are stored in the trap log and sent to the local console, the CLI process, or an NMS. Traps are generated by processes running on an LS2020 switch and sent to the MMA.

By default, the MMA writes the traps to a log file on the switch's network processor (NP). From there, traps are sent to the local console, if one is present. Traps can also be displayed on one or more NMSs, as well as on a terminal running the CLI.

Note If you are using an NMS, only one instance of the CLI can run on the NMS at any given time.

Figure 1-1 Trap Flow Through LightStream 2020 System



How Traps Are Reported

By default, a switch sends traps only to its trap log and to its local console, if one is present. However, you can configure a switch to send traps to another NP or to an NMS for viewing. This capability can be used to collect traps for all the switches in the network in a single place or to send traps to as many as 25 different destinations in the network. See the *LightStream 2020 Installation Guide* for information about changing trap delivery addresses.

You can also copy a switch's trap log to an NMS or workstation and view it there. See the section entitled "Moving Trap Log from NP" in the chapter "Managing LightStream 2020 Traps" for information about copying the trap log to another LS2020 system.

Types of Traps

LS2020 switches generate five types of traps:

- SNMP (or "generic")
- Operational
- Informational
- Trace
- Debug

Each type of trap is described briefly below.

SNMP Traps

The SNMP traps displayed by the LS2020 switch are the standard SNMP traps defined by the SNMP MIB-II specifications. Such traps are displayed as "generic" traps. SNMP traps are used by LS2020 network operators.

`Link Up` and `Link Down` are examples of SNMP traps.

Operational Traps

Operational traps provide information on the key system components to help you find and correct problems. Operational traps indicate that something is wrong with the system or that a significant change has occurred in system status. Operational traps can also be used to report the status of hardware components. Operational traps are of primary interest to network operators.

`Port 3 down` is an example of an operational trap.

Operational traps are divided into three categories:

- Traps that provide information only

  Traps in this category provide information only, such as notification that a line card has come up.

- Traps that require a response

  Traps in this category indicate problems that you can usually fix by following the procedures described in this manual.

- Traps that require you to contact your customer support representative

  Traps in this category indicate that there may be a problem with LS2020 software. Such traps are *very* unlikely to occur. However, if you receive a trap from this category, it is important that you record it and contact your customer support representative immediately so remedial action be taken.

Within each software process, operational traps are numbered from 1 to 999. Note that traps numbered from 1000 to 1999 are not documented, since the only response that you can take in such cases is to call your customer service representative.

Informational Traps

Informational traps provide supplemental details on problems that are reported by some operational and SNMP traps. Informational traps are used by customer support representatives to do advanced troubleshooting and software debugging.

The following is an example of an informational trap:

```
Trunk emtb7.2.5->emtb8.4.2 DOWN [transitioning to down (from has-vci)]
```

Within each software process, informational traps are numbered from 2000 to 2999.

Trace Traps

Trace traps are used to track a sequence of actions through a process. Trace traps are used by customer support representatives to do advanced troubleshooting and software debugging. Within each software process, trace traps are numbered from 3000 to 3999. Because trace traps are not intended for customer use, they are not discussed in detail in this manual.

Note Do not turn on trace traps. If you do, you may reduce the performance of your network.

Debug Traps

Debug traps are used to find and solve serious software problems in an LS2020 switch. Debug traps are used by customer support representatives and developers. Within each software process, debug traps are numbered from 4000 to 4999. Because debug traps are not intended for customer use, they are not discussed in detail in this manual.

Note Do not turn on debug traps. If you do, you may reduce the performance of your network.

Priorities of Trap Types

Each type of trap is assigned a priority level that cannot be changed. Table 1-1 lists the priorities of the different trap types in descending order.

Table 1-1 Trap Priorities

Trap Type	Priority
SNMP	Highest
Operational	Lower
Informational	Lower
Trace	Lower
Debug	Lowest

You can use priority levels to set a *trap reporting threshold* that controls which trap types will be reported. Setting the trap reporting threshold to a given priority level causes the system to report all traps at or above that level, and to discard traps below that level. For example, if you set the trap reporting threshold to informational, the system reports informational, operational, and SNMP traps, while discarding trace and debug traps.

By default, the system displays all SNMP and operational traps and logs all SNMP, operational, and informational traps for your network. (Trace and debug traps are discarded.) This arrangement works well for most networks. If you want to change the trap reporting threshold, refer to the chapter entitled “Managing LightStream 2020 Traps.”

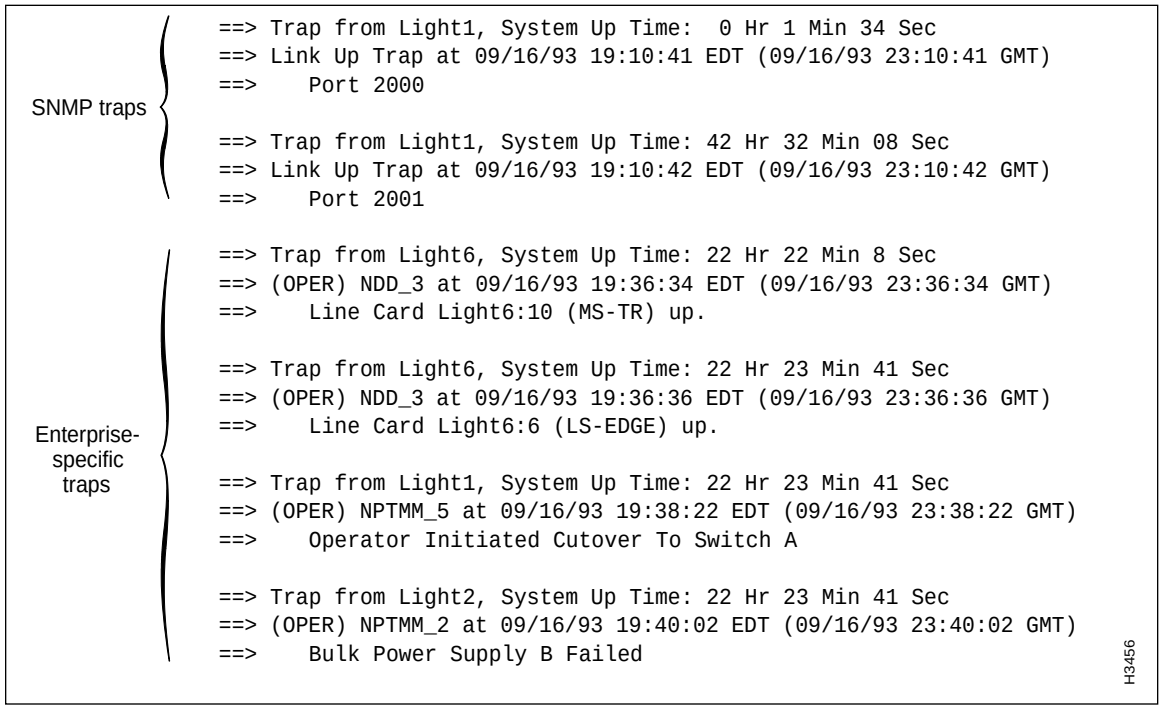
Trap Formats

Two trap formats have been defined for the LS2020 switch:

- SNMP standard traps
- Enterprise-specific traps

The SNMP trap format is defined by prevailing MIB-II specifications, while enterprise-specific traps are specific to the LS2020 switch. Figure 1-2 shows a sample trap display from nodes called *Light1* and *Light6*. The display contains both SNMP and enterprise-specific traps.

Figure 1-2 Trap Examples



Note If you are using an NMS to display traps, the display may differ somewhat in format from that shown in Figure 1-2, but the content will be identical.

SNMP Standard Traps

Standard SNMP traps include the following information:

- LS2020 node name

  The system uses the IP address of the packet containing the trap to look up the name of the node in the */etc/hosts* file. If the name is not available, the IP address is displayed. (Note that the node name is omitted from traps displayed on the same node in which the traps were generated.)

- System up time when the trap occurred

  In the trap log (*mma.traplog*) or on the console display, the system up time indicates when the MMA received the trap. In the CLI display, however, the system up time indicates the up time of the originating LS2020 node. (Note that the system up time is omitted from traps displayed on the same node in which the traps were generated.)

- Trap name
- Trap generation time
- Port number associated with the trap (if applicable)

Enterprise-specific Traps

Enterprise-specific traps contain the following information:

- LS2020 node name

  The system uses the IP address of the packet containing the trap to look up the name of the node in the */etc/hosts* file. If the name is not available, the IP address is displayed. (Note that the node name is omitted from traps displayed on the same node in which the traps were generated.)

- System up time when the trap occurred

  In the trap log (*mma.traplog*) or on the console display, the system up time indicates when the MMA received the trap. In the CLI display, however, the system up time indicates the up time of the originating LS2020 node. (Note that the system up time is omitted from traps displayed on the same node in which the traps were generated.)

- Trap severity level (oper, info, trace, or debug)

- Symbolic trap name

  The symbolic trap name consists of an abbreviation for the software module that generated the trap, followed by a number that identifies the specific trap and the trap type. For example, if the symbolic trap name is LCC_14, it is an operational trap generated in the line card control (LCC) process.

- Trap generation time

  The trap generation time is shown in two forms: the time zone you selected during installation and Greenwich Mean Time.

- Trap text

  The trap text describes the event being reported.

Trace and debug traps also include the process identification (PID) number and process alias name of the process in which the trap occurred.

Figure 1-3 shows each field of a sample enterprise-specific trap.

Figure 1-3 Fields in Enterprise-specific Trap Message