IDENTIFICATION OF VOLATILE AND NON-VOLATILE STORAGE AND SANITIZATION OF SYSTEM COMPONENTS

JUNIPER NETWORKS
M320 Internet Router

REVISION 1.0
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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide direction to identify and remove all non-volatile (NV) storage from the Juniper Networks M320 routing platform.

1.2 Scope

This document only addresses the M320 routing platform. While other platforms offered by Juniper Networks may contain similar hardware components, this document only applies to the M320 router. Furthermore, this document only provides direction for the identification and removal of NV storage components. It does not address destruction procedures for those components. As all of the NV storage components used in the M320 router are commercial off-the-shelf (COTS) components, directions for destruction of those components are left to the governing Department, Agency, or Office.

2 EQUIPMENT OVERVIEW

2.1 Identification of Chassis

The M320 router is a high-density edge aggregation, routing, and service creation platform that builds on Juniper Networks service-built edge design. Constructed with separations between the control plane, forwarding plane, and services plane, the router supports multiple services on a single platform. The JUNOS software runs on a control subsystem with dedicated hardware, ensuring that control functions are performed without affecting the forwarding subsystem. Forwarding and packet processing operations in the router are performed by dedicated programmable ASICs that enable the router to achieve data forwarding rates that match current fiber-optic capacity. This design eliminates processing and traffic bottlenecks, permitting the router to achieve high performance.

The router can be deployed in core, peering, and data center applications, but is optimized for dense edge aggregation and service creation. The M320 platform can provide a single point of edge aggregation for thousands of customers over any access type, including ATM, Frame Relay, Ethernet, and TDM, at any speed from DS0 up to OC192/STM64 and 10-Gigabit Ethernet.

The router is a half-rack chassis that supports up to eight Flexible PIC Concentrators (FPCs) providing up to 64 SONET/SDH OC48/STM16, 16 SONET/SDH OC192/STM64, or 160 Gigabit Ethernet ports for the router. In a standalone configuration, the router's maximum aggregate throughput is 320 gigabits per second (Gbps), half duplex.

Figure 2-1: M320 Chassis

2.2 Description of Components

The following major components are installed in the M320 chassis.

2.2.1 Host Subsystem

The host subsystem provides the routing and system management functions of the router. You can install one or two host subsystems on the router. To operate, each host subsystem functions as a unit; the Routing Engine (RE) requires the corresponding Control Board (CB) and vice versa.

The Routing Engine is an Intel-based PCI platform that runs JUNOS software. Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the router, control the router interfaces, control some chassis components, and provide the interface for system management and user access to the router.

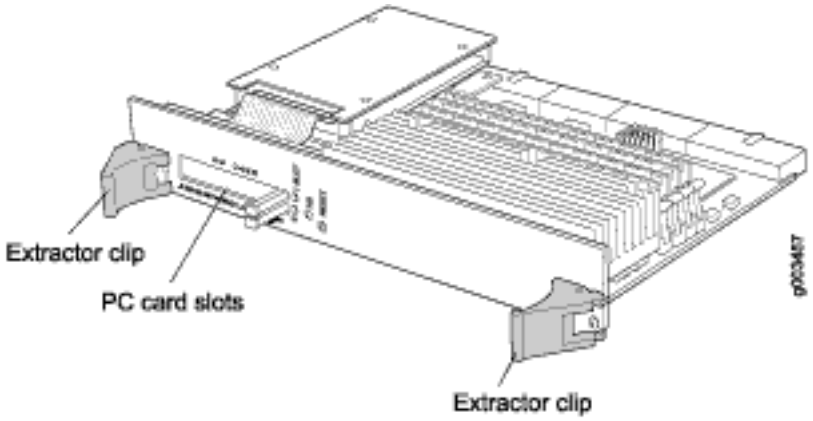

Figure 2-2: Routing Engine (RE)

You can install one or two Routing Engines in the router. The Routing Engines install into the upper rear of the chassis in the slots labeled RE0 and RE1. If two Routing Engines are installed, one functions as the master and the other acts as the backup. If the master Routing Engine fails or is removed, and the backup is configured appropriately, the backup takes over as the master.

The Routing Engines are hot-pluggable. Each Routing Engine requires a CB to be installed in the adjacent slot. RE0 installs below CB0, and RE1 installs above CB1. A Routing Engine does not power up if a CB is not present in the adjacent slot.

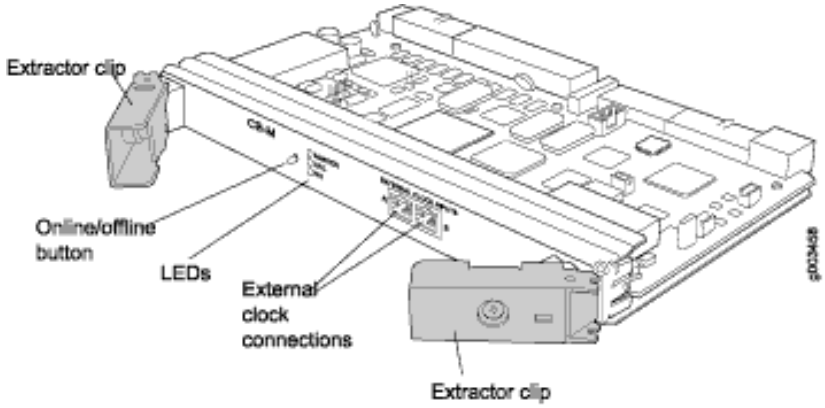

Figure 2-3: Control Board (CB)

The M320 router uses the RE-A-2000-4096. The RE contain the following storage elements: 4GB Synchronous Dynamic Random Access Memory (SDRAM), on-board FLASH disk, and on-board hard disk drive. The SDRAM is volatile storage; the contents are cleared when power is removed from the system. The FLASH disk and hard disk drive provide *non-volatile (NV)* storage. **These RE components must be removed to ensure that no data remains on**

the system. Removal procedures are outlined in section 3 of this document.

The CB contains no storage elements, either volatile or non-volatile.

2.2.2 Craft Interface

The craft interface allows you to view status and troubleshooting information at a glance and to perform many system control functions. It is hot-insertable and hot-removable. The craft interface is located on the front of the router above the FPCs**.**

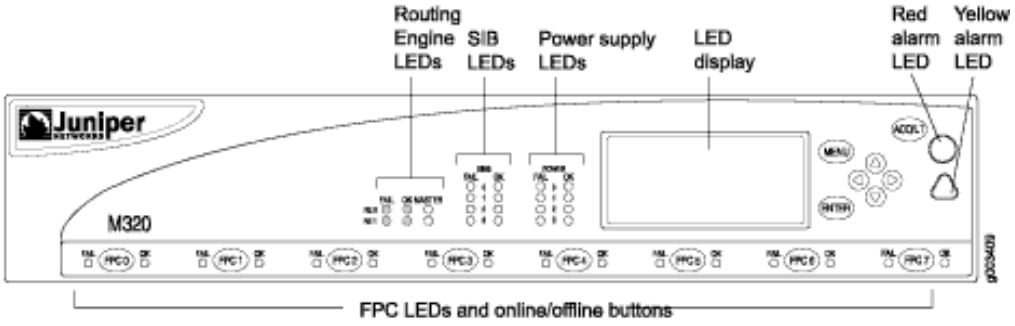

Figure 2-4: M320 Craft Interface

The Craft Interface contains no storage elements, either volatile or non-volatile.

2.2.3 Flexible PIC Concentrator (FPC)

The Flexible PIC Concentrators (FPCs) provide the infrastructure to power and control PICs and to translate packets to and from each PIC into a standard interface that the SIB processes. Each FPC contains a translator, a crossbar connection to the SIBs, power subsystem, and the physical PIC connectors. The assembly contains a translation component that converts between the midplane signals and the signals required by the types of supported PICs. The translator fully terminates the PIC side connection, providing local flow control, buffering, and electrical conversion.

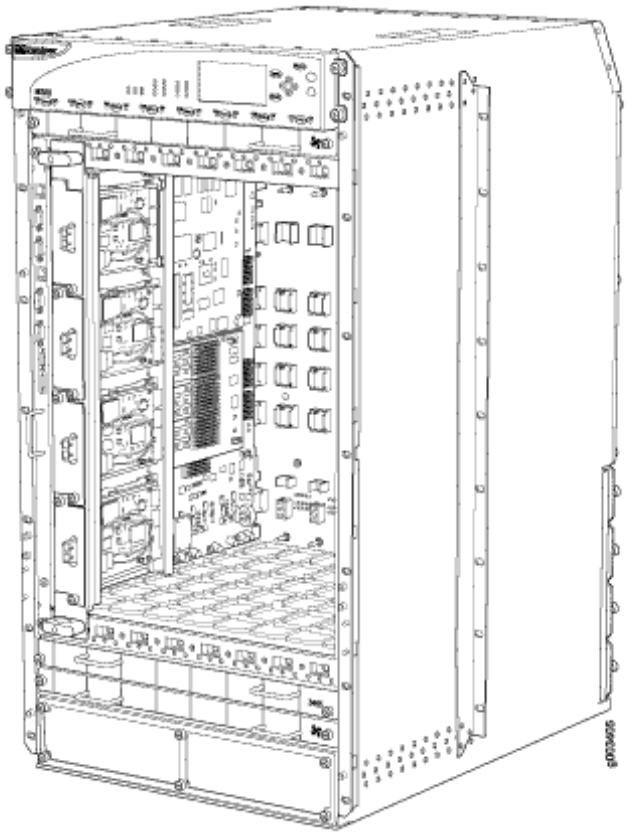

Figure 2-5: Flexible PIC Concentrator Installed in the router

The router supports up to eight of these FPCs:

- Type 1 FPCs—Rated at 4 Gbps full duplex, supports up to four PICs.
- Type 2 FPCs—Rated at 16 Gbps full duplex, supports up to four PICs.
- Type 3 FPCs—Rated at 20 Gbps full duplex, supports up to two PICs, including higher-speed PICs.

Each FPC includes 256MB of SDRAM. **The SDRAM is volatile storage, the contents of which are cleared when power is removed from the system. There are no NV storage components on any FPC.**

2.2.4 Switch Interface Board (SIB)

The Switch Interface Boards (SIBs) provide the switching function to the destination FPC. The SIBs create the switch fabric for the router, providing up to a total of 385 million packets per second (Mpps) of forwarding with the maximum configuration.

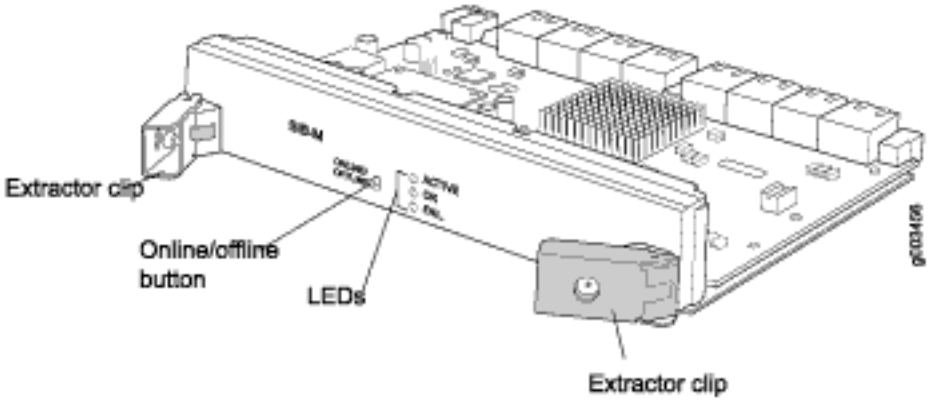

Figure 2-6: Switch Interface Board

SIBs are located at the center rear of the router chassis in the slots labeled SIB0 through SIB3 (top to bottom). The M320 router can be configured with two, three, or four SIBs. You can upgrade from two to three SIBs or from three to four SIBs without resetting or stopping Packet Forwarding Engines.

Each FEB contains 512BM of DRAM. **The DRAM is volatile storage, the contents of which are cleared when power is removed from the system. There are no NV storage components on any FPC.**

2.2.5 Power Supplies

The M320 router uses either AC or DC power supplies. The M320 router is configurable with two, three, or four AC power supplies or two or four DC power supplies. The power supplies connect to the midplane, which distributes the different output voltages produced by the power supplies to the router components, depending on their voltage requirements.

All power supplies are hot-removable and hot-insertable. Each power supply is cooled by its own internal cooling system.

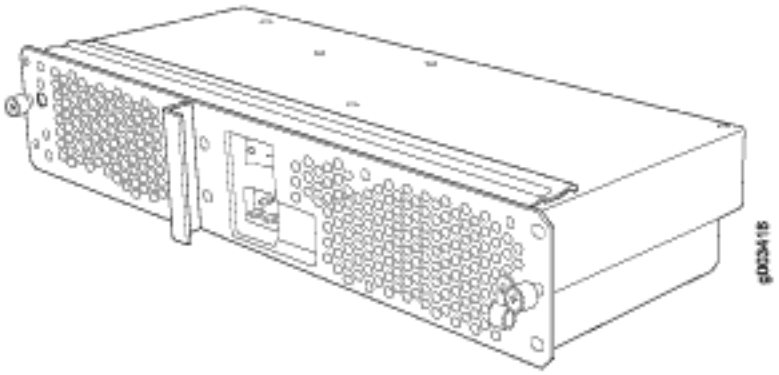

Figure 2-7: AC Power Supply

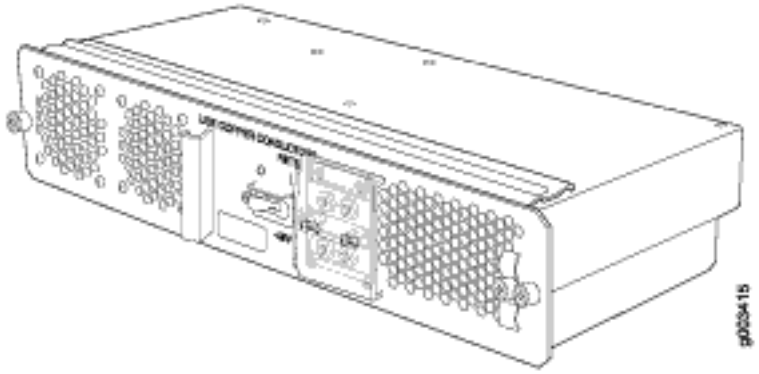

Figure 2-8: DC Power Supply

The PEM's contain no storage elements, either volatile or non-volatile.

2.2.6 Cooling Subsystem

The cooling system consists of the following components:

- Two front fan trays
- Front air filter
- Rear fan tray
- Rear air filter

The cooling system components work together to keep all router components within the acceptable temperature range. All fan trays and filters are hot-insertable and hot-removable. The two front fan trays are interchangeable. The front and rear fan trays are not interchangeable.

The Cooling Subsystem contains no storage elements, either volatile or non-volatile.

2.2.7 Physical Interface Cards (PIC)

PICs provide the physical connection to various network media types, receiving incoming packets from the network and transmitting outgoing packets to the network. During this process, each PIC performs framing and line-speed signaling for its media type. Before transmitting outgoing data packets, the PICs encapsulate the packets received from the FPCs. Each PIC is equipped with an ASIC that performs control functions specific to the media type of that PIC.

PICs are hot-removable and hot-insertable. You can install up to two or four PICs into the slots in each FPC. PICs used in a Type 1 FPC or Type 2 FPC have captive screws at their upper and lower corners. PICs used in a Type 3 FPC have an upper ejector handle and a lower captive screw.

PICs may contain different forms of RAM, all of which are considered volatile. Please refer to the PIC hardware guide for more information.

3 POWER DOWN AND REMOVAL OF NON-VOLATILE STORAGE

In order to ensure that no data remains resident on an M320 platform, the following steps must be performed:

1. Power must be removed from the system to clear all volatile storage
2. The FLASH disk and hard disk drive must be removed from any installed RE's to eliminate points of NV storage

A detailed process is included in the following sections.

3.1 System Power Down

The M320 should be powered down gracefully if time exists to do so. A graceful power down takes approximately five minutes to complete. To perform a graceful power down of an M320 platform, complete the following steps:

1. From the router CLI, execute the "request system power-off" command.
2. Wait for positive feedback that the shutdown is complete. If connected via the router console, you will see the message "The operating system has halted. Please press any key to reboot." If connected via Telnet or SSH, your session will be disconnected before the router completes the power down process. You can verify via the console or observe the LED's on the Craft Interface and verify that neither RE is online or master.
3. For a system with AC power supplies, set the on/off switch on each PEM to the off position and remove the corresponding electrical cable. For a system with DC power supplies, flip the breaker to the open position. **DO NOT ATTEMPT TO REMOVE POWER CONNECTIONS FROM A DC PEM! SERIOUS INJURY OR DEATH MAY RESULT!**

An emergency power down can be performed by omitting steps 1 and 2, and simply performing step 3 in the process above. Note that an emergency power down could possibly corrupt the operating system and configurations stored on the NV media. Once the system has been powered down, all volatile storage is clear.

3.2 Removal of the RE from the Host Subsystem

Once the M320 has been powered down, the next step is to remove all RE's from the Host Subsystem. Recall that an M320 platform may have one or two RE's installed. If multiple RE's are installed, the process defined here and in subsequent sections should be performed for all routing engines. To remove the RE from the Host Subsystem in M320 platform, complete the following steps:

1. Place an electrostatic bag or antistatic mat on a flat, stable surface.
2. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis. Make sure the router is attached to a proper earth ground.
3. Press the red tabs on the ejector handles on both sides of the Routing Engine faceplate.
4. Flip the ejector handles outward to unseat the Routing Engine.
5. Grasp the Routing Engine by the ejector handles and slide it about halfway out of the chassis.
6. Place one hand underneath the Routing Engine to support it and slide it completely out of the chassis.
7. Place the Routing Engine on the antistatic mat.

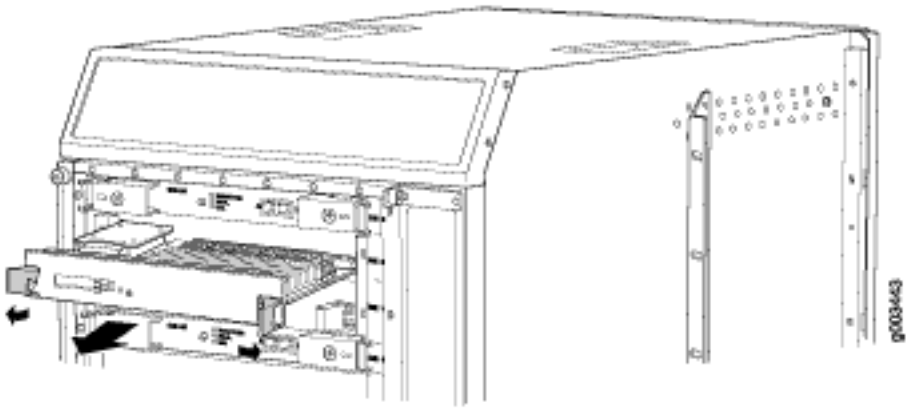

Figure 3-1: Removal of RE from an M320 Chassis

3.3 Removal of the FLASH Disk from the RE

Once the RE has been removed from the Host Subsystem, locate the compact FLASH and hard disk drive on the top side of the RE. The FLASH disk is a compact FLASH module. It is located opposite the hard drive. It is secured in place by a plastic screw or clip.

To remove the FLASH disk from the RE, complete the following steps:

1. Use a screwdriver to remove the plastic retaining screw.
2. Use the needlenose pliers to gently grasp the compact FLASH disk and slide it out of the connector.
3. Place the FLASH disk on the antistatic mat.

3.4 Removal of the Hard Disk Drive from the RE

The hard drive is secured in place by four screws that are removed from the underside of the RE. There may be a plastic cover on the bottom of the RE that must first be removed before the hard drive screws can be accessed. In addition, a power cable and SATA data cable connect the hard disk drive to the circuitry on the RE.

To remove the hard drive from the RE, complete the following steps:

1. The power and SATA cables are connected to the hard disk drive by a common plastic clip. Use needlenose pliers or a small flat blade screwdriver to gently pry the clip from the hard disk drive.
2. Turn the RE upside down and remove the four hard disk mounting screws with a small Philip's head screwdriver. Use caution as the last mounting screw is removed, as there is nothing else to secure the hard disk drive to the RE.
3. Place the hard disk drive on the antistatic mat.

This completes the sanitization process for the RE. Repeat the process defined in Section 3 for each RE installed in the chassis.

Please contact a Juniper Networks representative if there are any problems removing any of the NV components discussed in the previous section.