

Sanitization of Juniper Networks Field Replaceable Units (FRUs) for M40e, M10i, and selected Physical Interface Cards

Version 2.0

1.0 Field Replaceable Units in a CLASSIFIED Network Environment

Component failure is handled in the manner described in this document for the Lowest Replaceable Units (LRU) / (FRU). All chassis components are considered CLASSIFIED once they touch a CLASSIFIED network until it is determined that they contain no non-volatile memory. On board storage elements of all forms found in M40e chassis, M10i chassis, and selected Physical Interface Cards are identified in Table 1. Application Specific Integrated circuits (ASICs) critical to the functionality of the chassis are also listed in Table 1 for reference.

Note: LRU is recognized Vendor-C terminology and is included for the sake of clarity.

Table 1: M40e and M10i FRUs

Chassis Type	FRU Component (Description)	Part Number	Processor / Memory Component	Storage Type / Chip Type
M40E	M40e Base Chassis	M40eBASE-AC	EEPROM (stores serial#, Chassis Rev level)	Non-Volatile, Electrically Erasable Programmable Read Only Memory
	Switching Forwarding Module (SFM)	SFM-16-BB (SFM-16-R)	Internet Processor II ASIC	Application Specific Integrated Circuit
			Distributed Buffer Manager ASIC (x2)	Application Specific Integrated Circuit
			EEPROM (stores serial#, SFM Rev level)	Non-Volatile, Electrically Erasable Programmable Read Only Memory
			16MB SSRAM (forwarding table storage)	Volatile, Synchronous Static Random Access Memory
			PowerPC 603 CPU + 64MB DRAM	Volatile, Dynamic Random Access Memory
	Routing Engine, 600Mhz, 2GB,	RE-600-2048-BB (RE-600-2048-R)	2048MB SDRAM	Volatile, Synchronus Dynamic Random Access Memory
			128MB Compact Flash	Non-Volatile, Read/Write storage
			30GB Hard Drive	Non-Volatile, Read/Write storage
			Removable PCMCIA Card 128MB	Non-Volatile, Removable, Read/Write storage
			EEPROM (stores serial#, RE Rev level)	Non-Volatile, Electrically Erasable Programmable Read Only Memory
	Micellaneaous Control Subsystem (MCS)	MCS (MCS-R)	19.44Mhz Clock Generator (SONET Clocking)	Clocking component (no memory)
	Packet Forwarding Engine Clock Generator (PCG)	PCG	125Mhz Clock Generator (PFE Clocking)	Clocking component (no memory)
			EEPROM (stores Serial#, PCG revision level)	Non-Volatile, Electrically Erasable Programmable Read Only Memory
	M40e Flexible PIC Concentrator for M20/M40 PICs - Enhanced	M40e-FPC1	I/O Manager ASIC (x2)	Application Specific Integrated Circuit

		Packet Director ASIC (x2)	Application Specific Integrated Circuit	
		64MB DRAM (packet memory pool)	Volatile, Dynamic Random Access Memory	
		2MB SRAM (tied to I/O Manager ASIC)	Volatile, Static Random Access Memory	
		PowerPC 603 CPU + 64MB DRAM	Volatile, Dynamic Random Access Memory	
		EEPROM (stores Serial#, FPC revision level)	Non-Volatile, Electrically Erasable Programmable Read Only Memory	
	2-port ATM2 OC-3/STM1 PIC, SM IR	PB-2OC3-ATM2-SMIR	64MB SDRAM (ATM SAR Storage)	Volatile, Synchronus Dynamic Random Access Memory
	1-port ATM2 OC-12/STM4 PIC, SM IR	PB-1OC12-ATM2-SMIR	64MB SDRAM (ATM SAR Storage)	Volatile, Synchronus Dynamic Random Access Memory
4 Port DS3 Enhanced ATM PIC, w/cables,	PB-4DS3-ATM2	16MB SDRAM (ATM SAR Storage)	Volatile, Synchronus Dynamic Random Access Memory	

M10I

M10i Base Chassis	M10iBASE-AC	EEPROM (stores serial#, Chassis Rev level)	Non-Volatile, Electrically Erasable Programmable Read Only Memory
Compact Forwarding Engine Board (CFEB)	FEB-M10i-M7i-BB	128MB SDRAM (Packet Memory)	Volatile, Synchronus Dynamic Random Access Memory
		128MB SDRAM (MicroKernel)	Volatile, Synchronus Dynamic Random Access Memory
		8MB SSRAM (Route Lookup)	Volatile, Synchronus Static Random Access Memory
		4MB SSRAM (Control Memory)	Volatile, Synchronus Static Random Access Memory
		EEPROM (stores Serial#, CFEB revision level)	Non-Volatile, Electrically Erasable Programmable Read Only Memory
		512K Boot Flash EPROM (x2)	Non-Volatile, Erasable Programmable Read Only Memory
		Routing Engine, 400Mhz, 256MB	RE-400-256-BB (RE-400-256-R)
20GB Hard Drive	Non-Volatile, Read/Write storage		
256M Compact Flash with PCMCIA adapter (installs in RE)	CF-ADAP-256M-S	Removable PCMCIA Card 256MB removable	Non-Volatile, Removable, Read/Write storage

2.0 Sanitization

The Juniper Networks sanitization procedure is based on common practice for data communications systems deployed in sensitive and/or CLASSIFIED environments. The steps include

1. Identify all dedicated memory components and determine whether they are volatile (loses data after power is removed) or non-volatile (retains data after power is removed)
2. Identify the amount of time necessary for a volatile memory to lose its data
3. Provide procedures for cleaning of all data on non-volatile dedicated memory components
4. Identify any other potential memory locations over 2K in size and determine whether they can be written to directly
5. Provide procedures for erasing all storage areas that can be written to directly
6. Provide procedures for dumping the contents of any storage area over 2K in size regardless of a direct write capability

Items in the above list are addressed by **Table 1**. Each defined FRU Component listed in **Table 1** can be replaced at the customer site if spare parts are available.

2.1 Volatile Memory Components

If any FRUs containing only Volatile Memory space fail, the site must sanitize the FRU by taking it offline and removing it from its chassis and then release the FRU for repair/return processing. Removing power from M10i and M40e components for 36 hours will dump all data from **Volatile** memory

2.2 Non-Volatile Memory Components

To clean data from **Non-Volatile** storage areas it is necessary to first identify what memory components are present in the routing engine. To do this the user should issue the **show system storage** command to view all memory locations on the local routing engine. Output from this command will be similar to the following:

```
[edit]
lab@m40-3-re0# run show system storage
Filesystem      512-blocks    Used    Avail Capacity Mounted on
/dev/ad0s1a      437522    67746    334776    17% /
devfs            32         32         0    100% /dev/
/dev/vn0         22816     22816         0    100% /packages/mnt/jbase
/dev/vn1         77956     77956         0    100% /packages/mnt/jkernel-6.3R1.3
/dev/vn2         20720     20720         0    100% /packages/mnt/jpfe-M160-6.3R1.3
```

```

/dev/vn3          4492    4492     0 100% /packages/mnt/jdocs-6.3R1.3
/dev/vn4          27556   27556     0 100% /packages/mnt/jroute-6.3R1.3
/dev/vn5          9620    9620     0 100% /packages/mnt/jcrypto-6.3R1.3
mfs:152          4064278 8 3739128 0%
/tmp/dev/ad0s1e   48570    10 44676 0% /config
procfs           8      8      0 100% /proc
/dev/ad1s1f      52249814 212192 47857638 0% /var

```

The M10i and M40e can have as many as three forms of storage media on each Routing Engine present in the chassis

1. Flash Drive. This is a non-rotating drive. A copy of the JUNOS operating system and recent configuration files will be present on the Flash Drive. It is identified as **/ad0** in the **show system storage** command output above. Routers with a failed/faulty Flash Drive might have no listings for **/ad0**
2. Hard Drive. This is a rotating drive. A copy of the JUNOS operating system and all archived files will be present on the Hard Drive. This drive is also used to store system log files and diagnostic dump files. It is identified as **/ad1** in the **show system storage** command output above. Routers with a failed/faulty Hard Drive might have no listings for **/ad1**
3. Removable Media. This is a 128M PCMCIA card which can be inserted into a slot on the routing engine of both the M10i and M40e. The Removable Media card as it is shipped from the factory contains a copy of the JUNOS operating system. Other files can be written to Removable Media cards through the CLI therefore it is also subject to the sanitization procedures described herein.

The procedure for sanitizing the Flash Drive and Hard Drive on a Routing Engine are as follows:

1. Delete all **.conf** files in the **/config** directory. This directory contains the current operational router configuration as well as the last three committed configurations.
2. Delete the **/alt/config** directory if it exists. This is backup copy of the **/config** directory structures.
3. Delete the contents of the **/var/db/config** directory. This directory holds previously committed configurations.
4. Delete all sub-directories found under the **/var/home** directory. This contains home directories for each user configured to access the router and will include any save files created by the user.
5. Delete all files located in the **/var/tmp** directory. If sampling has been configured then packet header information, include source and destination IP addresses, will be contained in the sample files stored in this directory.
6. Delete all files located in the **/var/log** directory. If logging has been enabled then sensitive information (such as protocol, performance, and fault information) may be contained in the log files stored in this directory.

Some logging is enabled by default and cannot be disabled on an M10i and M40e

If circumstances permit a reboot of the chassis, then it is possible to reformat the hard drive and wipe all content from the flash by booting the Routing Engine with a PCMCIA card containing the **jinstall** version of the JUNOS operating system inserted in the RE PCMCIA slot. **This will probably be the preferred method of sanitizing a Routing Engine if circumstances permit.**

An alternative to cleaning the non-volatile storage areas would be to remove these devices from the Routing Engine. It is recommended that these components only be removed in accordance with instructions provided by Juniper Networks. Improperly removing the subcomponents of a recognized FRU component may void the warranty.

Once an FRU is sanitized it can be sent to a designated Juniper Networks Technical Assistance Center (JTAC) for repair or replacement. Depending on the terms and conditions of the support agreement component repair and return time may vary. In mission-critical communications situations it is highly recommended that a shelf spare be kept at the deployment site.

Approval for the return will be granted by JTAC to either a customer representative or the assigned Juniper Networks Resident Engineer(RE) or Systems Engineer(SE) prior to shipment to JTAC.

2.3 Handling of Removable Media

Removable Media cards are shipped with all M40e chassis and may also be shipped with M10i chassis as dictated by site configuration requirements. They will contain a **jinstall** version of the JUNOS operating system and are to be used as a means of recovering the operating system in the event of a catastrophic failure. If they are installed in the Routing Engine during a boot sequence they become the boot media. This behavior is comparable to that of a PC's Install floppy.

Many aftermarket PCMCIA cards are also compatible with the M10i and M40e Routing Engine card slot. Other/Spare cards can be used to archive files (such as log or sample files) and remove them from the router for remote storage. Other/Spare cards can also be used to introduce files and directory structures into the router. Removable Media cards are quite similar in nature and volatility to common 1.44MB floppy disks and CDRs and as such must follow existing and documented site procedures for removal from a CLASSIFIED environment.

2.4 Loss of Communication with an FRU

An alternative to cleaning the non-volatile storage areas would be to remove these memory locations from the Routing Engine board. It is recommended that these components only be removed in accordance with instructions provided by Juniper Networks. Improperly removing the subcomponents of a recognized FRU may result in accidental destruction of the component and/or the FRU and may void the warranty. This procedure may become a necessary “last resort” in the event of loss of communication with an FRU containing Non-Volatile memory.

In the event that it is impossible to communicate with a faulty FRU containing Non-Volatile storage space (the Routing Engine) or that it is impossible to delete file and directory structures as described in section **2.2 Non-Volatile Memory Components**, in other words if sanitization is not possible, the site should request a “Destruction Letter” be sent by the assigned RE or SE to JTAC documenting the circumstances of the situation. Destruction of the FRU should only commence after:

1. The site has contacted the assigned RE or SE
2. The RE or SE has opened a ticket with JTAC and been granted an Return Materials Authorization (RMA) number containing express consent for removal or destruction of some or all of the failed FRU
3. All parties are aware of the situation

The site is to ensure that this process is coordinated with the RE or SE. The RE or SE is to ensure that this process is coordinated with JTAC. JTAC will provide the site with a replacement FRU in accordance with the established service agreement for the FRU.

Note that the destruction policy only applies to components listed in Table 1 as having Non-Volatile Memory. All other faulty FRUs and router chassis are to follow normal RMA procedures as prescribed by JTAC.