PA-5000 Series SSD Storage Options

Configuring RAID and Disk Backup

 https://paloaltonetworks.com/documentation

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Contents

Overview

All PA-5000 Series firewalls are equipped with two slots for Solid State Drives (SSDs). These models ship standard with single or dual 120GB or 240GB SSD drives, which are field upgradeable. The PA-5000 Series supports the following configurations of SSD storage devices:

- Single 120 GB SSD
- Dual RAID 120GB SSDs
- Single 240 GB SSD
- Dual RAID 240GB SSDs

WARNING: Palo Alto Networks has determined that there are long-term reliability issues with running RAID with mixed drive models, even if those drives are from the same vendor. Do NOT configure a system in RAID mode with different SSD drive models. If you are already running a system in RAID mode with different SSD part numbers, please contact support for assistance.

If you are installing an SSD that is mismatched (not the same size as the existing SSD), you must use a console connection to perform this procedure because you will be required to go into maintenance mode to configure the RAID. In addition, if you install a second SSD that has an OS on it, or if you interrupt the bootup process too early, you will need to go to maintenance mode to configure RAID. After entering maintenance mode, you will select the primary boot drive as the existing drive. After selecting the primary boot drive, the system will then initialize the second drive in the RAID pair along with the original drive. For more details, see "Configuring RAID with Mismatched Models of SSDs".

SSD Upgrade Procedure

This document covers the different upgrade options and procedures that are available. RAID 1 will be enabled on the systems with two SSDs.

Important:

1. The SSD drives are not hot swappable. Ensure that the firewall is powered off before installing or removing drives.

2. This equipment may be affected by electrostatic discharge. ESD reduction procedures (wearing a wrist strap) shall be implemented during the installation and maintenance of this equipment.

3. Using mismatched drive models will result in the system booting into maintenance mode. Palo Alto Networks only supports using mismatched drives during the upgrade steps outlined in the section "Configuring RAID with Mismatched Models of SSDs".

4. While the RAID set is building or rebuilding, logging performance may be degraded. Palo Alto Networks recommends that you complete these steps during a maintenance window.

Configuring RAID with Two 120GB SSDs

This procedure covers migration steps to upgrade a PA-5000 Series device from a single SSD to a dual SSD configuration. This section also covers the case of a system being migrated from 1 to 2 drives and the scenario where a RAID configured system experiences a drive failure.

Note: To determine the drive model of the SSD currently installed in your firewall, run the command **show system raid detail**. Make sure that the new drive that will be installed in the RAID configuration has an identical model number.

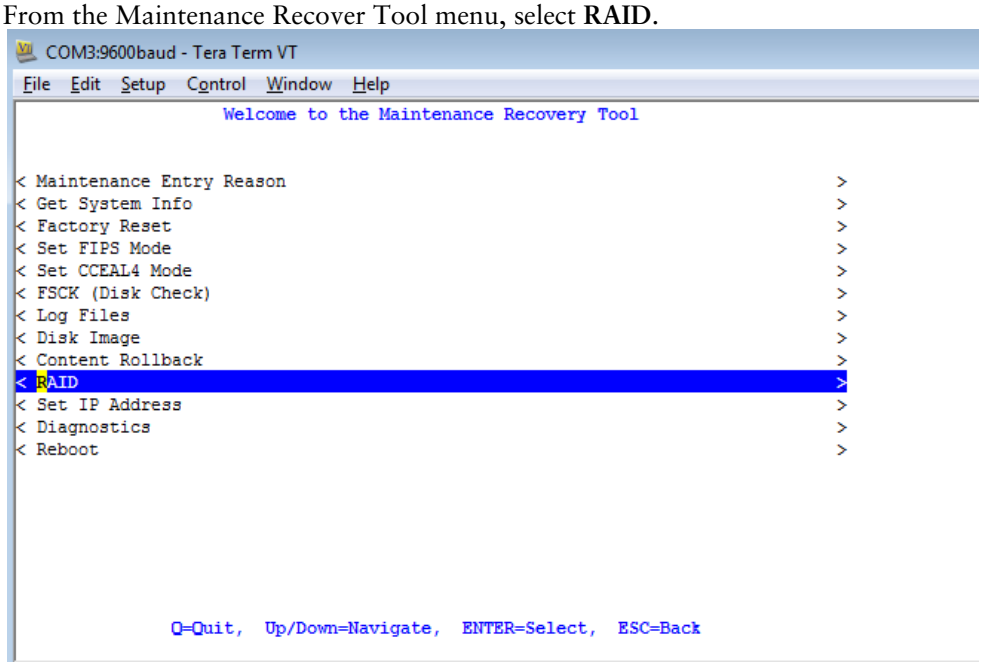
Configuring RAID with Matching SSD Models

In order to configure RAID with standard 120GB SSDs, power off the system, insert the second drive into the open disk bay and power on the system. The system automatically puts the drives into a RAID 1 pair and performs the data mirroring in the background if the drive models match. This process can take up to an hour or more. Use the command `show system raid detail` to view the SSD status.

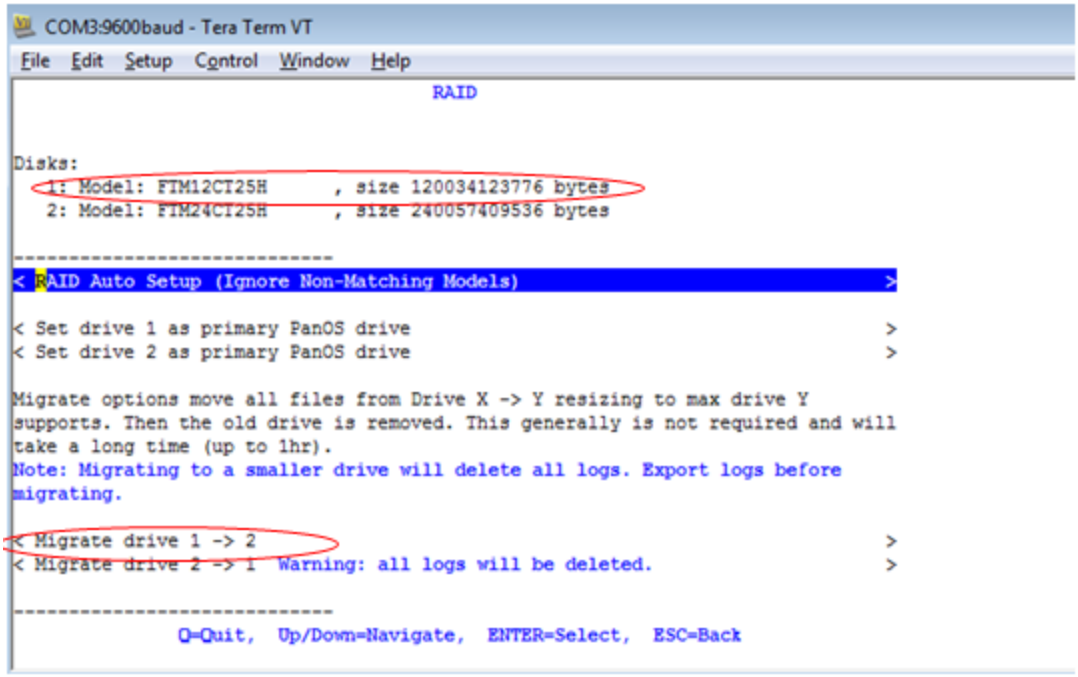
Configuring RAID with Mismatched Models of SSDs

If you do not have an identical drive, or need to order replacement/additional drives, Palo Alto Networks now ships all spare SSD drives for the PA-5000 in matching pairs. Part number **PAN-PA-5000-SSD-120-D** allows you to upgrade to RAID regardless of the current drive model.

To upgrade the system, power off the system, open the drive bay, and insert one of the new blank drives into the second drive bay. Close the cover and power on the system. The system boots up and recognizes the second drive. The system will recognize mismatching drives and will boot into maintenance mode. If the system does not boot into maintenance mode automatically, you can run the following command after logging into the firewall: `debug system maintenance-mode`. You can also reboot the firewall and when you see the message "Autoboot to default in 5 seconds. Enter "maint" to boot to maint partition", type MAINT within 5 seconds to enter maintenance mode.
From the Maintenance Recover Tool menu, select **RAID**.

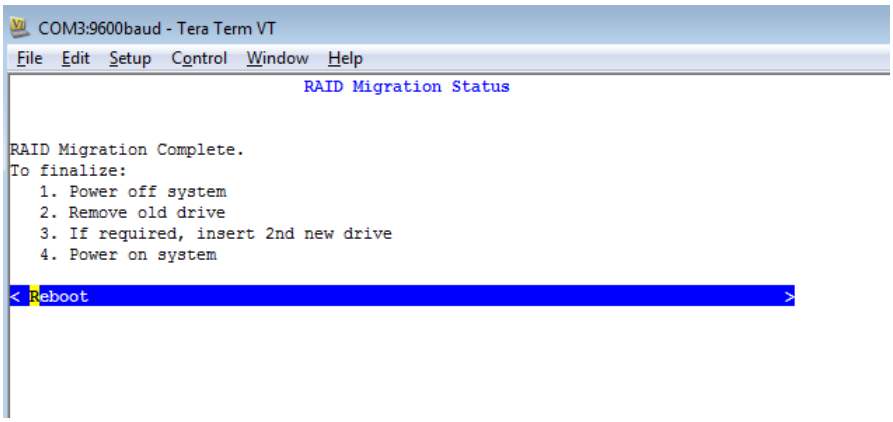


To begin the process, choose the **Migrate drive 1 -> 2** option (assuming the new drive is installed in drive bay 2). This will initiate the migration process.



Note: If the drive installed matches the existing drive, the system will NOT boot into maintenance mode and will automatically put the second drive into the RAID array and begin the mirroring process.

The RAID migration status screen shown below is displayed once the migration is completed.



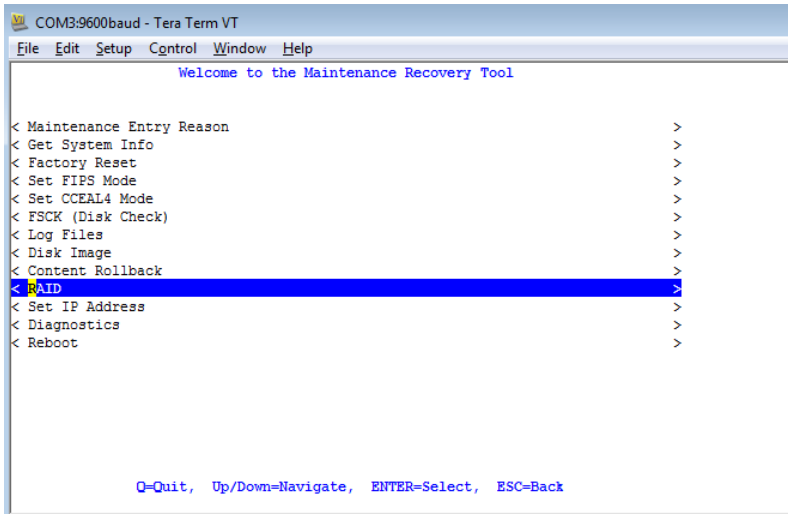
After the data migration is completed, power off the system and remove the old drive with the mismatched model number (120GB SSD). The new 120GB SSD can be left in the second disk bay or moved to the primary bay. Power on the system to verify system functionality.

In order to complete the RAID configuration, power off the system, open the drive bay cover and insert the matching second drive into the available drive bay. Close the cover and power on the system. The system automatically performs the data mirroring in the background. Use the command **show system raid detail** to view the SSD status.

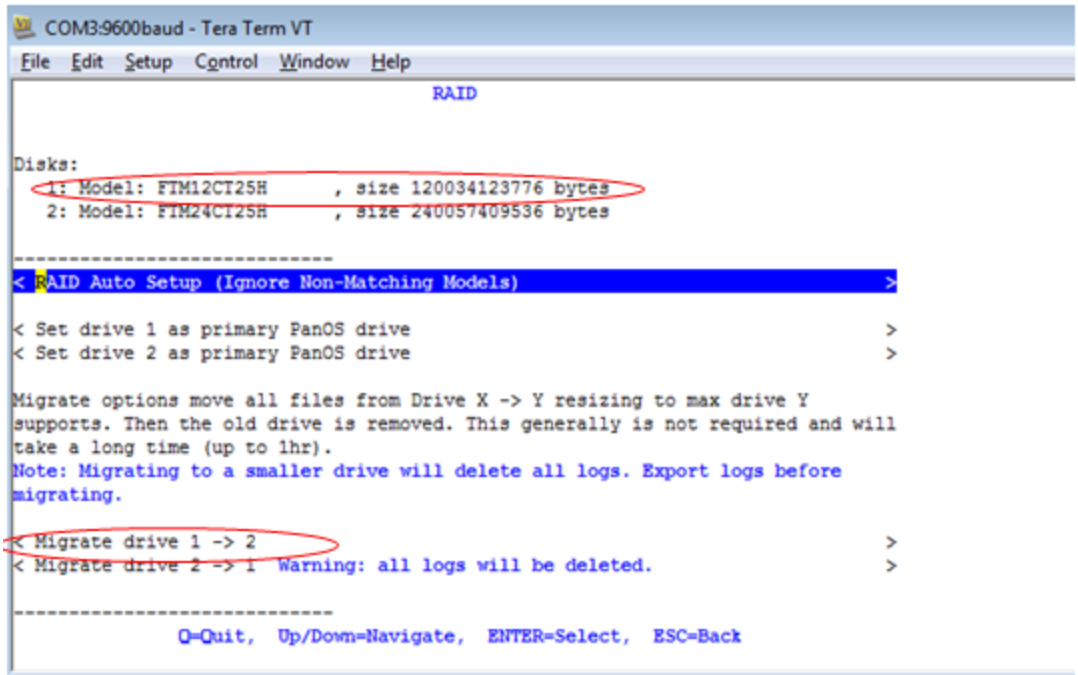
Upgrading from a Single 120GB SSD to a Single 240GB SSD

Note: Do not leave the system running with mismatched drives (120GB and 240GB) in production. Please plan your maintenance time to allow for the completion of this step. Depending on the size of the logs on the original drive, this process may take up to an hour or more.

In order to upgrade from a single 120GB SSD to a single 240GB, power off the system open the drive bay, insert the blank 240GB drive into the second drive bay. Close the cover and power on the system. The system boots up and recognizes the second drive. The system will recognize mismatching drives and will boot into the maintenance mode screen. From the menu option select **RAID**.

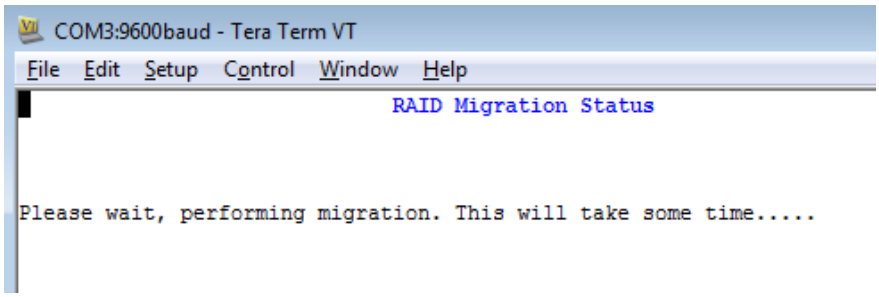


The following screen shows the information about the available SSD and data migration options.

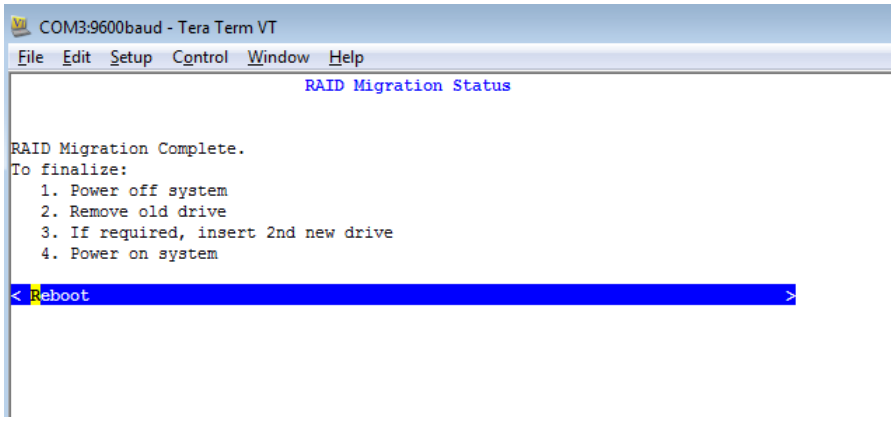


In order to migrate from a 120GB SSD to a 240GB SSD, choose the **Migrate drive 1 -> 2** option.

This will initiate the migration process.



The RAID migration status screen shown below is displayed once the migration is completed.



When the migration is completed, power off the system and remove the drive with the mismatched model number (120GB SSD). The new 240GB SSD can be left in the second disk bay or moved to the primary bay. You can then power on the system to verify the operation. Once the system boots up, you can verify the disk space to confirm the 240GB SSD is in use with the **show system disk-space** command. The output will be similar to the following:

```
admin@PA-5060> show system disk-space

Filesystem            Size  Used Avail Use% Mounted on
/dev/md2              3.8G  1.2G  2.5G  32% /
/dev/md5              7.6G  562M  6.6G   8% /opt/pancfg
/dev/md6              3.8G  401M  3.2G  11% /opt/panrepo
tmpfs                 1.8G   37M  1.7G   3% /dev/shm
/dev/md8              198G  189M  188G   1% /opt/panlogs
```

Configuring RAID with Two 240GB SSD Drives

The firewall must use identical SSD drives in a RAID configuration. The part number **PAN-PA-5000-SSD-240-D** can be purchased, which provides two identical drives. Please follow the steps provided in the section "Upgrading from a single 120GB SSD to a single 240GB SSD" to migrate data from 120GB SSD to 240GB SSD. You can then build the 240GB RAID set with the second 240GB SSD drive.
First, power off the system, insert the second drive into the open disk bay and then power on the system. The system automatically puts the drives into a RAID 1 pair and performs the data mirroring in the

background if the drive models match. This process can take up to an hour or more. Use the command **show system raid detail** to view the SSD status.

Swapping Drives between Firewalls

This section describes the sequence of steps required to swap SSD from one PA-5000 Series firewall to another. The firewalls must be powered off before you perform this procedure. In this example, we assume the drives are moved from firewall#1 to firewall#2.

1. Power off both firewalls
2. Remove all SSD drives from firewall #1
3. Insert all SSD drive to firewall #2
4. Power on firewall #2
5. Firewall #2 may reboot once during the first boot with the new drives
6. Firewall #2 will come up to its normal login prompt
7. Perform license migration for the new serial number. Contact Palo Alto Networks support for migration information.

Note: Drives should always be moved as a group. If the original system has two drives, they should be moved together.

Replacing a Failed SSD in a System with Only 1 SSD

If a firewall with a single SSD has a drive failure, a new SSD with the PAN-OS image must be installed. You can order the imaged drive using the part number **PAN-PA-5000-SSD-120-IMG** or **PAN-PA-5000-SSD-240-IMG** (depending on whether the system contains a 120GB or 240GB SSD). The sequence of steps required to replace the single failed SSD is listed below:

1. Power off the firewall.
2. Remove the failed SSD drive from the firewall.
3. Insert the imaged SSD drive into the firewall.
4. Power on the firewall.
5. Upgrade or downgrade the system in order to return to your previous version of PAN-OS.
6. Restore your configuration from your backups.

Revision History

Date	Revision	Comment
December 3, 2014	C	In the section "Configuring RAID with mismatched Models of SSDs" it states that if a mismatched drive (SSD drive of a different type) is installed, the system will reboot into maintenance mode. The system may not always boot into maintenance mode, so we added information on how to boot into maintenance mode. Note: Doc revision is still Rev C in order to accommodate revision history for the printed version. Palo Alto Networks now supports multiple drives in the PA-5000 Series firewall.
May 22, 2012	B	Improved the depth of content.