

6000 Series All Flash Array Release Notes For Release V6.3.3

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violin
MEMORY

Introduction

Release V6.3.3 is a maintenance release to vMOS 6. It includes enhancements to the array firmware (A6.3.3) and the Memory Gateway software.

Resolved Issues in V6.3.3 and A6.3.3

- **25685/28678** I/O stalled for 30 seconds after bringing down the third VCM. The message “FATAL vt_allocator_allocate(): list of free 384 byte bufs is empty” is reported in the log.
- **27924/28066** A VIMM is reported to be unexpectedly powered off although it is still on.
- **28517** Reduce the time need to perform firmware upgrades.
- **28780** Improved handling of VCM CRAM errors that includes an automatic VCM reload in cases where a CRAM error is detected.
- **29432** Insertion of wrong VIMM type causes other VIMMs to be isolated.
- **29614** The error “/opt/violin/bin/system_image_cmds.sh: line 1091: [: !=: unary operator expected” is encountered during upgrade.
- **21738/28680** Resolved a race condition in the iSCSI code, which can cause a Linux kernel Oops and subsequent CPU stalls and NMIs.
- **24794/29010** Allow rename of exported LUN.
- **27351/29008** On Manage LUNs, show ‘1024’ on drop-down, and display all LUN names in confirmation.
- **27485/29018, 27439/29019, 27423/29020, 27524/29022** Export action performance improvements.
- **26701/27263/27583** Resolved issue exporting LUNs.
- **27419/29014** REST API enhancements and addition of export2 action.
- **28005/29028** Snapshot unexport was not properly reported.
- **28070/29029** Issue with having LUNs exported to all and also specific initiators.
- **28860/29030** Time of the second and subsequent exports to specified initiators increase dramatically.
- **28819** Security Vulnerability CVE-2007-6750 (Slowloris denial of service attack) in Apache httpd.

What's New in V6.3.3

- **28434/28681** New SNMP/STMP events for various Fiber Channel (FC) errors.

The following Fiber Channel Errors are monitored:

Link failure

Fibre Channel connectivity when the port was broken. This type of error can occur when the system connected to the port is restarted, replaced, or serviced and the Fibre Channel cable connected to the port is temporarily disconnected. It could also indicate a faulty connector or cable. Link failures result in degraded performance of the Fibre Channel port until the failure is fixed.

Loss of sync

A synchronization loss error was detected on the Fibre Channel link. This type of error can occur when the system connected to the port is restarted, replaced, or serviced and the Fibre Channel cable connected to the port is temporarily disconnected. It could also indicate a faulty connector or cable. If a synchronization loss error persists, it can result in a link failure error.

Loss of signal

A loss of signal was detected on the Fibre Channel link. This type of error can occur when the system connected to the port is replaced, or serviced and the Fibre Channel cable connected to the port is temporarily disconnected. It could also indicate a faulty connector or cable. If a loss of signal error persists, it can result in a link failure error.

CRC error

A Fibre Channel frame was received with cyclic redundancy check (CRC) errors. This type of error is usually fixed when the frame is retransmitted. This type of error is usually recoverable and does not degrade system performance, unless the error persists and data cannot be relayed after retransmission.

Primitive sequence protocol error

A primitive sequence protocol error was detected. A primitive sequence is an ordered set that is transmitted and repeated continuously to indicate specific conditions within the port. The set might also indicate conditions that are encountered by the receiver logic of the port. This type of error occurs when an unexpected primitive sequence is received.

Transmission word count

A bit error was detected. A transmission word is the smallest transmission unit that is defined in Fibre Channel. This unit consists of four transmission characters, 4 x 10 or 40 bits. This type of error can include code violations, invalid special code alignment, and disparity errors.

Resolved Issues in V6.3.2.3

- **28327**: Support ALUA/Preferred Port for snapgroups
- **28323**: Resolved issue with exporting snapshots to InfiniBand initiators
- **28215**: Improved FPM resiliency
- **28486/28189/28177/28098/28056/27778/27776**: Resolved Leap Second issues

Note: If NTP is not enabled per the “`show ntp`” command, the timezone file must be updated manually by changing the timezone to a different setting and then back to the original setting using the “`clock timezone`” command.

- **28110:** Corrected web UI reporting for free/used container space
- **28055:** Resolved issue with offline rename of LUNs
- **27980/26734:** Improved immediate upgrade resiliency
- **27632:** Resolved issue where HBAs were showing as powered off while targets still online
- **27617:** Resolved issue where callhome emails were not sent
- **27611:** Improved PCM resiliency
- **27582:** Disable power off HBAs from CLI
- **27553/27554:** Removed superfluous CLI warnings in the messages log
- **27525:** Resolved disabling of unexpected-cluster-leave email event after cluster upgrade
- **27320/27318:** Resolved GHOST gblic Vulnerability (CVE-2015-0235)
- **27272/27274:** Resolved OpenSSL Vulnerability (Security Advisory 01-08-15)
- **27074/27076:** Resolved NTPD Vulnerabilities (US-CERT VU#852879)

Known Issues

Array Firmware

- **21596:** Large number of call home events could be triggered during array NDU

Workaround:

Disable VIMM State Change alerts during array NDU. On Master MG:

```
# no email notify event vimm-state-change
```

- **24218:** NDU can stall if L2P_ERASED CPL_IRQ is detected during NDU.

Workaround:

Restart the VCM where the NDU is stalled using the following commands:

```
# no array modules id vcm-x enable force
# array modules id vcm-x enable
```

NDU will resume soon after the VCM is brought back to service.

- **24274:** The “show story boot vcm-a/b” command returns valid data, but only if the command is issued on the standby ACM. This is due to syslog cross syncing issues on ACMs after a reboot. When one ACM reboots, the logs are only recorded for the ACM that is “alive.” The ACM eventually comes back and joins the cluster as the standby, but all the log messages are only seen on the previous standby.
- **24295:** “Hardware error count increased on Violin Array” callhome e-mails may be generated during an array NDU without any real failures.
- **24454:** In rare occurrences, a non-disruptive upgrade (NDU) can abort if vcm-d takes longer to boot.

Workaround:

1. Wait for vcm-d to go to active state.
2. Continue the aborted NDU by issuing the following command:

```
# cluster continue staged-upgrade
```

- **24479:** When a Memory Gateway (MG) is replaced with a MG running 5.2.0, the “show array modules” command on release 6.3.x may not show an IP address for the MG. Instead of booting with an expected address of 169.254.1.101(MG-A) or 169.254.1.102(MG-B), the MG comes up with a random 169.254.x.x Zeroconf IP address.

Workaround:

1. From the ACM Master, run ping -b 169.254.255.255 to send broadcast pings. If the replaced MG internal IP address is configured with a Zeroconf address, it will show up as a reply to the broadcast ping. ACMs and MGs are normally configured with pre-defined internal IP addresses: 169.254.1.10 (ACM-A), 169.254.1.11 (ACM-B), 169.254.1.101 (MG-A), 169.254.1.102 (MG-B). As a result, the zeroconf address can be easily recognized (it is a 169.254.x.x address that is not one of the pre-defined ACM or MG internal IP addresses).

2. Log in to the MG using its zeroconf IP address and configure/upgrade as required.

Memory Gateway Software

- **22996:** The Array Web interface does not have an upgrade option. This option was disabled in a previous release because a unified upgrade was introduced in release 6.2.0.

Workaround: Use the array CLI commands to upgrade the array.

- **24310:** Following an “fms admit” of a replacement Memory Gateway, the replaced MG may fail to upgrade.

Workaround:

1. Issue the following commands on the replacement MG:
image fetch <image matching master mg image>
image install <image matching master mg image>
reload

The replacement MG will come up with the new image running.

2. Perform an image remanufacture to the same image:
image remanufacture <image name>.img
3. Wait until the image remanufacture is done.
4. Log in to the replacement MG.
5. When logged in you will be prompted with the initial configuration wizard. Enter the required configuration data. The replacement MG will join the cluster.

Upgrading the System

Follow the instructions in this section carefully to upgrade the All Flash Array. It is recommended that you schedule system downtime to upgrade the array. Contact Violin Memory Customer Support if you need assistance.

Supported Upgrade Paths

The following table identifies the supported *starting* versions for both the Memory Gateway software and the array firmware from which to upgrade to V6.3.3. If your array is running versions prior to those listed below, you must first upgrade to the starting version (Gateway *and* Array) before continuing.

Previous software versions and upgrade instructions are available from Violin Memory Customer Support at <http://www.violin-memory.com/support/>

Starting Gateway Version	Starting Array Version	Upgrade Steps
V6.0.x/V6.2.x	A6.0.x/A6.2.x	Immediate upgrade to V6.3.3
V6.3.0.x	A6.3.0.x	Upgrade gateways (either NDU or immediate) to V6.3.3 and then upgrade the array to A6.3.3 (either NDU or immediate)
V6.3.1	A6.3.1	Upgrade gateways (either NDU or immediate) to V6.3.3 and then upgrade the array to A6.3.3 (either NDU or immediate)
V6.3.2/V6.3.2.x	A6.3.2/A6.3.2.x	Upgrade gateways (either NDU or immediate) to V6.3.3 and then upgrade the array to A6.3.3 (either NDU or immediate)

IMPORTANT: If your array requires an upgrade to meet the starting versions shown above, you must complete those upgrades before continuing.

Showing Current Software Versions

Follow these steps if you are unsure of the current software versions running on the array and the Memory Gateways.

1. Log in to the All Flash Array CLI using the ACM management IP address.
2. Type “show version” at the command prompt. The **current Array firmware version** is shown next to “Product release”.
3. Type “slogin mg-master” to log in to the Memory Gateway Master.
4. Type “show version”. The **current Gateway software version** is shown next to “Product release”.

Upgrade Overview

Upgrading the All Flash Array requires installation of new array firmware. To ensure a successful upgrade of the array, review this section to understand the steps involved. A typical upgrade will take more than one hour to complete.

Before you begin, verify that both nodes are present and online by typing the “show cluster global” command from the Master ACM CLI. Both nodes should show “Node State: online”.

1: Download the Software and Firmware

1. Go to <http://www.violin-memory.com/support/>
2. Log in to Customer Support using your Violin Memory Customer Portal user name and password. (Contact Customer Support if you do not have an account.)
3. Click the **Software Downloads** tab.
4. From the 6000 All Flash Array folder, download the software image for release V6.3.3 to a client computer (laptop).

2: Select Which Upgrade Option is Appropriate

You have two options when performing an upgrade to V6.3.3:

- **staged:** Non-Disruptive Upgrade (NDU). This is fully non-disruptive from a host application perspective. **Use this option *only* if the array is running traffic during the upgrade.** Refer to Appendix A for additional details and instructions.
- **immediate:** All components in the array are upgraded simultaneously. While this upgrade option takes less time, it will require application downtime as the array will be offline during the upgrade. Refer to Appendix B for additional details and instructions.

Initializing the All Flash Array

Violin 6264 All Flash Arrays are initialized to support block storage prior to customer delivery. There is no need to initialize this model during first-time configuration.

If you are initializing any other All Flash Array model for the first time, make sure to initialize the correct partition if more than one is available when issuing the “`show media detail`” command from the Master Memory Gateway. See the *Violin 6000 Series All Flash Array Installation Guide* for more information.

Product Documentation

PDF versions of product guides are available for download from the Violin Memory Customer Support portal. Go to <http://www.violin-memory.com/support/> to view and download the most up-to-date product documentation. Occasionally, a guide is updated after the software is released for improvement purposes or to address issues that are discovered. In such cases, an updated version may be available from the Violin Memory Support site.

Non-Disruptive Upgrade (NDU) for MGs, ACMs, VCMs and VIMMs

Non-Disruptive Upgrade Overview

The All Flash Array contains three distinct sets of modules, and as a result, must be upgraded in a staged manner for the system to remain operational during the NDU process.

These are the steps you will be performing to upgrade the system:

1. Upgrade the MGs.
2. Prepare the ACMs, VCMs and VIMMs for the upgrade.
 - a. Check the health of the system.
 - b. Download the image to the ACMs
3. Upgrade the ACMs, VCMs and VIMMs.
4. Check the health of the system.

Note: Performance is slightly reduced during the NDU process as the various modules are upgraded and rebooted.

Downloading the Upgrade Image

Before upgrading the system, download the upgrade image as described below.

1. Go to <http://www.violin-memory.com/support/>
2. Log in to Customer Support using your Violin Memory Customer Portal login and password information. (Contact Customer Support if you do not have an account.)
3. Click the **Software Downloads** tab.
4. From the 6000 All Flash Array folder, download the software image for release V6.3.3 to a client computer (laptop).

Upgrade Sequence

1. **Check Memory Gateway and Array for NDU Readiness:** Log in to ACM Master using the management virtual IP (VIP) address and check upgrade readiness. Log in to the Memory Gateway Master and check upgrade readiness.
2. **Upgrade the Memory Gateway Software:** Log in to ACM Master using the management virtual IP (VIP) address. From the ACM Master, log in to the Memory Gateway Master. Upgrade the Memory Gateway software.
3. **Upgrade the All Flash Array Firmware:** Log in to the Master ACM and then upgrade the firmware. The ACMs, VCMs and then VIMMs upgrade.

Check Memory Gateway and Array Module Upgrade Readiness

Verifying the Upgrade Readiness of the Array Modules

1. Start a terminal application and then use the VIP to log in to the Master ACM. Log in as “admin”. Once the terminal application is started, use the system host name or the ACM management IP address to ensure a direct connection.
2. Type the following at the command prompt to access the CLI’s configuration mode:

```
> enable  
# configure terminal
```
3. Type “slogin mg-master” to log in to the Memory Gateway Master.
4. Type the following at the command prompt to access the Memory Gateway’s configuration mode:

```
> enable  
# configure terminal
```
5. Run the command below to ensure that the Container is HA:

```
# show containers
```

Output should show that the container is ‘HA’.
6. Run the command below to ensure that all of the LUN exports are HA:

```
# show exports
```

Output should show that the each export is ‘HA’

Verifying the Upgrade Readiness of the Array Modules

1. Start a terminal application and then use the VIP to log in to the Master ACM. Log in as “admin”.
2. Enter enable mode using the following command:

```
violin-acm-a [violin: master] > enable
```

3. Type the “show cluster upgrade staged status” command to check the upgrade readiness. If all of the **NDU Prerequisites** are met for a staged upgrade, the following message displays:

```
# show cluster upgrade staged status  
Checking readiness for staged upgrade...  
  
Passed all checks for staged upgrade
```

- If the array passes all of the checks, proceed.
- If the array fails one or more of the checks, remedy the situation and then rerun the “show cluster upgrade staged status” command.

Download the Image to the MGs

1. Establish access from the client computer (laptop) to the Master MG using an Ethernet connection (remote or directly attached).
2. Using SCP from a Linux or Mac OS client, or PSCP.exe (part of the PuTTY package) from a Windows command shell, transfer the .img file to the All Flash Array as follows:

MAC OS or Linux

```
scp <path to file>/<image-name> admin@<MG Master IP>:/var/opt/tms/images/
```

Windows and PuTTY SCP

```
pscp -scp C:\<path-to-file>\<image-name> admin@<MG Master IP>:/var/opt/tms/images/
```

Upgrading the Memory Gateway Software

IMPORTANT: The Memory Gateway software must be upgraded *before* the array firmware.

1. Start a terminal application and then use the VIP to log in to the Master ACM. Log in as “admin”. Once the terminal application is started, use the system host name or the ACM management IP address to ensure a direct connection.

2. Type the following at the command prompt to access the CLI's configuration mode:

```
> enable
# configure terminal
```

3. Type "slogin mg-master" to log in to the Memory Gateway Master.

4. Type the following at the command prompt to access the Memory Gateway's configuration mode:

```
> enable
# configure terminal
```

5. Request the image location from Customer Support.

6. Type the following command to install the new image:

```
# cluster upgrade <image location> staged
```

staged: The cluster is split into two clusters, A and B, with one Memory Gateway in cluster A and the other in Cluster B. The Memory Gateway in Cluster B is upgraded first, followed by Cluster A. While Cluster B is being upgraded, Cluster A provides access to storage, and vice-versa.

After a few minutes, both Memory Gateways will upgrade and then reboot on their own. Several messages will display on-screen during this process. Once the Gateways reboot, the command prompt returns to the ACM master.

7. Type "show array modules type mg detail" to see if the Gateways have booted. The Gateways are powered on if their IP addresses are shown in the output.
8. Log in to the Memory Gateway master once again and then type the "show version" command to verify that the new image is installed on the Memory Gateway.
9. Type "show cluster global" to verify that both Memory Gateways are up and part of the cluster.
10. Log in to the Standby Memory Gateway ("slogin mg-a" or "slogin mg-b") and then repeat steps 7 and 8.
11. Type "exit" to return to the ACM Master.

Upgrading the Array Modules

Follow these steps to perform a staged, non-disruptive upgrade of all of the All Flash Array modules: ACMs, VCMs and VIMMs.

Note: Depending on the All Flash Array model and the type of VIMMs installed, the NDU process will take from 3 to 14 hours. Most of this time is during the VIMM upgrade process.

NDU Prerequisites

All of the following NDU prerequisites are checked by the “`show cluster upgrade staged status`” command. If any of the conditions are not met, a message will display in the CLI output along with a remedy. The system cannot be upgraded until it passes this pre-upgrade step.

1. There must be 2 ACMs, clustered and running the same release version.
2. The array must be a 24-, 32- or 64-VIMM model. Non-disruptive upgrades of 44-VIMM configurations are not supported.
3. All VIMMs must be booted and error-free (i.e., no VIMM alarms must be present).
4. All VCMs must be present, booted and assigned the default set of VIMMs.
5. The VIMM tree must be balanced and no RAID rebuilds can be in progress.
6. No FLASH free operations on any VIMMs can be in progress.
7. The system must be formatted and the dataplane up.
8. The system must have already completed an upgrade to the version that supports non-disruptive upgrades.
9. Both PCMs must be present.
10. All floating spares must be available as spares.
11. There must not be any degraded RAID groups.
12. All VIMMs should report an acceptable health threshold.
13. There must be no VCM or VIMM alarms raised on the array.
14. Internal links must not be degraded.
15. VIMM configs for all VCMs must be optimal and not degraded.
16. All VCMs and VIMMs must be capable of performing an NDU operation.
17. The system must have been scrubbed within the past four days.

Check the Health of the System

1. Log in to the Master Memory Gateway CLI.
2. Type “enable” and then “configure terminal” to enter configure mode.
3. Type the “vdiag” command and then inspect the output, ensuring that there are no errors reported on the Memory Gateways.
4. If alarms are present, clear the alarms before proceeding.
5. Log in to the Master ACM CLI.
6. Type “enable” and then “configure terminal” to enter configure mode.
7. Type the following commands to verify that the array is ready for a staged upgrade:
8. “show alarms”: no alarms should be present.
9. “vdiag”: no errors should be present.
10. “show cluster upgrade staged status”: no errors should be displayed.
11. If alarms are present, clear the alarms before proceeding.

Download the Image to the ACMs

1. Establish access from the client computer (laptop) to the Master ACM using an Ethernet connection (remote or directly attached).
2. Using SCP from a Linux or Mac OS client, or PSCP.exe (part of the PuTTY package) from a Windows command shell, transfer the .img file to the All Flash Array as follows:

MAC OS or Linux

```
scp <path to file>/<image-name> admin@<ACM Master IP>:/var/opt/tms/images/
```

Windows and PuTTY SCP

```
pscp -scp C:\<path-to-file>\<image-name> admin@<ACM Master IP>:/var/opt/tms/images/
```

Upgrade the ACMs, VCMs and VIMMs

1. Start the staged upgrade of the ACMs, VCMs and VIMMs by typing the following command:

```
(config) # cluster upgrade <image-name> staged
```

IMPORTANT: During the upgrade from A6.3.1, there is a pre-check script that is run as part of the upgrade process. If after running the script it is determined that a NDU cannot be completed, contact Violin Memory Customer Support for assistance upgrading the array.

This pre-installation check is not required for disruptive (immediate) upgrades or arrays currently running A6.3.0.x.

Running the Pre-install Check

During the NDU, a pre-check script is run automatically to detect any issues which could impact the upgrade:

```
2014-11-13 15:49:15: Executing pre-install script
```

```
2014-11-13 15:49:15: pre-install: pre-install started, log to be saved in
/var/tmp/pre-install_2014-11-13_154915.log ...
```

```
2014-11-13 15:49:15:
```

```
2014-11-13 15:49:15: Pre-install check done successfully, continuing with
upgrade
```

Contact Customer Support for assistance if you see any error messages.

The ACMs are upgraded in approximately 10 minutes.

Caution: The CLI session must remain open while the ACMs are upgraded. Do not disconnect or type Ctrl+C during the ACM upgrade. Doing so will terminate the upgrade.

Once the ACMs have been upgraded, they will reboot one after the other, starting with the standby. When the Master ACM reboots, the current CLI session is automatically disconnected.

1. Log in to the Master ACM to verify that the VCM upgrade process is occurring by typing the “monitor upgrade” command:

```
violin-acm-a [: master] # monitor upgrade
Press control-C to return...
VCM a is upgrading
VCM b is upgrading
VCM c is upgrading
VCM d is upgrading
vcm-a 1: 2013-09-01 09:03:10 [3742] Copying /opt/violin/libexec/vcm_x4ab.upg
to 169.254.1.20 ...
vcm-a 2: 2013-09-01 09:03:39 [3742] Verifying image on VCM at 169.254.1.20 ...
vcm-b 1: 2013-09-01 09:03:10 [3771] Copying /opt/violin/libexec/vcm_x4ab.upg
to 169.254.1.30 ...
vcm-b 2: 2013-09-01 09:03:41 [3771] Verifying image on VCM at 169.254.1.30
...
...
vcm-a 11: 2013-09-01 09:11:55 Reboot triggered. ETA for renewed
communications is 5 minutes ...
Any upgraded VCMs have now finished rebooting.
Waiting for about 2 minutes for VCMs to start staged upgrade of VIMMs...
Press control-C to return...
```


The VCMs are upgraded in approximately 20 minutes.

2. Once the VCMs are upgraded, verify that the VIMM upgrades occur by typing the “`monitor vimm-upgrades`” command:

```
violin-acm-a [: master] # monitor vimm-upgrades
Press control-C to return...

Staged upgrade of VIMMs starting...

2014-06-01 09:34:51: vcm-a starting firmware upgrade of VIMMs
2014-06-01 09:34:52: vcm-a completed firmware upgrade of VIMMs
```

Note: The “`monitor upgrade`” command by default shows the VIMM upgrade process.

2. Once all of the VIMMs are upgraded, type the “`show vimm version detail`” command to ensure that all VIMMs are running the new version:

```
violin-acm-a [: master] # show vimm version detail
Vimm Firmware Version ( Date )           Control Plane Version ( Date )
-----
00      6.3.1.2 ( Aug  5 22:19:00 2014 )   6.3.1.1 ( Apr 28 16:36:00 2014 )
01      6.3.1.2 ( Aug  5 22:19:00 2014 )   6.3.1.1 ( Apr 28 16:36:00 2014 )
02      6.3.1.2 ( Aug  5 22:19:00 2014 )   6.3.1.1 ( Apr 28 16:36:00 2014 )
03      6.3.1.2 ( Aug  5 22:19:00 2014 )   6.3.1.1 ( Apr 28 16:36:00 2014 )
```

3. Check the health of the system once again:
 - a. From the Master ACM CLI, type the following commands:
 - “`show alarms`”: no alarms should be present.
 - “`vdiag`”: no errors should be present.
 - b. From the Master Memory Gateway CLI, type the following commands:
 - “`vdiag`”: no errors should be reported on the Memory Gateways.

Relevant CLI Commands

The following table shows the commands that can be used with the procedures in this document. See the *Violin Memory Command Line Interface Reference* for more information on using these and other CLI commands.

Command	Meaning
Memory Gateway Staged Upgrade Commands	
<code>show version [concise]</code>	Display the version information of the Memory Gateways.
<code>cluster upgrade <URL> staged</code>	Attempt to start a non-disruptive upgrade. If prerequisites for NDU are not met, the command is rejected with an appropriate error message, which provides guidance for correcting the error.
<code>cluster continue staged-upgrade</code>	Resume the staged upgrade process from the point of discontinuation.
<code>cluster recover staged-upgrade</code>	If NDU is aborted due to some failure, this command recovers the cluster after an aborted staged upgrade. This command should be run individually from both Memory Gateways.
<code>cluster cleanup staged-upgrade</code>	Clean up any existing staged-upgrade configuration.
Array Staged Upgrade Commands	
<code>show cluster upgrade staged status</code>	Show the status of NDU readiness for the array: display pre-checks for staged upgrade including array scrubbing.
<code>show vimms version [summary detail]</code>	Display version of all VIMMs or a summary of VIMMs running different versions.
<code>cluster upgrade <URL filespec> staged</code>	Attempts to start a non-disruptive upgrade. If the NDU prerequisites are not met, the command is rejected with an appropriate error indicating what portion(s) of the prerequisites have not been met. Running the command without the staged qualifier will allow for a cluster upgrade, but in a disruptive fashion. The user could also correct the problem first and then try the upgrade again (e.g., replace a failed VIMM, initiate an autobalance, etc.).

<p><code>cluster suspend staged-upgrade</code></p>	<p>Suspend an ongoing NDU. This allows the VCMs to finish with the current VIMM NDU operation and suspend NDU so it does not continue on to the next VIMM. The NDU can be resumed using the <code>cluster continue staged-upgrade</code> command or terminated by a disruptive operation such as a reboot or immediate upgrade.</p>
<p><code>cluster continue staged-upgrade</code></p>	<p>If issued during a NDU that is currently paused due to a system interruption, this command resumes the NDU.</p>
<p><code>monitor upgrade</code></p>	<p>Display the VCM upgrade progress to start with and then switch to VIMM upgrade progress.</p>
<p><code>monitor vimm-upgrades</code></p>	<p>Display progress of staged VIMM upgrade.</p>

Disruptive Upgrade for MGs, ACMs, VCMs and VIMMs

Upgrade Overview

Upgrading the All Flash Array requires installation of new array firmware. To ensure a successful upgrade of the array, review this section to understand the steps involved. A typical upgrade will take more than one hour to complete.

Before you begin, verify that both nodes are present and online by typing the “show cluster global” command from the Master ACM CLI. Both nodes should show “Node State: online”.

Upgrade Sequence

1. **Upgrade the Memory Gateway Software:** Log in to ACM Master using the ACM management IP address. From the ACM Master, log in to the Memory Gateway Master. Upgrade the Memory Gateway software.
2. **Shut down the Memory Gateways:** Following Memory Gateway upgrade, log back into Memory Gateway Master (from ACM Master) and then shut down cluster. Then, power down the Memory Gateways from the ACM Master.
3. **Upgrade the All Flash Array Firmware:** Log in to the Master ACM and then upgrade the firmware. The ACMs, VCMs and then VIMMs upgrade. Network connection is lost during this process. Log back in to the ACM Master to verify ACM upgrade and to view VCM then VIMM upgrade processes.

1: Upgrading the Memory Gateway Software

IMPORTANT: The Memory Gateway software must be upgraded *before* the array firmware.

1. Using SCP from a Linux or Mac OS client, or PSCP.exe (part of the PuTTY package) from a Windows command shell, transfer the .img file to the master Memory Gateway as follows:

MAC OS or Linux

```
scp <path to file>/V6.3.3.img admin@<MG Master IP>:/var/opt/tms/images/
```

Windows and PuTTY SCP

```
pscp -scp C:\<path-to-file>\V6.3.3.img admin@<MG Master  
IP>:/var/opt/tms/images/
```

2. Start a terminal application and log in to the All Flash Array Master ACM as “admin”. Once the terminal application is started, use the system host name or the ACM management IP address to ensure a direct connection.
3. Type the following at the command prompt to access the CLI’s configuration mode:

```
> enable  
#configure terminal
```

4. Type “slogin mg-master” to log in to the Memory Gateway Master.
5. Type the following at the command prompt to access the Memory Gateway’s configuration mode:

```
> enable  
#configure terminal
```

6. Request the image location from Customer Support.

7. Type the following command to install the patch image:

```
# cluster upgrade <image location> staged
```

Or

```
# cluster upgrade <image location> immediate
```

- *staged*: The cluster is split into two clusters, A and B, with one Memory Gateway in cluster A and the other in Cluster B. The Memory Gateway in Cluster B is upgraded first, followed by Cluster A. While Cluster B is being upgraded, Cluster A provides access to storage, and vice-versa.
- *immediate*: The Memory Gateways are upgraded simultaneously. During this process clients are unable to maintain connections to exported LUNs until the cluster is restarted. Although this method of upgrading the cluster is relatively quick, you experience some downtime while the nodes reboot.

After a few minutes, both Memory Gateways will upgrade and then reboot on their own. Several messages will display on-screen during this process. Once the Gateways reboot, the command prompt returns to the ACM master.

8. Type `show array modules type mg detail` to see if the Gateways have booted. The Gateways are powered on if their IP addresses are shown in the output.
9. Log in to the Memory Gateway master once again and then type the `show version` command to verify that the new image is installed on the Memory Gateway.
10. Type `show cluster global` to verify that both Memory Gateways are up and part of the cluster.
11. Log in to the Standby Memory Gateway (`slogin mg-a` or `slogin mg-b`) and then repeat steps 7 and 8.
12. Type `exit` to return to the ACM Master.

Shut down the Memory Gateways

Both of the Memory Gateways must be shut down and powered off *before* upgrading the ACMs to release V6.3.3. Follow these steps to shut down the Memory Gateways.

1. From the Master ACM, type `slogin mg-master` to log in to the Master Memory Gateway.
2. Type the following at the command prompt:

```
> enable
# configure terminal
# cluster shutdown
```
3. Respond `yes` to the shutdown confirmation question.

The command prompt returns to the Master ACM once the Memory Gateways shut down.

4. From the Master ACM command prompt, type the following to verify that the Memory Gateways have shut down:

```
# show array modules type mg detail
```

The following line in the output for both Memory Gateways shows that the Memory Gateway cluster is now shut down:

```
Running                : no
```

5. After ensuring that the Memory Gateways have shut down, type the following to power off the Memory Gateways:

```
# no array modules type mg enable
```

6. Respond “yes” to confirm the shutdown.
7. From the Master ACM command prompt, type the following to verify that the Memory Gateways are powered off:

```
# show array modules type mg detail
```

The following line in the output for the Memory Gateways shows that both are now powered off:

```
Power                : no
```

2: Upgrade the Array Firmware

IMPORTANT: Make sure the Memory Gateways are shut down and powered off *before* upgrading to release V6.3.3.

1. Start a terminal application and log in to the All Flash Array Master ACM as “admin”. Once the terminal application is started, use the system host name or the ACM management IP address to ensure a direct connection.
2. Establish access from the client computer (laptop) to the Master ACM using an Ethernet connection (remote or directly attached).
3. Using SCP from a Linux or Mac OS client, or PSCP.exe (part of the PuTTY package) from a Windows command shell, transfer the .img file to the All Flash Array as follows:

MAC OS or Linux

```
scp <path to file>/V6.3.3.img admin@<ACM Master IP>:/var/opt/tms/images/
```

Windows and PuTTY SCP

```
pscp -scp C:\<path-to-file>\V6.3.3.img admin@<ACM Master IP>:/var/opt/tms/images/
```

4. Type the following at the command prompt to access the CLI’s configuration mode:

```
> enable  
# configure terminal
```

5. Type the following to install the V6.3.3 image:

```
# cluster upgrade <image name and location> immediate
```

6. Respond “yes” to confirm the upgrade.

This upgrades both Array Controller Modules (ACMs) and reboots both modules immediately after completion of the upgrade.

IMPORTANT: The upgrade process takes about one hour to complete. Do not power off or reboot the system during the upgrade process. Do not manually power on any of the array modules. All modules should reboot on their own after the modules are upgraded.

7. Log in to the Master ACM once again. Use the following commands to verify that the ACMs are now installed with the new image and that both ACMs are part of the cluster:

```
> show version
```

The following line in the output shows that the ACM is now running A6.3.3:

```
Product release:   A6.3.3
```

```
# show cluster global
```

The following line in the output shows that both ACM's are up and part of the cluster:

```
Cluster node count:  2
```

8. Use the “monitor upgrades” command to verify that the VCM upgrade is still in progress:

```
# monitor upgrades
Press control-C to return...
VCM a is upgrading
VCM b is upgrading
VCM c is upgrading
VCM d is upgrading
...
```

Use CONTROL-C to exit the monitor command.

The above output shows that the VCMs are being upgraded to the new release.

The array continues its upgrade process. The Memory Gateways will power on when the VCMs are ready.

Note: Complete the steps below if the following warning messages display:

```
“WARNING: POSSIBLE DNS SPOOFING DETECTED!” or
“WARNING: REMOTE HOST IDENTIFICATION HAS CHANGED!”
```

These steps allow you to log in to the Memory Gateways from either ACM.

1. Log in to the Master ACM.
2. Type the following at the command prompt to access the CLI's configuration mode:

```
> enable
# configure terminal
```

3. Type the following commands:

```
# ssh client user admin known-host mg-a remove
# ssh client user admin known-host mg-b remove
# ssh client user admin known-host 169.254.1.101 remove
# ssh client user admin known-host 169.254.1.102 remove
```

Note: If the Memory Gateways are not automatically powered back on following the upgrade, complete the following steps:

1. Start a terminal application and log in to the array Master ACM as "admin". Once the terminal application is started, use the system host name or the ACM management IP address to ensure a direct connection.
2. Type the following at the command prompt to access the CLI's configuration mode:

```
> enable
# configure terminal
```

3. Run the following command to power on both Memory Gateways:

```
# array module type mg enable
```

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