UPTIME BULLETIN
A Newsletter from CTD, a Division of EMC
For VNX/VNXe

When Running VNX Block OE Versions R33.096 or R33.102, an NDU Operation Could Fail Due to a Default SAS Address Being Detected

In versions of VNX2 Block OE prior to 05.33.006.5.096, and in versions of VNX Block OE prior to 05.32.000.5.217, it was possible for an LCC's internal SAS address to reset to a default value in certain storage system power fail or power down scenarios. Most of the time this condition would go undetected and as long as no more than 1 LCC in any given loop is set to its default value, the storage system will continue to operate normally and will not suffer any ill effect. This is because a default SAS address is still a legitimate SAS address so long as it remains unique on a loop.

This condition would only become problematic if 2 or more SAS addresses were set to the default on the same loop. In that very rare instance, the LCCs would become faulted and IO would have to be re-routed to the other loop provided that the other loop remains accessible. Replacing an LCC would ensure that the new LCC has a correct SAS address and would clear this condition.

In VNX block OE versions R32.217 and later, as well as VNX2 Block OE R33.096 and later the root cause for this condition has been fixed such that the storage system will no longer reset any SAS address to the default address on any storage system power down or power loss event. However, on the VNX2 a new pre-NDU rule check was introduced within R33.096 and R33.102 that will check for any latent default SAS addresses present on the storage system. If any are detected, it will fail the NDU rules pre-check and disallow the NDU until the condition is cleared. See knowledge base solution KB196087 for more information about this error and how to resolve it.

Because the underlying root cause of the condition is already resolved in R33.096 and R33.102, any latent default SAS addresses detected by the NDU rules pre-check are no longer deemed serious by EMC. As long as there are no fault lights present on the storage system, it is safe and recommended to bypass this specific rule when it fails. Support can run a rebootless NDU script that is attached to knowledge base solution KB196087 which disables the specific rule check for default SAS addresses and allows any NDU from R33.096 or R33.102 to proceed normally. This error can be encountered on any NDU attempt once you are running R33.096 or R33.102, whether the code being installed is an enabler, a full package, or a hotfix. Latent default SAS address conditions will be fixed/resolved automatically in the background in new VNX2 Block OE code due out in Q3 of 2015. Upgrading to this new code once it becomes available will automatically clear this condition when the code is installed.

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Search the VNX Series page for *Uptime Bulletin* here:

https://support.emc.com/products/12781

COMMENTS? IDEAS?

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Customer Documentation

- https://mydocuments.emc.com/VNX
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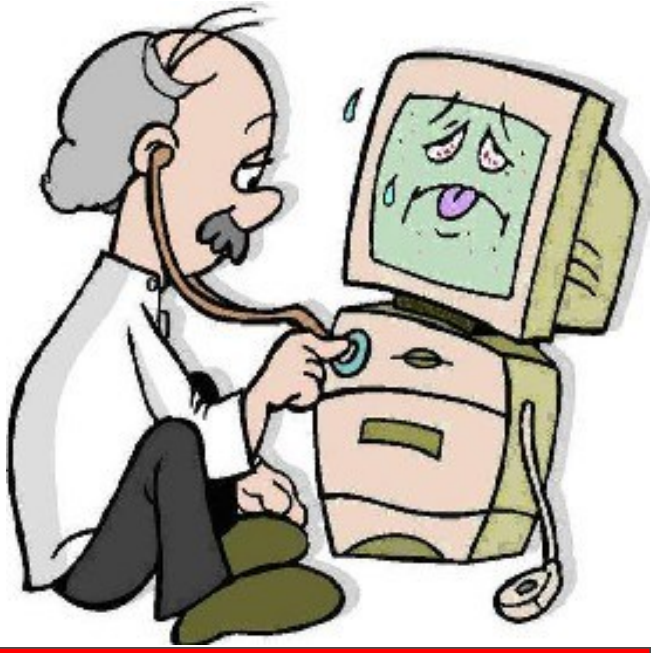
An Update on EMC's Most Common Software Causes of DU/DL in the VNX Block OE and Where They are Fixed

Last quarter we presented an update on the most common causes of process related outages within the VNX family, and how to avoid those pitfalls. This quarter we will focus on the two most common software related DU/DL incidents and how to avoid them. Those incidents are:

1) A condition we refer to as ***stuck evacuations***: This condition is discussed in more detail in knowledge base solution KB172028. Evacuations occur when free space is returned to pools for general use. There are a number of use cases that are more vulnerable than others, but anyone using pools should consider upgrading to code where the root cause is resolved in order to minimize exposure. This condition can cause poor performance and can eventually lead to DU/DL if left untreated. The underlying cause of the problem that leads to stuck evacuations is fixed in Block OE versions R32.215 and later (VNX) and R33.072 and later (VNX2). Further actions may still be required to resolve pre-existing orphan blocks which can lead to this condition. See the knowledge base article for more details about eliminating pre-existing conditions. EMC recommends upgrading to a Block OE revision that has the underlying root cause for this issue resolved in order to minimize future risk. See the knowledge base solution for more details.

2) A condition we sometimes refer to as the ***free behind race condition***: This condition is discussed in further detail in knowledge base solution KB190616. This condition may occur on any storage system using Pools, although certain configurations such as deduplication may increase your exposure. The free behind race condition is resolved in Block OE versions 33.072 or later. EMC recommends upgrading to a version of code that contains this fix in order to minimize exposure to one of our most common software causes of DU/DL.



An Update on EMC's Disk Reliability ETA and FCO Progress and Continued Improvements

In last month's Bulletin, we shared with you information regarding EMC's new firmware for the 600GB VNX SAS drive, part numbers 005049675 and 005049677. While the FCO is well underway across the VNX install base, if you still have not upgraded your drive firmware, you do not need to wait for EMC to perform the upgrade. You may follow KB 195555 for more information about downloading the firmware and installing it using the Unisphere Service Manager's (USM's) ODFU tool.

We are requesting that customers with these drives should also install the latest Block OE code for VNX (05.32.000.5.218) because this new code implements an enhanced proactive disk copy algorithm (PACO-R) for all drives that has proven to add very significant incremental benefit on top of the firmware improvements. **Similar PACO-R improvements are on the way for VNX2 in new Block OE code due out in Q3 of 2015. The PACO-R enhancements due out in the Q3 release will specifically target these 600GB SAS drives only.**

For customers running VNX Block OE 05.32.000.5.209 or later who do not wish to upgrade to 05.32.000.5.218, there remains a script option that can install only the PACO-R enhancement without the full software upgrade. Contact support if you desire this option.

Updating EMC's Progress on VAAI Improvements

The VAAI fixes are now part of general VNX Block OE releases 05.32.000.5.218. Reception for these enhancements has been very positive.

There are release notes available for this hotfix as well that document the use cases where the fix will be more effective.

A hotfix is available based upon release 05.32.000.5.216 of code. To request the hotfix, contact support and they will open a ticket with EMC.

Finally, engineering has published a white paper about VAAI XCopy operations and the VNX environment with specific references to the hotfix and what users should expect for performance in various use cases. This white paper is downloadable from support.emc.com.

VNX/VNXe TARGET VERSIONS

EMC has established target revisions for each product to ensure stable and reliable environments. As a best practice, EMC recommends that you operate at target code levels or above to benefit from the latest enhancements and fixes available. Search using the term "adoption rates" in http://support.emc.com for current VNX/VNXe target code adoption rates.

VNXe OS VERSION	RELEASE DATE	STATUS
2.4.3.21980	11/17/14	Target
2.4.3.21980	11/17/14	Latest Release
VNXe2 OS VERSION	**RELEASE DATE**	**STATUS**
3.1.1.5395470	05/20/15	Target
3.1.1.5395470	05/20/15	Latest Release
UNIFIED VNX CODE VERSIONS (7.1 & R32)	**RELEASE DATE**	**STATUS**
7.1.76.8 (VNX for File)	05/26/15	Target
7.1.79.8 (VNX for File)	05/26/15	Latest Release
05.32.000.5.218 (VNX for Block)	05/26/15	Target
05.32.000.5.218 (VNX for Block)	05/26/15	Latest Release
UNIFIED VNX CODE VERSIONS (8.1 & R33)	**RELEASE DATE**	**STATUS**
8.1.3.79 (VNX for File)	11/25/14	Target
8.1.6.101 (VNX for File)	05/12/15	Latest Release
05.33.000.5.081 (VNX for Block)	12/19/14	Target
05.33.006.5.102 (VNX for Block)	05/12/15	Latest Release

See Product Release Notes for a full list of enhancements per new code release.

VNXe2 OE CODE ENHANCEMENTS IN RELEASE 3.1.1.5393470

- UFS64 file system support.
- Asynch replication support for block LUNs.
- eSLIC 4 port 10Gb optical support
- Synchronous replication of block LUNs supported.
- Unisphere improvements.
- Fixed a VMware integration issue where removing access to one ESX server could trigger another ESX server to unmount the datastore.

VNX CODE ENHANCEMENTS IN RELEASE 05.32.000.5.217

- Extended PACO-R support to all drives. This will achieve a significant reduction in DU/DLs due to multi drive failures.
- Multiple key fixes in LCC (CDES) code .
- VAAI related performance enhancements previously provided only through a special hotfix are now made standard.
- Fixes performance issues and SP panics associated with Win2012 Trim/Unmap or RecoverPoint use of "Describe Extents."

VNX CODE ENHANCEMENTS IN RELEASE 05.32.000.5.218/7.1.79.8

- Includes all of the fixes in 05.32.000.5..217 plus the following:
- Fixes a regression bug that could leave any storage system using FIPS in an unmanaged state after the system was upgraded to 05.32.000.5.217.
- Associated file code 7.1.79.8 fixes a regression issue in file deduplication only present in the 7.1.79.6 release.

VNX CODE ENHANCEMENTS IN RELEASE 05.33.006.5.102

- GHOST security fix.
- Improves performance on heavily shared dedup LUNs.
- Support for 4 port 16Gb FC SLIC and 120 drive dense disk enclosures.
- Resolves an issue in 33.096 that would fault an enclosure if a default SAS address was detected.
- Pool LUN recovery improvements.
- Fix for unmanaged SPs in the GUI due to a bug in host connection limits tracking.

FILE CODE ENHANCEMENTS IN 8.1.6.101

- Newly created file systems utilize their own journal\log (split log) for recovery in the event of an unexpected outage. In earlier versions file systems shared a LUN for recovery (common log).
- The VNX for File OE Out-of-Space handling feature enables better handling when a VNX for Block pool is at maximum capacity and the pool is associated with file systems hosted on thin LUNs.

Latest VNX Block OE Code Resolves Issues That May Cause the Storage System to go Unmanaged, or Stop Statistics Logging

An issue exists in all versions of VNX2 Block OE code prior to 05.33.006.5.096 as well as VNX Block OE versions 05.32.000.5.215 and 05.32.000.5.216 where a new *number of connections per host* parameter was introduced. This new parameter is not being handled correctly in code, and as a result the parameter is not always being decreased when it should be. This may result in the connection limit being hit and the storage processors going unmanaged. A knowledge base solution exists describing this condition and how to work around it. This solution may be found here: KB188877.

This issue is **resolved** in newly released block OE codes 05.33.006.5.96 and 05.33.006.5.102 for the VNX2 family, and in both 05.32.000.5.217 and 05.32.000.5.218 for the VNX family. These new codes released in mid to late Q2 and typically take 4 to 6 weeks before they become EMC's recommended new targets, provided they meet certain pre-defined stability metrics.

A secondary issue has been observed on certain VNX2 storage systems that may result in statistics/performance logging randomly stopping from time to time. This may be resolved by restarting the CIMOM process. This issue only manifested itself in the R33 code family, and is also resolved in block OE codes 05.33.006.5.96 and 05.33.006.5.102.

Functionally, releases 05.33.006.5.96 and 05.33.006.5.102 are very similar, except R33.096 started shipping on storage systems shipped from the factory a few weeks before R33.102 was available for general upgrades to already in production storage systems. The latter release (R33.102) resolved an issue that could only impact storage systems already in production if they were upgraded to R33.096. EMC never made R33.096 available for customer upgrades except by RPQ. Functionally and for the purposes of the fixes discussed above, these two releases are essentially the same.

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