

VERITAS EDUCATION

INSTRUCTOR ARTICLES – OCTOBER 2002

1. USING VERITAS VOLUME MANAGER™ WITH HARDWARE RAID
2. VERITAS NETBACKUP™ PERFORMANCE TESTS

USING VERITAS VOLUME MANAGER™ (VXVM) WITH HARDWARE RAID

I always ask my VERITAS Volume Manager students if they are using Hardware RAID. They often ask “Why should I use Veritas Volume Manager if I have Hardware RAID”?

Hardware RAID implementations typically employ RAID capabilities via firmware or downloadable software running in the Host Bus Adapter (HBA) or an array-based controller. Any RAID calculations or management overhead are performed in a dedicated processor on the controller or in the HBA. With Hardware RAID, LUNs (Logical Units) are created that appear to the O/S (and hence Volume Manager) as a single disk. These LUN's can be configured using part of or all of a physical disk(s) inside the Hardware RAID enclosure just like creating Volumes with VERITAS Volume Manager. Be aware that there are Vendor-unique restrictions to creating these Hardware RAID LUN's. Most Hardware RAID allows creation of RAID 1 (mirroring) and RAID 5 (striping with parity), but either does not allow RAID 0 (striping), or does inflexible striping (not easily changed).

Both hardware and software RAID offer benefits. However, by combining VERITAS Volume Manager with RAID subsystems, the total solution can attain new levels of availability, flexibility, performance and manageability. Combining Hardware RAID with VERITAS Volume Manager is complementary, and in most cases the same functionality in both H/W & S/W RAID should not duplicated; if you want to mirror your data, you would most likely mirror with either H/W or S/W but not both.

Be aware that Volume Manager Hot Relocation/Hot Sparring will only work if you have VERITAS Volume Manager Volumes that are either RAID 1 or RAID 5 done with Volume Manager. Furthermore, Volume Manager features such as Snap Shot/Fast Mirror Resync (3rd mirror break-off) require VM Volumes that are done with VERITAS Volume Manager RAID 1.

My favorite configuration is to combine Hardware Mirroring with host-based VxVM striping:

- All single disk failures can be resolved without involving VxVM; this makes it much easier for the repair vendor to make a repair without the presence of the host's UNIX admin.
- Striping parameters can be dynamically changed with the volume/file system remaining on-line.
- VERITAS File System (VxFS) auto-tunes itself to the underlying characteristics of the device the file system is built on. If the device is a Striped VxVM Volume, better performance can be realized because VxFS will do I/O alignment of stripe-unit boundaries instead of sector boundaries.

There are many benefits to using VERITAS Volume Manager in addition to Hardware RAID:

- Volumes can be grown/re-configured online
- The VERITAS Enterprise Administrator (VEA) GUI can manage multiple hosts from a single management console

- VEA has useful and powerful performance monitoring and graphical reporting features
- Take advantage of 3rd mirror break-off functionalities for off-host processing via the FlashSnap option
- You can manage multi-vendor Hardware RAID devices using a single interface

Special Cases

You can combine Hardware RAID 5 with VxVM striping. The combination is known as Plaiding. File system performance of 2 G bytes per second can be achieved if done PROPERLY.

Some UNIX admins report using VxVM mirroring on hardware RAID 5. The reasoning is that neither hardware or software RAID 5 can survive a 2 disk failure, creating a hot spare for a 72 gig drive will take several hours, so for extra safety, mirror with VxVM to provide redundancy while the Hardware RAID hot-spare builds.

Finally, not all Hardware RAID enclosures are created equally – features vary. If your hardware RAID enclosure has cache memory, it is most likely that the acknowledgement for write transactions will be sent to the application issuing the write well-before the data is actually written to disk. Some enclosures make caching optional. This is probably a good idea if your application is write-intensive (percentage of writes is greater than 25%) to ensure you data is written to disk ASAP. After all, no DBA wants to discover that all his or her data has not been written to disk.

For additional information on VERITAS Volume Manager, check out the datasheets and white papers at:

<http://www.veritas.com/products/listing/ProductDownloadList.jhtml?productId=volumemanagerwin#datasheets>

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VERITAS NETBACKUP™ PERFORMANCE TESTS

This document has been compiled from notes that have been made over the past several years working with VERITAS NetBackup. Some of the information is original and some has come from other VERITAS NetBackup Professional Consultants. This was created to assist in the troubleshooting of network performance issue as it relates to VERITAS NetBackup. Some of the following are undocumented and “unsupported” by VERITAS Software, and are provided merely for testing purposes only.

TESTING PERFORMANCE WITH VERITAS NETBACKUP

Dumping to the “bit bucket”

In order to troubleshoot network performance, there are a couple of things that can be done to eliminate the many variables that exist between the client and the server.

FROM THE CLIENT

To see if the client is the bottleneck in the network performance, perform the following.

From Windows

This test will use just bpbkar writing to /dev/null (the bit bucket). Which eliminates the network portion of the equation.

As far as bpbdm, he has to stop/restart NB for that to take effect... performance wise... you could run the bpbkar to /dev/null on the Windows client to see whether the client or the network is the problem...

```
c:\Veritas\Netbackup\bin\bpbkar32 -nocont > NUL 2> (for Windows)
```

```
i.e. c:\Veritas\Netbackup\bin\bpbkar32 -nocont c:\ > NUL 2> temp.f
```

temp.f will contain all of the files that bpbkar has collected. This will grow considerably if there is a large file system or directory structure you are testing with. PLEASE BE WARNED

From Unix

```
/usr/opensv/netbackup/bin/bpbkar -nocont / > /dev/null 2> /tmp/files.out
```

Same idea.

FROM THE SERVER

There is an undocumented feature, if you want backups going to an infinitely fast device (null). If this is the case, please read the entire balance of this document to fully understand all of the caveats and WARNINGS.

1. Create a disk storage unit
2. Touch /usr/opensv/netbackup/bpdm_dev_null
3. Run your backup

bptm will not write its images to disk files (the fragments will be created but the file length will remain 0 and bpdm will write the image to the bit-bucket (i.e. /dev/null).

Obviously, you can't restore from images like these, but its nice for testing backup only if you want to pump thru a lot of data.

If you touch the file, you should see the following in bpdm debug log for backups:

really writing to /dev/null

caveats

- Do not try restores
- Doing this screws up ALL disk-based backups on the server (all go to null)
- While it has yet to be proven, it may cause problems with tape-based backups as well.
- Doing this leaves extra stuff lying around in NB databases.
- Expire any images that you create with this test after the test is over.

USING FTP

The final test is simply using FTP. We have now tested and timed the backup at the client to the bit bucket, client to the server to the bit bucket and now we want to try the network, from the client to the server. This will tell us if we are looking at a client issue, server issue or network issue. If anything it will give us good information as to how to proceed resolving our performance problem.

1. FTP from the client to the server
2. FTP something large enough to measure
3. Evaluate findings to determine next step.

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