



# SNIA VDBENCH Emerald Overview

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## SNIA Emerald™ Training

*SNIA Emerald Power Efficiency  
Measurement Specification,  
for use in EPA ENERGY STAR®*

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# Agenda

- Introduction to SNIA Emerald
- Phases test
  - ◆ Pre-fill
  - ◆ Warm up
  - ◆ Optionally time for tiering to move things around
  - ◆ Hot band test
  - ◆ 4 corners test
    - › Small block random read and write
    - › Large block sequential read and write

# Determining target storage

- First part of the process is the configure your storage.
- Determine your optimal configuration (Raid 1, Raid 5, ??, Stripe size, Volume Manager settings, etc)
- Determine the amount of total capacity
- Export 56+% of the storage or all of it and let vdbench execute against 56+% of capacity (sd parameter “range=(0,57)”)
- List all the luns for the test and put it in a file. Use format or Disk Manager (OS Dependent) to identify the LUNs

# Filling storage

- For the 56+% capacity, all of it needs to be initialized by vdbench
- Vdbench will create a near random pattern that has a characteristic of 2:1 compression
- Have vdbench write from beginning to end to have a known pattern across all active blocks of storage (part of the example script provided)
- No power measurements or performance will be reported on this phase

# Warm-up storage 12+ hours

- ▶ The warm-up phase designed to have the following effect on storage:
  - ◆ Get the system to a relatively steady state. No out of the box performance for any component.
  - ◆ Cause some amount of fragmentation in systems that do “copy on write”
  - ◆ Let intelligent tiering systems study access pattern for moving blocks around
  - ◆ Optionally slow period that allows tiering systems have cycles to move data around
- ▶ Hopefully system will approximate a customer system after weeks of activity

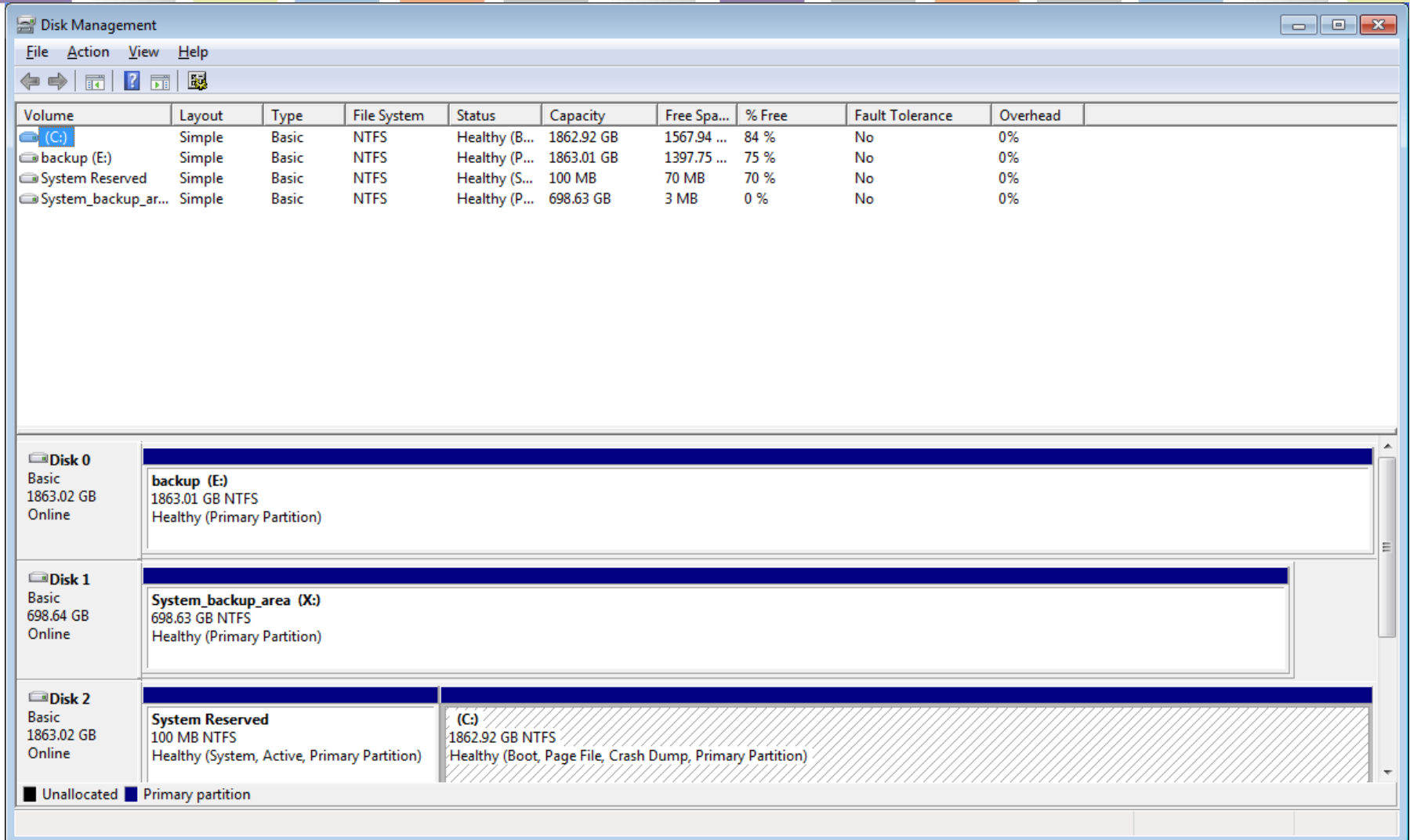
# Hot Band run

## ➤ Hot Band workload

- ◆ Hot band is a cache friendly workload
- ◆ Has very hot spots that tend to stay in cache
- ◆ More cache the more cache hit the storage should produce
- ◆ 8 sequential streams, 5 read, 3 write make up 40% of workload

## ➤ Intended to simulate a transactional workload

# Windows Disk Manager



The screenshot shows the Windows Disk Management console. The top pane displays a table of volumes, and the bottom pane shows a graphical representation of three disks with their partitions.

Volume	Layout	Type	File System	Status	Capacity	Free Spa...	% Free	Fault Tolerance	Overhead
(C:)	Simple	Basic	NTFS	Healthy (B...	1862.92 GB	1567.94 ...	84 %	No	0%
backup (E:)	Simple	Basic	NTFS	Healthy (P...	1863.01 GB	1397.75 ...	75 %	No	0%
System Reserved	Simple	Basic	NTFS	Healthy (S...	100 MB	70 MB	70 %	No	0%
System_backup_ar...	Simple	Basic	NTFS	Healthy (P...	698.63 GB	3 MB	0 %	No	0%

Disk	Capacity	Layout	Type	File System	Status
Disk 0	1863.02 GB	Basic	Basic	NTFS	Online
Disk 1	698.64 GB	Basic	Basic	NTFS	Online
Disk 2	1863.02 GB	Basic	Basic	NTFS	Online

Legend: ■ Unallocated ■ Primary partition

# Solaris Format

```
sbm-q212-4470a.us.oracle.com - PuTTY
root@sbm-q212-4470a:~# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
 0. c0t5000CCA012A8C56Cd0 <HITACHI-H106060SDSUN600G-A2B0 cyl 36477 alt 2 hd 255 sec 126> bootdisk
    /scsi_vhci/disk@g5000cca012a8c56c
 1. c0t5000CCA0128DCED0d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64983 alt 2 hd 27 sec 668>
    /scsi_vhci/disk@g5000cca0128dced0
 2. c0t60080E5000233FA60000112E500663C6d0 <SUN-LCSM100_F-0780 cyl 36397 alt 2 hd 255 sec 126>
    /scsi_vhci/disk@g60080e5000233fa60000112e500663c6
 3. c0t60080E5000233FA6000011295006633Ad0 <SUN-LCSM100_F-0780 cyl 36397 alt 2 hd 255 sec 126>
    /scsi_vhci/disk@g60080e5000233fa6000011295006633a
 4. c0t60080E5000233FA60000112450066233d0 <SUN-LCSM100_F-0780 cyl 36397 alt 2 hd 255 sec 126>
    /scsi_vhci/disk@g60080e5000233fa60000112450066233
 5. c0t60080E500023401A00001022500661A1d0 <SUN-LCSM100_F-0780 cyl 36397 alt 2 hd 255 sec 126>
    /scsi_vhci/disk@g60080e500023401a00001022500661a1
 6. c0t60080E500023401A0000102550066266d0 <SUN-LCSM100_F-0780 cyl 36397 alt 2 hd 255 sec 126>
    /scsi_vhci/disk@g60080e500023401a0000102550066266
 7. c0t60080E500023401A0000102850066302d0 <SUN-LCSM100_F-0780 cyl 36397 alt 2 hd 255 sec 126>
    /scsi_vhci/disk@g60080e500023401a0000102850066302
 8. c0t600144F084B772B2000050C63E9B0002d0 <SUN-ZFS Storage 7420-1.0-4.50TB>
    /scsi_vhci/disk@g600144f084b772b2000050c63e9b0002
 9. c0t600144F084B772B2000050C63E770001d0 <SUN-ZFS Storage 7420-1.0-4.50TB>
    /scsi_vhci/disk@g600144f084b772b2000050c63e770001
10. c0t600144F084B772B2000050C63EC40003d0 <SUN-ZFS Storage 7420-1.0-1.00TB>
    /scsi_vhci/disk@g600144f084b772b2000050c63ec40003
11. c0t600144F084B772B2000050C63EE40004d0 <SUN-ZFS Storage 7420-1.0-4.50TB>
    /scsi_vhci/disk@g600144f084b772b2000050c63ee40004
12. c0t600144F084B772B2000050C63EFA0005d0 <SUN-ZFS Storage 7420-1.0-4.50TB>
    /scsi_vhci/disk@g600144f084b772b2000050c63efa0005
13. c0t600144F084B772B2000050C63F160006d0 <SUN-ZFS Storage 7420-1.0-1.00TB>
    /scsi_vhci/disk@g600144f084b772b2000050c63f160006

Specify disk (enter its number): █
```



# Red Hat parted

- Linux will have various ways to find the partition table
- Need to figure out your version
- Red Hat has the “parted” command and print will display the drives and partitions on each drive
- See details

[https://access.redhat.com/site/documentation/en-US/Red\\_Hat\\_Enterprise\\_Linux/6/html/Storage\\_Administration\\_Guide/s1-disk-storage-parted.html#s2-disk-storage-parted-view-part-table](https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Storage_Administration_Guide/s1-disk-storage-parted.html#s2-disk-storage-parted-view-part-table)

# 4 Corners 20 minutes

- ▶ Tests the extremes of workloads
  - ◆ Random Read and Write 8K transfer
  - ◆ Sequential Read and Write 256K transfer

# Phase time line

## Typical

Phase	Fill	Hot Band Warm-up	4 Corners
Duration	MB capacity/MB rate/3600	~12Hr	80 Minutes

## Tiering

Phase	Fill	Hot Band Warmup/learning	Hot Band Semi-idle Move blocks	Hot Band	4 Corners
Duration		~12Hr	TBD	TBD	80 Minutes



# Questions