OpenVMS Storage Updates

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Agenda

- **Recent Storage options added to OpenVMS**
  - HBAs
  - Targets
  - Tape and Software
- **HP StoreOnce (VLS and D2D) and OpenVMS**
  - Overview of Deduplication Technologies
  - Support with OpenVMS
- **HP 3PAR and OpenVMS**
  - Overview and Features
  - Support with OpenVMS
  - Configuration with OpenVMS

Recent Storage Feature Additions

HBA support on OpenVMS

- 6GB SAS Support
  - P410i, P411, P711m, P812
- HBA Mode support for P410i and P411
  - Can now serve up raw disks, could only have RAID LUNs earlier
  - Disks can be moved between machines
  - LUN size limitations
  - Associated EFI ,boot options, SDA and MSA$UTIL changes
- Multi-Initiator Configurations
  - Possible with P411 in HBA mode
  - Not yet officially supported if someone is interested contact us

HBA support on OpenVMS

- SSD support via SAS HBAs
  - Qualified with SLC drives
  - Support for gas gauge feature via MSA$UTIL
  - New item codes in $GETDVI get to SSD parameters
- Parallel SCSI support for rx2800
  - Support for only tape drives
  - Not qualified for disks
  - PCIe SCSI card (AT134A)

Targets support on OpenVMS

- P2000 G3 – SAS
  - Follow-on product to P2000G2 sa
  - SFF disks
  - 6GB SAS
- D2200sb storage blade
  - Follow-on to SB40C
  - Can support upto 12 SFF SAS disks
  - Has an embedded P410i with flash backed write cache
- D2600/D2700 support
  - JBODs with ability to have SAS / SATA disks

Targets support on OpenVMS

- HP 6Gb/s SAS BL Switch + P711m 6Gb SAS Mezz card combination
- MDS600 diagnostics support
  - Ability to collect diagnostic information for MDS600 connected to P700m
  - Information such as IO, Power, firmware revision
  - Solution is specific to 3GB SAS
  - With 6GB SAS solution the diagnostic information is available via the switch
- 3PAR (Registered Release)

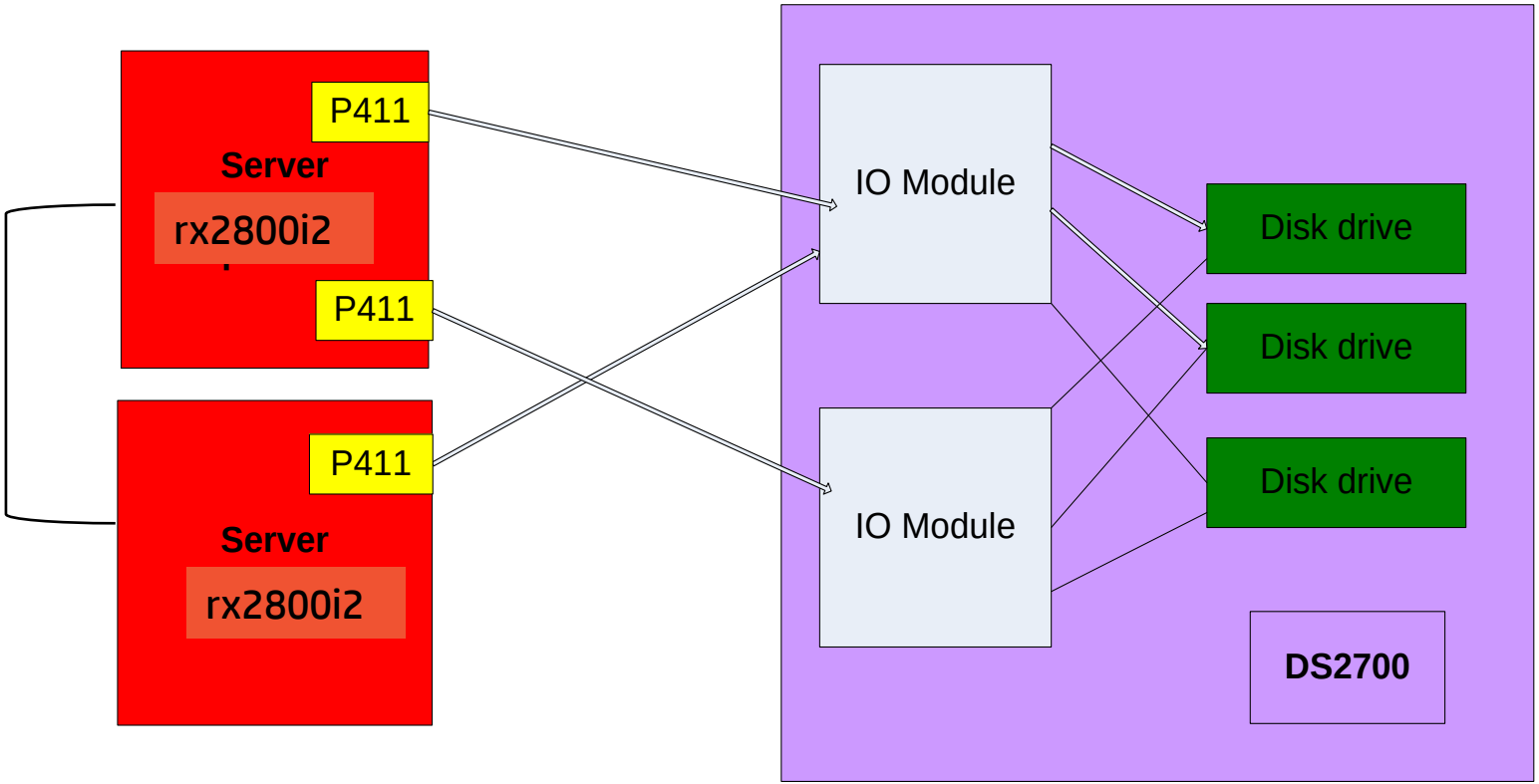
Tape and Software Support

- LTO5
  - 1.5TB raw data capacity
  - Compression ratio of nearly 2:1
  - 280 MB/Sec Transfer rate for compressed data
- LTO6 (Planned)
  - Capacity expected to double
  - Compression ratio of 2.5:1
  - 400 MB/Sec transfer rate for compressed data
- VLS9x00 support
  - Only Virtual tape functionality no Dedup support

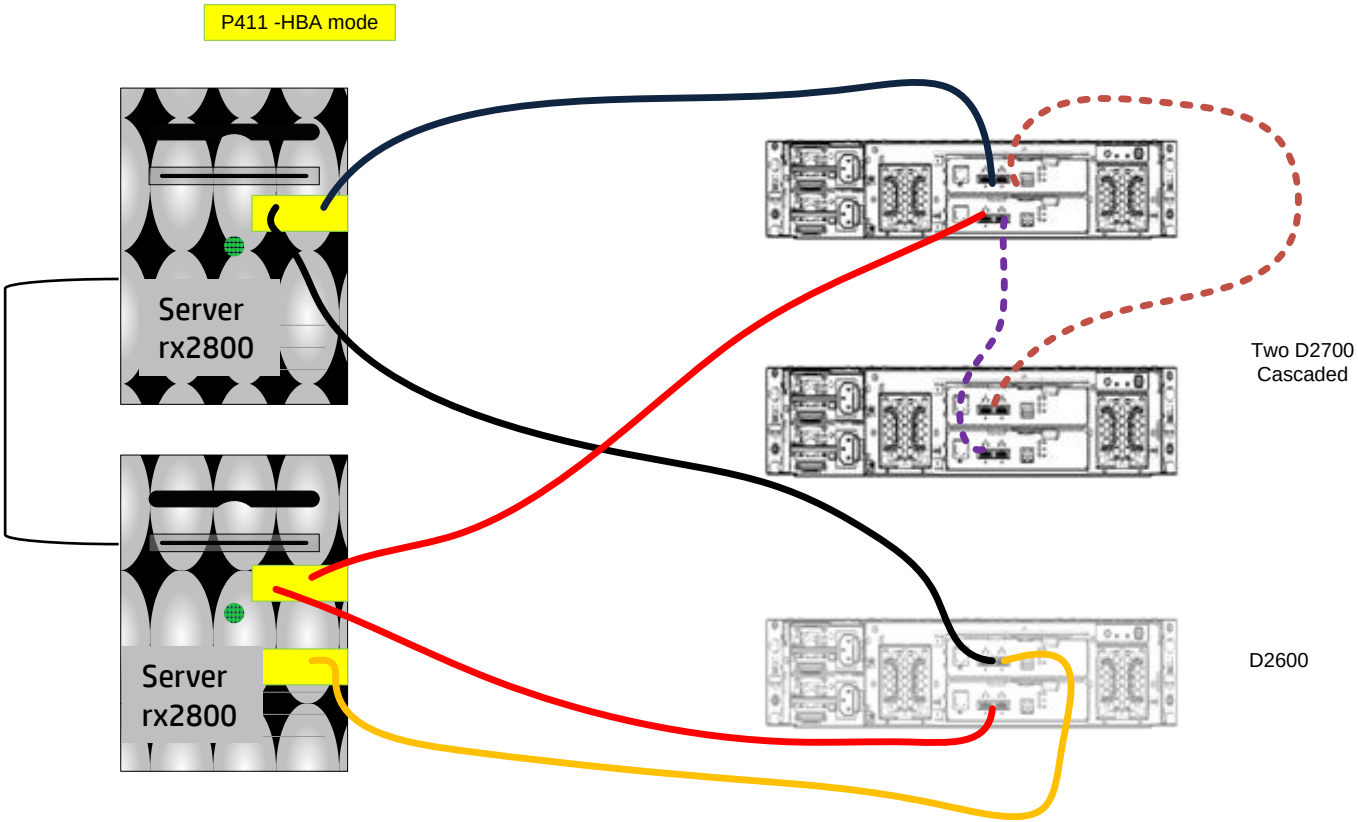
Tape and Software Support

- D2D support
  - Support matrix at http://h71000.www7.hp.com/openvms/storage/smstape_matrix.html
- Release of ABS ECOs (qualification and bug fixes)
  - D2D-4312
  - D2D Rdb Spanover
  - ESL G3
  - LTO5
  - JAVA 1.6

Multipath + Multi – initiator - Official Support soon



Multi-Initiator – Support soon



HP StoreOnce and OpenVMS

Deduplication solutions – Combining the best of tape and disk backups

	Disk Based backup	Tape Based backup
Advantages	• Fast file access • Reduced backup windows • Easy to use	• Most cost-effective storage • Long-term archival • Offsite disaster recovery
Issues	• More expensive in $/GB • Difficult to remove offsite • Open to many of the same risks as the server	• Slower single file backup and restore • Management overhead – changing and managing tapes

But why choose when you can combine the best of both worlds?

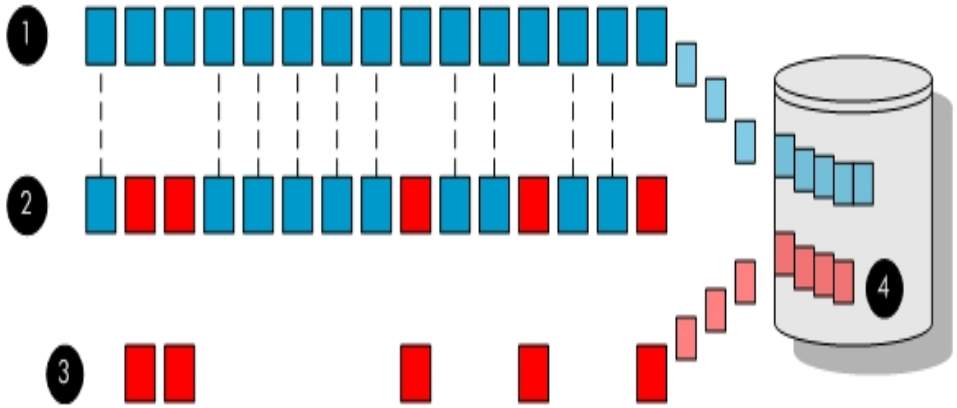
Deduplication can help you if you are ....

- Not meeting backup windows due to slow servers
- Not consistently streaming your tape drives
- Dealing with restore problems caused by interleaving
- Performing many restores
- Backing up data that has a short life
- Having issues with backup reliability
- Using snapshot and clone technology for non-critical data (which makes the storage inappropriately expensive for the nature of the data)
- Looking to deemphasize tape in your environment

What is Deduplication ?

- Specialized data compression technique
- Technique to eliminate the need to store duplicate copies of repeating data
- Compare blocks of data being backed up with previously backed up data blocks
- Store only if changed
- If unchanged keep a pointer to data block on backup device
- Post process deduplication (VLS devices)
- In-line deduplication (D2D devices)

Deduplication Process



Item	Description
1.	Data from the first backup stream is stored to disk.
2.	Duplicate data (in blue) as well as unique data (in red) in a second backup stream is dentified.
3.	Duplicate data in the second backup stream is eliminated.
4.	Unique data in the second backup stream is stored to disk.

HP Deduplication product portfolio

- Two technologies - one for large enterprises and one for smaller businesses
- “Accelerated” deduplication for large enterprise data centers – **HP VLS Series**
  - Leverages object-level differencing designed for performance and scalability
  - Delivers fastest possible backup performance
  - leverages post-processing technology to deduplicate data after the backup application completes writing to VLS
  - Delivers fastest restore from recently backed up data
  - Maintains a complete copy of most recent backup data and eliminates duplicate data in previous backups
  - Provides scalable deduplication performance
  - Needs knowledge of file system
  - Not supported with OpenVMS

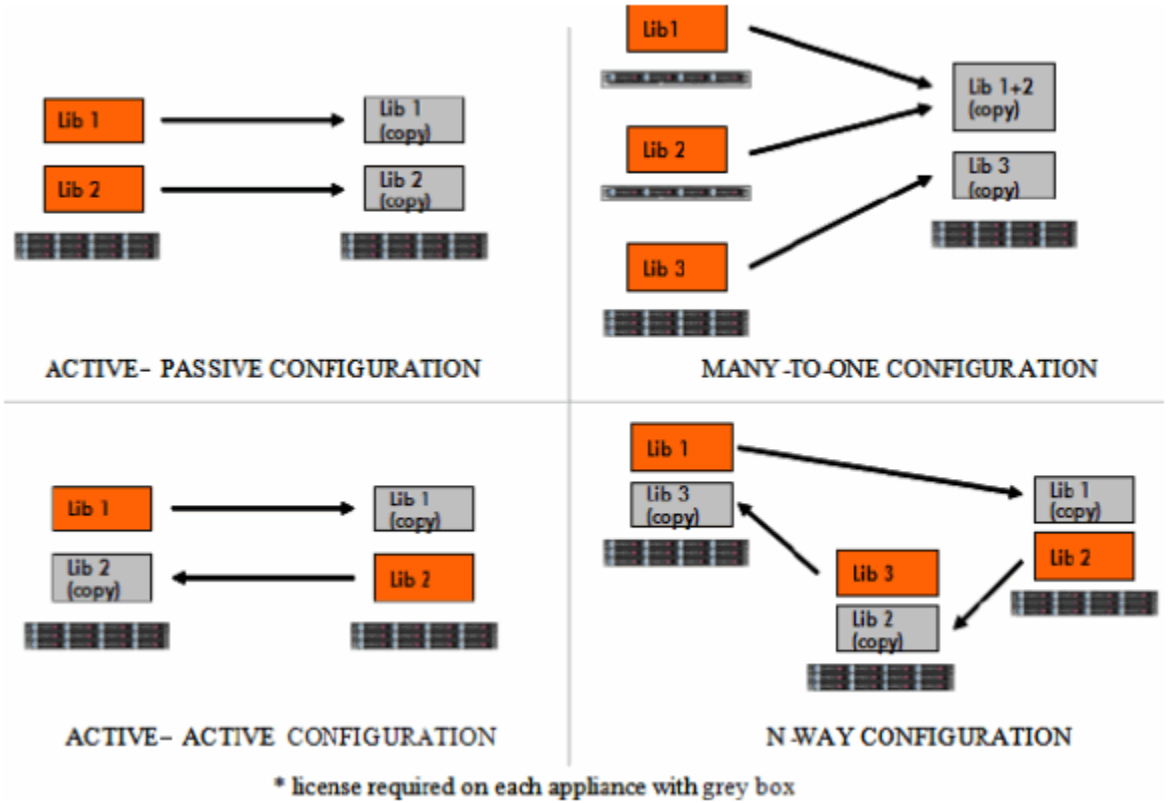
HP Deduplication product protfolio

- "Dynamic" deduplication for SME and small remote offices – **HP D2D Series**
  - Uses hash-based chunking designed for software compatibility and low cost
  - Delivers a low-cost, small footprint
  - Delivers a backup format-independent solution
  - Delivers a platform with integrated data deduplication
  - Data format agnostic
  - Supported with OpenVMS

HP Deduplication product protfolio

- VLS product portfolio being phased out
  - Replaced with StoreOnce B6200
  - Contact your HP sales person if you are a VLS user

Replication



Migrating data off a Virtual Library

- Can use ABS+MDMS+SSM to migrate data
- Data can also be migrated using SSM

Data Migration using SSM

- Layered product
- Allows tape to tape copy
- Use /IDENTICAL

$ mount/over=id 2MGA200: (Virtual tape device)

$ mount/over=id 2MGA400: (Physical tape device)

$ SAVESET COPY 2MGA200:image.bck 2MGA400:

$ SAVESET COPY 2MGA200:*.* 2MGA400:*.*

$ SAVESET COPY 2MGA200:image.bck 2MGA400: /journal=image.jnl

Data Migration using ABS + MDMS + SSM

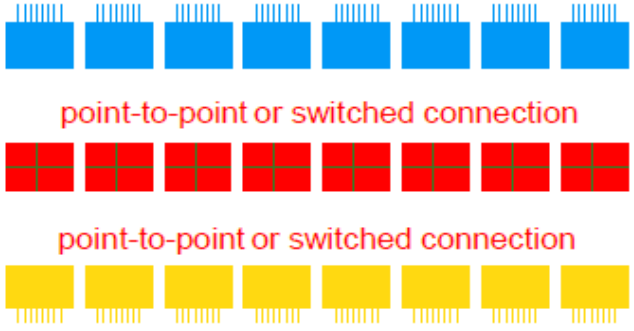
- Copy contents of VLS to physical tape
  - Use SSM or Use auto migration feature
  - Have same tape labels
- Tweak the MDMS database
  - Change location of cartridge to physical library

D2D configuration example video

HP 3PAR and OpenVMS

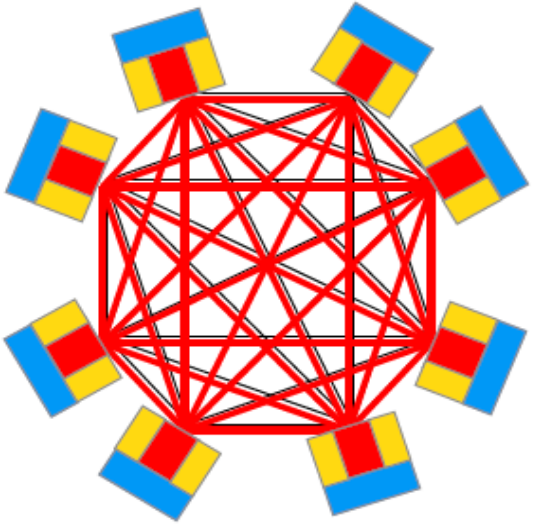
HP 3PAR Architectural Overview

Traditional
Monolithic Architecture

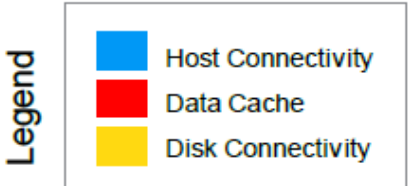


Traditional Modular
Architecture

3PAR InSpire® Architecture

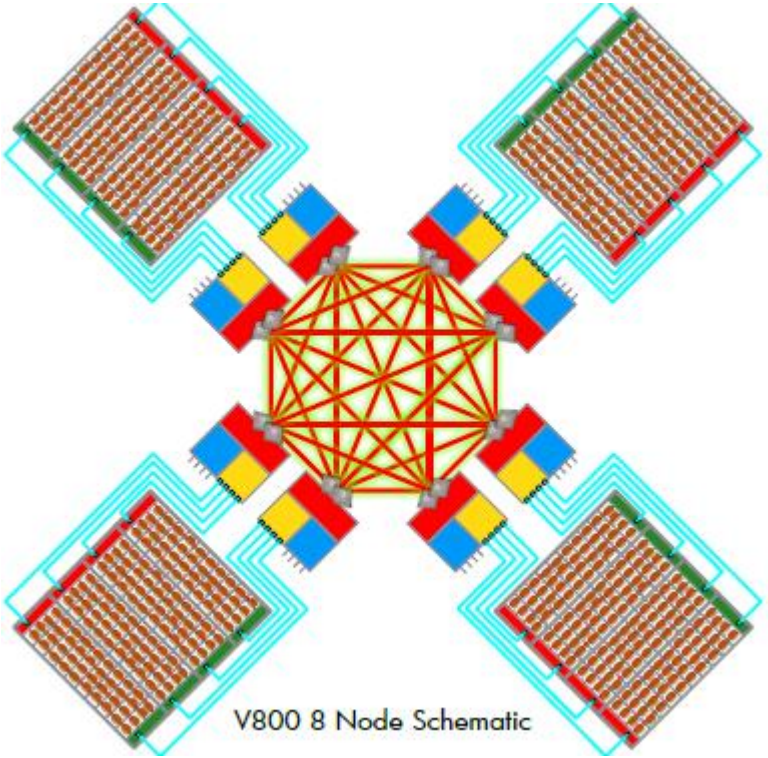


a finely, massively, and
automatically load
balanced cluster

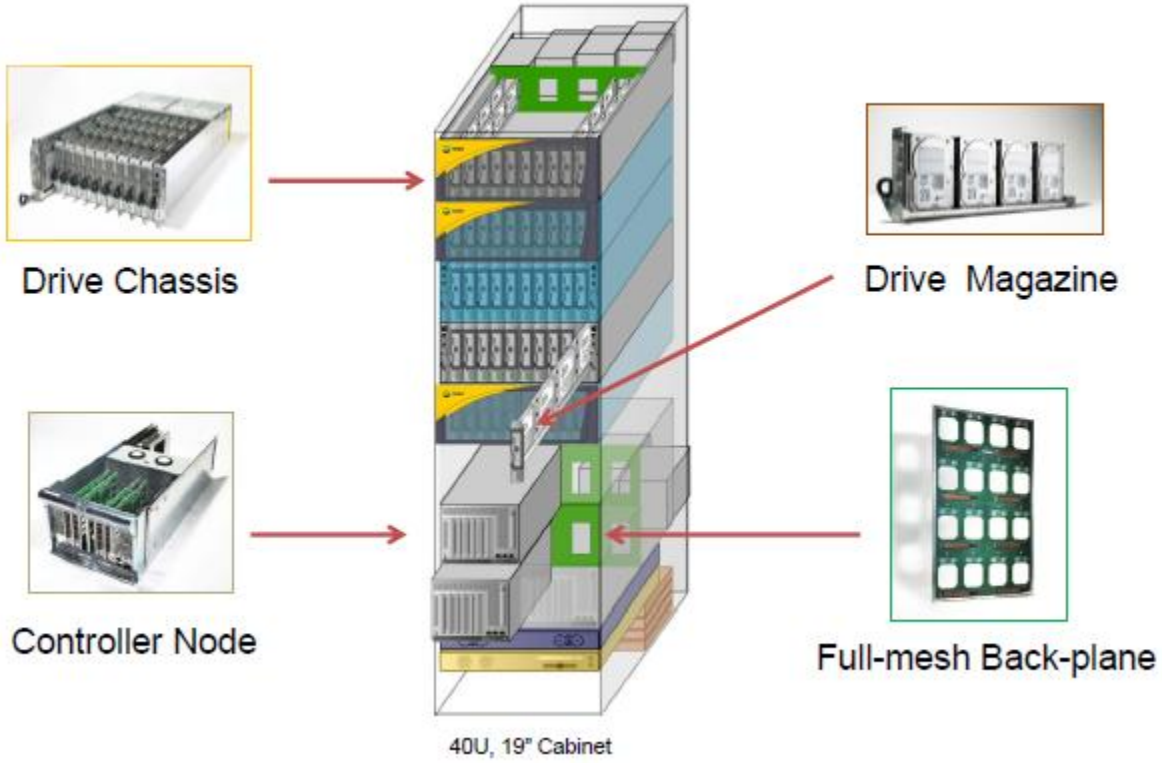


HP 3PAR Architectural Overview – V Class

- V-Class Full Mesh Backplane
  - Low Latency/ High Bandwidth
  - Backplane Bandwidth112 GB/s (2.0 GB/s ASIC to ASIC)
  - Completely Passive
- P10000 3PAR V800 max config
  - 8 x Controller Nodes
  - 16 x Gen4 ASICs （2 per Node）
  - 16 x Intel® Quad-Core CPUs
  - 256 GB Control Cache
  - 512 GB Data Cache



HP 3PAR system components



HP 3PAR product Overview

	HP 3PAR P10000 (V class)	HP 3PAR F class	HP 3PAR T class
Capacity	1.6PB	384TB	800 TB Raw
	Maximum, depending on model	Maximum, depending on model. None included	Maximum, depending on model
Host Interface	8 Gb/sec Fibre Channel (192) Ports	4 Gb Fibre Channel (24) Ports or	4 Gb Fibre Channel (128) Ports or
	10 Gb/sec iSCSI (32) Ports	1 Gb iSCSI (16) Ports	1 Gb iSCSI (32) Ports
	Maximum, depending on model	Maximum, depending on model. None included	Maximum, depending on model
Type and Number of Disk Enclosures	(48) 3PAR 40-drive chassis	(24) 3PAR 16-drive chassis	(32) 3PAR 40-drive chassis
	Maximum, depending on model	Maximum, depending on model. None included	Maximum
Maximum drives per enclosure	40	(16) Maximum	40
			Maximum, depending on model

HP 3PAR product Overview

	HP 3PAR P10000 (V class)	HP 3PAR F class	HP 3PAR T class
Cache	768GB	24GB Data Cache maximum, depending on model	96 GB
	Maximum supported, depending on model	16 GB Control cache maximum, depending on model	Data Cache Maximum, depending on model
Storage Controller	(8) 3PAR Quad-core 2.8GHz P10000 Controller Node	(4) 3PAR 2.33GHz F-Class Controller Node	(8) 3PAR Dual-core 2.33GHz T-Class Controller Node
	Maximum, depending on model	Maximum, depending on model	Maximum, depending on model
Availability	Redundant power supplies and fans	Redundant power supplies and fans	Redundant power supplies and fans
	Redundant batteries	Redundant batteries	Redundant batteries

HP 3PAR product Overview

	HP 3PAR P10000 (V class)	HP 3PAR F class	HP 3PAR T class
Availability	A minimum of dual redundant controllers	A minimum of dual redundant controllers	A minimum of dual redundant controllers
	RAID 1, RAID 5 and RAID MP for data protection	RAID 1, RAID 5 and RAID MP for data protection	RAID 1, RAID 5 and RAID MP for data protection
	High availability cage and high availability magazine	High availability cage and high availability magazine	High availability cage and high availability magazine

HP 3PAR + OpenVMS supported Configurations

- HP 3PAR Storage models/HP 3PAR OS supported with OpenVMS
  - HP 3PAR OS 3.1.1 MU1 and above
    - V-Class (HP P10000 3PAR)
    - **Registered Release is now open, General Availability in targeted for mid CY2013**
- Supported OpenVMS versions
  - OpenVMS 8.4 integrity
  - OpenVMS 8.3/8.3 -1H1 integrity
- Supported OpenVMS version Hardware
  - HP Integrity Server Blades
    - BL860c, BL870c, BL860c i2, BL870c i2, BL890c i2
  - HP Integrity Servers
    - rx2660, rx2800 i2, rx3600, rx6600, rx7640, rx8640,
    - Integrity Superdome (SD1)

HP 3PAR + OpenVMS supported Configurations

- UDID Support
  - 12K (HP P10000 3PAR)
- Fibre Channel Support
- Multipath Support
- OpenVMS Cluster support
- HBA
  - Emulex 4G
  - QLogic 8G, 4G

HP 3PAR + OpenVMS supported Configurations

- Switches
  - –Brocade 4G,8G
  - –Cisco 4G,8G
  - –QLogic 4G,8G
- Boot from SAN
  - –Yes, for QLogic HBA
  - –No, for Emulex HBA
- Volume shadow for EVA to 3PAR migration

HP 3PAR Supported features on OpenVMS

- Thin Provisioning
- Adaptive Optimization
- Dynamic Optimization
- Virtual Copy
- Remote Copy
- Online Upgrades (3PAR OS 3.1.1 MU1 and above)

HP 3PAR unsupported features on OpenVMS

- Peer Motion
- 3PAR Host based software
  - Recovery Manager products not applicable in OpenVMS environments
  - No native System Reporter/IMC/CLI on OpenVMS servers. Requires Windows or Linux Servers
  - Host Explorer: Will require manual collection of host data when doing upgrades

HP 3PAR and OpenVMS – Current limitations and workaround

- HP 3PAR OS 3.1.1 MU1
  - In order to connect OpenVMS host to an HP 3PAR Storage Array, minimum version required is HP 3PAR OS 3.1.1. MU1
- UDID Support limits
  - The UDID supported limits for HP P10000 3PAR (V-Class) are 12K
- LUN 0 Manual creation
  - In order to connect OpenVMS hosts to a HP 3PAR Storage Array, **generic host persona 2** is recommended. The main limitation of using Host Person 2 is that LUN 0 has to be manually created, which may have some impact on SAN Management software
- Boot From SAN is not supported with Emulex HBA

Configuring HP 3PAR arrays for use with OpenVMS

Q & A

Thank you