



**Hewlett Packard
Enterprise**

HPE HC Simplivity

konwergentna chmura, pamięć masowa realizowana programowo (ang. Software Defined Storage)

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Agenda

Date

Description

Alternatywne rozwiązanie backupu w bardzo dobrej cenie: HPE VM Explorer + deduplikacja z HPE StoreOnce

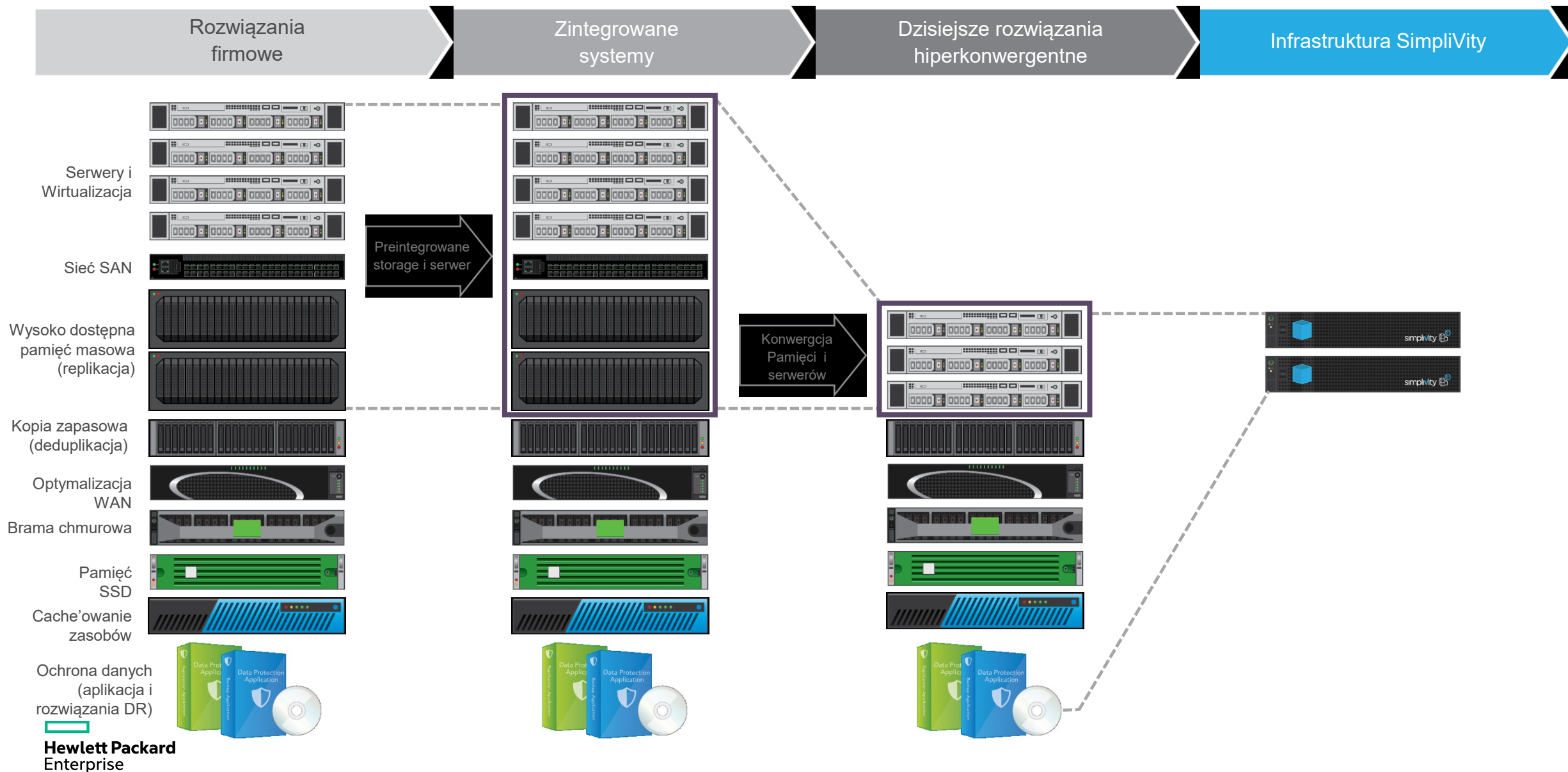
Niedrogi multisite stretched cluster (network RAID) z użyciem macierzy HPE StoreVirtual 3200.

Nowości w świecie HPE 3PAR - dodatkowe funkcjonalności, korzystne zmiany licencjonowania.



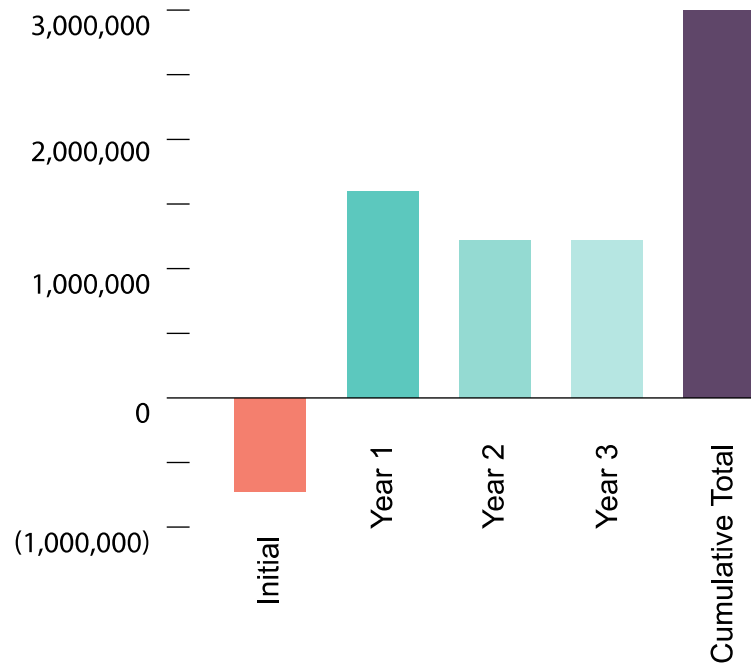
Zintegrowane rozwiązanie HPE

Transformacja, kierunek hiperkonwergencja



Redukcja kosztów IT i uproszczenie procesów operacyjnych

Financial Analysis (risk-adjusted)



**224%
ROI**

**6.6 M-c
Zwrot**

**3.7x
Redukcja
TCO**

FORRESTER[®]

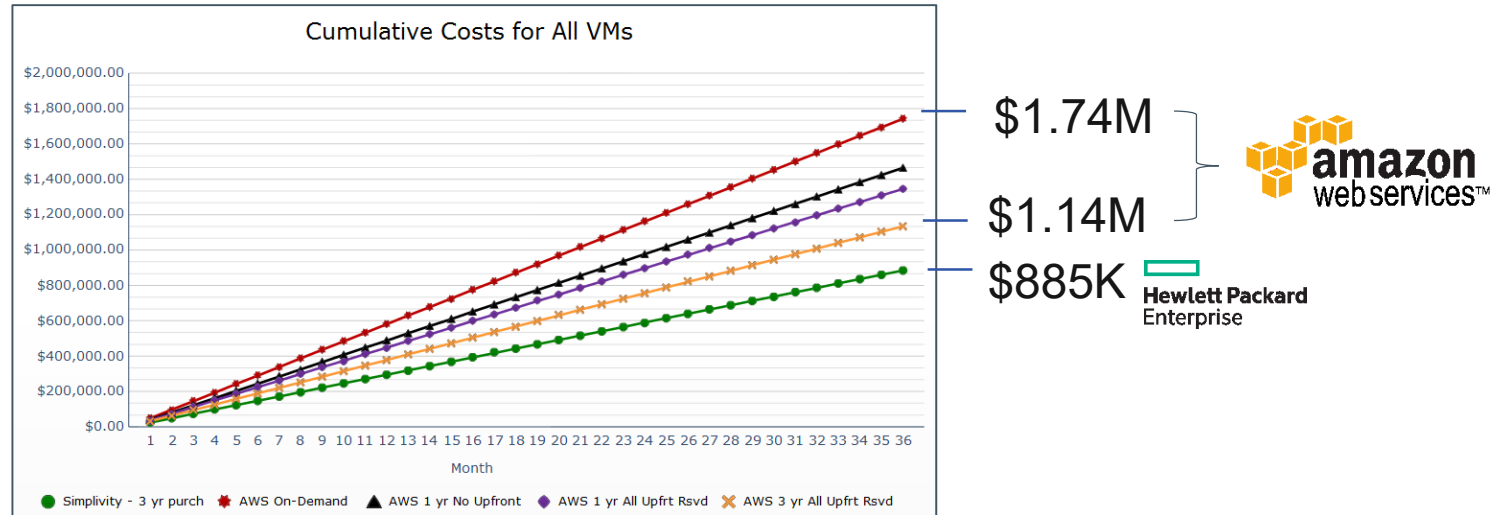
Source: Independent commissioned study conducted by Forrester Consulting

- Efektywność wykorzystania pamięci masowych : **60:1**
 - Redukcja miejsca w centrum przetwarzania: **10:1**
 - Redukcja procesów backup: **3 h/dzień**
 - Redukcja konsultingu : **24 h/tydzień**
-
- Więcej czasu na innowacyjność
 - Zwiększona wydajność aplikacji
 - Lepsze parametry odporności na awarie i katastrofy
 - Zunifikowane zarządzanie

Źródło: The Total Economic Impact Of SimpliVity Hyperconverged Infrastructure, a November 2015 commissioned study conducted by Forrester Consulting on behalf of SimpliVity.

SimpliVity TCO 22-49% niższe od AWS w 3 letnim okresie

Sumaryczne koszty 515 VM przez okres 3 lat



- Prosta instalacja i konfiguracja
- Efektywność pracy i przechowywania danych
- Więcej VM per admin
- 4% mniej per VM niż AWS

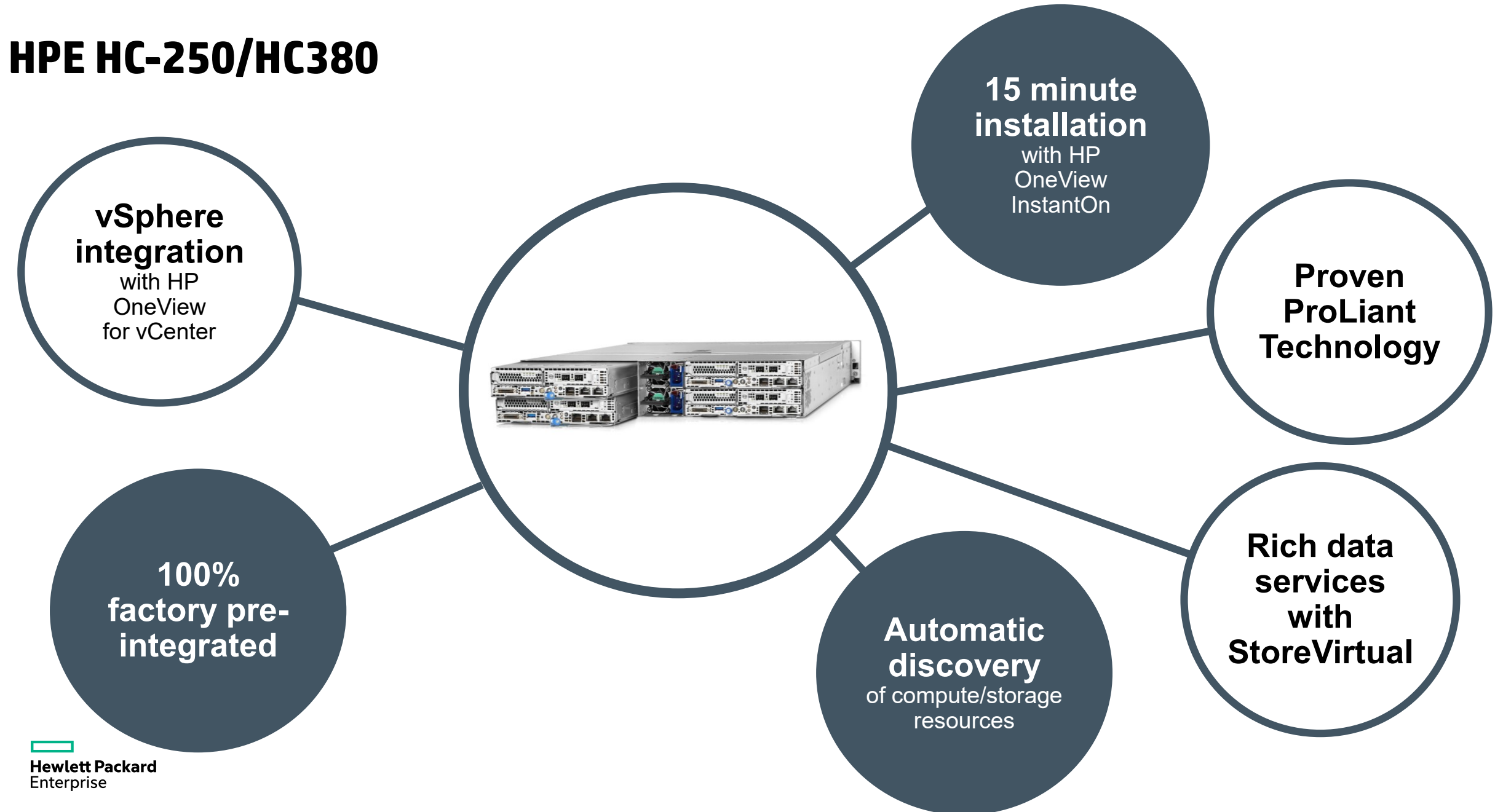
22%

Niższe TCO(3) od AWS
Rezerwacja z góry

49%

Niższe TCO(3) od AWS
Tryb na żądanie

HPE HC-250/HC380



2015 Gartner, Magic Quadrant for Deduplication Backup Target Appliances

Figure 1. Magic Quadrant for Deduplication Backup Target Appliances



Source: Gartner (September 2015)

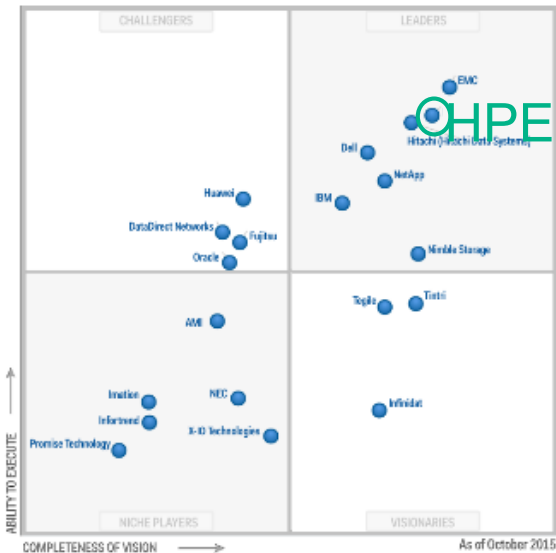
“By 2018, 50% of applications with high change rates will be backed up directly to deduplication target appliances, bypassing traditional backup software, up from 25% today.”

* This graphic was published by Gartner, Inc. as part of a larger research document and should be evaluated in the context of the entire document. The Gartner document is available upon request from HPE. Gartner does not endorse any vendor, product or service depicted in its research publications, and does not advise technology users to select only those vendors with the highest ratings or other designation. Gartner research publications consist of the opinions of Gartner's research organization and should not be construed as statements of fact. Gartner disclaims all warranties, expressed or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose. Gartner, Magic Quadrant for Deduplication Backup Target Appliances, Pushan Rinnen, Dave Russell, Robert Rhame, September 29, 2015.



Gartner - Recognized HPE Leadership

General-Purpose Disk Arrays



Gartner Magic Quadrant for General-Purpose Disk Arrays
21 October 2015
Analysts: Stanley Zaffos, Roger W. Cox, Valdis Filks, Santhosh Rao

Solid-State Arrays



Gartner Magic Quadrant for Solid-State Arrays
June 23, 2015
Analysts: Valdis Filks | Joseph Unsworth | Arun Chandrasekaran

Integrated Systems



Gartner Magic Quadrant for Integrated Systems
August 11, 2015
Analysts: Andrew Butler | George J. Weiss | Philip Dawson | Stanley Zaffos | Errol Rasit | Hiroko Aoyama

Deduplication Backup Appliances



Gartner Magic Quadrant for Deduplication Backup Target Appliances
September 25, 2015
Analysts: Pushan Rinnen | Dave Russell | Robert Rhame

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3Par – prawdziwie uniwersalna macierz (1+1=3)

Bezwzględny lider wszystkich zastosowań (ang. use cases)

Product or Service Scores for Overall



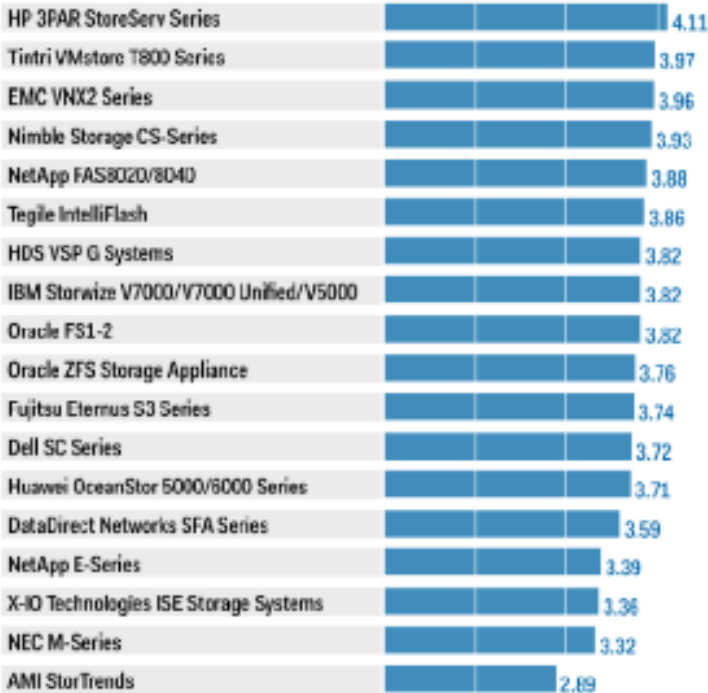
Product or Service Scores for Consolidation



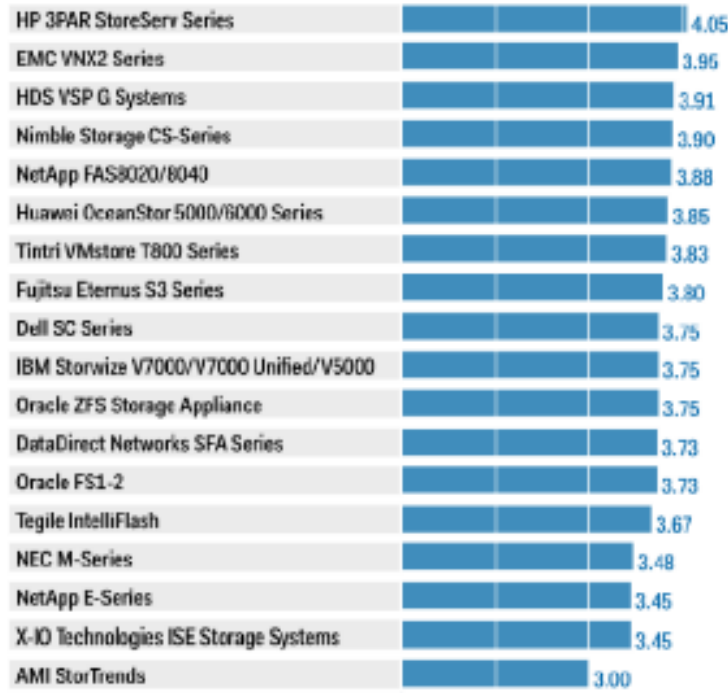
Product or Service Scores for DLTP



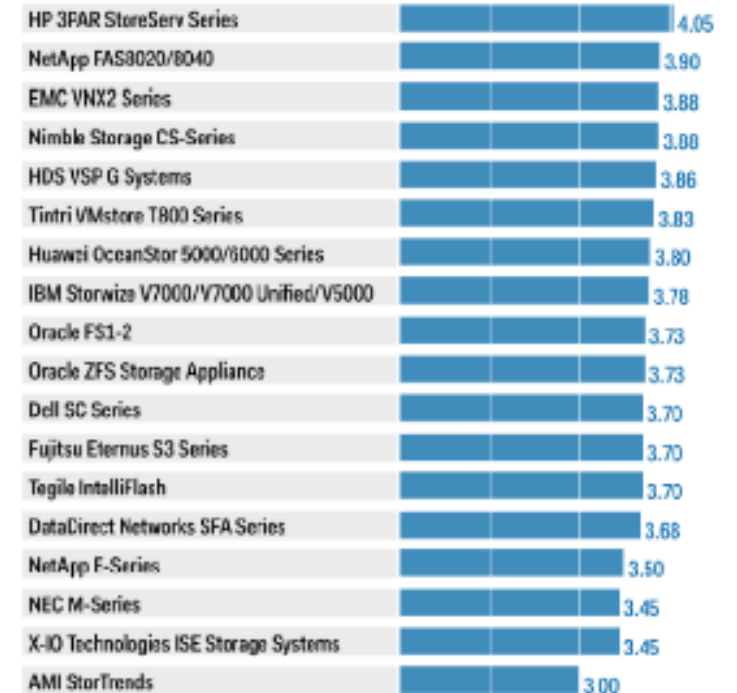
Product or Service Scores for Server Virtualization and VDI



Product or Service Scores for Analytics



Product or Service Scores for Cloud



RMC vs backup tradycyjny: porównanie (1+1=3)

Express backup



3PAR StoreServ

Kopia i odtworzenie – transfer bezpośredni**

StoreOnce RMC



StoreOnce Backup

Express Backup jest znacznie szybszy. Dane są transportowane bezpośrednio z macierzy produkcyjnej do urządzenia StoreOnce *

23x szybszy Backup*

Backup tradycyjny



3PAR StoreServ

Chroniona Aplikacja

Serwer kopii

Tworzenie i odtwarzanie kopii z udziałem serwerów produkcyjnego i backup

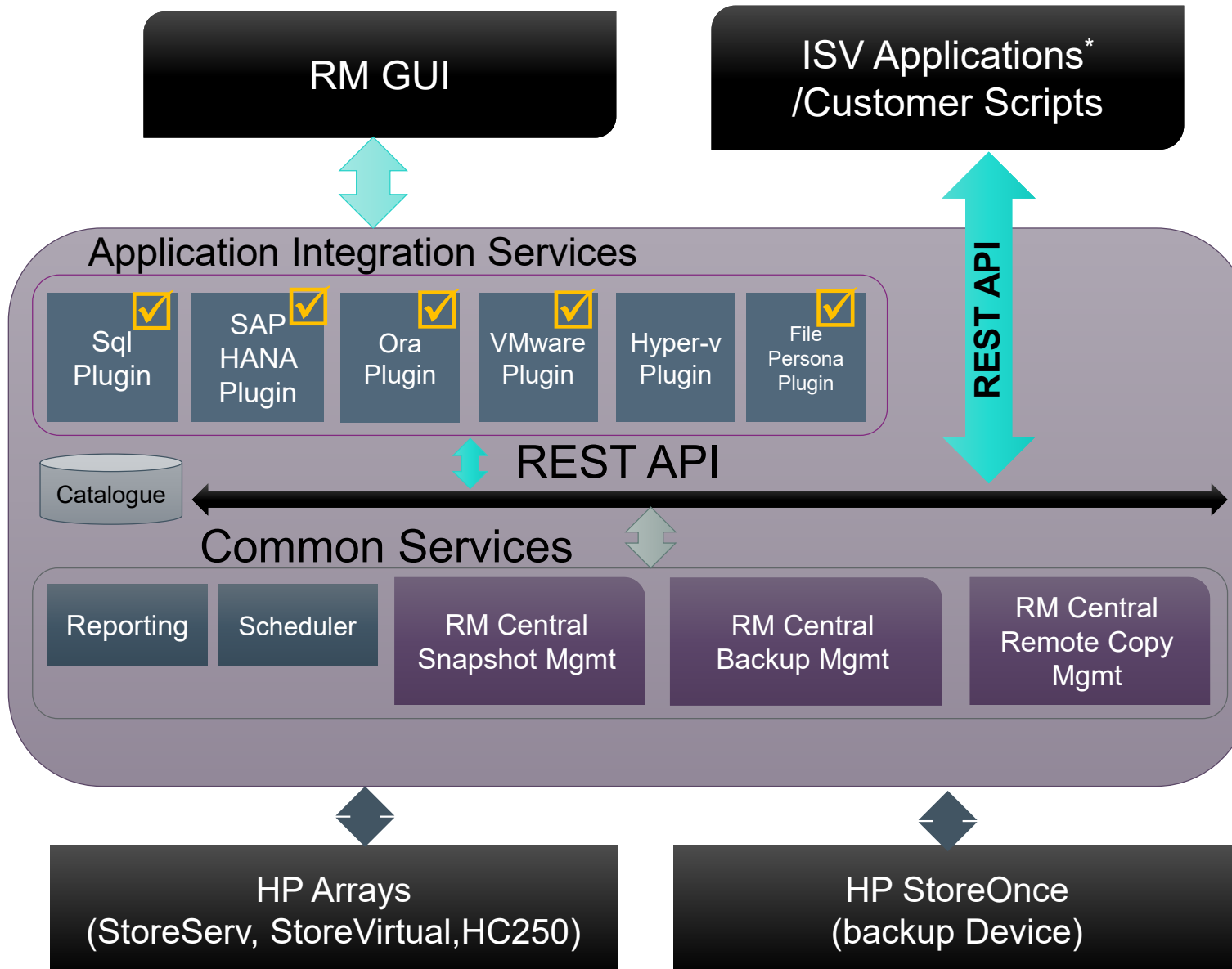


HPE StoreOnce

* Porównanie StoreOnce RMC oraz Symantec NBU

** Ekwiwalent tradycyjnego systemu o przepustowości 80TB/h

Recovery Manager – architektura rozwiązania

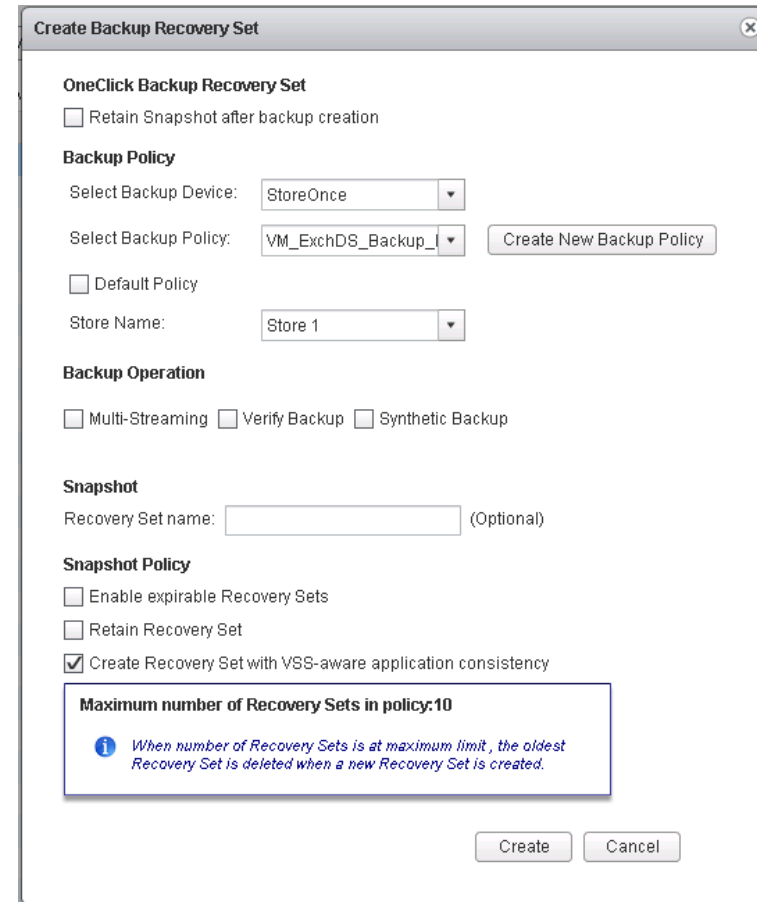
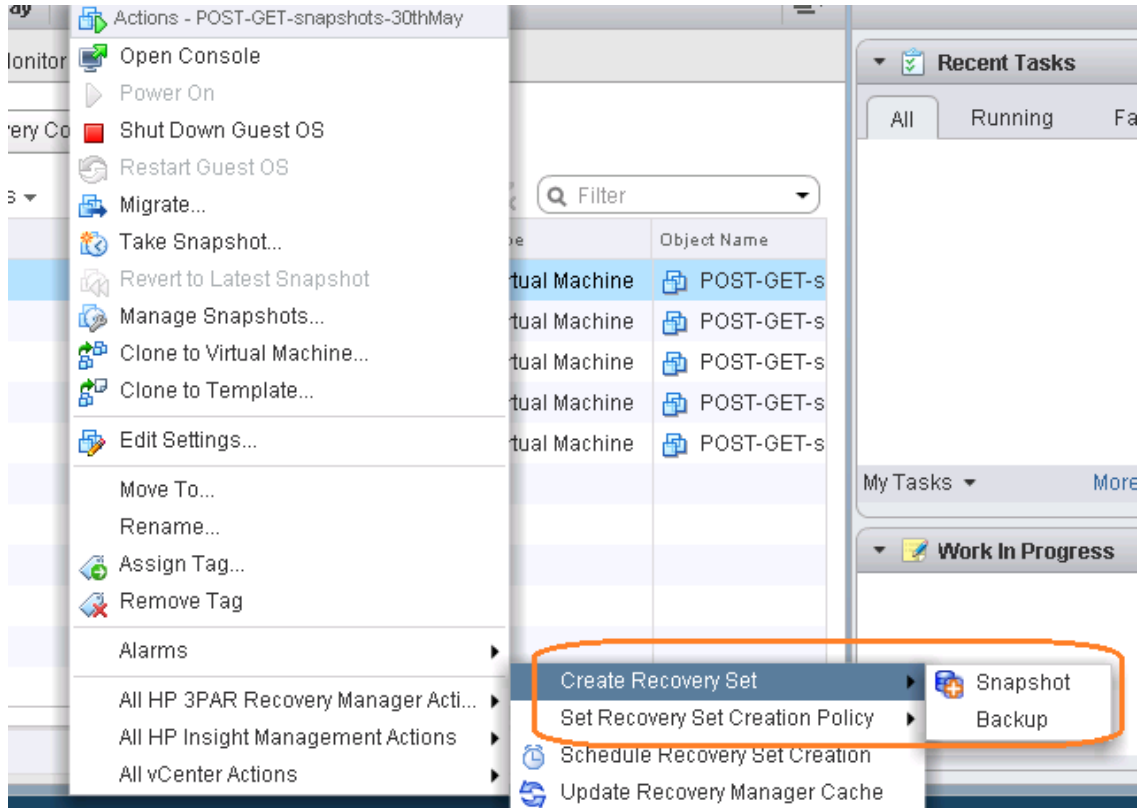


- **Consolidation** of all the Recovery Manager functionality into one.
- **Convergence** of all array support in one software
- **Better together** – StoreServ to StoreOnce Integration
- **ISV Integration*** enablement

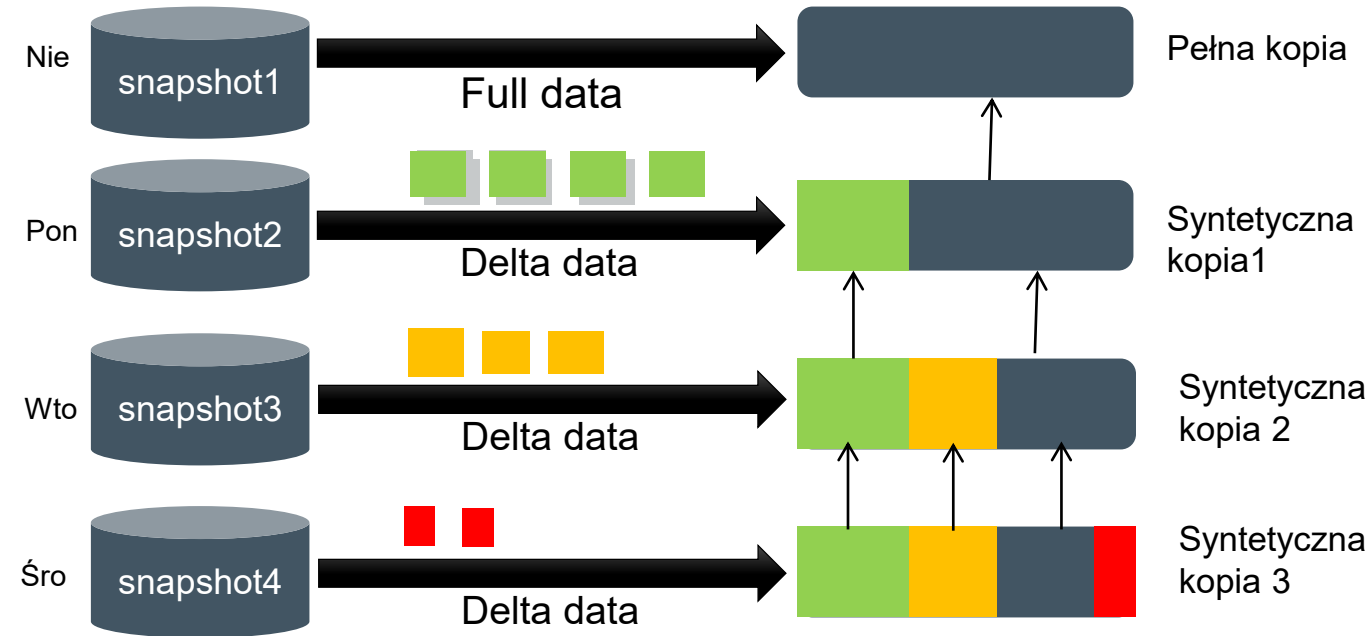
* HP-DP (9.0.5+), VRTS NetBackup (7.7+) and Backup Exec (2014+)

Recovery Manager: zarządzanie

RMCV – example GUI snaps set through vCenter / backup dialogue; similar for restore..



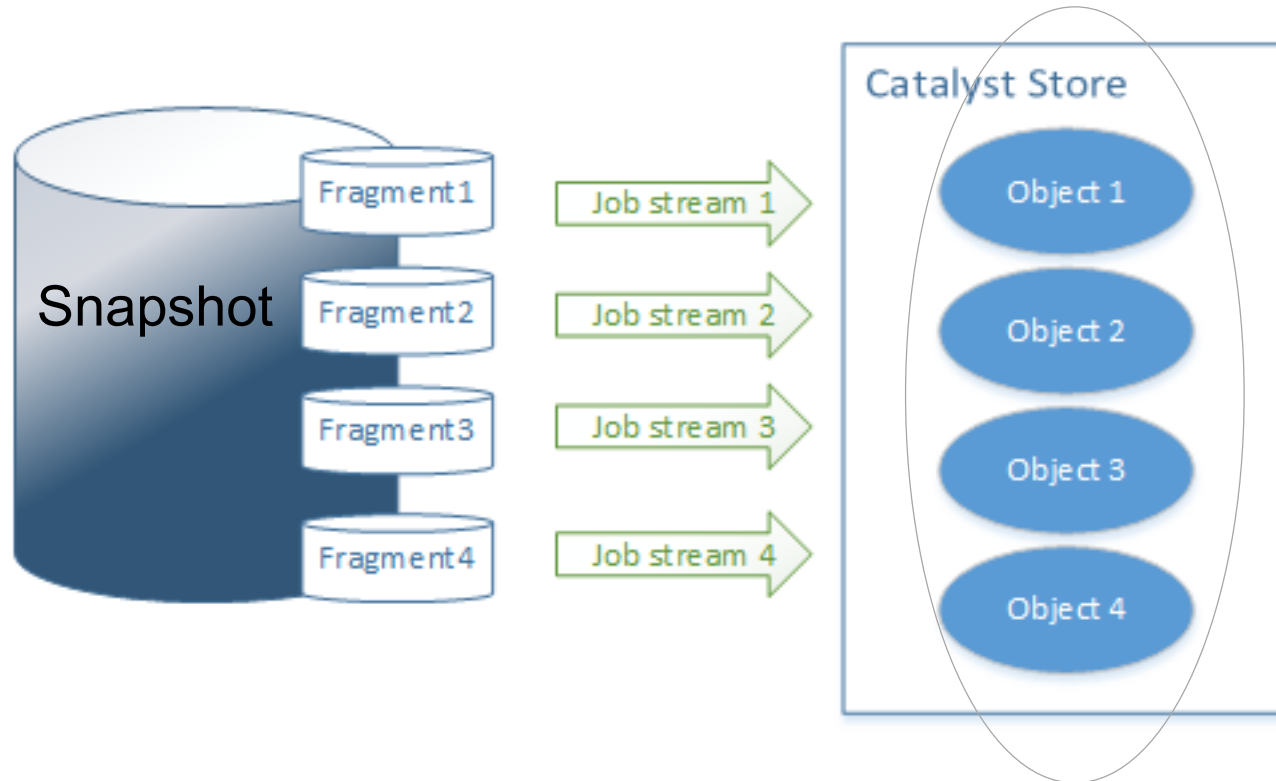
RMC: zawsze (Syntetyczny) pełny backup



- RMC creates Synthetic full backups.
- Data transferred will be just the delta data. However, the backup object created will be a full backup.
- Synthesizing the full backup is done without additional overhead neither on RMC nor StoreOnce device.
- This helps restore performance, preventing multiple-overlays of backups during restore. Which is error prone and time consuming.
- Optionally user is allowed to restore just the delta data. Giving both the options to the user.
- Replication to StoreVirtual VSA

Wsparcie wielu strumieni

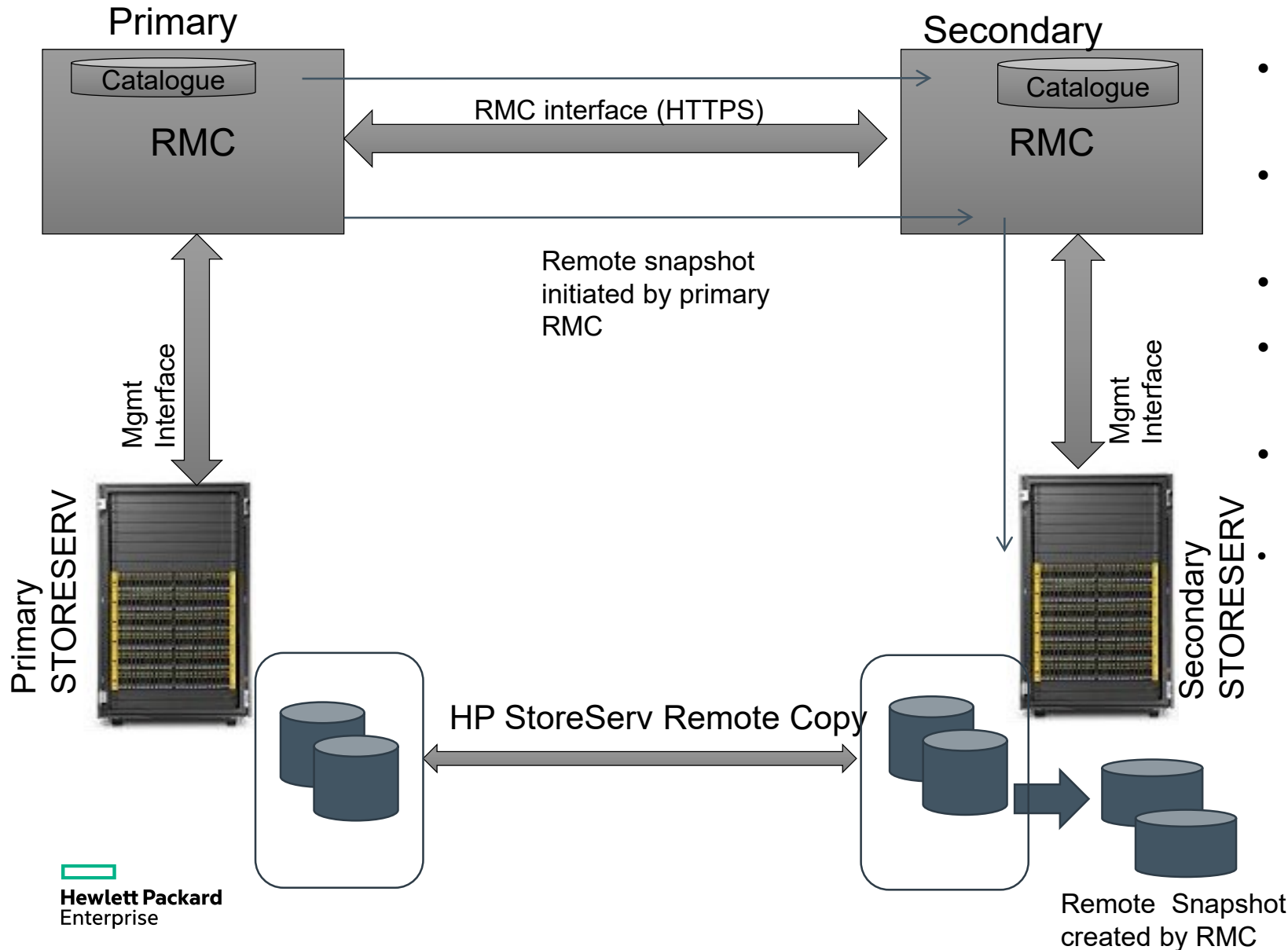
Automatic performance management



Obiekt Catalyst
reprezentujący kopię
woluminu

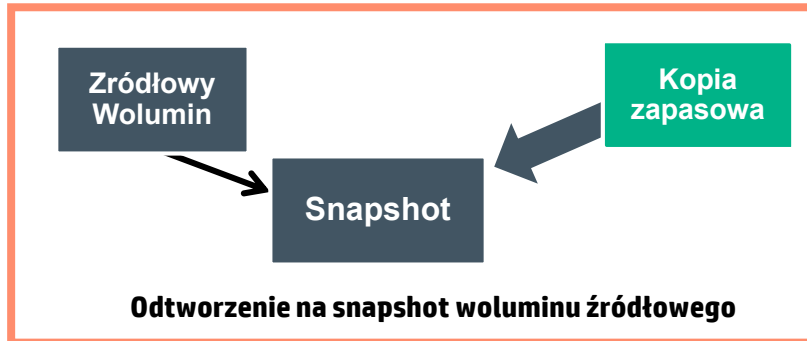
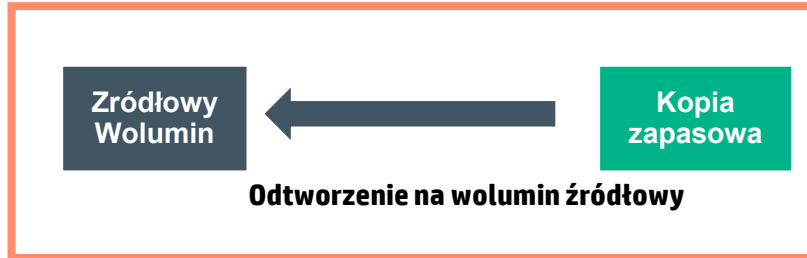
- Concurrent backups/restores deliver good performance with Catalyst deduplication API.
- Snapshot full backup takes a long time - making this a multi-streamed job increases performance by utilizing full bandwidth.

Rozwiązania DR: zdalne snapshot'y i zadania backup



- RMC leverages remote copy feature of StoreServ disk array.
- Creates a application consistent remote snapshot.
- Backups the remote snapshot.
- Synchs the remote site RMC catalogue – enabling DR functionality.
- Manages the work-flow related to the remote snapshot and backup.
- * Common interface for all HP arrays.

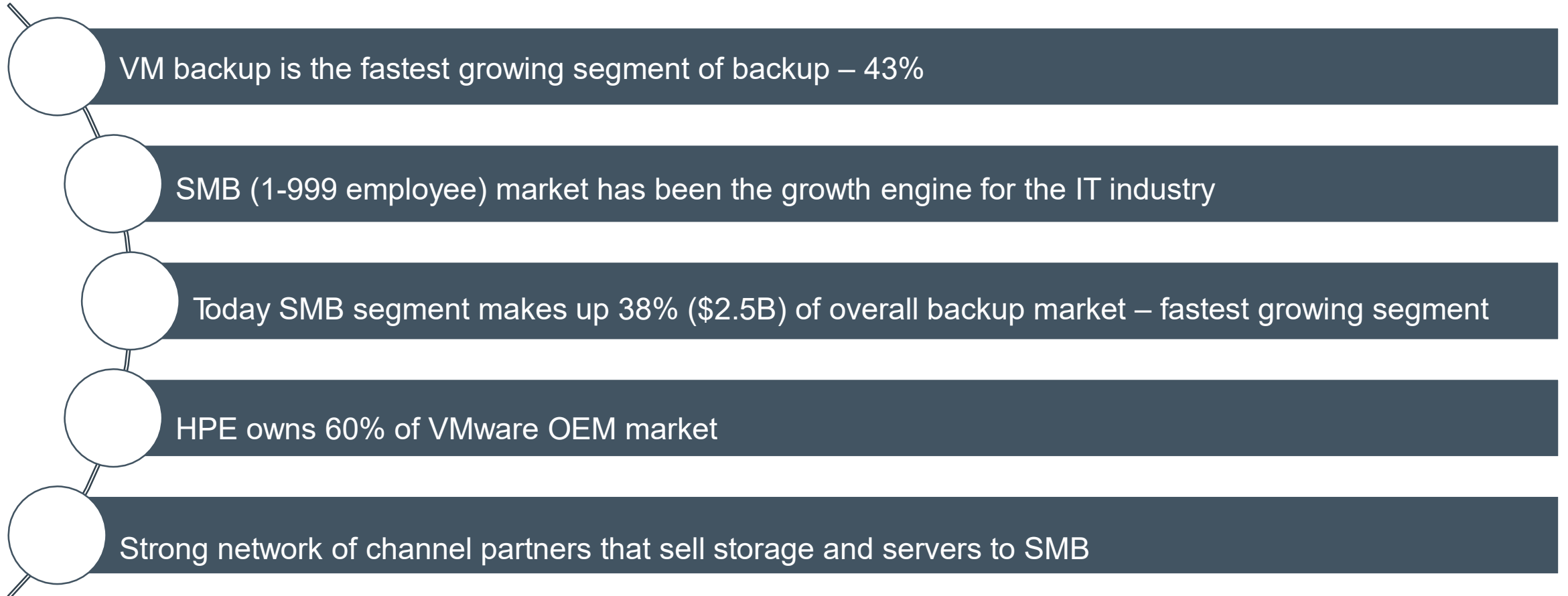
RMC: Opcje odtworzenia



- Odtworzenie
 - z lokalnego lub zdalnego snapshot'u i/lub kopii
 - na dowolny zasób macierzy 3PAR
- Element Recovery Technology (ERT)
 - Granularne odtworzenie plików, baz danych lub maszyn wirtualnych
 - 5 krotnie wyższa wydajność odtworzenia¹
 - Odtworzenie na dowolny zasób (niekoniecznie 3PAR)

¹W porównaniu do tradycyjnego systemu backup.

SMB virtualization backup – key trends and opportunity



SMB backup - challenges and needs

Environment

- Highly virtualized
- Standardized on VMware or Hyper-V

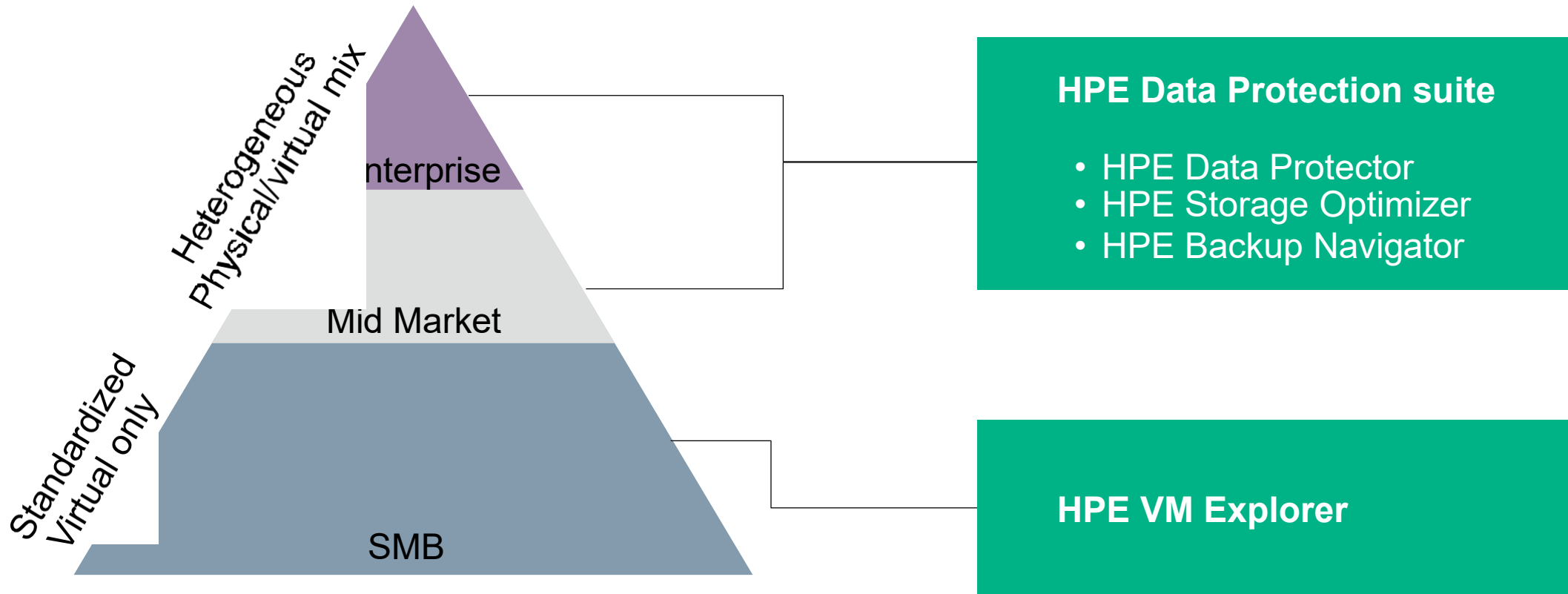
Challenges

- Limited IT staff and backup skills
- Most VM backup solutions are expensive

Needs

- Cost effective, easy to use backup solution
- Self-service, low touch

HPE's server backup market coverage





Introducing VM Explorer



VM Explorer

A cost effective easy to use backup solution for VMware and Hyper-V

- All-in-one solution (VMware vSphere & Microsoft Hyper-V)
- Easy to install and configure / manage
- User-friendly web interface
- Native cloud support
- Cost effective pricing model, priced aggressively
- Licensed software with multiple editions – Free, Pro. & Enterprise

Manage, Protect and Replicate Virtual Env. in Small Businesses

HPE VM Explorer

A uniquely simple and flexible backup solution for virtualized infrastructures: easy to configure and powerful functionalities.

- VMware & Hyper-V
- Full and incremental backups (CBT)
- Application consistent with VSS
- Storage Snapshots
- File level restoration
- Instant VM Recovery
- Replication for disaster recovery: Server-to-server fast copying
- Automated backup test
- Job scheduling
- Backup targets: Disks, NAS, Cloud, Tapes

The screenshot displays the HPE VM Explorer web interface, which is a dashboard for managing and backing up virtual environments. The interface is divided into several sections:

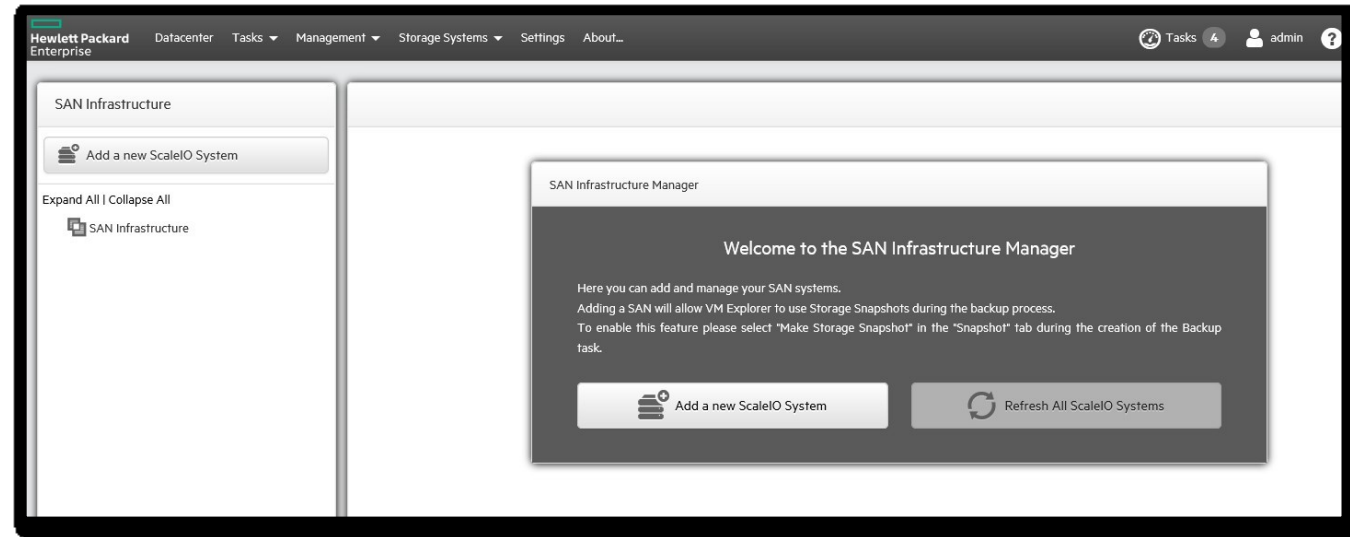
- My Datacenter:** A search bar and a tree view of virtual machines (VMs) under various hosts like 'vmvcenter55.cbc.gva'.
- VM Explorer:** A central panel with a 'Welcome to VM Explorer Web Interface' message and buttons for 'Add a new Server', 'Backup a Virtual Machine', and 'Restore a Virtual Machine'.
- Datacenter Overview:** A graph showing a green circle representing the datacenter's status.
- 10 days Scheduled Task Results:** A bar chart showing the results of scheduled backup tasks over the last 10 days.
- File Explorer:** A file browser showing the local computer's file system, including folders like 'Common Files', 'Internet Explorer', and 'Microsoft Office'.
- Task History:** A table listing the history of scheduled backup tasks, including their names, start and end times, durations, and results.
- Task Statistics:** A summary of scheduled tasks, showing 0 Success, 1 Failed, 4 Warning, and 0 Aborted.

Name	Start	End	Duration	Result
Backup of vmMichelG	Wednesday, January 20, 2016 2:42:49 PM	-	3 Minutes	Running
Backup of vmMichelG	Wednesday, January 20, 2016 2:31:53 PM	Wednesday, January 20, 2016 2:32:52 PM	1 Minute	Failed
Multi VDI VM Backup	Wednesday, January 20, 2016 12:41:28 PM	Wednesday, January 20, 2016 1:16:54 PM	36 Minutes	Warning
Backup of vmMichelG	Wednesday, January 20, 2016 11:00:02 AM	Wednesday, January 20, 2016 11:11:29 AM	12 Minutes	Warning
Multi VDI VM Backup	Wednesday, January 20, 2016 12:05:02 AM	Wednesday, January 20, 2016 12:40:39 AM	36 Minutes	Warning
Backup of vmMichelG	Tuesday, January 19, 2016 9:15:11 PM	Tuesday, January 19, 2016 9:26:17 PM	12 Minutes	Warning

VM Explorer Enterprise Features

Enterprise includes all the features in the Professional edition plus:

- Instant VM Recovery (IVMR) for ESX/ESXi
- Support for vMotion on IVMR
- File Level Restore from the Cloud
- Automated test on cloud backups
- Multi user web interface with AD integration
- Support for VMware vSAN
- Encryption (256bit AES)
- Support for storage snapshot with EMC ScaleIO, StoreVirtual
- Support for StoreOnce Catalyst



VM Explorer Professional Features

- Task Scheduler
- Incremental Backup
- Replication
- Tape Backup
- Automated backup test
- Cloud backup
- File Level Restore
- Email reports
- Command Line Interface

The screenshot displays the VM Explorer Professional web interface. The top navigation bar includes 'Hewlett Packard Enterprise', 'Datacenter', 'Tasks', 'Management', 'Storage Systems', 'Settings', and 'About...'. The user is logged in as 'admin'. The main content area is divided into several sections:

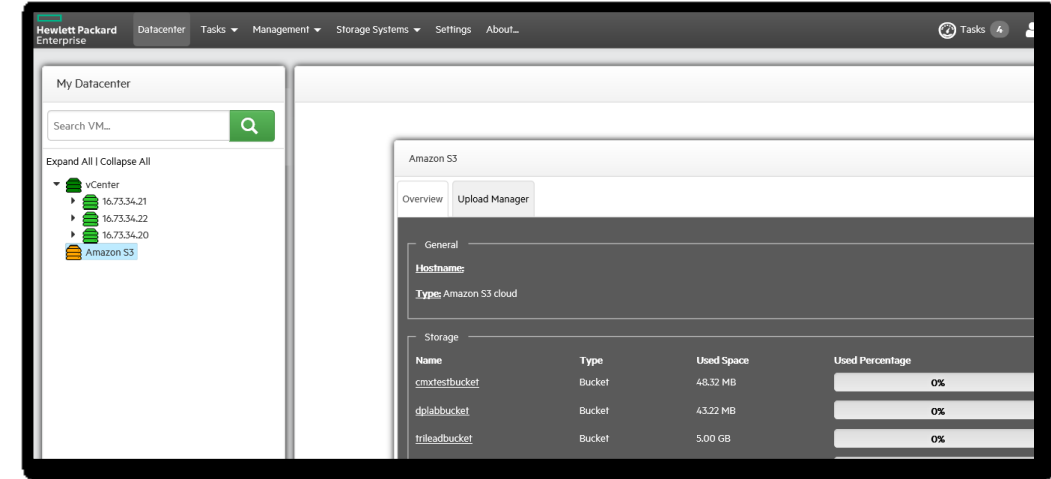
- My Datacenter:** A search bar for VMs and a tree view showing a vCenter with three hosts (IPs: 16.73.34.21, 16.73.34.22, 16.73.34.20) and an Amazon S3 cloud connection.
- VM Explorer:** A central dashboard with a 'Welcome to VM Explorer Web Interface' message. It features a 'Wizard' section with buttons for 'Add a new Server', 'Backup a Virtual Machine', 'Replicate a Virtual Machine', and 'Restore a Virtual Machine'. Below this is a 'Statistics' section showing 'Overview of scheduled tasks result in the last 24h.' with four metrics: Success (23), Failed (0), Warning (1), and Aborted (0).
- Graphs:** A 'Datacenter Overview' donut chart showing a split between Amazon S3 (orange) and vCenter (green). Below it is a '10 days Scheduled Task Results' bar chart.

Tapping into the cloud

Customers have widely differing backup requirements and environments.

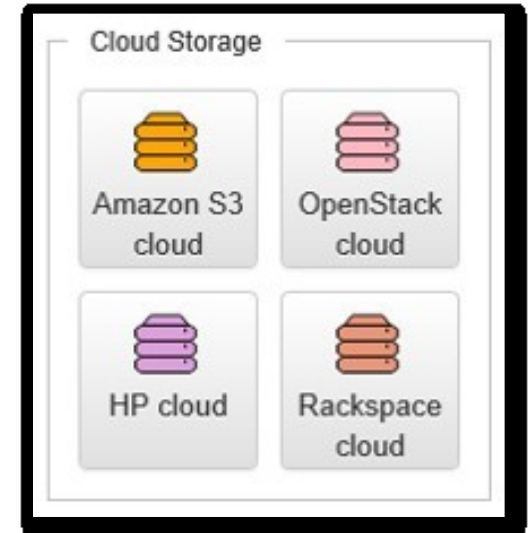
Numerous scenarios and backup targets supported:

- Local storage (direct attached)
- NFS / CIFS
- NAS
- SAN
- Tape
- Cloud



Cloud targets: **Amazon S3, OpenStack, Helion & Rackspace**

You can build your private OpenStack Object Storage infrastructure and backup your VM to your own cloud storage (e.g. Helion)



VM Explorer Web Interface

Web Interface

- Data Center Overview
- 10 days scheduled task results
- Add new server
- Backup VM
- Replicate VM
- Restore VM
- Etc.

The screenshot displays the VM Explorer Web Interface. The top navigation bar includes 'Hewlett Packard Enterprise', 'Datacenter', 'Tasks', 'Management', 'Storage Systems', 'Settings', and 'About...'. On the right, there are icons for 'Tasks', 'admin', and a 'Logout' button.

The main content area is divided into several sections:

- My Datacenter:** A search bar labeled 'Search VM...' and a tree view showing a hierarchy of data centers: vCenter (with IP addresses 16.73.34.21, 16.73.34.22, and 16.73.34.20), Amazon S3, and Hyper-V (with 'Win2012 R2 -File SVR' and 'Win2012R2 Template').
- VM Explorer:** A central panel with a 'Welcome to VM Explorer Web Interface' message. It contains a 'Wizard' section with buttons for 'Add a new Server', 'Backup a Virtual Machine', 'Replicate a Virtual Machine', and 'Restore a Virtual Machine'. Below this is a 'Statistics' section titled 'Overview of scheduled tasks result in the last 24h.' with four circular indicators: Success (25), Failed (0), Warning (0), and Aborted (0).
- Graphs:** A section containing a 'Datacenter Overview' donut chart showing the distribution of data centers (Hyper-V, Amazon S3, vCenter) and a '10 days Scheduled Task Results' bar chart.

The footer of the interface shows '© Copyright 2016 Hewlett Packard Enterprise Development LP' and a zoom level of '100%'.

VM Explorer Virtual Machine Backup

Hewlett Packard Enterprise | Datacenter | Tasks | Management | Storage Systems | Settings | About...

Virtual Machine Backup

General | Files & Disks | **Snapshot** | Connection | Advanced | Verify Backup

Virtual Machine Snapshot Options

- Include memory dump of the virtual machine (needs an additional snapshot).
- Quiesce the file system in the virtual machine (only when VMware tools are installed)**
- Set warning flag in case of a Volume Shadow Copy Service (VSS) error, for Windows Server 2008 or greater

In order to access and backup the virtual disks of a virtual machine a snapshot has to be created. The snapshot serves two purposes: First, it allows the backup software to access the VM's virtual disks. Second, it assures that the virtual disks won't be altered by the VM during the backup. To ensure that the system is in a consistent state at the time of the backup, the VM can be set to "quiesce" its virtual disks when the snapshot is being taken.

Storage Snapshot

- Make storage snapshot.

This feature will be performed only if all the datastores used by this VM are present in SAN Systems. If not, the backup of this VM will be executed without this feature.

Scheduled Tasks

- 10 RedHat machines (Paused)
- 17 Windows VMs (Paused)
- Cent21 - full
- Cent22 - full
- Cent23 - full
- Cent24 - full
- Cent25 - full
- Cent26 - full
- CentOS1 (Paused)
- CentOS21-26 - Incremental Copy Backup (Paused)
- Exchange backup (Paused)
- Hourly Backup of Windows D
- HP Cloud backup of RedHat7
- Mike and Gagan demo
- Replication test
- SQL backup (Paused)



VM Explorer Editions



HPE VM Explorer Editions (1)

	Free	Professional	Enterprise
Supported Hypervisors	VMware vSphere 4.0 - 6.0 VMware vCenter 4.0 - 6.0 VMware ESXi (free) 3.5 - 6.0 VMware ESX 3.5 - 4.1 Microsoft Hyper-V Server 2008 R2 (SP1) Microsoft Hyper-V Server 2012 Microsoft Hyper-V Server 2012 R2	VMware vSphere 4.0 - 6.0 VMware vCenter 4.0 - 6.0 VMware ESXi (free) 3.5 - 6.0 VMware ESX 3.5 - 4.1 Microsoft Hyper-V Server 2008 R2 (SP1) Microsoft Hyper-V Server 2012 Microsoft Hyper-V Server 2012 R2	VMware vSphere 4.0 - 6.0 VMware vCenter 4.0 - 6.0 VMware ESXi (free) 3.5 - 6.0 VMware ESX 3.5 - 4.1 Microsoft Hyper-V Server 2008 R2 (SP1) Microsoft Hyper-V Server 2012 Microsoft Hyper-V Server 2012 R2
Backup & Restore for virtual machines	✓	✓	✓
Backup virtual machines while powered on	✓	✓	✓
Direct Copy: copy files with drag&drop between ESX/Windows/Linux/FreeBSD servers	✓	✓	✓
Instant VM Recovery (IVMR) (ESX/ESXi, Local Backup)	✗	✗	✓
Support for vMotion on IVMR (ESX/ESXi, Local Backup)	✗	✗	✓
File Level Restore from the cloud	✗	✗	✓
Automated test on cloud backups (ESX/ESXi)	✗	✗	✓
Multi user interface with Active Directory Integration	✗	✗	✓

HPE VM Explorer Editions (2)

	Free	Professional	Enterprise
Tape Backup	✗	✓	✓
Virtual SAN (VSAN) support	✗	✗	✓
Storage Snapshots for EMC ScaleIO, HPE StoreVirtual VSA	✗	✗	✓
Incremental Backup	✗	✓	✓
Offsite backup copy	✗	✓	✓
Backup encryption (XTS-AES/256bit)	✗	✗	✓
File Level Restore (ntfs/fat/ext/lvm/ldm)	✗	✓	✓
Replication ESX/ESXi to ESX/ESXi	✗	✓	✓
Replication Hyper-V to Hyper-V	✗	✓	✓
Task Scheduler	✗	✓	✓
Automated backups test (ESX/ESXi)	✗	✓	✓
Cloud backup	✗	✓	✓
SSH Client	✓	✓	✓

HPE VM Explorer Editions (3)

	Free	Professional	Enterprise
Browse ESX, Hyper-V, Linux and FreeBSD Servers	✓	✓	✓
Backup from ESX/ESXi to ESX/ESXi (SAN or local storage), Windows, Linux or FreeBSD	✗	✓	✓
Backup from ESX/ESXi to VM Explorer management station	✓	✓	✓
Backup from Hyper-V to Hyper-V (SAN or local storage), Windows, Linux or FreeBSD	✗	✓	✓
Backup from Hyper-V to VM Explorer management station	✓	✓	✓
Generate compressed backups	✓	✓	✓
Migrate (clone) VMs from ESX to ESXi	✗	✓	✓
Max Devices (ESX/Hyper-V/Linux/FreeBSD host servers)	2	Unlimited	Unlimited
Password protect configuration	✗	✓	✓
Report via E-Mail	✗	✓	✓
Localized Webbased interface (en,de,it)	✓	✓	✓
Commandline Interface	✗	✓	✓
Start vSphere client with host credentials	✗	✓	✓

HPE VM Explorer Prof vs. Enterprise Summary

		Professional	Enterprise
Instant VM Recovery (IVMR) (ESX/ESXi, Local Backup)	✗	✗	✓
Support for vMotion on IVMR (ESX/ESXi, Local Backup)	✗	✗	✓
File Level Restore from the cloud	✗	✗	✓
Automated test on cloud backups (ESX/ESXi)	✗	✗	✓
Multi user interface with Active Directory Integration	✗	✗	✓
Virtual SAN (VSAN) support	✗	✗	✓
Backup encryption (XTS-AES/256bit)	✗	✗	✓
Deduplication (HPE StoreOnce NAS)	✓	✓	✓
Deduplication (HPE StoreOnce VTL)	✗	✓	✓
Deduplication (HPE StoreOnce Catalyst)	✗	✗	✓



HPE StoreOnce Backup Systems

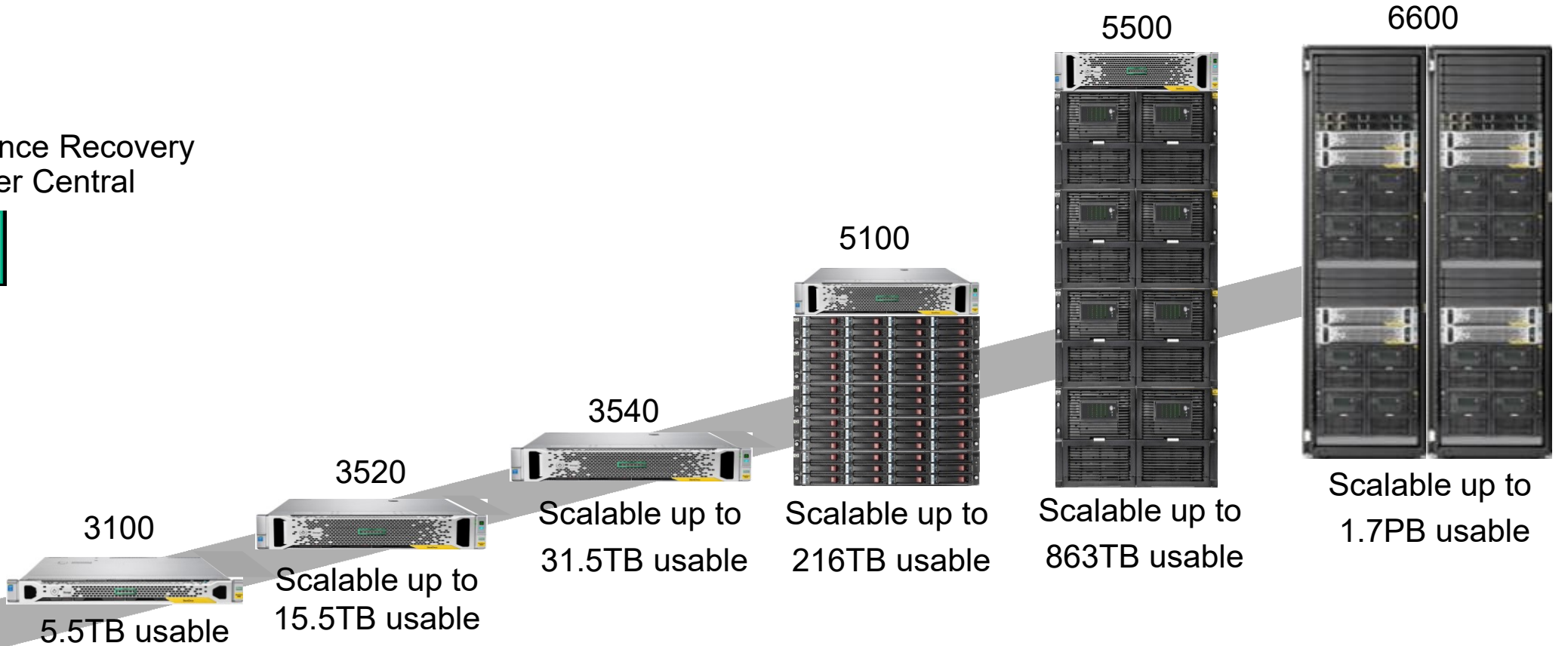
HPE StoreOnce Portfolio



StoreOnce Recovery
Manager Central



VSA

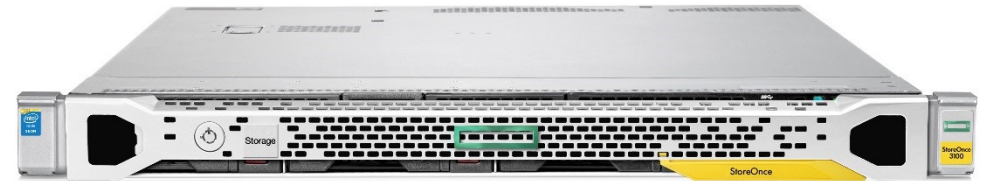


StoreOnce Catalyst
Backup/Restore/Copy



StoreOnce 3100 – BB913A

- Based on HPE DL360p LFF Disk Gen9 Server
 - 1 x Intel Xeon E5-2620v3 2.4Ghz Six-Core 64-bit processor
 - 32 GB RAM (2 x 16GB DDR4-2133)
 - 1 x 500W PSU as standard, option to add 2nd PSU
- HBAs
 - 1 x p1224 Storage Controllers with 1 GB FWBC (new part number to ensure f/w revision is a minimum 2.50)
- Storage
 - 4 x 2 TB using RAID 5 :
 - 5.5 TB usable space
 - 500 GB partition for OS/Application
 - No additional storage allowed
- Interfaces
 - 4 x 1GbE (LoM)
 - No FC or additional HBAs



Security bezel removed

StoreOnce 3520 – BB922A

– Based on HPE DL380p LFF Disk Gen9 Server

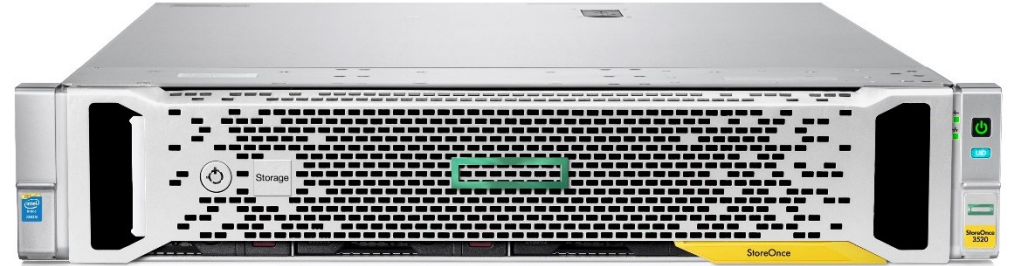
- 2 x Intel Xeon E5-2620v3 2.4Ghz Six-Core 64-bit processor
- 64 GB RAM (4 x 16GB DDR4-2133)
- 2 x 800W PSU as standard
- 4 x 1GbE network ports (LoM)

– HBAs

- 1 x p1224 Storage Controllers with 1 GB FWBC (new part number to ensure f/w revision is a minimum 2.50)
- Optional Hardware Available (see later)

– Storage

- 12 x 2 TB disks using RAID 6 (4+2) x2
- Basic Capacity capped at 50% of the available usable capacity.
- Software License (BB944A \ BB944AAE) expands filesystem to 14.1TB usable space. No additional Hardware required.



StoreOnce 3540 - BB914A

- Based on HPE DL380p LFF Disk Gen9 Server

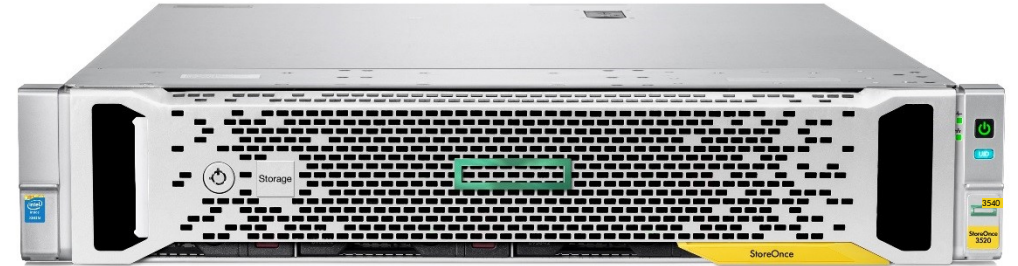
- 2 x Intel Xeon E5-2620v3 2.4Ghz Six-Core 64-bit processor
- 64 GB RAM (4 x 16GB DDR4-2133)
- 2 x 800W PSU as standard
- 4 x 1GbE Network Ports (LoM)

- HBAs

- 1 x p1224 Storage Controllers with 1 GB FWBC (new part number to ensure f/w revision is a minimum 2.50)
- 4 I/O slots for Optional Hardware (see later)

- Storage

- 12 x 4 TB disks using RAID 6 (4+2)x2
- Basic Capacity capped at 50% of the available usable capacity.
- Software License (BB944A \ BB944AAE) expands filesystem to ~28TB usable space. No additional Hardware required.



StoreOnce 5100 – BB915A

- Based on HPE DL380p LFF Disk Gen9 Server
 - 2 x Intel Xeon E5-2640v3 2.6Ghz Eight-Core 64-bit processor
 - 128 GB RAM (8 x 16 GB DDR4-2133)
 - 2 x 800W PSU as standard
 - 4 x 1GbE network ports (LoM)
- HBAs
 - Co1 x p1224 Storage controllers with 1 GB FWBC (new part number to ensure f/w revision is a minimum 2.50)
 - 4 x I/O slots for Optional Hardware (see later)
- Storage
 - Supports up to 5 additional D3650 JBODs i.e. BB916A upgrade kits
 - 2 x 920GB entry SAS Level HDDs for OS/Application – located on rear of product
 - ~32 TB usable space on 12 x 4 TB using RAID 6 (9+2 + 1 hot spare)



StoreOnce 5500

- Based on Proliant DL380p SFF Disk Gen9 Server
 - 2 x Intel E5-2680v3 2.6GHz twelve core 64-bit processor
 - 384 GB RAM (12 x 32 GB DDR4-2133)
 - 2 x 920 GB SFF drives in RAID 1+0
 - 500 GB partition for OS (CentOS) plus StoreOnce software
 - Connected to onboard P440ar controller with 2 GB Flash Based Write Cache (FBWC)
- HBAs
 - 2 x HPE p1228 RAID controller
 - 4 x optional I/O slots (Flex I/O)
 - 4 x 1GbE Ethernet ports (on motherboard – LoM)
 - iLO4



- Storage
 - 1 x D6020 enclosure (minimum configuration of 15 * 4 TB HDDs)
 - Supports up to 70 HDDs via 5 x BB941A upgrade kits per D6020
 - Additional 3 x D6020 shelf via BB933A
 - 216 TB usable space on 70 x 4 TB using RAID 6 (9+2) including 4 spares per D6020

StoreOnce 6600

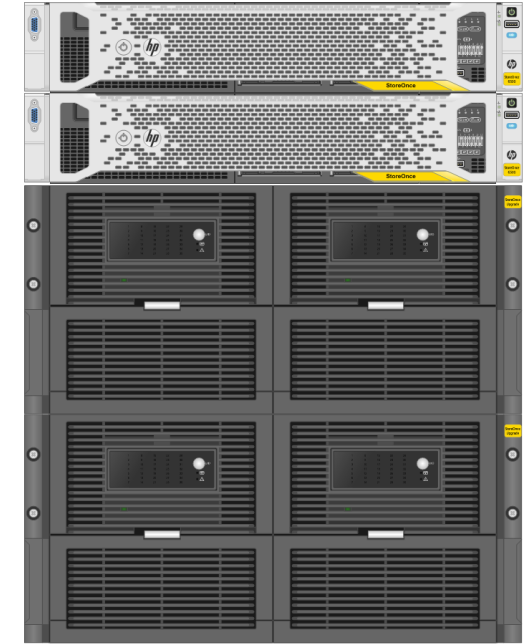
- Based on Proliant DL380p SFF Disk Gen9 Server

- Intel Xeon E5-2680v3 Twelve-Core 64-bit processor — 2.5 GHz
- 256 GB RAM (16 x 16 GB DDR4-2133)
- 2 x 920 GB SFF drives 7.2K SAS Server HDD for OS/Application
 - 500 GB partition for OS (CentOS) plus StoreOnce software

- HBAs

- 2 x p1228 "Defender 8E" Storage Controllers with 1 GB FWBCStorage
- 2 x optional I/O slots (Flex I/O)
- 2 x HPE NC552SFP 10 Gb 2-port Ethernet Server Adapter
- 4 x 1GbE Ethernet ports (on motherboard – LoM)

- 2 x D6020 enclosure (minimum configuration of 30 * 4 TB HDDs) per couplet
- Supports up to 140 HDDs via 5 x BB942A upgrade kits per couplet





HPE StoreOnce Backup Systems

specifications

HPE StoreOnce Backup – capacity scalability



StoreOnce	3100	3520	3540	5100	5500
Base SKU raw	8 TB	12 TB	24 TB	48 TB	60 TB
Capacity upgraded raw		12 TB	24 TB	5 x 48 TB	44 TB
Total Capacity raw	8 TB	24 TB	48 TB	288 TB	1120 TB
Base SKU Capacity usable	5.5 TB	7.5 TB	15.5 TB	36 TB	36 TB
Capacity upgrade usable		8 TB	16 TB	5 x 36 TB	23 x 36TB
Total Capacity usable	5.5 TB	15.5 TB	31.5 TB	216 TB	863 TB

HPE StoreOnce Backup System – Performance figures

Model	3100	3520	3540	5100	5500	6600
max VTL Write performance [TB/h]	1.6	4.6	4.6	13.8	20.4	151.2
max Catalyst performance [TB/h]	5.4	10.8	10.8	26.7	37.7	184

6600	1 couplet	2 couplet	3 couplet	4 couplet
max VTL Write performance [TB/h]	37.8	75.6	113.4	151.2
max Catalyst performance [TB/h]	46	92	138	184

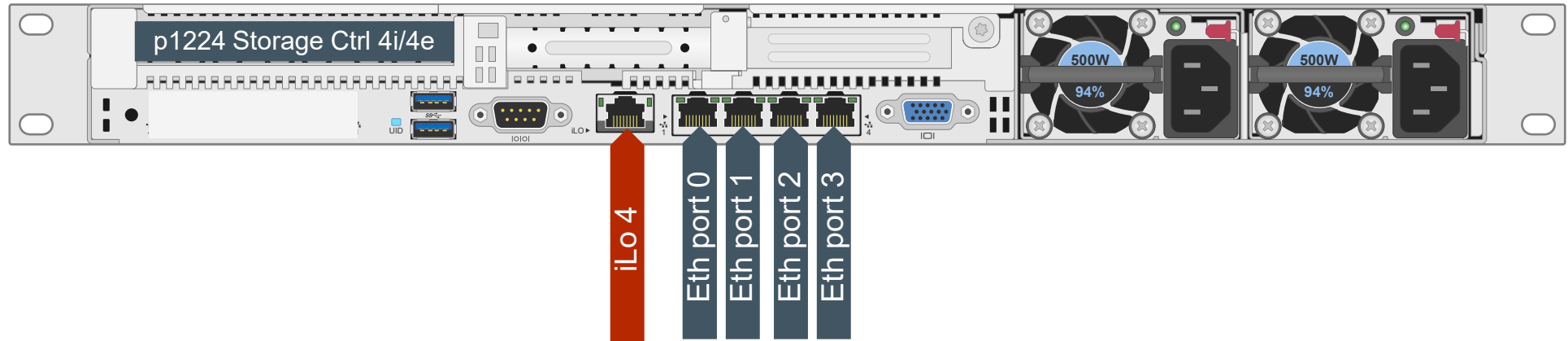


HPE StoreOnce Backup Systems

Connectors

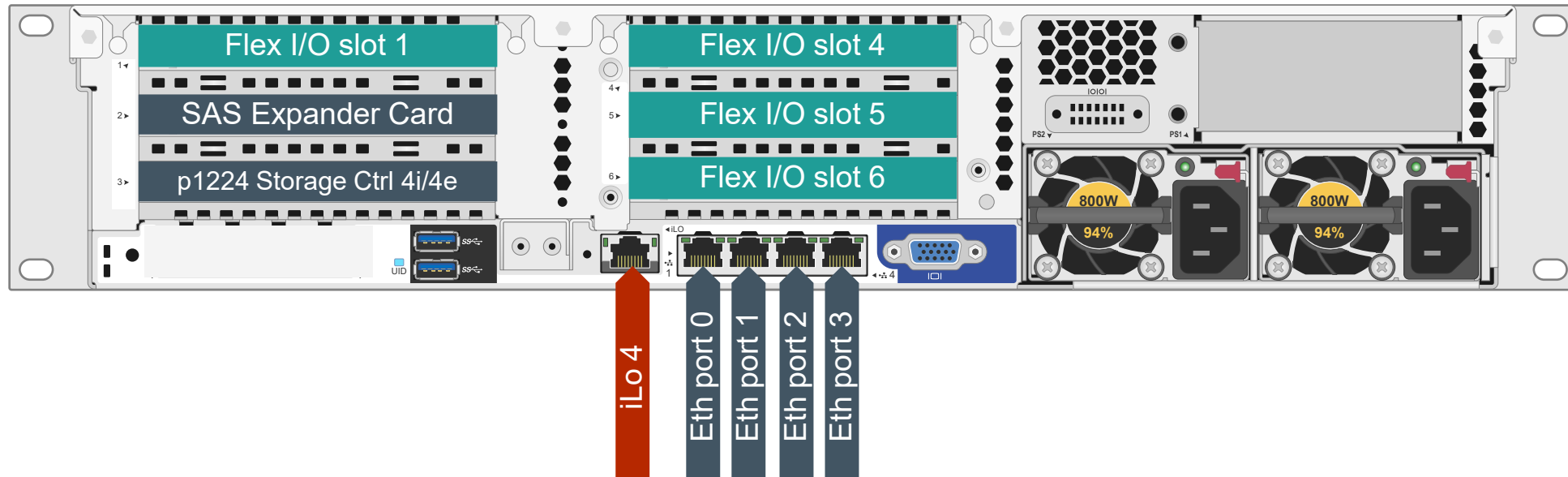
StoreOnce 3100

- HPE StoreOnce 3100 has 4 x 1GbE ports. They can be configured for individual subnets or bonded in any combination. Note for initial configuration the unit is configured with one subnet set to DHCP.



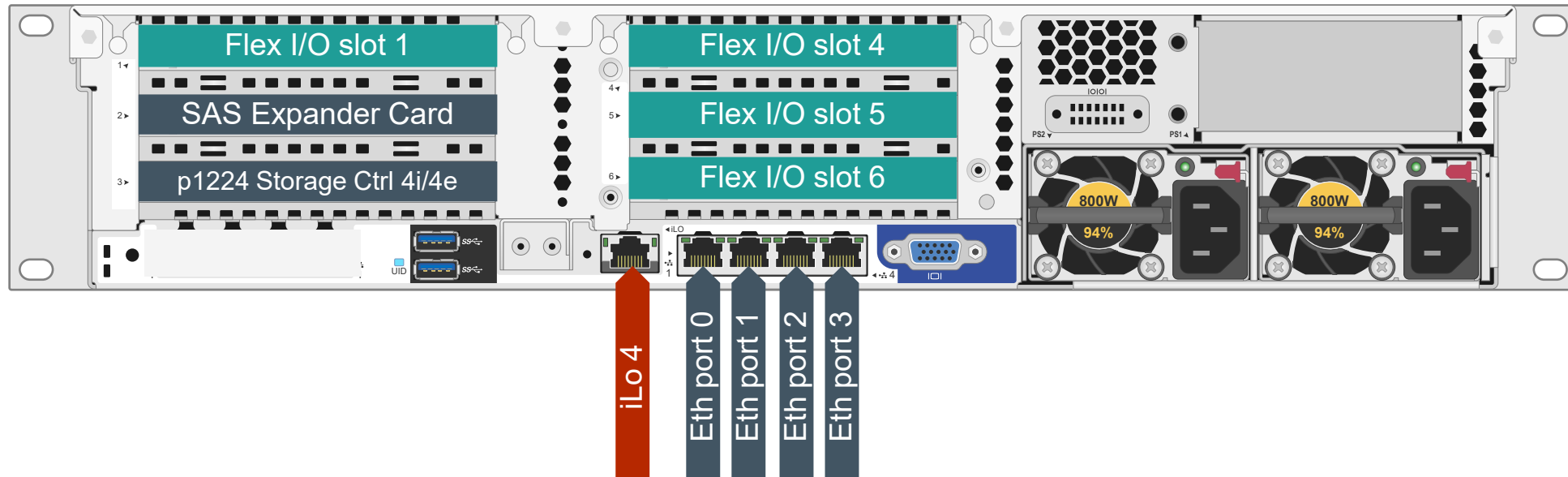
StoreOnce 35x0

- HPE StoreOnce 35x0 has 4 x 1GbE ports per default. They can be configured for individual subnets or bonded in any combination. Note for initial configuration the unit is configured with one subnet set to DHCP.



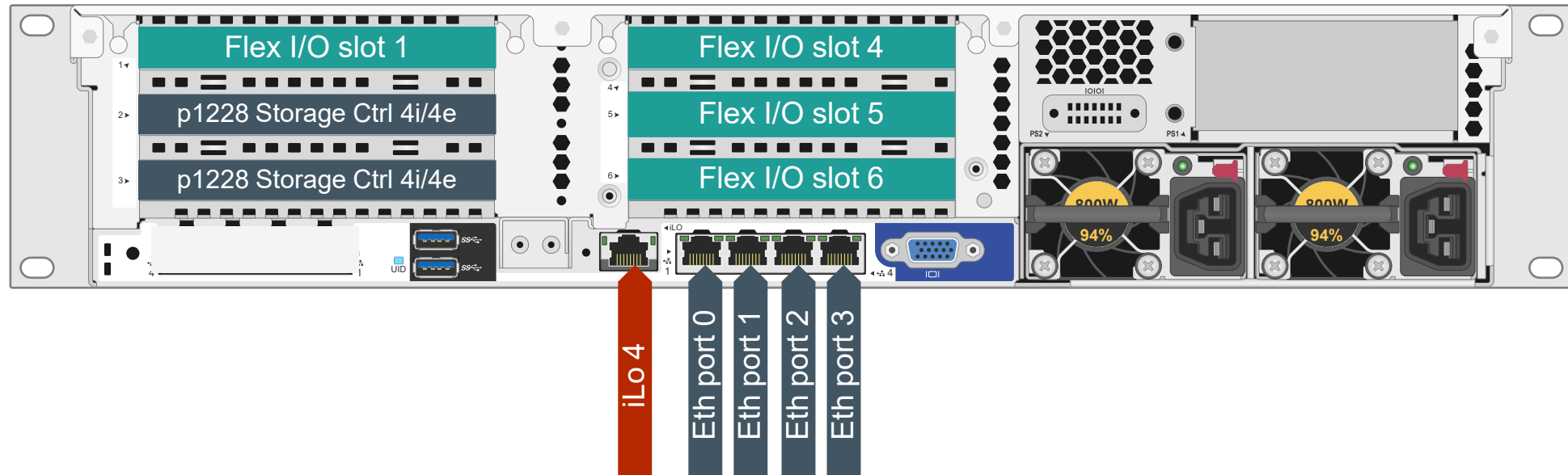
StoreOnce 5100

- HPE StoreOnce 5100 has 4 x 1GbE ports per default. They can be configured for individual subnets or bonded in any combination. Note for initial configuration the unit is configured with one subnet set to DHCP.



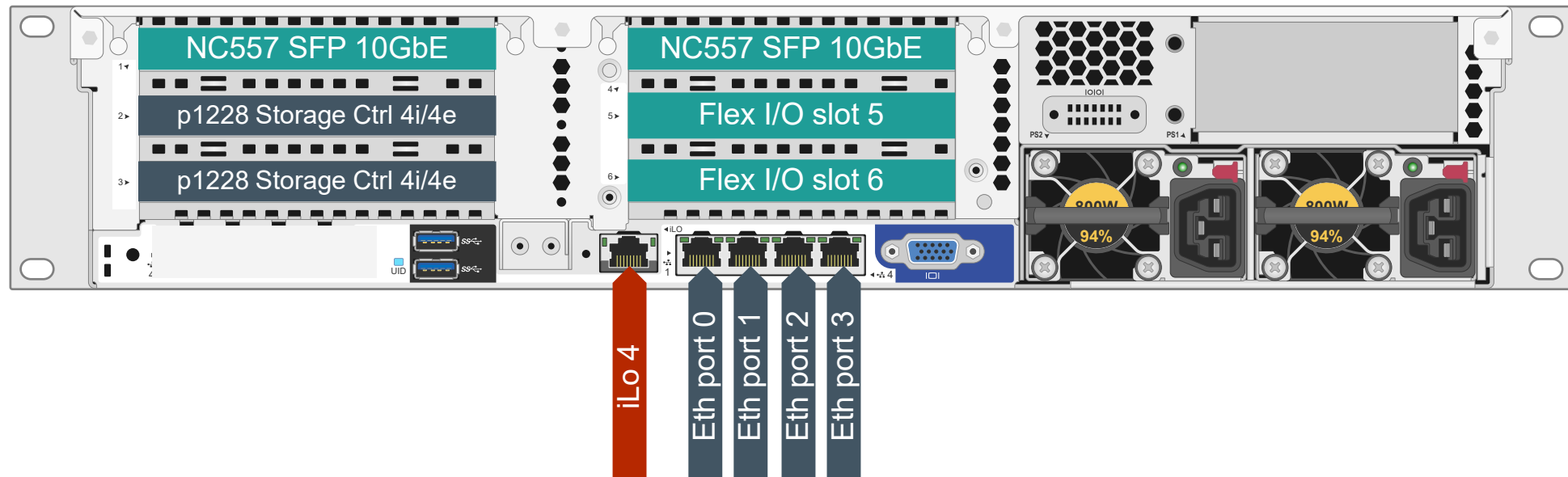
StoreOnce 5500

- HPE StoreOnce 5500 has 4 x 1GbE ports per default. They can be configured for individual subnets or bonded in any combination. Note for initial configuration the unit is configured with one subnet set to DHCP.



StoreOnce 6600

- The Flex I/O cards at HPE StoreOnce 6600 are used to connect the StoreOnce Backup System to the servers. They are options to both the base and upgrade couplets and go into the nodes of the couplets.
- The Flex I/O cards must be added in quads, all 4 cards in a couplet must be the same type (e.g. 16Gb Fibre Channel)





HPE StoreOnce VSA

StoreOnce VSA - Specification

	VSA 4 TB	VSA 10 TB	VSA 20 TB	VSA 32 TB	VSA 50 TB
Max useable configurable capacity	4 TB	10 TB	20 TB	32 TB	50 TB
Catalyst write performance (max)	1TB/hour	2TB/hour	6 TB/hour	6 TB/hour	12TB/hour
NAS, VTL write performance (max)	400GB/hour	800GB/hour	2.4 TB/hour	2.4 TB/hour	3,6TB/hour
Replication fan-in/fan-out (appliance)	8/2	8/2	8/2	8/2	8/2
Backup targets (recommended max)	4	6	8	8	8
Backup targets supported	Catalyst, VTL, NFS, CIFS over Ethernet				
Hypervisor support	VMware ESXi, Microsoft Hyper-V, see http://www.hpe.com/storage/BURACompatibility				
License to use term	unlimited				
Technical support	Business hours phone technical support included for LTU term				
Care Packs	Available to upgrade included technical support				

StoreOnce VSA configuration information

All Hypervisor

- Capacity upgrade licenses are available. Adding a capacity upgrade license is non-disruptive. Once the new license is added increased backup data capacity can be configured. The larger usable capacity will require adding more memory and processor resources to meet performance. Adding resources requires the StoreOnce VSA to be restarted so these upgrades should be done outside backup times.
- The StoreOnce VSA requires significant disk I/O for backup and recovery operations. The number, type and configuration of hard disks that provide capacity for the virtual disks is an important choice. The number of disks and the type of disk will significantly affect the I/O potential and consequently backup and recovery performance.
- To be resilient to hard disk failure it is recommended that RAID protection is used. To further reduce risk from physical hard disk failure, the disks used for StoreOnce VSA backup data storage should not be shared with hard drives that provide storage for the protected data and virtual machines particularly if backup data copy/replication is not used.
- It is recommended that the effect of the resource consumption of the StoreOnce VSA on other virtual applications running on the same pool of resources is assessed. This impact assessment should consider any backup software components, running in virtual machines, which will require resources to execute backup and recovery jobs.

Recommended minimum resources

Configured capacity	1 TB to 4 TB	5 TB to 10 TB	10 TB to 50 TB
Memory (min)	16 GB	24 GB	32 GB
Processor (min @ 2.2 GHz)	2 vCPU	4 vCPU	12 vCPU
IOPs (typical)	450	900	2700

What are the the new StoreOnce VSA feature in 3.16.2?

- Branding is now consistent with the StoreOnce hardware platforms.
- Support for fibre channel connect for Virtual Tape & Catalyst over FC. (Note: VMWare version ONLY at present. 8GB fibre only).
- New 32TB capacity license. (enables max. capacity in MS Azure public cloud)
- New capacity upgrade licenses. 20TB to 32TB and 32TB to 50TB

- Post GA support will be introduced for VMWare vSphere 2016 and Microsoft Hyper-V 2016

- Deployment in Microsoft Azure Cloud as a replication/catalyst copy target.

Please note the 'stackable license' model is not available in this release. Planned for future StoreOnce VSA releases.

StoreOnce VSA version 3.16.2 with Fibre Channel connect

The screenshot displays the configuration interface for StoreOnce VSA Software. The top navigation bar includes the HP logo, 'StoreOnce VSA Software', and user information (User: Admin, Role: admin). The left sidebar contains a 'Navigator' with various system components. The main area is titled 'Configuration' and has tabs for 'Status', 'Settings', 'Clients', 'Blackout Windows', 'Bandwidth Limiting Windows', and 'Fibre Channel Settings'. The 'Fibre Channel Settings' section shows the 'Identifier' and 'Identifier Alias' as 'COFC-2DC512ED8B01'. Below this is a 'Ports' section with a 'Target Ports' table. The 'Devices' section contains two tables: 'Target Devices' and 'Initiator Devices'. The 'Target Devices' table lists two devices connected to HBA-1 ports, both online with 8Gb/s speed. The 'Initiator Devices' table lists two devices connected to HBA-1 ports, both online.

System Status

System Time: Mar. 2, 2017, 10:38:19 AM GMT
Version: 3.16.1-1707.1
Total Events: 7 (Critical), 1 (Warning), 68 (Info)

Configuration

Settings | Clients | Blackout Windows | Bandwidth Limiting Windows | **Fibre Channel Settings**

Fibre Channel Settings

Identifier: COFC-2DC512ED8B01
Identifier Alias: COFC-2DC512ED8B01 [Edit]

Ports

Target Ports

Port	Port Location	Status	Speed	Topology	Beacon
Port 1	HBA-1.Port1	8Gb/s	Auto (default)	N_Port (default)(requires Switch Port to support NPIV)	<input type="checkbox"/>
Port 2	HBA-1.Port2	8Gb/s	Auto (default)	N_Port (default)(requires Switch Port to support NPIV)	<input type="checkbox"/>

[Edit]

Devices

Target Devices

Device Name	Status	FC Address	World Wide Node Name	World Wide Port Name	Number of Logins	Number of Devices per Login
Catalyst over FC Target Port 1	Online	0x350F01	5001438026EDD5E1	5001438026EDD5E0	2	1
Catalyst over FC Target Port 2	Online	0x360F01	5001438026EDD5E3	5001438026EDD5E2	2	1

[Edit]

Initiator Devices

Device Name	Status	FC Address	World Wide Node Name	World Wide Port Name
Catalyst over FC Initiator Port 1	Online	0x350F00	5001438034408D99	5001438034408DA0
Catalyst over FC Initiator Port 2	Online	0x360F00	5001438034408D9F	5001438034408DA0

StoreOnce VSA version 3.16.2 with Fibre Channel connect

VTL emulation on StoreOnce VSA with FC configured

The screenshot displays the StoreOnce VSA Software configuration interface. The top navigation bar includes the Hewlett Packard Enterprise logo, the product name 'StoreOnce VSA Software', and user information: 'User: Admin', 'Role: admin', 'Logout', and 'Help'.

The left sidebar contains a 'System Status' section with the following information:
System Time: Mar. 2, 2017, 10:40:04 AM GMT
Version: 3.16.1-1707.1
Total Events: 7 (critical), 1 (warning), 68 (info)

The main content area is titled 'Configuration' and has two tabs: 'Fibre Channel Settings' (which is highlighted with a red box) and 'iSCSI Settings'.

Under the 'Fibre Channel Settings' tab, there is a 'Target Ports' section containing a table with the following data:

Port Index	Port Location	Status	Speed	Topology	Beacon
Port 1	HBA-1.Port1	8Gb/s	Auto (default)	N_Port (default)(requires Switch Port to support NPIV)	<input type="checkbox"/>
Port 2	HBA-1.Port2	8Gb/s	Auto (default)	N_Port (default)(requires Switch Port to support NPIV)	<input type="checkbox"/>

An 'Edit' button is located at the bottom right of the table.

StoreOnce VSA version – configuring pass-through

The screenshot displays the VMware vSphere Web Client interface. In the left-hand 'Navigator' pane, the virtual machine 'SOVSA-FC' is highlighted with a red box. The main content area shows the 'SOVSA-FC - Edit Settings' dialog box, which is open to the 'Virtual Hardware' tab. This dialog lists various hardware components for the VM, including CPU (2), Memory (16384 MB), and two Hard disks (46.56612777709961 GB and 1,024 GB). Under the 'SCSI controller 0' (LSI Logic Parallel), two Network adapters are listed, both connected to 'Infra(10) (dvSwitch)'. The 'PCI device 0' and 'PCI device 1' are both set to '0000:05:00.0 | QLogic Corp ISP2532-based 8Gb Fibre Channel to PCI Express HBA', with these entries highlighted by a red box. A tooltip is visible over the 'PCI device 1' entry, showing the full device name. At the bottom of the dialog, the 'New device' dropdown is set to '----- Select -----', and the compatibility is noted as 'ESXi 5.1 and later (VM version 9)'. The background shows the vSphere interface with a 'Getting Started' section and a 'Basic Tasks' list.

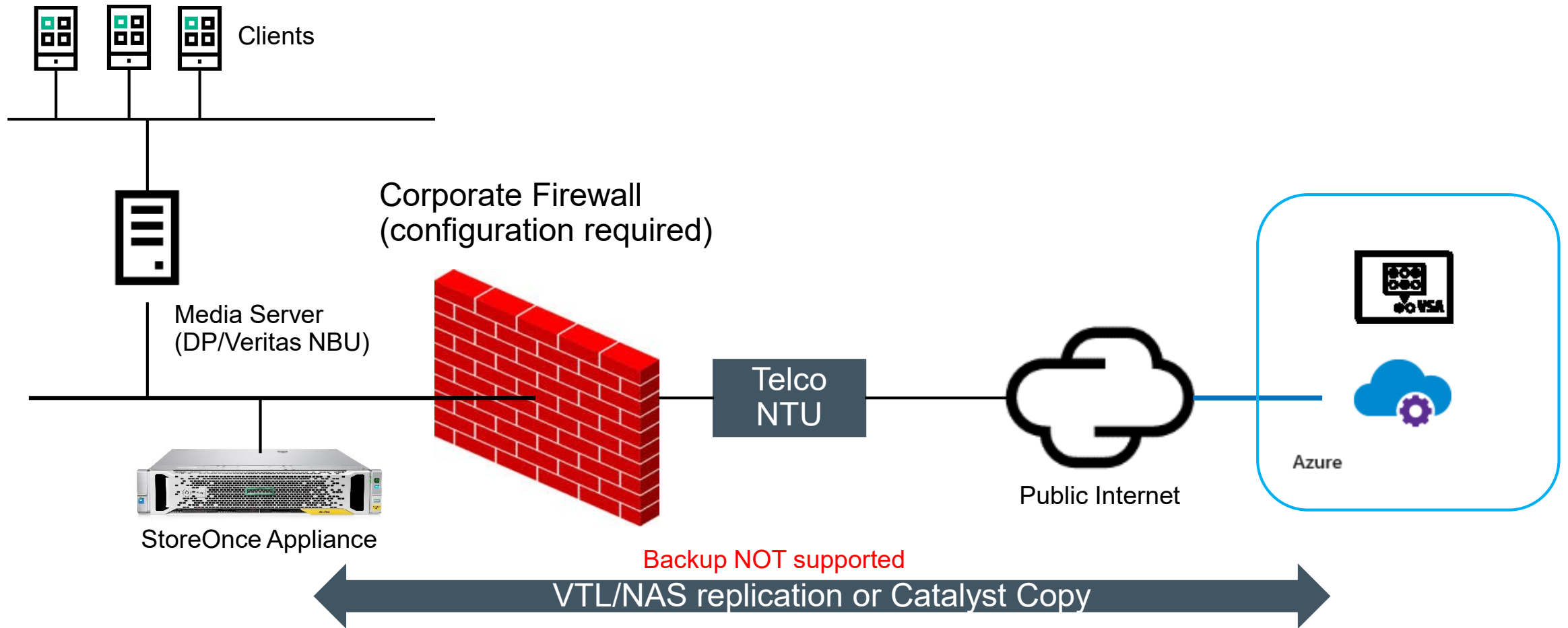


StoreOnce VSA in MS Azure

StoreOnce VSA in MS Azure

- Available in Azure Market Place from GA date (27th March 2017)
- Up to 32TB capacity
- Licenses available in 1 (free), 4,10,20 and 32 TB sizes.
- VTL/NAS replication and Catalyst copy only. BACKUP NOT SUPPORTED.
- Bring your own license model (BYOL)
- Use the Azure Resource Manager model (ARM)
- For cost reasons the 50TB license is not recommended for the Azure StoreOnce VSA.

Network configuration diagram- example



Network and Security considerations

The screenshot displays the Microsoft Azure portal interface for a Network Security Group (NSG) named 'azurevsansg'. The left-hand navigation pane shows 'All resources' selected, with a list of subscriptions including '841749westeurope', 'azurevsansg', 'azurevsasa', 'vsanic', 'vsapubip', 'vsavm', and 'vsavnet'. The central navigation menu includes 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Settings', 'Monitoring', and 'Support + Troubleshooting'. The main content area shows the 'Essentials' section for the NSG, including its location (West Europe), subscription name (Visual Studio Enterprise), and subscription ID (842d0639-83ba-44a9-b1d3-8364055fc824). Below this, the 'Inbound security rules' section is expanded, showing a table of 7 rules. The 'Outbound security rules' section shows 0 rules.

PRIORITY	NAME	SOURCE	DESTINATION	SERVICE	ACTION
100	catalystallow	213.120.210.122/24	Any	Custom (Any/9388)	Allow
110	repallow	213.120.210.122/24	Any	Custom (Any/9387)	Allow
120	vtlallow	213.120.210.122/24	Any	Custom (Any/3260)	Allow
130	cifsallow	213.120.210.122/24	Any	Custom (Any/445)	Allow
140	nfsallow	213.120.210.122/24	Any	Custom (Any/2049)	Allow
150	sshallow	213.120.210.122/24	Any	SSH (TCP/22)	Allow
160	httpsallow	213.120.210.122/24	Any	HTTPS (TCP/443)	Allow

Estimated Costs

Estimated cost per month of the 4 supported compute models (GBP/£)

DS11_V2 Standard ★

2	Cores
14	GB
4	Data disks
6400	Max IOPS
28 GB	Local SSD
	Load balancing
	Premium disk support

105.36
GBP/MONTH (ESTIMATED)

Your estimate

British Pound (£) ▼

Storage	£23.01
IP Addresses	£2.22
Virtual Machines	£105.36
Storage	£9.55
Support Options	£0.00

ESTIMATED MONTHLY COST

£140.13

Purchase options >

Export estimate

Prices are estimates and are not intended as actual price quotes.



DS12_V2 Standard

4	Cores
28	GB
8	Data disks
12800	Max IOPS
56 GB	Local SSD
	Load balancing
	Premium disk support

210.16
GBP/MONTH (ESTIMATED)

Your estimate

British Pound (£) ▼

Storage	£23.01
IP Addresses	£2.22
Virtual Machines	£210.16
Storage	£9.55
Support Options	£0.00

ESTIMATED MONTHLY COST

£244.93

Purchase options >

Export estimate

Prices are estimates and are not intended as actual price quotes.



DS4_V2 Standard

8	Cores
28	GB
16	Data disks
25600	Max IOPS
56 GB	Local SSD
	Load balancing
	Premium disk support

301.65
GBP/MONTH (ESTIMATED)

Your estimate

British Pound (£) ▼

Storage	£23.01
IP Addresses	£2.22
Virtual Machines	£301.65
Storage	£9.55
Support Options	£0.00

ESTIMATED MONTHLY COST

£336.43

Purchase options >

Export estimate

Prices are estimates and are not intended as actual price quotes.



DS5_V2 Standard

16	Cores
56	GB
32	Data disks
51200	Max IOPS
112 GB	Local SSD
	Load balancing
	Premium disk support

602.75
GBP/MONTH (ESTIMATED)

Your estimate

British Pound (£) ▼

Storage	£23.01
IP Addresses	£2.22
Virtual Machines	£602.75
Storage	£9.55
Support Options	£0.00

ESTIMATED MONTHLY COST

£637.53

Purchase options >

Export estimate

Prices are estimates and are not intended as actual price quotes.



Managing the StoreOnce VSA in Azure Cloud

– Once deployed is managed in the same way as traditional StoreOnce.

The screenshot displays the HP StoreOnce VSA Software management interface in a web browser. The interface shows system status, configuration options, and a navigation menu. A terminal window (PuTTY) is open, showing the command-line interface for the VSA software. The terminal output includes login information, system status, and storage usage details.

System Status

System Time: Feb 28 2017 15:47:33 PM UTC
Version: 3.16.1-1707.1
Total Events: 250 2 250

Status

System Information	
Type	HP StoreOnce VSA
Name	store
Serial Number(s)	84627426
Software Revision	3.16.1-1707.1

Status	
Overall Status	Running
StoreOnce Subsystem	Running
Virtual Tape	Running
NAS	Running
StoreOnce Catalyst	Running
Replication	Running
Housekeeping	Running

Storage Usage	
User Data Stored	10.0 GB
Size On Disk	8.47 GB
Deduplication Ratio	1.88:1
Capacity Saved	40.84 %

IP Address

10.0.0.4

Terminal Output (PuTTY):

```
168.63.109.230 - PuTTY
Login as: Admin
Using keyboard-interactive authentication.
Password:
Last login: Tue Feb 28 13:41:30 2017 from 219.120.210.124

Welcome to the HPE StoreOnce Command Line Interface.
Type 'help' at the prompt for context-sensitive help.

Management interface is 10.0.0.4[dhcp]
Enter 'net net address' to change the Management interface.

Product class      : HPE StoreOnce VSA Software
Software version   : 3.16.1-1707.1

The system has unacknowledged events:
Alerts: 250
Warnings: 2
You can view these events from the command 'log show events'
You can also view and acknowledge these events by navigating to the Events page
in the Management GUI

28 Feb 2017 15:53:33 UTC
! █
```

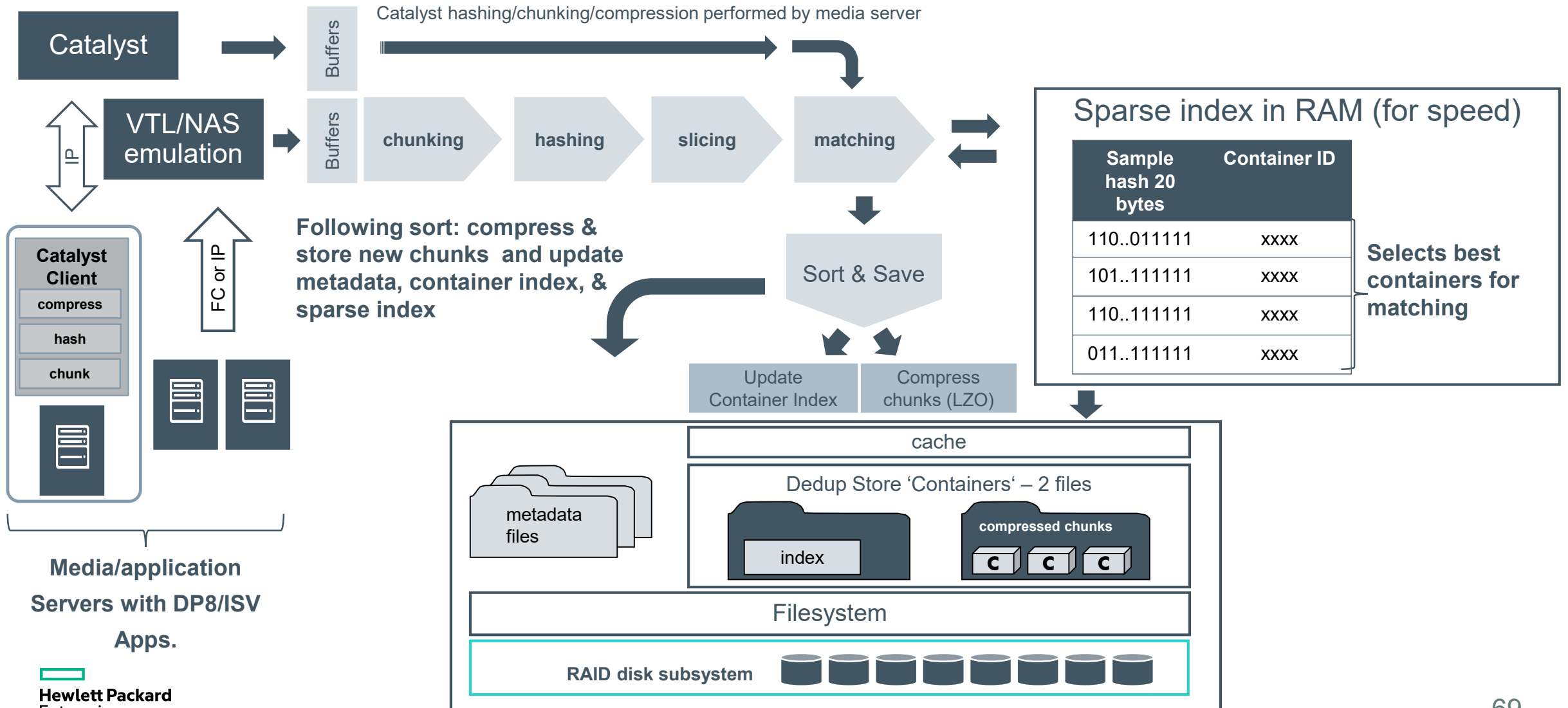
Useful links

- Azure pricing calculator
- <https://azure.microsoft.com/en-us/pricing/calculator/>
- Azure compute model sizing guide
- <https://docs.microsoft.com/en-gb/azure/cloud-services/cloud-services-sizes-specs>
- Azure products availability by region
- <https://azure.microsoft.com/en-gb/regions/services/>
- Azure ExpressRoute
- <https://azure.microsoft.com/en-us/services/expressroute/>

MS Azure FAQ

- Q: Why do we only show support for the 4 compute models (DS_11_v2, DS_12_v2, DS_4_v2 and DS_5_v2)
- A: The cost of other compute models gave no added performance increase for the cost increase.

HPE StoreOnce deduplication process





HPE StoreOnce Backup System

IBM i VTL Emulation

What is IBM i VTL Emulation

- StoreOnce software already provided IBM TS3500 emulation in TSM environment, however this didn't work in IBM i. This new emulation type will allow IBM i customers to fully integrate StoreOnce into IBM i and BRMS configurations.
- This is a very different emulation type “under the hood” which uses LUN based model as opposed to NPIV based model.

IBM i VTL Emulation

- new library and drive emulation model in Store Once software (addition to the existing IBM type)
- the emulation will only be available on products with FC installed
- can only be configured on one single Fibre Channel port
- it is possible to replicate data from an HPE library to an IBM i library (and vice-versa)
- follows IBM standard of media barcode numbers, drive and library serial numbers
- it is possible to change emulation type to 'HPE' without loss of data (and vice-versa)
- IBM i emulation libraries will not work in non IBM i environment

IBM i VTL Emulation - GUI

The screenshot displays the HP StoreOnce 6500 Backup GUI. The top navigation bar includes the HP logo, the product name 'HP StoreOnce 6500 Backup', and user information: 'User: Admin Role: admin | Logout Help'. On the left, a 'System Status' panel shows 'System Time: May 18, 2015, 8:34:04 AM' and 'Total Events' with counts for error (257), warning (104), and info (9703). Below this is a 'Navigator' sidebar with a tree view containing 'HP StoreOnce', 'VTL', 'Libraries', 'NAS', 'Replication', 'StoreOnce Catalyst', 'Activity', 'Housekeeping', 'Reporting', 'Hardware', 'Storage Report', 'Reporting Central', 'Device Configuration', 'Remote Support', and 'Events'. The main content area is divided into two sections: 'Libraries' and 'New Library'. The 'Libraries' section contains a table with the following data:

Name	Replication Role	Status	Connection	Device Type	Cartridges / Slots	Port	User Data Stored	Size On Disk	Dedupe Ratio	Service Set
Library 1	Replication Source	Online	Connected	D2DBS Generic / LTO4	7 / 8	FC Port(s): 2	262.6 GB	32.6 GB	8	1
Library 2	Non Replicating	Online	Connected	D2DBS Generic / LTO4	8 / 8	FC Port(s): 1	0 B	228 B	0	1
Library 2	Replication Source	Online	Connected	D2DBS Generic / LTO4	8 / 8	FC Port(s): 2	64.3 GB	18.5 GB	3.4	2
Lib3	Replication Target	Running	Not Connected	D2DBS Generic / LTO4	7 / 8	No Port	262.6 GB	29.8 GB	8.8	2

The 'New Library' section is currently in the 'Device Details' tab. It includes the following configuration options:

- Library Name:** Library 3
- Media Changer Port:** FC Port 1
- Deduplication:** (Not Licensed)
- Physical Data Size Quota:** 50 GB
- Logical Data Size Quota:** 50 GB
- Emulation:**
 - Library Emulation:** [Redacted]
 - Default Drive Emulation:** [Redacted]
 - Number of Cartridge Slots:** 384 (Default: 8)
 - Number of Drives:** 1
 - Cartridge Size:** 800 GB
 - Number of Barcode Characters:** Eight
 - Barcode Template Enabled:** Prefix: Start Value: 0 First barcode: 00000L5
 - Suffix:** L5

Buttons for 'Cancel' and 'Create' are located at the bottom right of the 'New Library' form.

IBM i VTL Emulation - CLI

Configuring IBM i VTL Emulation using the StoreOnce CLI :

- The 'vtl <create/modify> library ' commands have new parameters for IBM i emulation through the CLI.
For example:

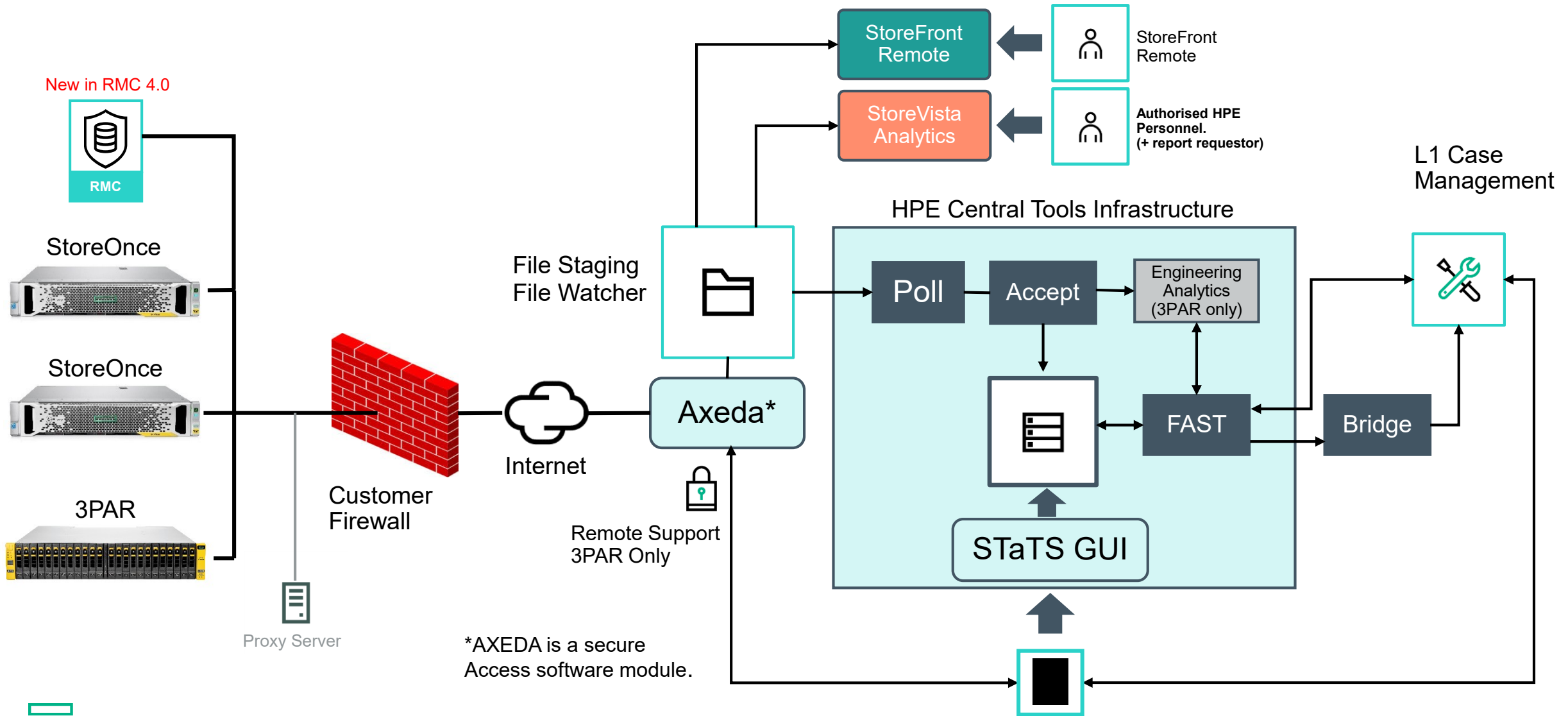
```
vtl create library SET1 name IBMiTest interface FC Port 1 LibEmulation  
"IBM-TS3500 IBM i" DriveEmulation "IBM-LTO5 IBM i" NoOfSlots 8 NoOfDrives  
1 Encrypt false dedupe yes BarcodeLength 8 BarcodeType template  
BarcodeType template BarcodePrefix none BarcodeStartValue 500000  
BarcodeSuffix L5
```
- The 'vtl show <library/drive>' command display library and drive information including emulation type



STaTS

-Service Tools and Technical Support

STaTS support for customers with 3PAR & StoreOnce (revision)

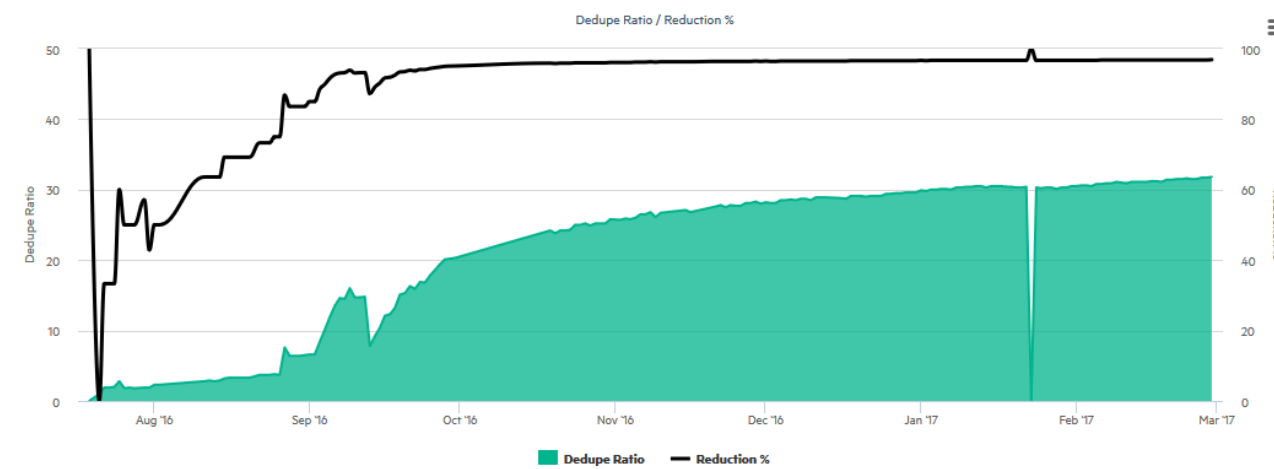
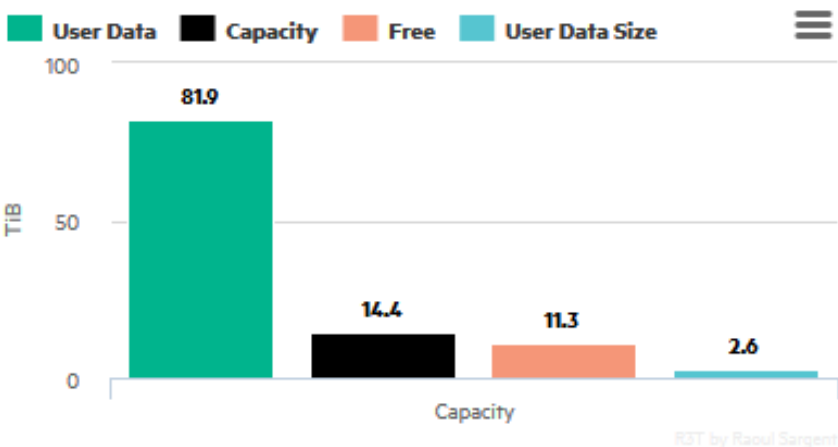
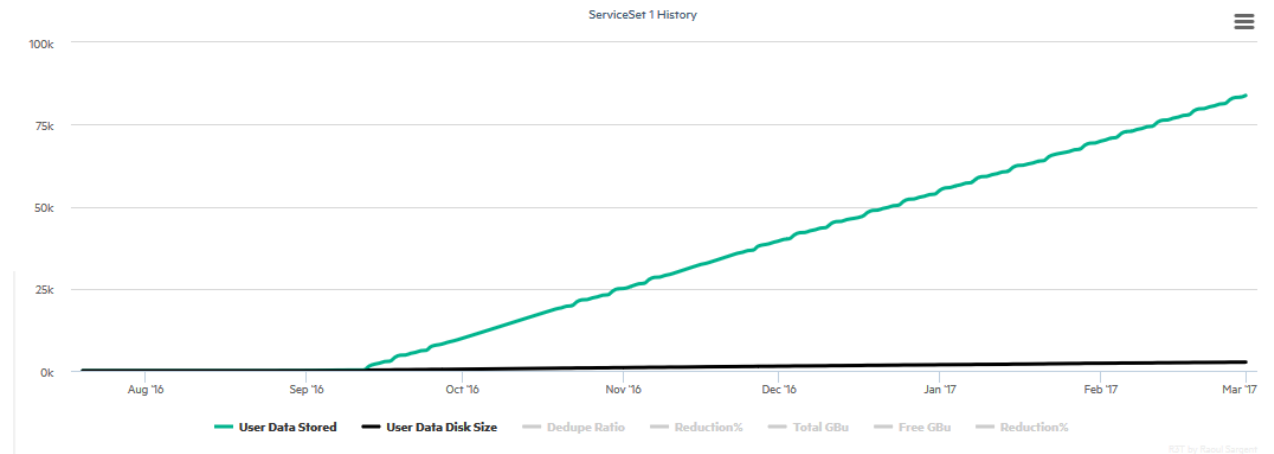


StoreVista individual system detail and performance history

Every call-home enabled StoreOnce device can be reviewed online. Including current config and historical capacity/performance details.

Capacity: 14.37 TiBu
 Free Space: 11.33 TiBu [79%]
 User Data Stored: 81.86 TiBu
 User Data Size On Disk: 2.58 TiBu
 Overall Dedupe Ratio: 31.77 : 1
 System Up Since: Monday 23rd January 2017 21:07:21
 System Health [Status]: OK [Running]
 Replication Health [Status]: OK [Running]

SSID	Name	CAT	VTL	NAS	User Data TiB	Size On Disk TiB	Dedupe	Reduction%	Health	Status
1	Service Set 1			2	819	2.6	31.8:1	96.9%	OK	Running





StoreVirtual 3200

HPE StoreVirtual 3200 Storage

Low-cost, next-gen storage that scales with you

200,000+
StoreVirtual Deployments

*SDS Data Fabric
Same DNA as StoreVirtual
VSA and HC 250/380*

Next-gen, flexible shared storage starting at 6K*
Advanced features for price-sensitive users



Accelerates my apps



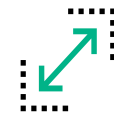
Management that's simple



Built-in resiliency



Grows with my business



Unmatched Availability

- Dual-controller system with failover
 - All drives in the array available from either controller
- Selectable Availability Levels
 - from HW RAID to Network RAID
 - Selectable at a Volume-level
- Maximum availability through optional Network RAID 10
 - Business continuity in the event of a disaster



Built on same foundation that provides
Five 9's availability to StoreVirtual

StoreVirtual 3200 Platform Highlights



System-Level Attributes

- 2U dual-controller system with active-active capabilities for high availability
- Redundant, hot-swappable components
 - Drives, power supplies, fans, SAS connections, controllers, I/O modules
 - 25-slot SFF and/or 12-slot LFF enclosures (can be mixed)
- End-to-End 12Gb SAS support: HDDs through Host Interconnect
- Scale-up: add drives to an existing array enclosure
 - add up to three drive enclosures per system (48 LFF or 100 SFF drives max)

Controller Architecture

- High-performance multi-core processor architecture
 - Designed to meet entry-level performance and cost targets
 - 16GB Total System Cache (8GB per controller)
- Host connectivity options
 - 2 ports per controller: 16Gb FC, 8Gb FC, 10GbE iSCSI (SFP+), 1GbE iSCSI (RJ45)
 - 4 ports per controller: 1GbE iSCSI (RJ45)

StoreVirtual 3200 Software Highlights

Integrated StoreVirtual OS Features

- Thin Provisioning and reclaim
- Snapshots (traditional and application integrated)
- Space Reclamation
- Adaptive Optimization (two storage tiers)
- Remote Copy (optional)
- Remote Support through StoreFront Manager

New StoreVirtual OS Features for Entry Storage platform

- Native Dual-Controller Architecture (active-active with fail-over)
- Dynamic Scale-up
- Network RAID as a Volume-level Option

StoreVirtual 3200 Building Blocks

Base Enclosure

2.5" SFF



StoreVirtual 3200
(2 Controllers, 25 SFF slots)

3.5" LFF



StoreVirtual 3200
(2 Controllers, 12 LFF slots)

Host Interconnect Options

4-port 8/16Gb FC

4-port 10GbE iSCSI

4-port 10GBase-T iSCSI

4-port 1GbE iSCSI

8-port 1GbE iSCSI

Drives



SFF SAS
HDDs/SSDs



LFF SAS
HDDs/SSDs

Optional Selections

Drive Enclosures (DE)

2.5" SFF



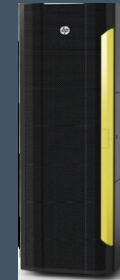
StoreVirtual 3000 DE
(25 SFF slots)

3.5" LFF



StoreVirtual 3000 DE
(12 LFF slots)

Rack



HPE Intelligent
Series Rack



Customer-supplied
rack
(4-post, square hole, EIA
standard, 19 in.)

Software

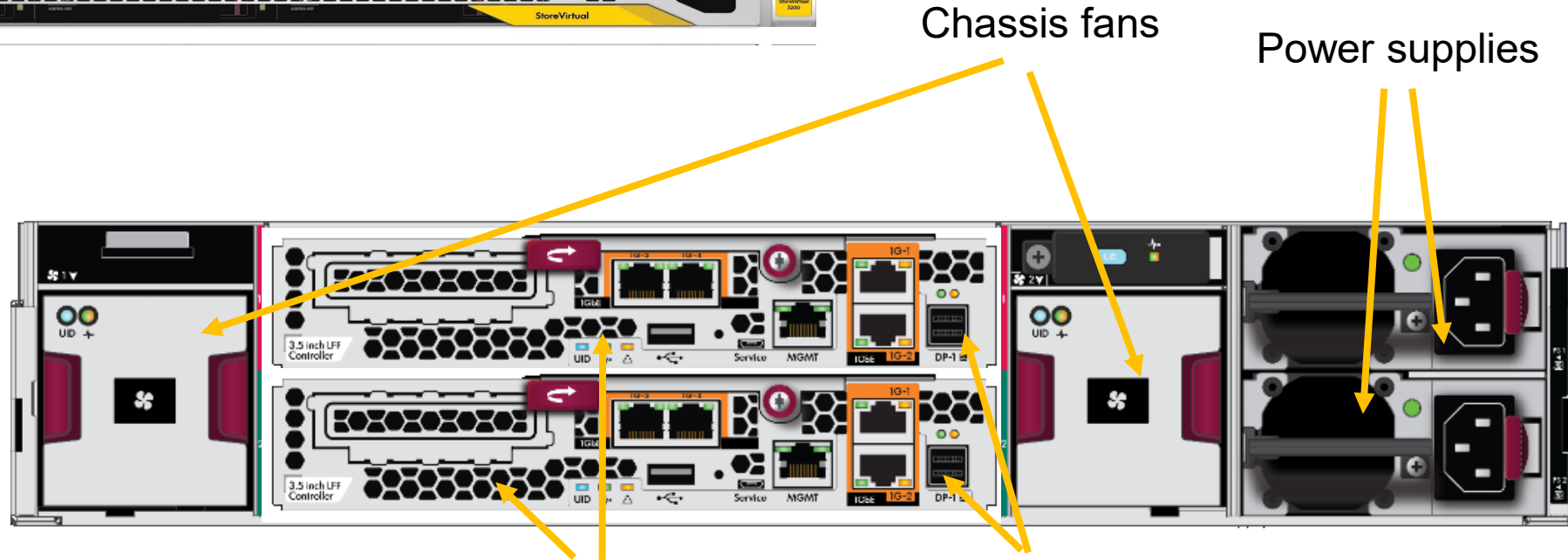
Advanced
Data Services
Suite

StoreVirtual
Migration
Manager

File Data
Services

StoreVirtual
3000 File
Controller

StoreVirtual 3200 array enclosure and controllers



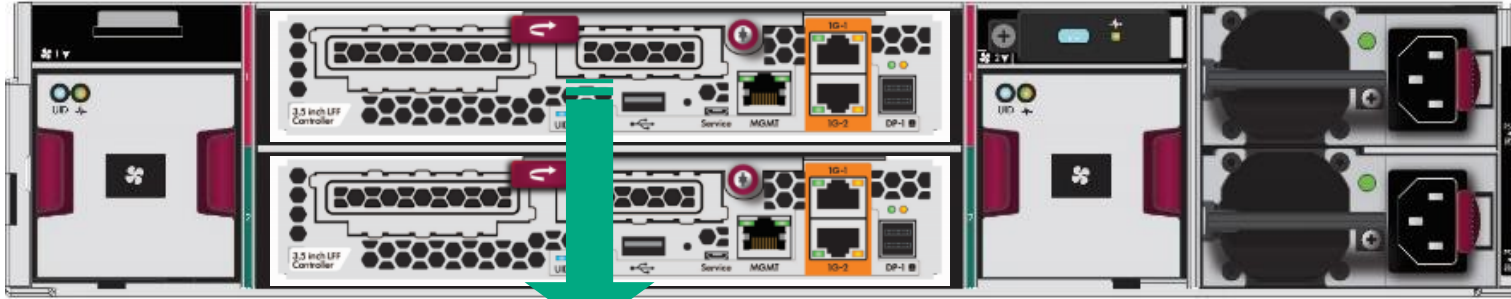
Chassis fans

Power supplies

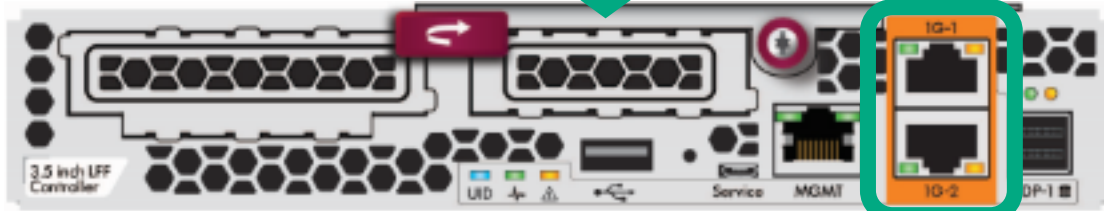
Storage controllers

12Gb SAS connectors to I/O modules
in drive enclosure

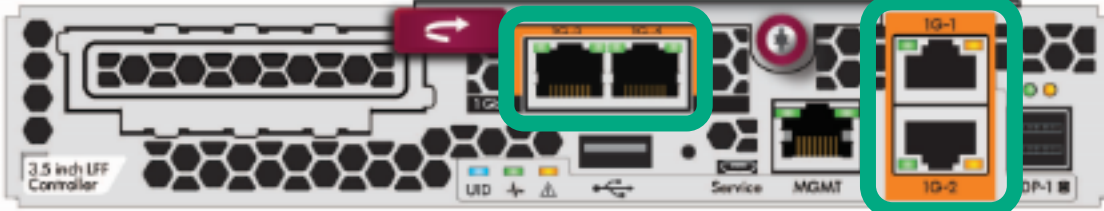
StoreVirtual 3200 Protocol Options



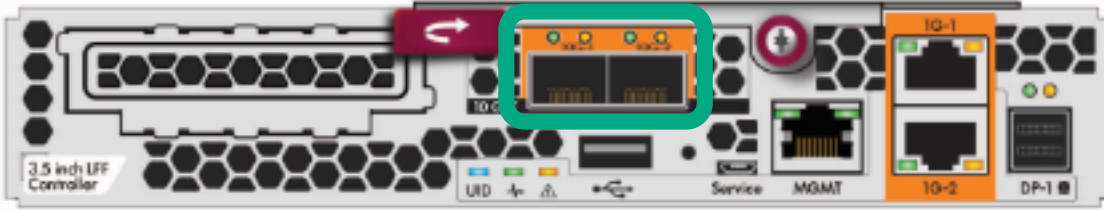
Back View



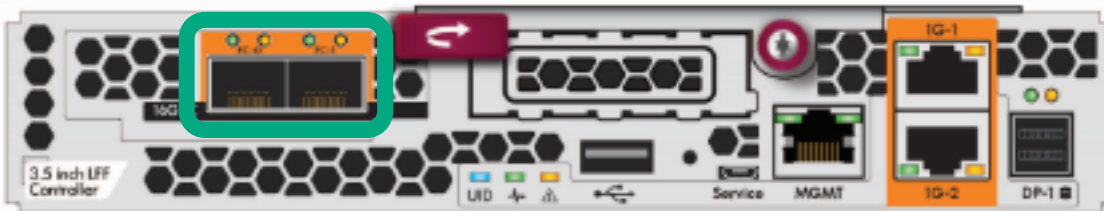
1GbE iSCSI
2 ports per controller
4 ports per array



1GbE iSCSI
4 ports per controller
8 ports per array

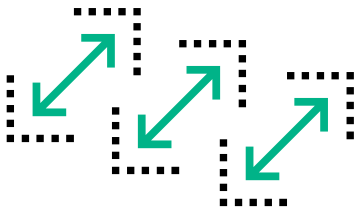
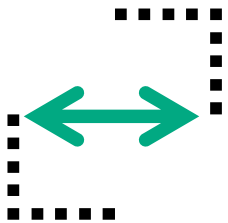
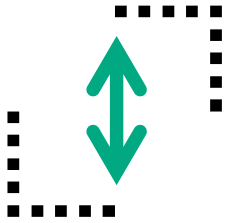


10GbE iSCSI
2 SFP ports per controller
4 SFP ports per array



8/16Gb FC
2 SFP ports per controller
4 SFP ports per array

Multi-Dimensional Scaling



Need more capacity?

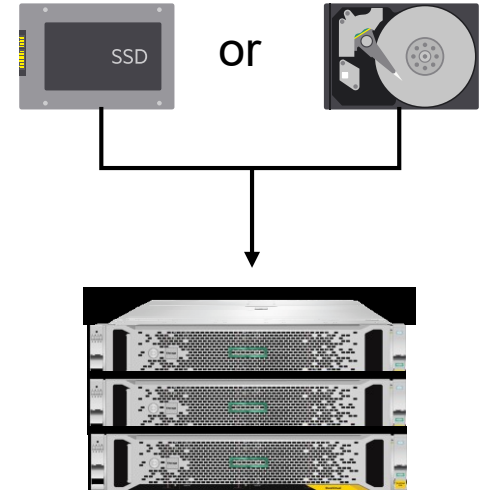
- **Scale-up:** Grow an array or add drive enclosures
 - Dynamically add capacity and/or I/O capabilities
 - Up to three additional drive enclosures
 - 12 LFF drive enclosure or 25 SFF drive enclosure
 - Can Mix LFF/SFF drive enclosures

Need more performance?

- **Scale-up:** Two options today
 - Dynamically increase spindle counts increasing I/O capabilities of storage pool
 - Add SSDs and leverage Adaptive Optimization (AO)
 - System will automatically respond to changing workloads and “hot spots” moving them to SSDs in real-time – No admin intervention required
- **Scaleout:** Leverage Network RAID for DR/performance enhancement

Need to Move Workloads/Data Seamlessly?

- **Scale-across:** Leverage core data mobility technologies
 - Migration Services – StoreVirtual Migration Manager SW LTU + utility



StoreVirtual 3200 Storage Systems

A new class of flexibility, Scale-IT your way!

Scale-up – Single Array

From 12 to 100 Drives



StoreVirtual 3200 Storage Systems

A new class of flexibility, Scale-IT your way!

Performance Media

SSDs SFF/LFF

400GB

800GB

1.6TB*

3.2TB*

IOPS/drive

15k SFF

300GB

600GB

1.2TB

1.8TB

10k SFF

300GB

600GB

900GB

* SFF only

StoreVirtual 3200 Storage Systems

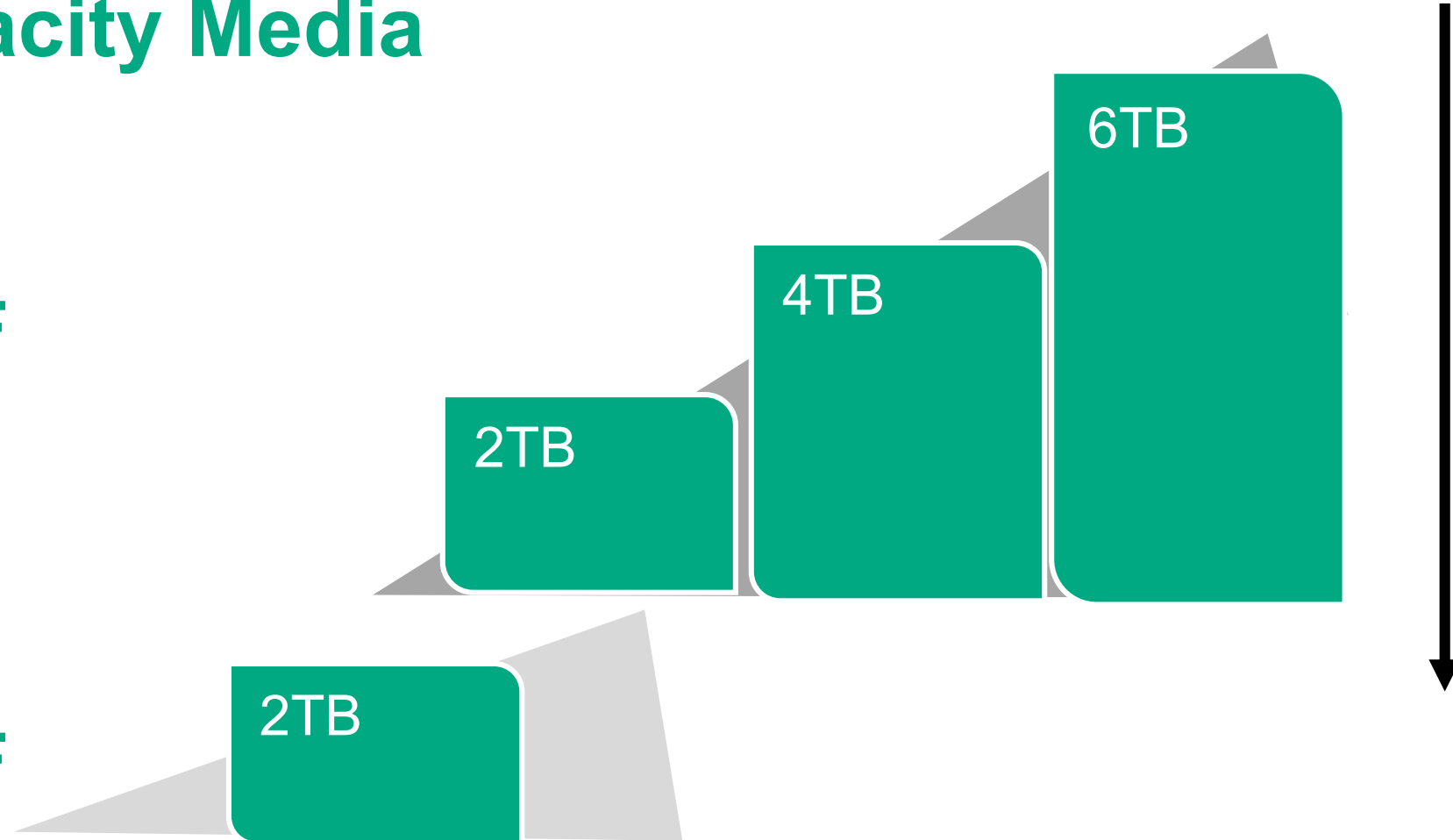
A new class of flexibility, Scale-IT your way!

High Capacity Media

\$/GB

7.2k LFF

7.2k SFF



Scale-out

– Scale out with a second system for added availability, capacity, and performance



Scale-Out Planning

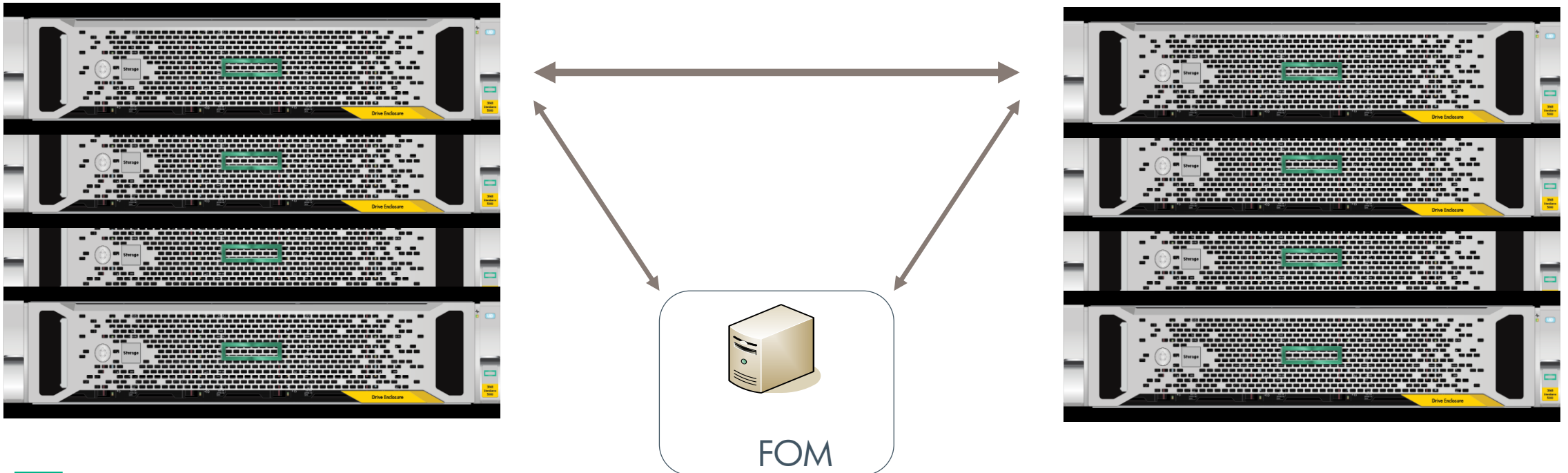
- SVOS 13.5 supports scaling out from one iSCSI SV3200 array to two iSCSI SV3200 arrays.
- Scale-out requires an additional SV3200 with the same or greater capacity.
- The best practice is to use the same drive and RAID configuration as the original system.
 - This gives predictable performance and reliability.
- The total storage in the storage pool is the usable capacity of the smallest system multiplied by the number of systems, not the sum of capacities of all of the storage systems.
- Using systems with different capacities will strand storage that will not be part of the storage pool.
- Don't scale up too much before scaling out. Configurations with four enclosures must scale-out with four enclosures as the next expansion step.
- Any licensed features should be licensed on both Storage Systems to provide expected results.

A scale-out example

- Two identical StoreVirtual 3200 storage systems
 - 10GbE iSCSI storage controllers
 - Small Form Factor drives
 - Four SSDs per storage system
 - Six SAS HDDs per storage system
- One storage system fully configured
 - Data network ports bonded
 - RAID configured
 - Management Group, Storage Pool created
 - All network settings (DNS, e-mail, etc.) configured
- Second system partially configured
 - Data network ports bonded
 - RAID configured

How it works

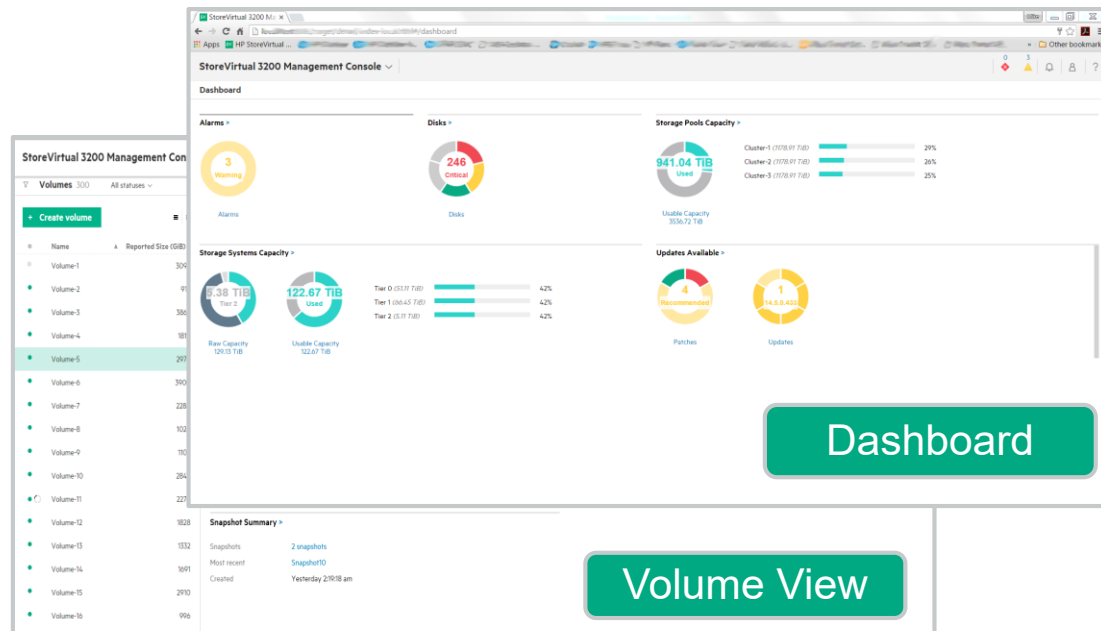
- Configure a StoreVirtual 3200 scaled-out array as described in the previous section, installing the Storage Systems (and servers) on different sites
- License both Storage Systems with the Advanced Data Services Suite LTU
- Install the Failover Manager (FOM) at a third site for quorum management and automatic failover/failback



Failover Manager (FOM)

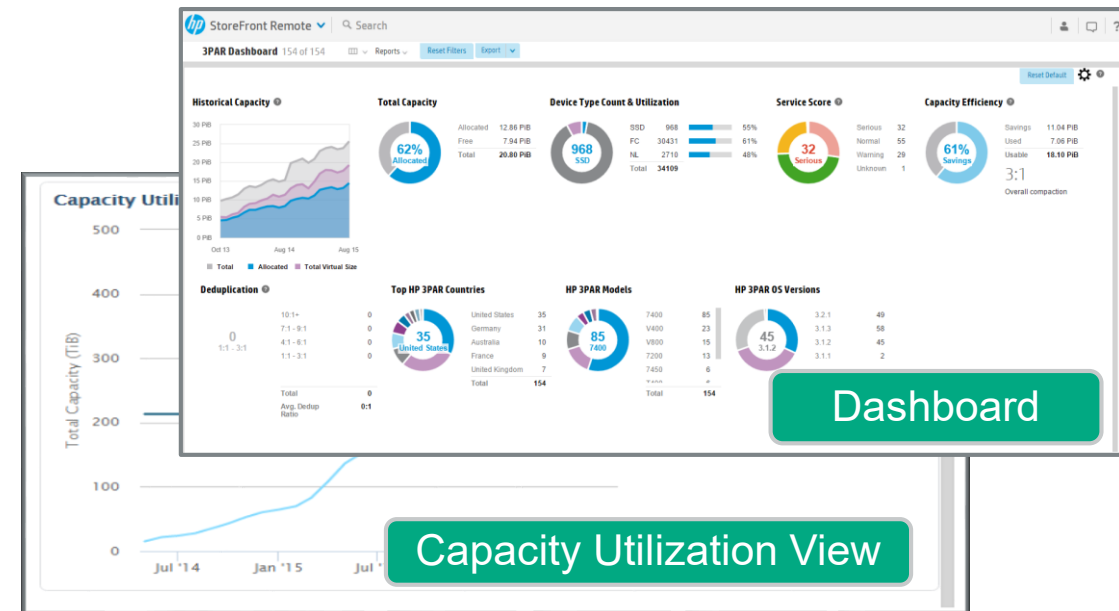
- Special version of the StoreVirtual VSA
 - Participates in the Management Group as a Manager
 - Quorum operations only – no data movement operations
 - Versions for VMware ESX and Microsoft Hyper-V
- Ideally installed at a third site
 - Sites may or may not be in different physical locations
 - Separate subnets and power sources are highly recommended
- Maintains quorum if one of the two sites containing a Storage System goes offline

Revolutionizing User Interfaces and Storage Management



New, Easy-to-use Web-based GUI

- Manage multiple StoreVirtual 3200 arrays from a single view
- Designed from the ground up to offer an intuitive design and streamlined features
- Simplistic use and navigation for new users
- Extensive features and reporting for advanced users



Cloud-based Remote Analytics Dashboard

- Web portal dashboard offering unique insights in one place
- Proactive tools to identify capacity and performance issues early
- Integrated data collection with analytics to help maximize asset utilization and optimize environments

Software Licensing – Simplified One SW Suite Structure

SV3200

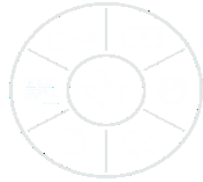
Base Operating System

Thin Technologies

Snapshots

Network RAID (user option)

Web Services API



Advanced Data Services Suite

Remote Copy

Adaptive Optimization (AO)

StoreVirtual Migration Manager

Guided Migrations from SV4000 to the SV3200



3PAR 3.3.1

-What's new

3PAR OS 3.3.1 – High Level new Functionalities

Performance

Support for iSCSI Express Write* → enhanced performance

Cache provisioning options: Block only or block preferred

Customer selectable write back cache behavior in single node state (WBC on or off in failure/upgrade case)

Scalability

Higher drive counts for certain models

Higher raw capacities for certain models

Larger VV/LUN size of 64TB for FPVV and TPVV *

Efficiency

Data Compression and Data Packing *

Adaptive Sparing enhancements

Express layout support for SSD **and** HDD

New combo adapters for the 8000 series
FC + IP /
iSCSI + IP

New 9450 Mid-range All-Flash system

Security

Common Access Card (CAC) Two Factor Authentication (2FA) via LDAP

Dual sign-on for File Persona WORM

High Availability

Enhanced Peer Persistence - combination of PP and 3DC SLD

10Gb RCIP support for the 8k with the new PCIe combo adapters

On-node CLX 5.0 for Windows 2016

Various

New all inclusive Licensing (not dependent on 3.3.1)

RAID 6 is the new default for all FC drives

SSMC 3.1 and 3.2 with many new features (not dependent on 3.3.1)

New Online Import support for EMC DMX4

Service Processor V5.0 with SSMC look and feel

RMC 4.0 with new capabilities

[Go back to Table of Content](#)

* Only on GEN5 ASIC systems (8000, 9000 and 20000)

Agenda

- **What's New in HPE 3PAR OS 3.3.1**
- **All-inclusive Licensing**
- **New 9450 and 20000 Refresh**
- **3D Cache**
- **SSMC Enhancements**

HP 3PAR OS Evolution

HP 3PAR OS 3.1.3
Max limits increase
Performance Optimizations
Priority Optimization: Latency Goal
MxN Replication
Adaptive Sparing
480GB/920GB SSD w/ 5 Year Warranty
1.2TiB 10K and 4TiB 7.2K HDDs
Upgrade Automation (SW/Drives)
Peer Motion: load balancing and clusters
Resiliency improvements
SR-on-Node Performance Alerts
Online-Import for EMC

HP 3PAR OS 3.2.1
7000 Converged models
HP 3PAR StoreServ 7440
Adaptive Flash Cache
Express Writes
FIPS 140-2 EKM
AO on VVsets
Peer Persistence for MSFT
VMware VVOLS
Tunesys fixes
Resiliency improvements
Thin Deduplication
File Persona
1,92/3.84TiB cMLC SSDs

HP 3PAR OS 3.2.2
HP 3PAR StoreServ 8000/20000 Systems
StoreServ Management Console 2.2
Support for Higher Scalability
Persistent Checksum
Remote Copy Asynchronous Streaming
Peer Persistence for RHEL
HP StoreOnce Recovery Manager Central 1.1
Storage Federation (4x4 multi-directional)
Online Import for HDS
Priority Optimization: <1ms latency goal
Adaptive Flash Cache enhancements
iSCSI VLAN tagging
VMware VVOLS higher scalability
Autonomic Rebalance enhancements
On-node System Reporter changes
Adaptive Optimization new options
LDAP improvements
SmartSAN support
Express Layout

HPE 3PAR OS 3.3.1
Compression / Dedup Enhancements
SSMC 3.1
SP 5.0
Support for larger raw capacity
Larger Volume Sizes
Express Writes for iSCSI and 16Gb/s FC
Persistent Checksum with standard T10 DIF
Adaptive Sparing 2.0
Express Layout for all Drives
Self Identifying Drives
3DC Peer Persistence
On Node CLX
Async Streaming longer distance & RCIP support
RC Scalability / Performance improvements
Adaptive Flash Cache Enhancements
File Persona 1.3
Write Cache for node down in a 2 node system
Combo Cards
DC PCM Support
Replication for VMware VVols
VMware VVols over iSCSI
2 Factor Authentication
Security Updates
Improved serviceability
SmartSAN 2.0

2014

2015

2017

3.3.1 Highlights

- Support for 2x the amount of capacity vs 3.2.2: the 8440 now scales to 4PB raw and the 20K to 9.6PB
- Larger volume sizes for thin and full volumes only (64TB). Dedup and compressed still 16TB max.
- AFC enhancements allow for additional wkld types, but small block random still preferred
- Combo cards with 10Gb Ethernet & FC or iSCSI (8000 only)
- Express Layout for all drive types but only if system requires it. NL min config still 12 per node pair.
- Adaptive Sparing 2.0 - only 7% spare space now reserved on SSDs vs 10% on 3.2.2. Applies to all systems that support 7.68 and 15TB SSDs
- Multi-queuing performance improvements applies to all models except the 8200/8400
- Async streaming:
 - RCIP support requires 10Gb port (combo card on 8000 or 20000 built-in port)
 - Compressed volumes may not be replicated with streaming
- code



3PAR All-inclusive Licensing

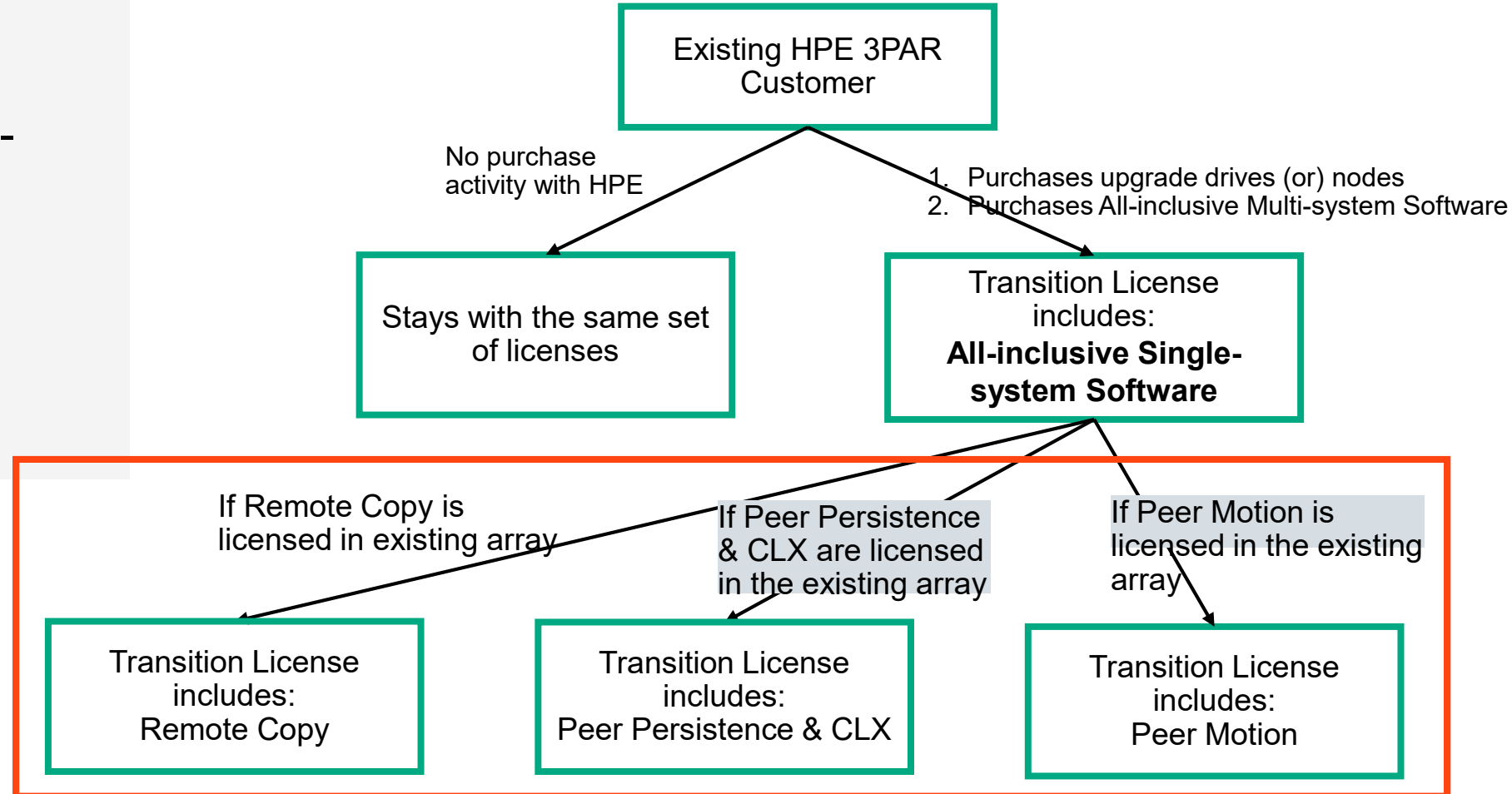
3PAR Replication and the new all-inclusive licensing model

Software	8000, 9000, & 20000	Delivered As
Single system	OS Suite, Virtual Copy, Dynamic Optimization , Adaptive Optimization, Priority Optimization, Virtual Domains, Virtual Lock, Online Import, File Persona, Smart SAN, Recovery Manager Central App Suite	License bundled with each new system or as transition license to existing systems
Multi-system	Peer Motion, Remote Copy, Peer Persistence & CLX	Frame license for each array in federation or replication group
Encryption	Encryption license	Separate license from all-inclusive

All-inclusive licensing transition from existing arrays

Transition license includes:

- Single system software
 - (RMC included)
- Unlimited access to multi-system software **already licensed on the array**
 - Remote Copy, Peer Persistence, CLX and Peer Motion



All-inclusive Licensing FAQ

Q. What 3PAR OS is required?

A. All inclusive is supported with *all versions of 3.2.2*. Supply Chain generates license key updates appropriate to each customer scenario.

Q. But I thought I heard MU3 was required?

A. A license for unlimited Online Import was added in MU3. Prior to MU3, the Online Import is licensed for only one year. And RMC for SAP HANA support was also added in MU3.

Q. What 3PAR models are included?

A. Only the 8000, 9000, and 20000 can use all-inclusive licensing. The 7000 and 10000 still use capacity based licenses.

Q. Do I need a new license if I add drives to an array?

A. The all-inclusive license includes an unlimited number of drives so a drive license is no longer needed.

Q. Does the transition license require a hw or sw upgrade?

A. No hardware or software upgrade is required for the transition license. However the transition license checkbox does not appear without an upgrade. To add it manually in SBW, consult [this document](#).

Q. Why is there no NFR trial license for all-inclusive?

A. The 3PAR NFR license is already all-inclusive as it includes all 3PAR software features

Applying an all-inclusive license

- No change to existing license installation or viewing
- However if upgrading with multi-system and single system licenses, you must activate them separately on the HPE licensing portal
 1. Activate single sys / transition license which will allow unlimited disk
 2. Activate multisystem license
- To determine whether an install base array has transitioned to All-Inclusive Licensing:

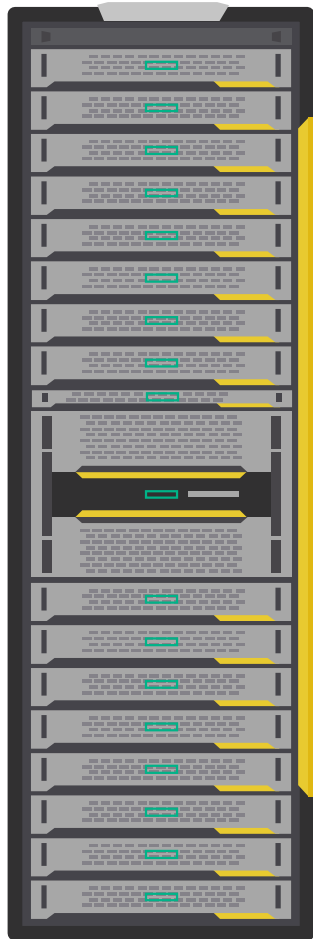
Steps to Check	Pre-condition	Interfaces
License list shows new feature: Online Import	3.2.2 MU3	SSMC, CLI, SFRM
License list shows File Persona licensed to max capacity: File Persona (2147482624G)	NA	SSMC, CLI, SFRM
All-inclusive license status (Binary toggle)	NA	SFRM



9450 and 20000 Refresh

HPE 3PAR StoreServ 9450 AFA Overview

Upper mid-range dual-socket all-flash unified platform



HPE 3PAR 9450 Dual Socket - Dual ASIC

- 2 Million IOPS* @ <1ms
- 80 Cores
- 896GB of DRAM Cache
- 10GbE built-in RCIP port
- 80 host ports per system
- 24 Ethernet ports for File
- 16 drive enclosures and 384 SSDs in base rack
- 6PB of RAW SSDs!

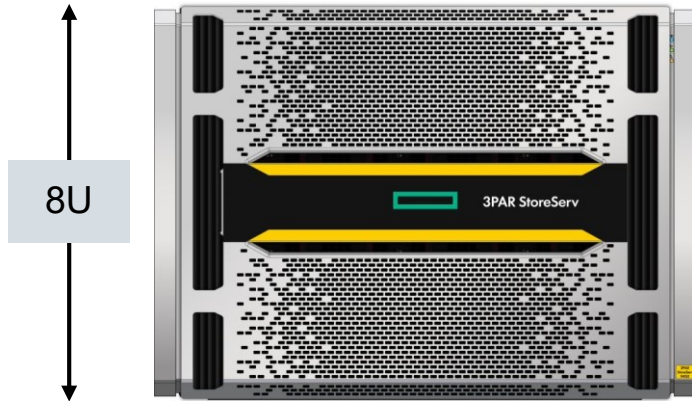
Customer Self Installation capable

Virtual or physical SP

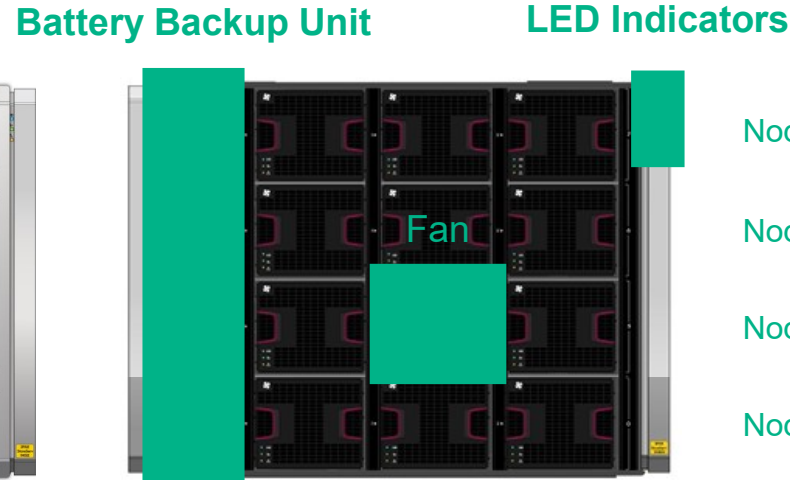
All-Inclusive licensing

HPE 3PAR StoreServ 9450 Controller

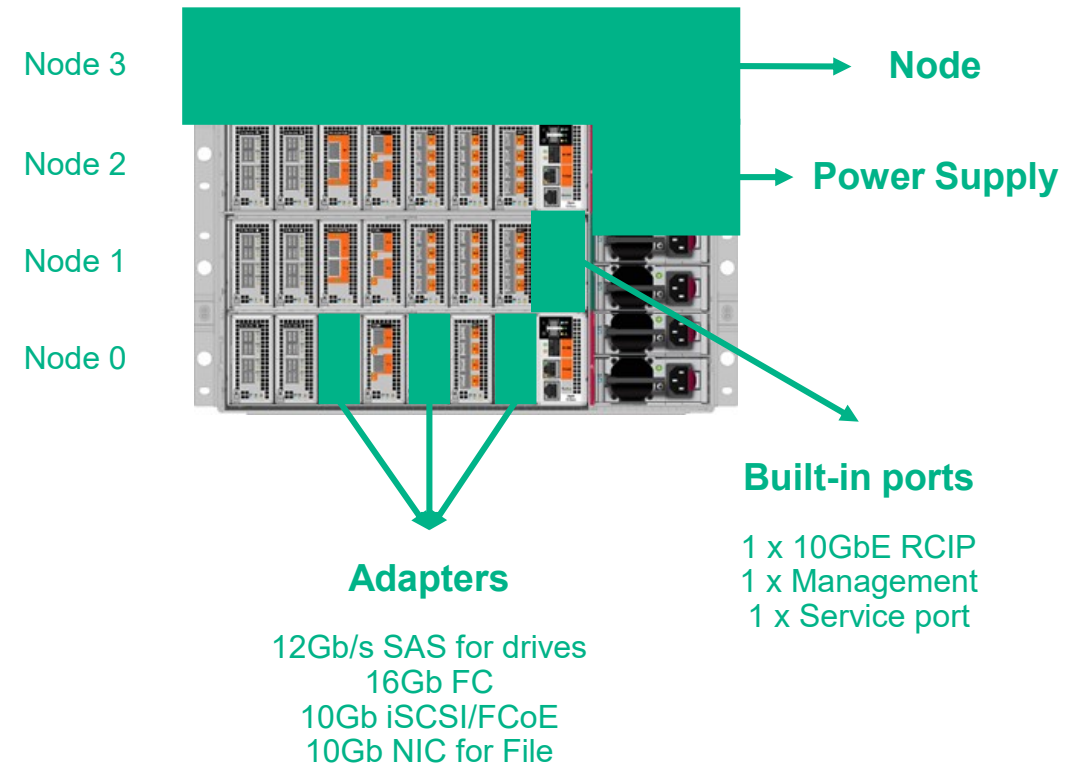
Front with bezel



Front without bezel



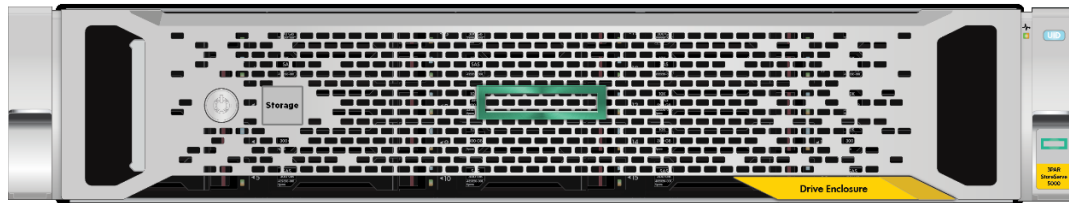
Rear



HPE 3PAR StoreServ 9450 Drive Enclosure

One type of drive enclosure: 2U, 24 SFF (2.5in) drives

Drive Enclosure with bezel

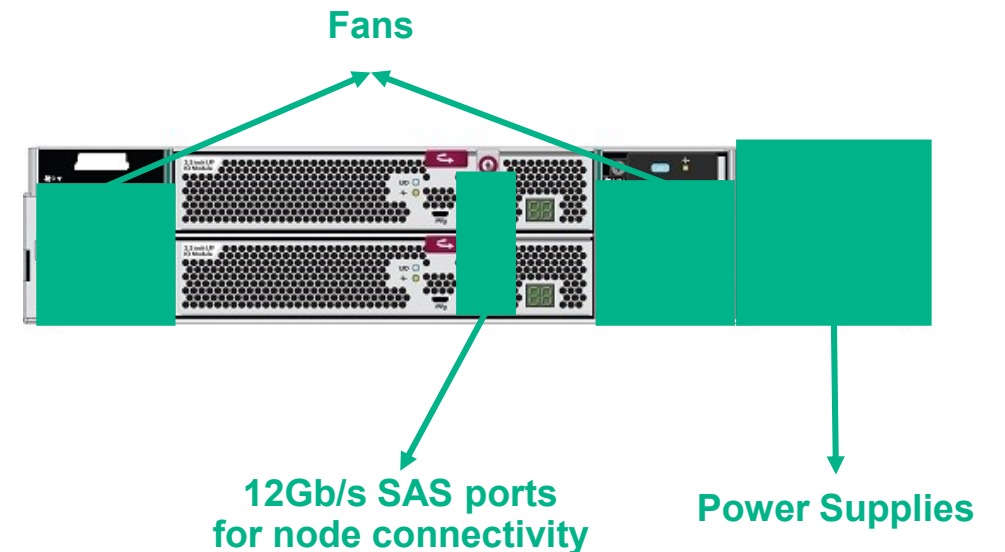


Drive Enclosure without bezel



25th slot not to be used

Rear



HPE 3PAR StoreServ 9450 Drive Enclosure Connectivity

Two options to connect the drive enclosures to the nodes

Direct Connect configuration - Default

- Each drive enclosure is directly connected to the node SAS ports
- Better performance and balanced configuration
- **Provides the max capacity today on the 9450 (288 drives per node pair)**

Daisy-chained configuration

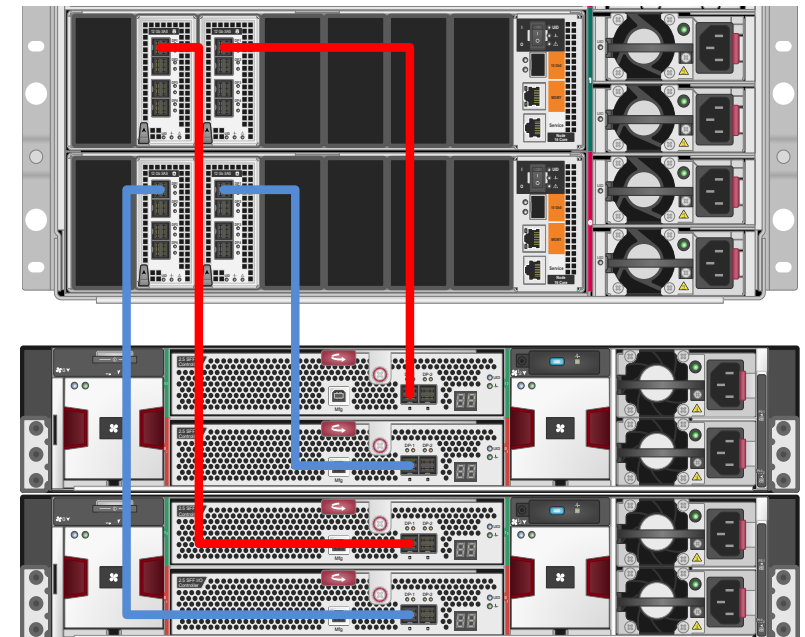
- 2 drive enclosures are daisy chained behind a pair of SAS ports
- To accommodate **future drive scalability** increase

Cables

- 12Gb Mini-SAS HD copper cables (0.5m, 2m)
 - Between controller and drive enclosures within the base rack
- Available 12Gb Mini-SAS AOC optical cables (10m, 25m, 100m)
 - Between controller and drive enclosures in an expansion rack

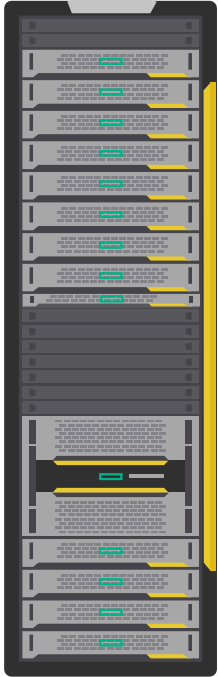
Direct connect

Node Enclosure



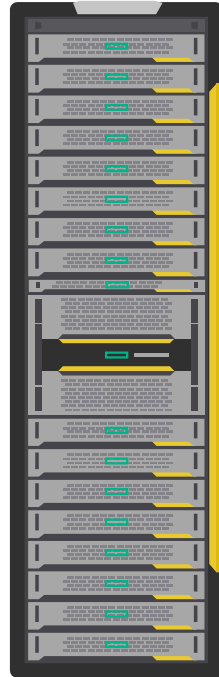
Drive Enclosures

HPE 3PAR 9450 StoreServ Racks



Base Rack – 1075mm

4 Nodes
12 Drive Enclosures



Base Rack – 1200mm

4 Nodes
16 Drive Enclosures



Expansion Rack – 1075mm/1200mm

20 Drive Enclosures

HPE 3PAR StoreServ 9450 Customer Self Installation

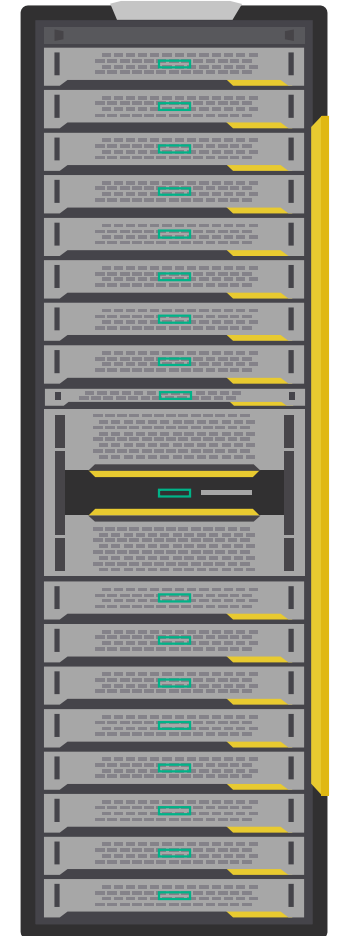
Customer Self Installation - CSI

Available on all HPE 3PAR 9000 arrays that meet the following requirement:

- Fully racked CTO configurations in a single rack
- CTO only (racked in the factory)

As long as the condition above is met there are no restrictions in terms of:

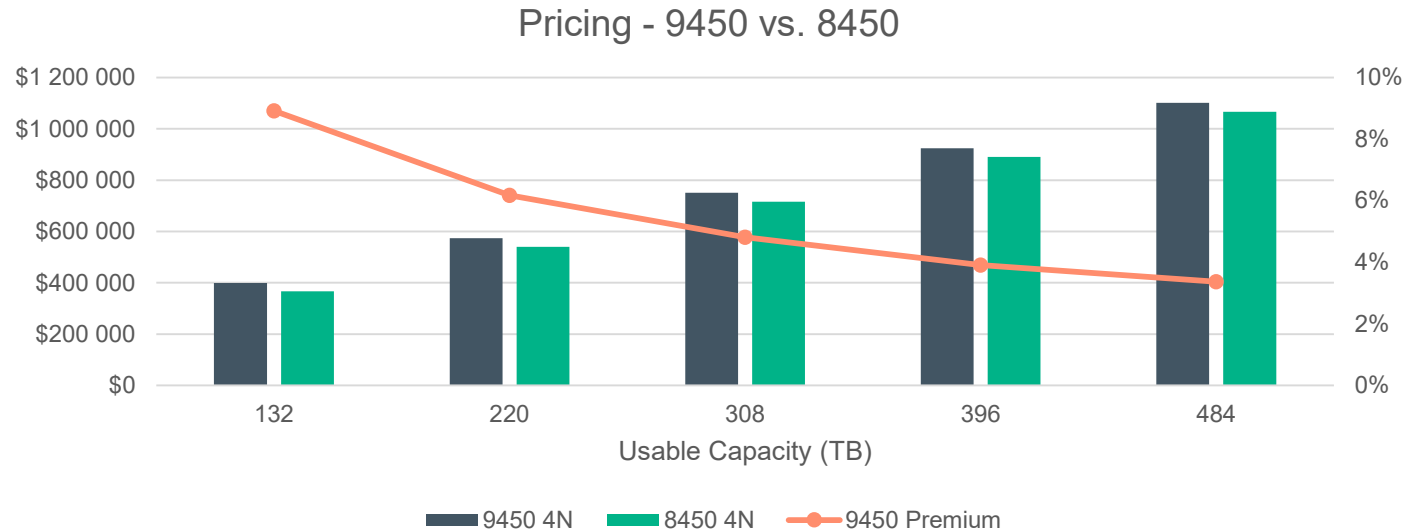
- Number of nodes (2 or 4)
- Number of drive enclosures (as many as the base rack allows)



HPE 3PAR StoreServ 9450 vs 8450 Comparison

	8450	9450	Improvement
Controller Nodes	2 - 4	2 - 4	-
CPU	10-core Ivy Bridge – 2.4GHz	10-core Ivy Bridge – 2.4GHz	-
CPU per system (max cores)	2 – 4 (40)	4 – 8 (80)	100%
ASIC	2 – 4 Gen 5	4 – 8 Gen 5	100%
16Gb Fiber Channel Ports	4 – 24	0 – 80	230%
10Gb iSCSI Ports	0 – 8	0 – 40	400%
1Gb Ethernet IP Ports	0 – 16	NA	
10Gb Ethernet IP Ports	0 – 8	0 – 24	300%
Built-in IP Remote Copy Ports	2 – 4 (1GbE)	2 – 4 (10GbE)	
Cache per node-pair / per system (GiB)	192 / 384	448 / 896	130%
SSDs per array	6 – 480	6 – 576	20%
SSDs in Base Rack	480 SFF	384 SFF ¹	- 20%
Number of Drive Enclosures	0 - 18	2 - 48	140%
Raw Capacity (TiB)	3351 TiB	6000 TiB	79%

3PAR 9450 vs. 3PAR 8450 Pricing Compare



At **100TB** usable capacity, the 9450 has a **9% premium** over the 8450 that decreases at bigger capacity points

Usable Capacity (TB)	132	220	308	396	484
9450 4N	\$ 399,372	\$ 573,789	\$ 750,793	\$ 924,810	\$ 1,101,813
8450 4N	\$ 366,687	\$ 540,412	\$ 716,308	\$ 890,033	\$ 1,065,929
Premium 9450 vs. 8450	9%	6%	5%	4%	3%

- 3PAR Discount: 55%
- Multi-System Software
- 3PAR Compaction: 2:1
- 3PAR Overheads: 30%
- 3.84TB SSD
- Proactive care support

Price include product + support (Proactive Care)

What is the role of the 20450 in the portfolio

The HPE 3PAR 9450 and 20450 will co-exist in the portfolio

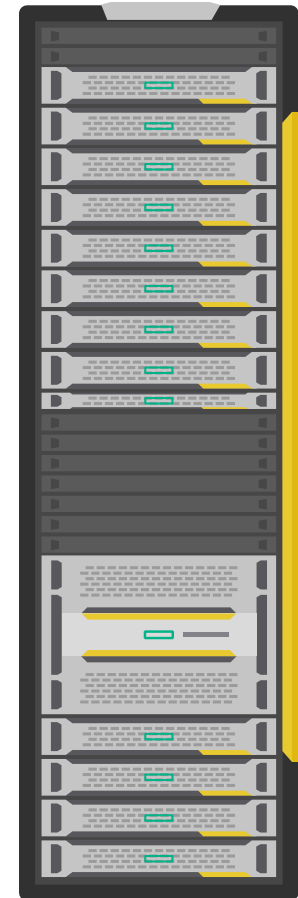
The HPE 3PAR 20450 is the right model to position for the following use cases

- 1) Large customer accounts that require purchase continuity
- 2) Cache focused conversations

The 3PAR 20450 has the highest per-node cache amongst all 4-node scalable models (896GB per node pair, or 2x the 9450)

- 3) RFP lockouts around cache

- The 20450 does not currently support the 1200mm racks
- The 9450 has more CPU power than the 20450:
10 cores per node pair on the 9450 vs 8 on the 20450



HPE 3PAR 20450



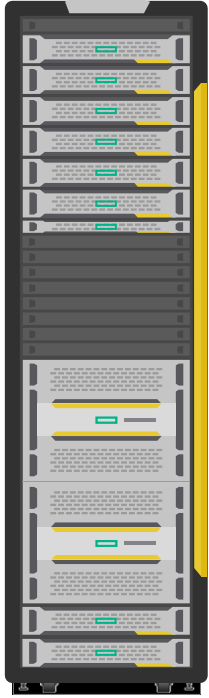
HPE 3PAR StoreServ 20000 Refresh

HPE 3PAR StoreServ 20000 Refresh Tech Specs

	20800	20840	20850
Controller Nodes	2, 4, 6, 8		
CPU	6-core → 8-core	8-core → 10-core	8-core → 10-core
CPU (max cores)	96 → 128	128 → 160	128 → 160
ASIC	16		
16 Gb Fibre Channel Ports	0 – 160		
10Gb iSCSI / FCoE Ports	0 – 80		
10Gb Ethernet IP Ports	0 – 48		
Built-in IP Remote Copy Ports	0 – 8		
GBs Cache per node-pair (GiB)	448 → 640	896	
Drives per array	2304		1152
Drives in Base Rack*	144 → 288	144 → 288	144 → 288
Max SSD per array	1152		
Raw Capacity (TiB)	6000	9600	8043

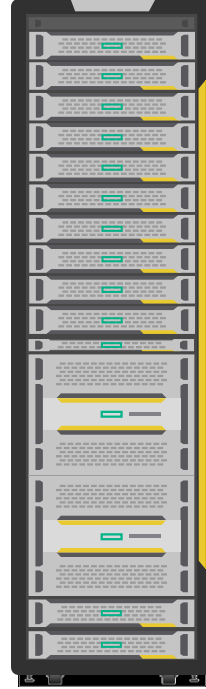
- At **100TB** usable capacity, the 20000 R2 has a **5% premium** over the equivalent 20000 model that decreases at bigger capacity points

HPE 3PAR 20000 Racking options



Base Rack – 1075mm

8 Nodes
8 Drive Enclosures



Base Rack – 1200mm

8 Nodes
12 Drive Enclosures



Expansion Rack – 1075mm / 1200mm

20 Drive Enclosures

HPE 3PAR StoreServ 20000 Refresh Performance

Workload	RAID	Volume	20850 R2	20850	Improvement
8KiB Random Reads (local)	RAID 1	CPVV	3.8M IOPS	3.2M IOPS	12.5%
256KiB Sequential Reads (local)	RAID 1	CPVV	84GB/s	75GB/s	12%
8KiB OLTP 60/40 (distributed)	RAID 5	CPVV	1M IOPS	920K IOPS	14%
16KiB Random Reads (distributed)	RAID 5	DECO	1.1M IOPS	954K IOPS	18%
16KiB OLTP 60/40 (distributed)	RAID 5	DECO	501K IOPS	432K IOPS	16%

Workload	RAID	Volume	20800 R2	20800	Improvement
8KiB OLTP 60/40 (distributed)	RAID 5	CPVV	920K IOPS	749K IOPS	23%
16KiB Random Reads (distributed)	RAID 5	DECO	954K IOPS	675K IOPS	41%
16KiB OLTP 60/40 (distributed)	RAID 5	DECO	432K IOPS	335K IOPS	29%

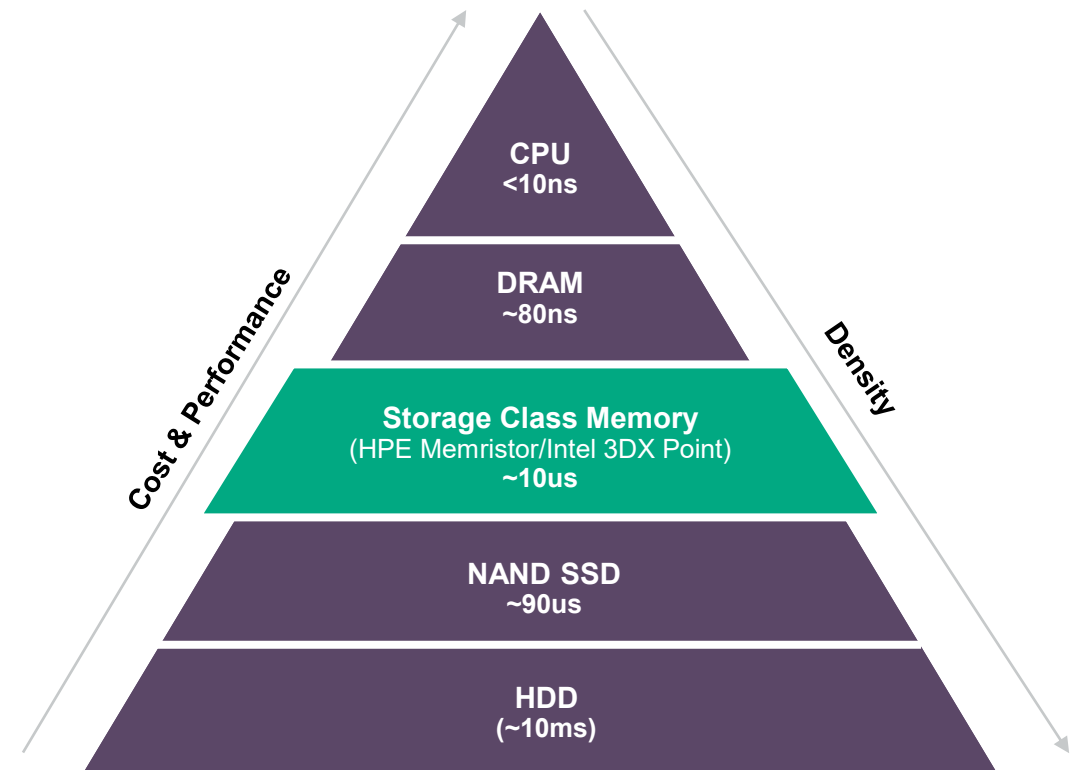
- The tables show preliminary numbers coming from empirical measurements and estimation
- Performance of specific configurations is now available in NinjaSTARS



HPE 3PAR 3D Cache Technology

Storage Class Memory basics

- A new class of persistent solid state storage device that has the following characteristics
 - Performance close to DRAM
 - Endurance close to DRAM
 - Cost closer to NAND flash media
- Technologies under development
 - Magnetic Spin Torque Transfer
 - Phase Change Memory (PCM)
 - Resistive RAM
- SCM products announced or shipping:
 - Intel 3DXPoint is shipping in SSD version (Intel Optane) today, DIMM version expected later
 - Micron version expected in the near future
 - Samsung has announced a device called Z-SSD
- HPE & WD jointly developing Memristor

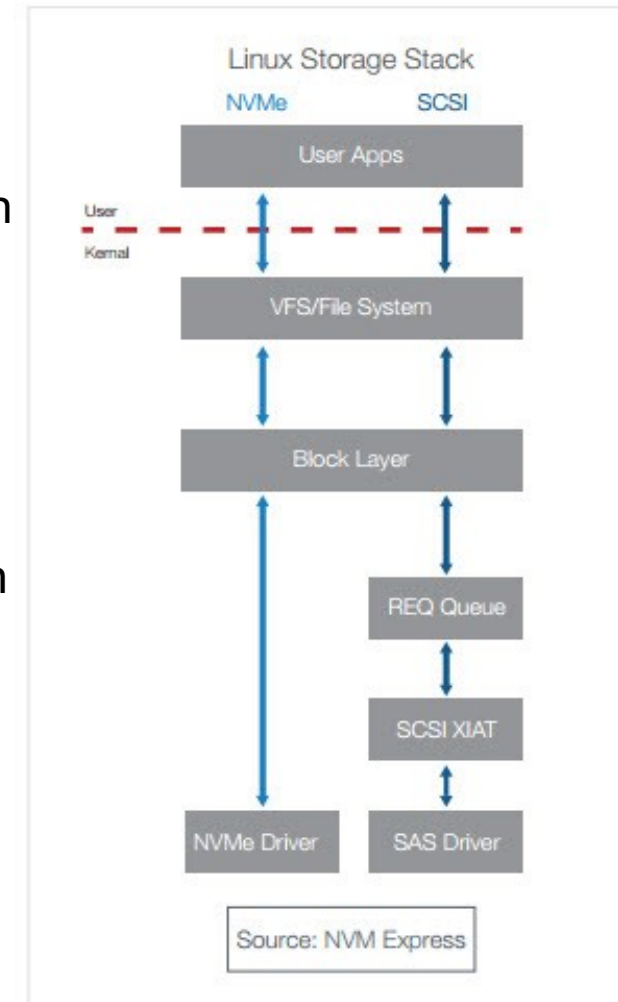
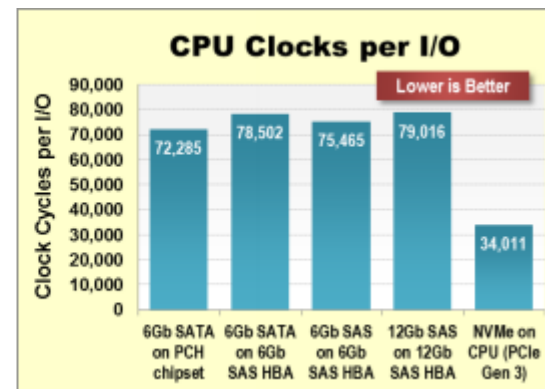
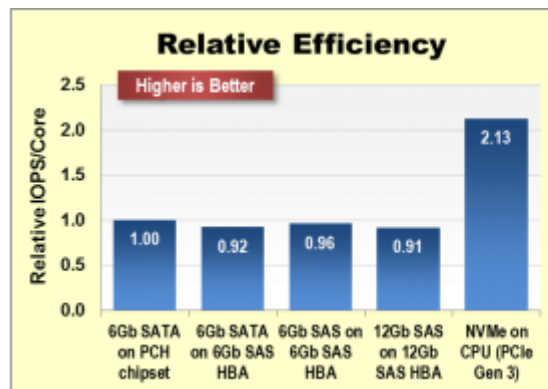


SCM blurs the distinction between memory and storage and opens up the possibility of “universal memory”

NVMe basics

Unlocking the full potential of solid state media

- NVMe is a storage interface protocol designed to work with non-volatile memory devices such as NAND flash and SCM
- NVMe replaces the SCSI protocol stack (SAS or SATA by extension) in the IO path
- NVMe has been designed to take advantage solid state media:
 - Supports multiple deep queues (64K queues and 64K commands per queue)
 - Lower overhead with fewer commands provides higher IOPS per CPU cycle
 - Parallelization: MSI-X and interrupt steering to prevent CPU bottlenecks
- The end results are more IOPS, lower latencies while lowering CPU utilization with solid state media



Enterprise flash gets you ready for what's next

Coming soon

The next level of hyper-acceleration

16x
lower max
latency

50%
lower avg.
latency

Storage Class Memory

Storage Class Memory (SCM) provides incredible levels of performance compared to NAND flash but currently higher cost

3PAR 3D Cache

Deploying SCM, driven by NVMe, as a caching tier provides the highest performance benefits with the lowest cost

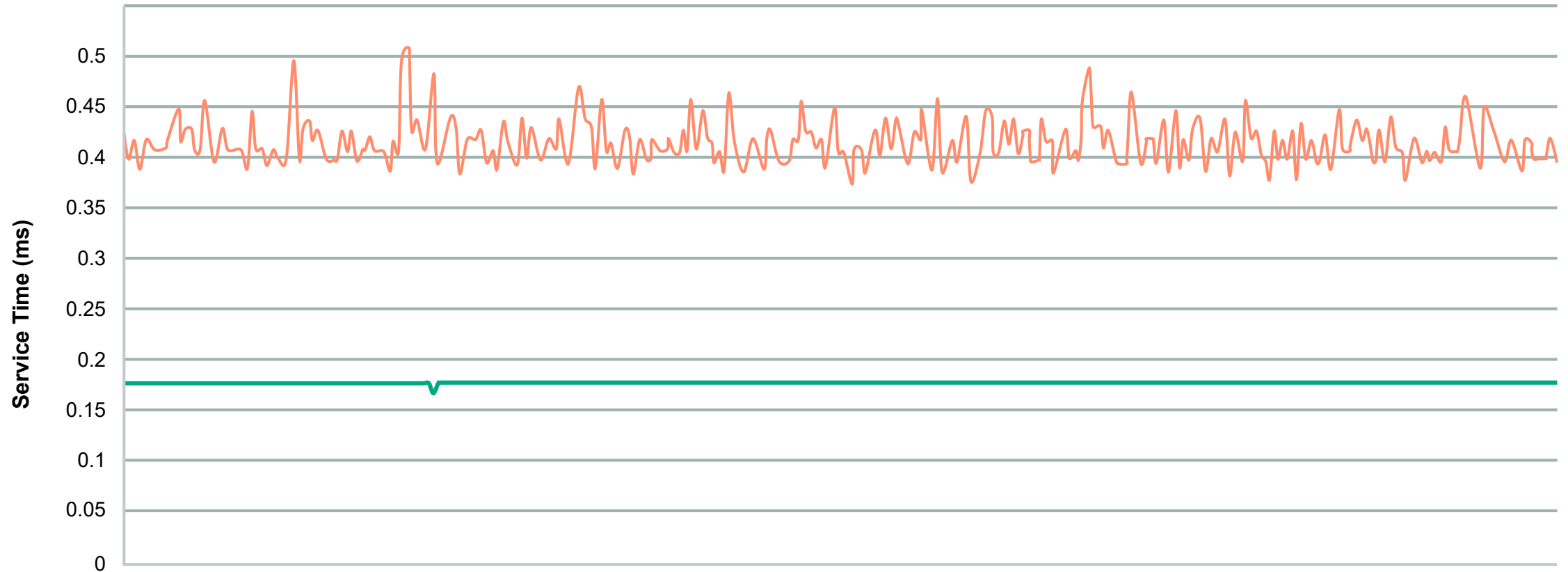
NVMe

Non-Volatile Memory Express (NVMe) provides high performance, low-overhead access to solid state media to drive performance

3PAR update

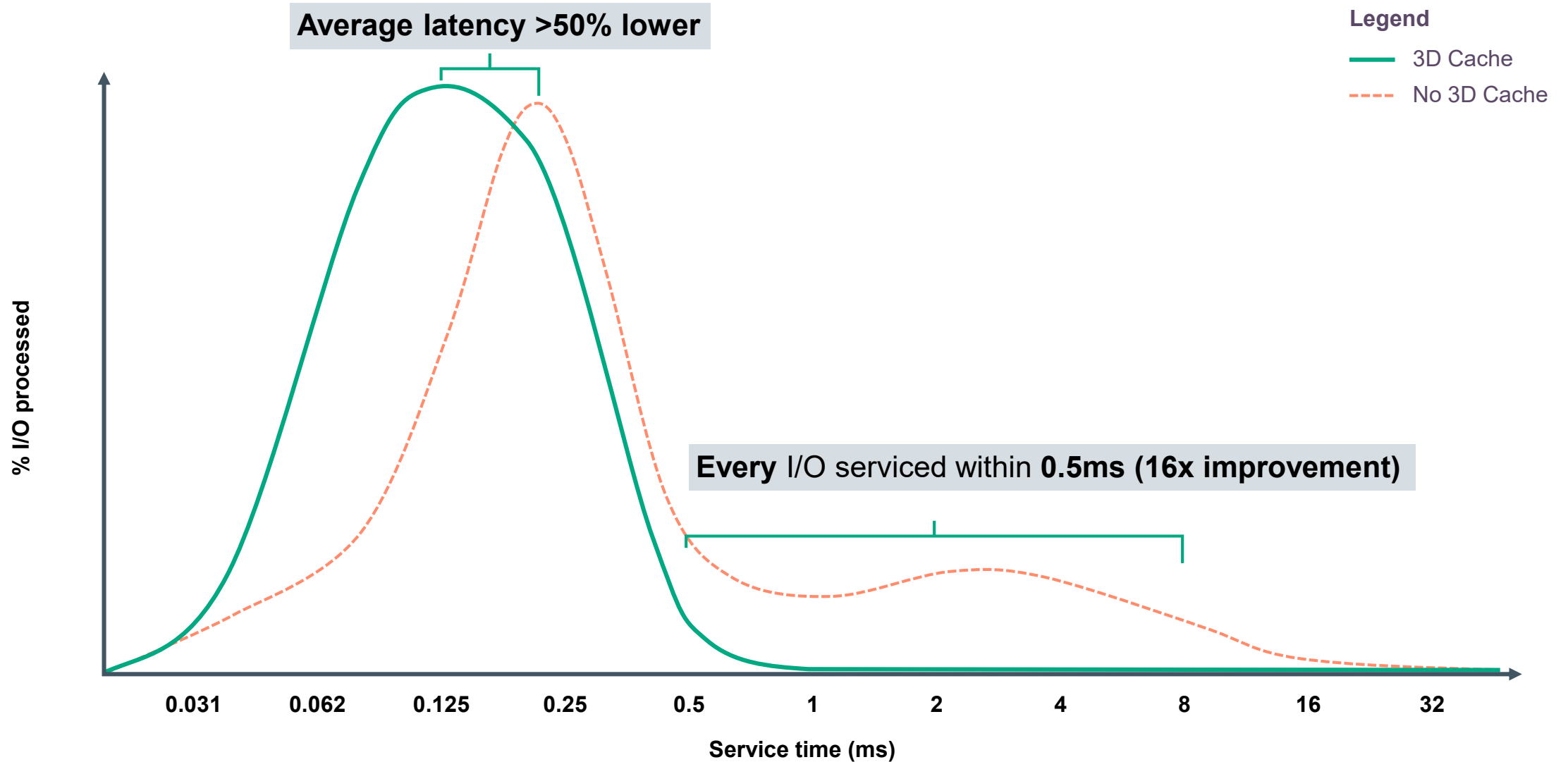
>50% lower, consistent latency

- Legend
- 3D Cache
 - No 3D Cache

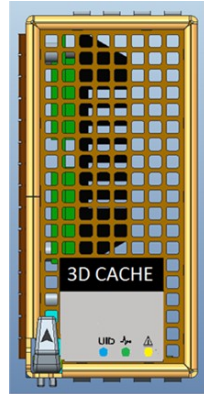
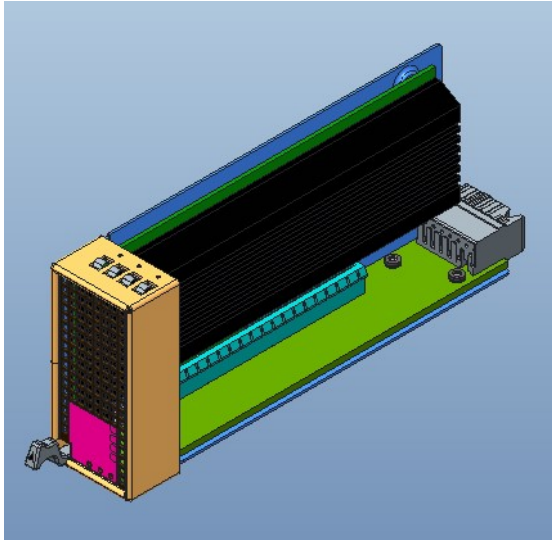


57% lower average latency with 3D Cache vs non 3D Cache

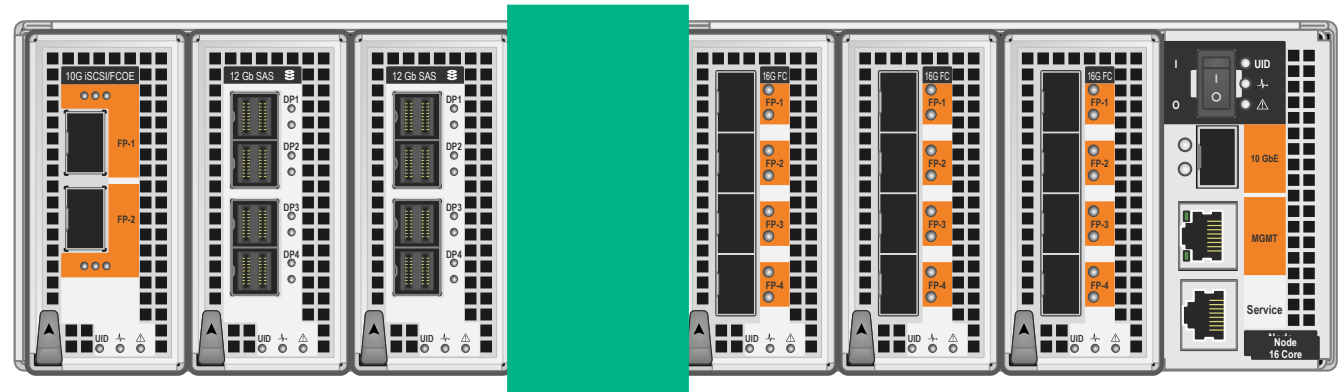
16x reduction in max latency



HPE 3PAR 3D Cache card



3D Cache card



Slot 0
SAS-3
or HBA 5

Slot 1
SAS-2

Slot 2
SAS-1

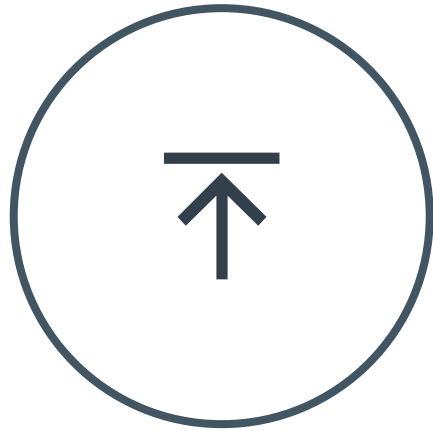
Slot 3
HBA 4

Slot 4
HBA 2

Slot 5
HBA 1

Slot 6
HBA 3

HPE 3PAR 3D Cache: Summary of Use Cases



Application acceleration

Applications where lowest possible latency needs to be guaranteed for every transaction



Density Optimization

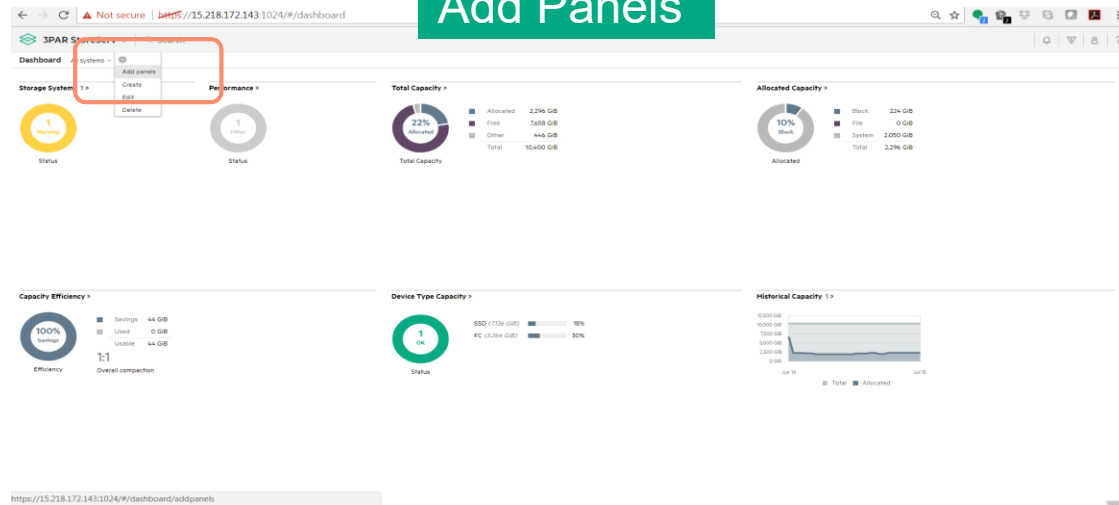
As SSD capacity increases, performance density decreases. 3D Cache allows high density and performance



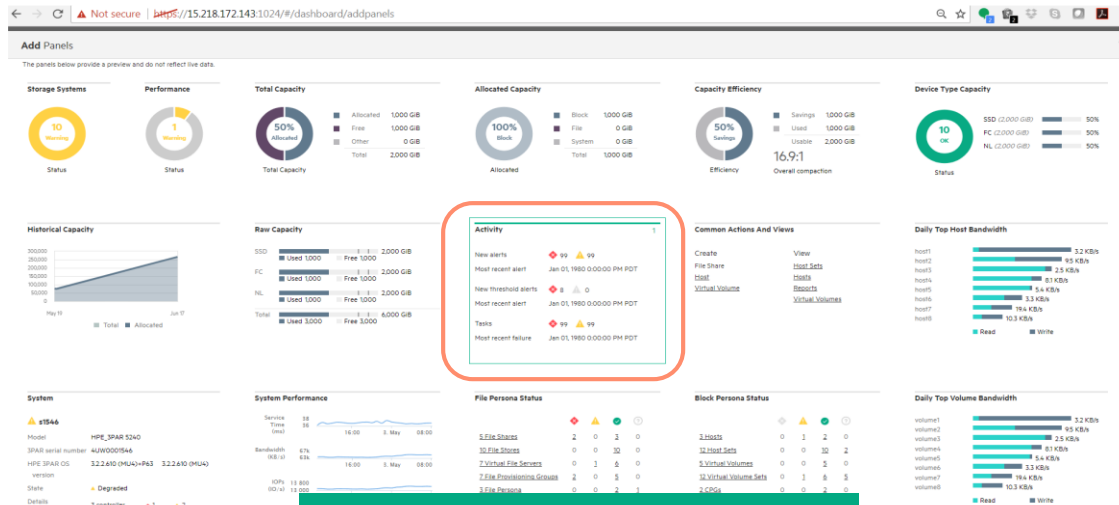
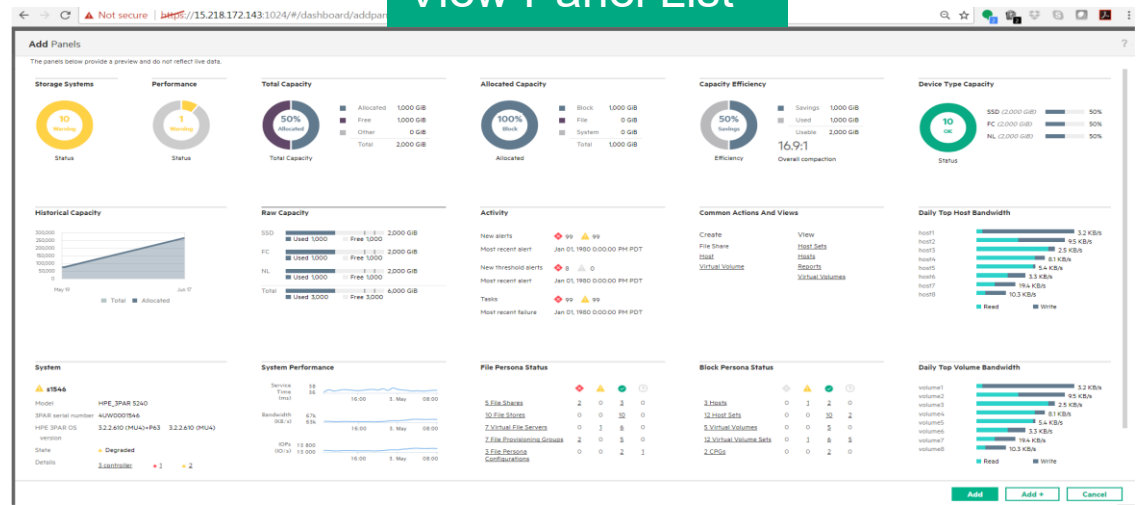
SSMC 3.2 Enhancements

New Dashboard Panels : Add/Add+ Additional Panels on the Dashboard

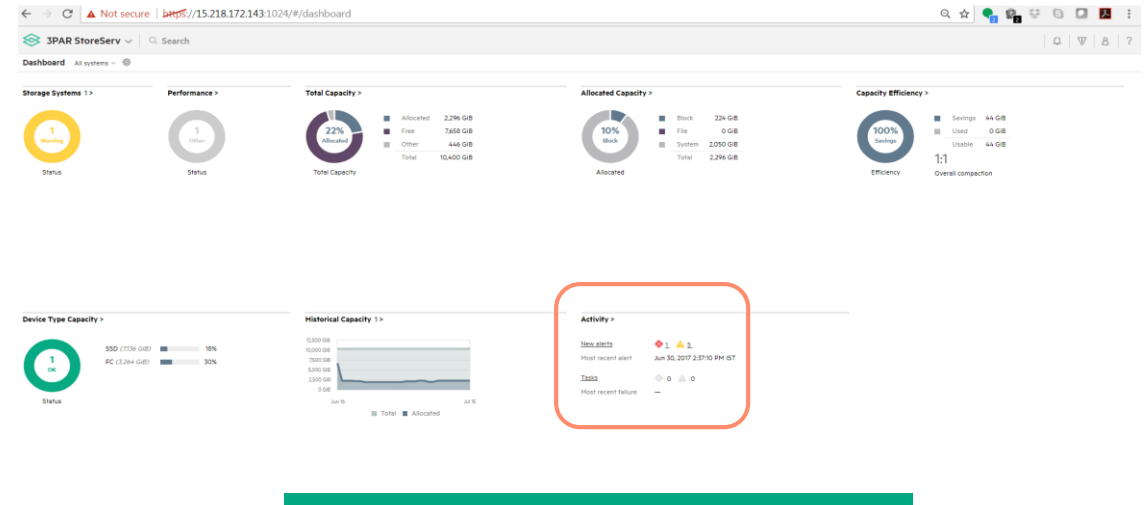
Add Panels



View Panel List



Select Additional Panels



Panel added to Dashboard

Configurable System Columns

What's this?

- SSMC 3.2 brings additional Columns that are
 - Selectable
 - Configurable
- New Column added for system LHS is:
 - Overprovisioning ratio

How?

- Expand System LHS column view
- User can now Select additional column through the select Column Option in the "Device Type Capacity View"

Default Columns

The screenshot shows the 3PAR StoreServ interface with the 'Device Type Capacity View' dropdown menu open. The menu lists various columns with checkboxes. The 'Overprovisioning Ratio' column is not selected in this view.

Column Name	Selected
Status	<input checked="" type="checkbox"/>
Name	<input checked="" type="checkbox"/>
FC Allocated	<input checked="" type="checkbox"/>
NL Allocated	<input checked="" type="checkbox"/>
SSD Allocated	<input checked="" type="checkbox"/>
Allocated (TiB)	<input type="checkbox"/>
Compaction Ratio	<input type="checkbox"/>
Compaction Savings (TiB)	<input type="checkbox"/>
Compaction Usable (TiB)	<input type="checkbox"/>
Compaction Used (TiB)	<input type="checkbox"/>
Dedup Women (TiB)	<input type="checkbox"/>
Compression Ratio	<input type="checkbox"/>
Compression Savings (TiB)	<input type="checkbox"/>
Data Reduction Ratio	<input type="checkbox"/>
Data Reduction Savings (TiB)	<input type="checkbox"/>
Dedup Ratio	<input type="checkbox"/>
Dedup Savings (TiB)	<input type="checkbox"/>
Dedup Used (TiB)	<input type="checkbox"/>
Dedup Women (TiB)	<input type="checkbox"/>
SSD Total (TiB)	<input checked="" type="checkbox"/>
Disk Ports	<input type="checkbox"/>
Drives	<input type="checkbox"/>
Enclosures	<input type="checkbox"/>
Failed	<input type="checkbox"/>
Failed (TiB)	<input type="checkbox"/>
FC Drives	<input type="checkbox"/>
FC Total (TiB)	<input type="checkbox"/>
Free	<input type="checkbox"/>
Free (TiB)	<input type="checkbox"/>
Free Bays	<input type="checkbox"/>
Free Ports	<input type="checkbox"/>
FS Ports	<input type="checkbox"/>
Host Ports	<input type="checkbox"/>
HPE 3PAR OS Version	<input type="checkbox"/>
IP Address	<input type="checkbox"/>
Model	<input type="checkbox"/>
NL Drives	<input type="checkbox"/>
NL Total (TiB)	<input type="checkbox"/>
Overprovisioning Ratio	<input type="checkbox"/>
Peer Ports	<input type="checkbox"/>
RC Ports	<input type="checkbox"/>
Serial Number	<input type="checkbox"/>
Snapshot (TiB)	<input type="checkbox"/>
Snapshot Efficiency	<input type="checkbox"/>
Snapshot Savings (TiB)	<input type="checkbox"/>
Snapshot Used (TiB)	<input type="checkbox"/>
SSD Drives	<input type="checkbox"/>
Thin Provisioning Ratio	<input type="checkbox"/>
Thin Provisioning Savings (TiB)	<input type="checkbox"/>
Total (TiB)	<input type="checkbox"/>
Total Ports	<input type="checkbox"/>
UID / Locate	<input type="checkbox"/>
Unavailable	<input type="checkbox"/>
Unavailable (TiB)	<input type="checkbox"/>
Up Since	<input type="checkbox"/>
WWN	<input type="checkbox"/>

New Column Selected

The screenshot shows the 3PAR StoreServ interface with the 'Device Type Capacity View' dropdown menu open. The 'Overprovisioning Ratio' column is now selected, indicated by a red box.

Column Name	Selected
Status	<input checked="" type="checkbox"/>
Name	<input checked="" type="checkbox"/>
FC Allocated	<input checked="" type="checkbox"/>
NL Allocated	<input checked="" type="checkbox"/>
SSD Allocated	<input checked="" type="checkbox"/>
Allocated (TiB)	<input type="checkbox"/>
Compaction Ratio	<input type="checkbox"/>
Compaction Savings (TiB)	<input type="checkbox"/>
Compaction Usable (TiB)	<input type="checkbox"/>
Compaction Used (TiB)	<input type="checkbox"/>
Dedup Women (TiB)	<input type="checkbox"/>
Compression Ratio	<input type="checkbox"/>
Compression Savings (TiB)	<input type="checkbox"/>
Data Reduction Ratio	<input type="checkbox"/>
Data Reduction Savings (TiB)	<input type="checkbox"/>
Dedup Ratio	<input type="checkbox"/>
Dedup Savings (TiB)	<input type="checkbox"/>
Dedup Used (TiB)	<input type="checkbox"/>
Dedup Women (TiB)	<input type="checkbox"/>
SSD Total (TiB)	<input checked="" type="checkbox"/>
Disk Ports	<input type="checkbox"/>
Drives	<input type="checkbox"/>
Enclosures	<input type="checkbox"/>
Failed	<input type="checkbox"/>
Failed (TiB)	<input type="checkbox"/>
FC Drives	<input type="checkbox"/>
FC Total (TiB)	<input type="checkbox"/>
Free	<input type="checkbox"/>
Free (TiB)	<input type="checkbox"/>
Free Bays	<input type="checkbox"/>
Free Ports	<input type="checkbox"/>
FS Ports	<input type="checkbox"/>
Host Ports	<input type="checkbox"/>
HPE 3PAR OS Version	<input type="checkbox"/>
IP Address	<input type="checkbox"/>
Model	<input type="checkbox"/>
NL Drives	<input type="checkbox"/>
NL Total (TiB)	<input type="checkbox"/>
Overprovisioning Ratio	<input checked="" type="checkbox"/>
Peer Ports	<input type="checkbox"/>
RC Ports	<input type="checkbox"/>
Serial Number	<input type="checkbox"/>
Snapshot (TiB)	<input type="checkbox"/>
Snapshot Efficiency	<input type="checkbox"/>
Snapshot Savings (TiB)	<input type="checkbox"/>
Snapshot Used (TiB)	<input type="checkbox"/>
SSD Drives	<input type="checkbox"/>
Thin Provisioning Ratio	<input type="checkbox"/>
Thin Provisioning Savings (TiB)	<input type="checkbox"/>
Total (TiB)	<input type="checkbox"/>
Total Ports	<input type="checkbox"/>
UID / Locate	<input type="checkbox"/>
Unavailable	<input type="checkbox"/>
Unavailable (TiB)	<input type="checkbox"/>
Up Since	<input type="checkbox"/>
WWN	<input type="checkbox"/>

Reporting Enhancements : New Report Template: Performance Summary Report

What's New?

- SSMC 3.2 has new report template called "Performance Summary Report" to select multiple components and provide different compare options for each of the component.
- User can select histogram report as well.
- User can select multiple components and edit each of them.
- Supported components
 - Physical Drives
 - Hosts
 - Exported Volumes
 - Host Ports
 - Node CPU
 - Node Cache

The screenshot shows the 'Create Report' interface with the following sections:

- General**:
 - Report type: Create report Create multiple reports
 - System: s935
 - Report template: System Report - Performance Summary [Select](#)
 - Report name: System Performance Report
 - Description: (empty)
 - Access type: Private Public
- Component**:

Component	Category		
Enclosure Ports	Histogram	edit	x
Exported Volumes	Performance	edit	x
Exported Volumes	Histogram	edit	x
Host Ports	Performance	edit	x
Host Ports	Histogram	edit	x
Hosts	Performance	edit	x
Node Cache	Performance	edit	x
Node CPU	Performance	edit	x
Physical Drives	Performance	edit	x
Physical Drives	Histogram	edit	x
- Time Settings**:
 - Changed: Sampling to 'Hi-res'
 - [Create](#) [Create +](#) [Cancel](#)

Percentile in User Preference : Set Percentile / Report view

What's New?

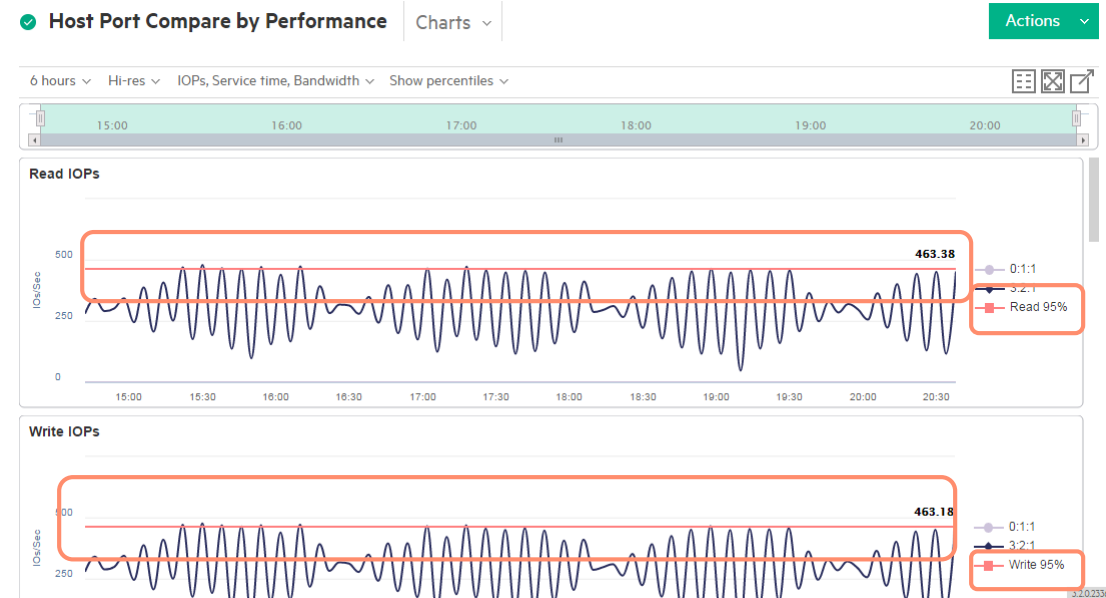
SSMC 3.2 users can now set percentile values to see where various system parameters are at that percentile levels.

How?

Setting available in System Reporter Global Setting to enable Percentile

User can also provide multiple percentile values

Data can be displayed per chart or per series



The screenshot shows the 'System Reporter' configuration page. It includes fields for 'Retention period' (7 Days), 'Shared directory path', 'SMTP server', 'SMTP port' (25), 'SMTP server authorization' (No), 'From address' (sr@example.com), and 'Email recipients'. There are buttons for 'Test directory path' and 'Send test email'. Under 'Report formats', 'PDF' and 'CSV' are checked. The 'Display percentile' section is highlighted with a red box and contains a 'Yes' radio button, a 'Percentile values' input field, and a 'Plot percentile' dropdown set to 'Per chart'. Below this is the 'Other Formats' section with options for 'Date & time' (Short display, Long display) and 'WWN format'. At the bottom, there is a 'Preferences' section with a notification 'Changed: Display percentile to "Yes"' and buttons for 'Restore defaults', 'OK', and 'Cancel'.

SmartSAN 2.0 in SSMC 3.1

Create Host | General ▾ ?

General

Name

System **R207-S12**
OS: Windows 2008/2008 R2

Host set **R207-S13**
OS: Windows 2012 / WS2012

Host OS **R2**

Persona **R207-S14.snesanbox.lab**

Select an available Host Explorer or Smart SAN host or enter a host name. Name must be unique on the selected storage system. Name may be 1 to 31 alphanumeric characters including hyphen, period, and underscore but cannot begin with a hyphen.
optional

Paths

0 Paths

Name	System Ports (N:S:P)	Type	Reported Host Name	Operating System
No data available in table				

Descriptors

Operating system

Location optional

IP address optional

Model optional

Contact optional

Creating TDPZ Zones Using SSMC

Hosts and their associated zones can be created from the **Hosts** screen within **Block Persona (Block Persona > Hosts)**.

- Select **Create Host**
- On the **Create Host** screen, the drop-down menu lists the hostnames as well as the host's operating system
- Select the hostname

Smart SAN for Host Synchronization : Synchronize Federation Import Configuration

What's new?

- In Federation Configuration Action Menu, following Options are provided
- Synchronize Federation
- Import Configuration

Sync SMART-SAN-CXO ?

Settings and resources will be synchronized among all systems in the federation. Smart SAN host ports are available on some or all of the federated systems. They can be used to create hosts if the WWNs are not found on a destination system.

Use Smart SAN host ports Yes | When copying a host, Smart SAN host ports will be used to create the hosts if Smart SAN host ports are available on the destination system.

Default port selected is based upon source system destination configuration. If no port is selected on a system, Smart SAN host ports will not be used on that system. Otherwise at least 2 ports must be selected on each system. The least loaded ports will be used if there are more ports selected than needed.

System	Node Pair	Smart SAN Host Ports (NS:SP) (# of Hosts Connected)
p5200-7023	0/1	<input type="checkbox"/> 0:1:1 (17) <input type="checkbox"/> 0:1:2 (12) <input type="checkbox"/> 0:2:1 (15) <input type="checkbox"/> 1:1:1 (16) <input type="checkbox"/> 1:1:2 (13) <input type="checkbox"/> 1:2:1 (15)
P8200-7009	0/1	<input type="checkbox"/> 0:0:1 (16) <input type="checkbox"/> 1:0:1 (16)

Changed: Use Smart SAN host ports to "Yes"

Import Configuration SMART-SAN-CXO General ?

Settings and resources will be imported from a source system (not in the federation) to all systems in the federation. The check box will be disabled if the logon user is not authorized to import a setting or resource, or the setting or resource is not found on the source system.

General

Name SMART-SAN-CXO

Import From

System	Model	Version
p574	HPE_3PAR 7L00	3.31 (GA)

Configuration

Select the settings and resources you want to import

- LDAP configuration
- SNMP configuration
- NTP servers
- System log parameters
- Domains/Domain Sets
- Hosts/Host Sets

57 hosts, 327 host sets

Name	Type	Set
0_rtest_hostset	Host Set	—
2FF70002AC000104	Host	—
2FF70002AC07E0A2	Host	—
2FF70002AC07E0A5	Host	—
Aagami_PP_HOST	Host	PP_HOSTSET

Use Smart SAN host ports Yes | When copying a host, Smart SAN host ports will be used to create the hosts if Smart SAN host ports are available on the destination system.

Default port selected is based upon source system destination configuration. If no port is selected on a system, Smart SAN host ports will not be used on that system. Otherwise at least 2 ports must be selected on each system. The least loaded ports will be used if there are more ports selected than needed.

System	Node Pair	Smart SAN Host Ports (NS:SP) (# of Hosts Connected)
p5200-7023	0/1	<input type="checkbox"/> 0:1:1 (17) <input type="checkbox"/> 0:1:2 (12) <input type="checkbox"/> 0:2:1 (15) <input type="checkbox"/> 1:1:1 (16) <input type="checkbox"/> 1:1:2 (13) <input type="checkbox"/> 1:2:1 (15)
P8200-7009	0/1	<input type="checkbox"/> 0:0:1 (16) <input type="checkbox"/> 1:0:1 (16)

Changed: Use Smart SAN host ports to "Yes"

3PAR StoreServ

Federation Configurations

Create Federation

BB_Federation Overview

Health: Normal

Peer Links

Peer Motion Summary

Actions

- Create
- Edit
- Delete
- Upgrade
- Add migration source
- Edit migration source
- Synchronize Federation**
- Import configuration
- Refresh external systems
- Start Peer Motion

https://15.212.201.248:3024/#/federations/sync/federation/federation/REST/fm/ieservice/clusters/9437d99e9e954e3e3e5a48e7d5d66927f_sort=name%3Aasc

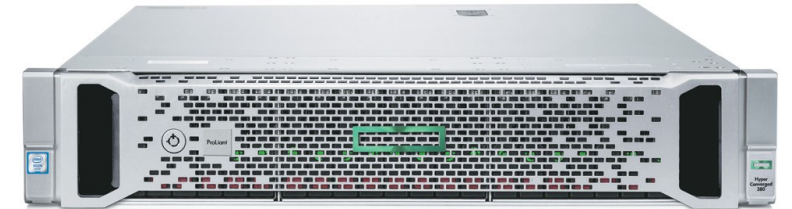
Backup Appliance for HPE DP/VMX

– Najważniejsze cechy:

- Pełna funkcjonalność systemu zabezpieczania danych w urządzeniu 2U
- Redukcja okien backupowych 30-60%
- Redukcja czasu odtworzenia 50-300%
- Wspiera nielimitowaną ilość klientów backupowych (oraz aplikacje Oracle, MSSQL, SAP)
- Wydajność tworzenia kopii zapasowych ekwiwalent 12TB/h backupu tradycyjnego
- Pojemność 16|32|54TB w tym 10|20|32|50 TB na dane zdeduplikowane(1PB max przy poz dedupliakcji 20:1).
- Porty , 1|10GbE
- Ochrona zasobów przez LAN i WAN (zdalne biura)
- Backup do chmury
- Wsparcie 3 lata na sprzęt i oprogramowanie

– Opcje rozbudowy:

- Agenci aplikacyjni HPDP
- DR po WAN (min. 2Mbps) pomiędzy ośrodkami klienta lub do ośrodka partnera technologicznego
- FC i SAS
- Biblioteki taśmowe HP StoreEver



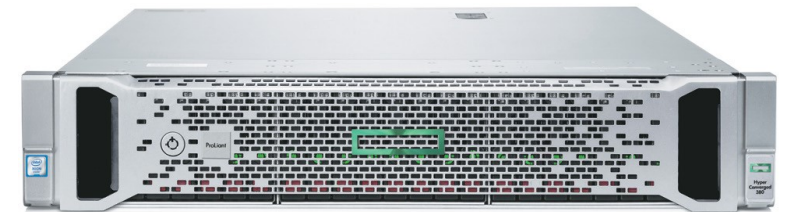
Backup Appliance for Veeam

– Najważniejsze cechy:

- System zabezpieczania danych w urządzeniu 2U
- redukcja wykorzystania pasma replikacji do 75% (w stosunku do oferowanego przez Veeam)
- Deduplikacja StoreOnce redukuje 4-5 krotnie ilości przechowywanych przez Veeam danych
- Deduplikuje strumienie natywnych narzędzi backupu serwerów fizycznych oraz MS SQL, Oracle oraz SAP.
- Szyfrowanie oraz bezpieczne kasowanie danych
- Wydajność tworzenia kopii zapasowych ekwiwalent 12TB/h backupu tradycyjnego
- Pojemność 16|32|54TB w tym 10|20|32|50 TB na dane zdeduplikowane(1PB max przy poz dedupliacji 20:1).
- Porty FC8|16Gb, 1|10GbE, SAS
- Ochrona zasobów przez SAN/LAN oraz zoptymalizowana replikacja przez WAN (zdalne biura)
- Backup do chmury
- Wsparcie 3 lata

– Opcje rozbudowy:

- DR po WAN (min. 2Mbps) pomiędzy ośrodkami klienta lub do ośrodka partnera technologicznego
- Rozbudowa do 50TB przestrzeni a deduplikaty (ekwiwalent -1PB przestrzeni tradycyjnej)
- Biblioteki taśmowe HP StoreEver (wymagają licencji Enterprise Plus)



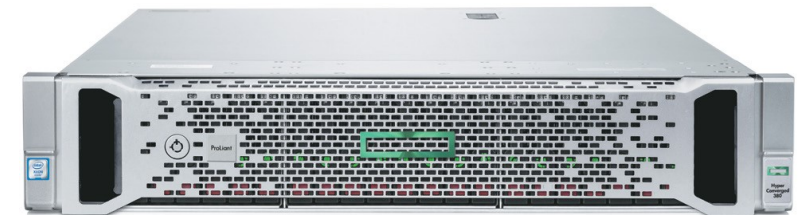
Backup Appliance for RMC 4.0

– Najważniejsze cechy:

- Integracja technologii 3Par, StoreVirtual i StoreOnce
- Wydajność tworzenia kopii zapasowych 23x wydajność NetBackup (do 80TB/h).
- Przesyła wyłącznie zmienione dane (śr. Blok 4kB) - każdy backup jest backupem pełnym
- Granularne odtworzenie danych
- Nie wymaga licencji oprogramowania backupowego
- Wspiera natywne narzędzia backupu serwerów fizycznych oraz MS SQL, Oracle oraz SAP.
- Wydajność tworzenia kopii zapasowych ekwiwalent 12TB/h backupu tradycyjnego
- Pojemność 16|32|54TB w tym 10|20|32|50 TB na dane zdeduplikowane(1PB max przy poz dedupliakcji 20:1).
- Porty 1|10GbE
- Backup i replikacja (StoreVirtual VSA) do chmury
- Wsparcie 3 lata

– Opcje rozbudowy:

- Szyfrowanie oraz bezpieczne kasowanie danych
- Opcja FC FC8|16Gb
- DR po WAN (min. 2Mbps) pomiędzy ośrodkami klienta lub do ośrodka partnera technologicznego





Hewlett Packard
Enterprise

Thank you

Contact information