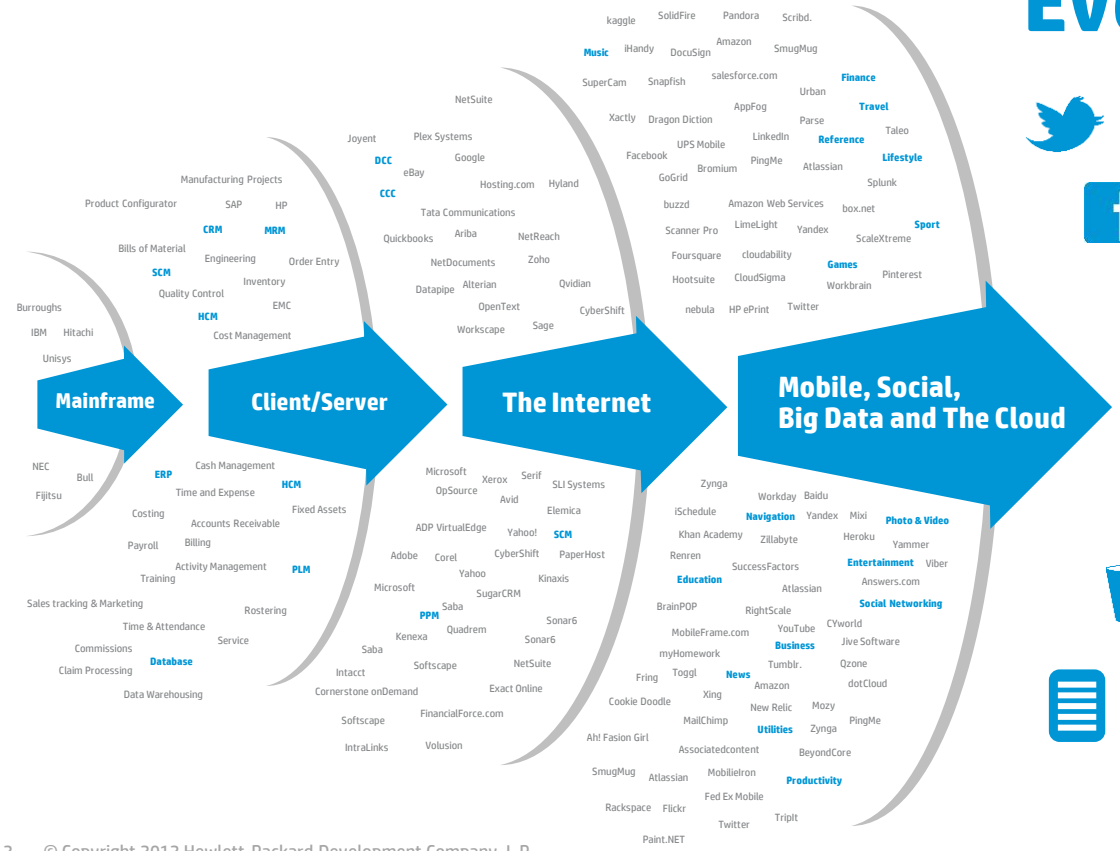
The Ultimate HP Storage Overview for Insight

Chet Jacobs
Chief Storage Evangelist
December 2012

A New Style of IT Emerging



Every 60 seconds

98,000+ tweets

695,000 status updates

11million instant messages

698,445 Google searches

168 million+ emails sent

38 tons of e-waste

217 new mobile web users

Industry Trends in Storage

There is NO viable alternative to on-line storage

"A terabyte of text printed on paper represents the death of 50,000 trees ~ or one day's data from the space-based Earth Observing System."

Roy Williams, Caltech's Center for Advanced Computing Research

Data Storage Trivia

Q: What was the typical capacity utilization of a storage system 20 years ago?

A: About 20%

Q: Today?

A: About 20%, …but the average capacity has grown ~20,000X

Q: What was the largest storage management problem 20 years ago?

A: Data Backup

Q: Today?

A: Data Backup

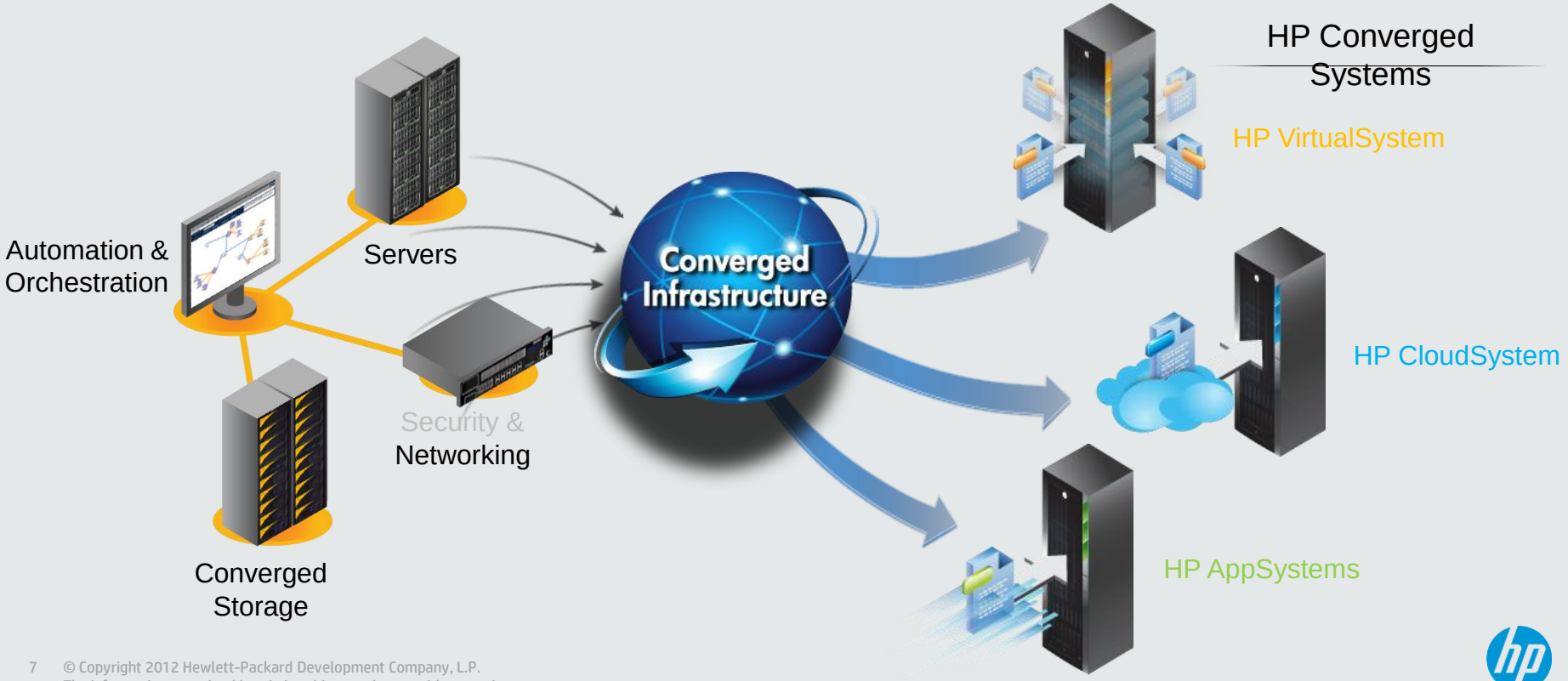
Q: How often did users typically delete data from their system 20 years ago?

A: Don't know yet…

The storage business is a great place to be!

STORAGE FOR THE CONVERGED INFRASTRUCTURE

Converged Storage: building blocks for new solutions

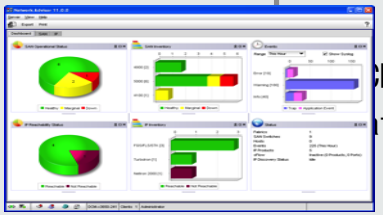


7

Interconnect Strategy

The HP Storage B-series Family Portfolio

Building Blocks for the Adaptive Infrastructure



HP SAN Network Advisor

CFM 10.4.5

ta Center Fabric Manager

SN8000B-8

SN8000B-4

16 Gb

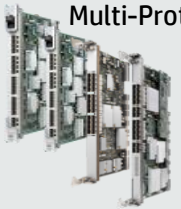
New!

Encryption SAN Switch

DC SAN Directors

Director

- 16-512 ports
- 1, 2, 4, 8 & 10 Gb
- 16, 32, 48 & 64 port blades
- Multi-Protocol / Encryption



Director Blades

- FC Blades
- FCoE Blade
- MP Ext. Blade
- Encryption

16 Gbps

Brocade 6510

24-48 ports

8/80 SAN Switch

8/40 SAN Switch

8/8 & 8/24 SAN Switch

2408 FCoE Switch

HP1606 Distance Extension

Brocade 8Gb HP c-Class Embedded

- 24 ports
- 8Gb

Brocade 8Gb Mezz Card

FC HBAs

8Gb & 4Gb PCI-e

Common, scalable B-series Fabric OS & New FC HBAs


Get ready for the NEXT
generation of HP Storage..

HP Near line Solutions

Introducing Enhancements to HP StoreOnce Backup

Federated Deduplication for data mobility without rehydration

Accelerated: **Rapid backup and guaranteed recovery performance**
Variable chunking and StoreOnce Catalyst offload to increase performance
Now for ANY customer environment, big or small

Available: **Eliminate single points of failure**
High-end HP StoreOnce 6200 with Autonomic Restart so backup always completes

Flexible: **Dedupe and Replicate backup anywhere**
Multi-site replication plus dedupe at source, server, or target from ROBO to datacenter

Simple: **Centralize control to eliminate complexity**
Integration with HP and ISV applications so one console does it all

5X Faster Recovery and Autonomic Restart

Introducing the world's fastest deduplication solution

HP StoreOnce B6200 and StoreOnce Catalyst software

Recover more in 1 day with HP StoreOnce than you can in 1 work week with EMC

- **3x faster backup** and **5x faster recovery** than EMC Data Domain
- **Federated Deduplication** for data mobility without rehydration
- Deduplication **processing at the server** for flexibility
- Manage **StoreOnce functions** directly from backup applications

100TB/hr.
Backup Speed: B6200 with StoreOnce Catalyst

40TB/hr.
Backup Speed: B6200 Native performance

40TB/hr.
Restore Speed: B6200 Native performance

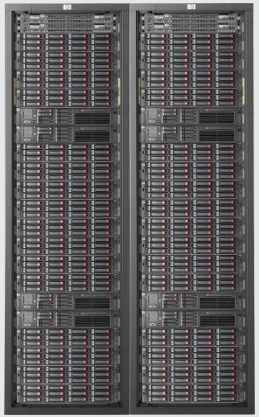
HP StoreOnce is a single technology from SMB to Enterprise

Application Source & Backup Server

ROBO Appliance

Mid Range Appliance

Large Enterprise/HSP

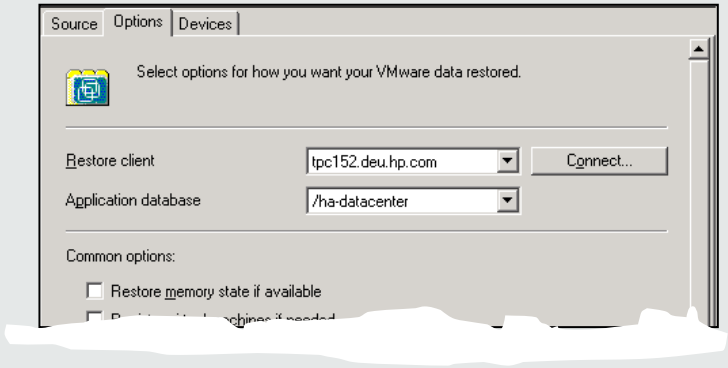


	HP Data Protector	StoreOnce 2500	StoreOnce 41XX	StoreOnce 43XX	StoreOnce B6200
Speed (StoreOnce Catalyst)	Up to 1.8TB/hr	Coming later in 2012	Coming later in 2012	Coming later in 2012	Up to 100TB/hr
Speed (native)	Up to 1.8TB/hr	Up to 800GB/hr	Up to 1.3TB/hr	Up to 4TB/hr	Up to 40TB/hr
Speed (restore)	Up to 1.8TB/hr	Up to 640GB/hr	Up to 1TB/hr	Up to 3.2TB/hr	Up to 40TB/hr
Logical capacity*	Up to 400 TB	30TB & 60TB	180 TB & 360TB	720TB & 1.4PB	Up to 10.2PB
Usable capacity	Up to 20TB	1.5TB & 3TB	Upgrade from 4.5TB to 9TB & 9TB to18TB	Scale from 9TB to 36TB & 18TB to 72TB	Scale from 32TB out to 512TB

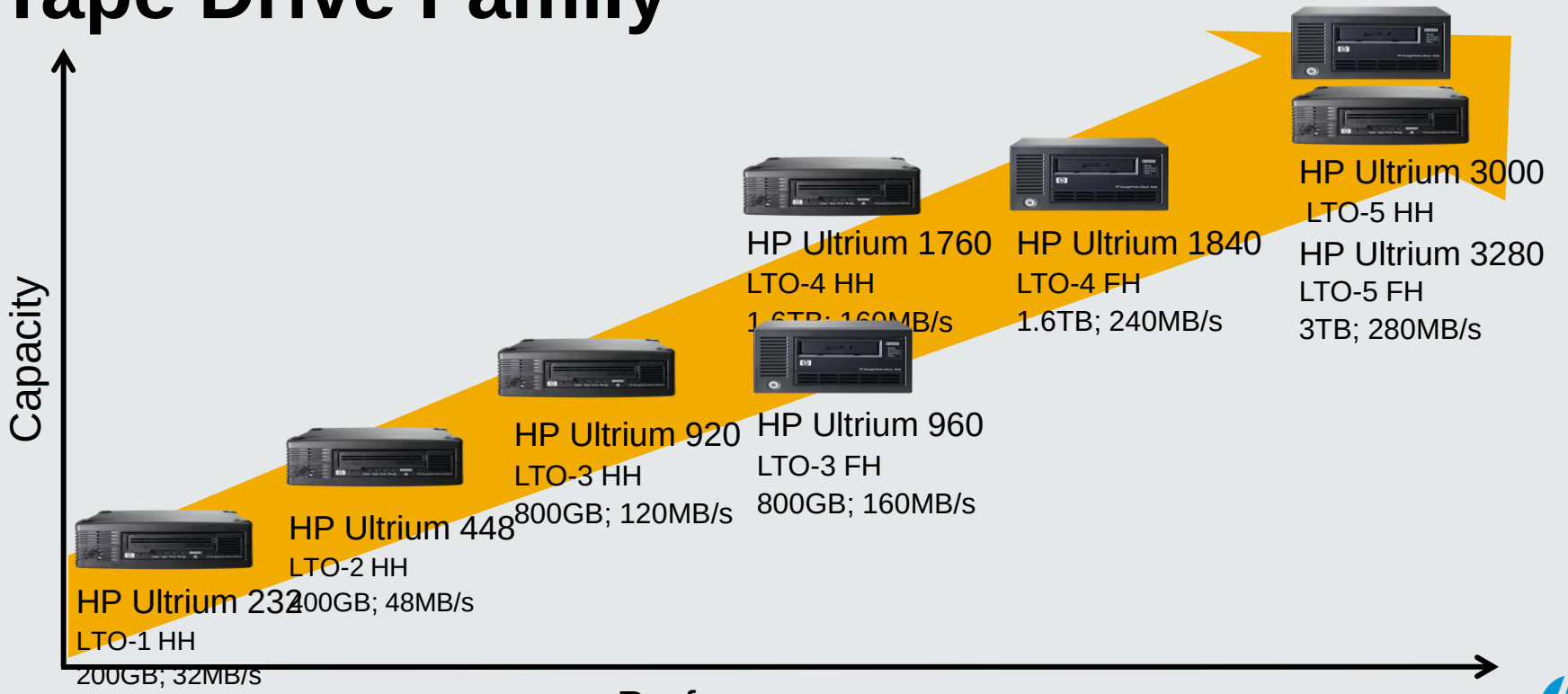
HP StoreOnce Backup Systems deliver broad application support

- Data Protector
- Data Protector Express
- ARCserve
- Simpana
- NetWorker
- NetVault (Bakbone)
- Backup Exec
- NetBackup
- TSM

- vRanger Pro (Vizioncore)
- Veeam Backup



HP Storage LTO Ultrium Tape Drive Family



www.hp.com/go/lto

Tape Automation Portfolio HP

June 2011 – even higher scalability; even greater manageability

Autoloaders

- Simple and low cost
- Ideal for small servers or small networks
- DAS and LAN backup

MSL Series

- Manageable, flexible, reliable
- Suitable for medium and large businesses
- DAS, LAN, entry-level SAN backup

EML E-Series

- Scalable, manageable, reliable
- Medium to large data centers
- Medium to large SANs

ESL G3 series

- Higher capacity and performance points
- Scalable, dual robotics capable
- Licensed features: automated media pool (AMP), control path, data path failover etc.
- Enterprise data centers
- Large-scale SANs

Entry-Level 1-20 slots

Mid-Range 21-100 slots

Enterprise >100 slots

Introducing HP StoreEver, featuring LTO6 Technology AKA tape and libraries

StoreEver LTO6 now available across the portfolio

New LTO6 technology refreshed for existing products from standalone to ESL G3

- **6.25 TB*** - Twice the compressed capacity of LTO-5 in the same cartridge footprint – massive archive in a small space
- **1.45 TB/Hour** - Transfer data at up to 400MB/second for blistering store and restore speeds to meet demanding SLAs
- **LTFS with StoreOpen** - Game-changing technology that makes tape as easy to use as disk
- **Added Security** - Hardware based data encryption for added data security, and WORM cartridge tapes for even more compliance
- **Investment Protection** - Backward read/write compatible with LTO-5 and LTO-5 LTFS written cartridges, and backward read compatible with LTO-4 for worry-free data retrieval

HP Storage Arrays

HP Storage portfolio – SAN Storage

3PAR

XP

P4000
iSAN

EVA

EVA6400

EVA8400

EVA4400

XP24000
≤ 1.13 PB

XP20000
≤ 454+ TB

P2000

Consolidation and Performance

Business Continuity and Availability

Low cost consolidation
≤ 48TB

- 4GB FC, 1GbE iSCSI, and 3Gb SAS
- SAS & SATA together
- Controller-based snapshot/clone
- Windows, Linux, VMware
- WEB, Exchange, SQL

Scalable, Clustered IP SAN
≤ 960 TB

- Scalable iSCSI performance
- Cost effective high availability
- Simplified mgmt for virtualization
- VMware, Citrix, Hyper-V, Windows, Linux

Outstanding TCO
≤ 324 TB

- FC & iSCSI host ports
- FC & FATA HDD
- Storage consolidation + disaster recovery
- Simplification through virtualization
- Windows, HP-UX, Linux, + more

Always-on availability
≤ 851+ TB

- Data center consolidation + disaster recovery
- Large-scale Oracle/SAP applications
- HP-UX, Windows, + 20 more, including NonStop & mainframe

Ready to help wherever you are in the journey

OPTIMIZE
Traditional IT

MSA | EVA | XP | Tape

ESTABLISHED PLATFORMS

BUILD
What's Next

3PAR | LeftHand | StoreOnce | IBRIX

CONVERGED STORAGE

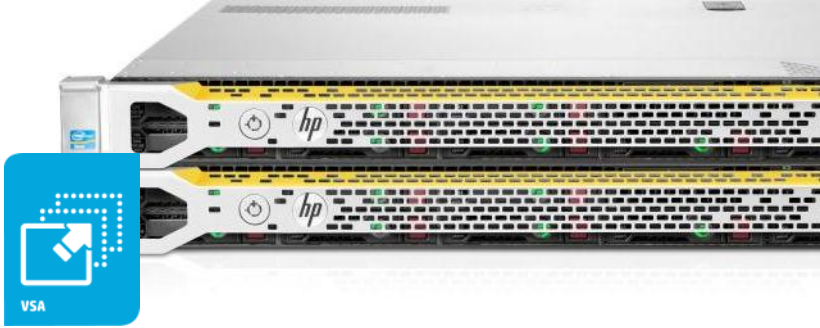
ACCELERATE
Time to Results

CONVERGED SYSTEMS & SERVICES

Storage Virtualization

Introducing HP StoreVirtual "AKA P4000 Lefthand

Taking LeftHand Storage into the future



Simple: Simple management for virtualization

Common management and all-inclusive licensing with integration into hypervisor management tools

Scalable: Grow without disruption

Linear scale of performance and capacity plus non-disruptive maintenance and addition of new storage nodes

Highly Available: Keep your applications running

Proven 5 9's availability and unique multi-site clustering for transparent failover and simple disaster recovery.

- New ProLiant Gen8 based platforms
- Lower entry point with new 4-drive and 8-drive configurations
- Fibre Channel support on new models
- LeftHand OS v10
- Higher performing StoreVirtual VSA for software defined storage

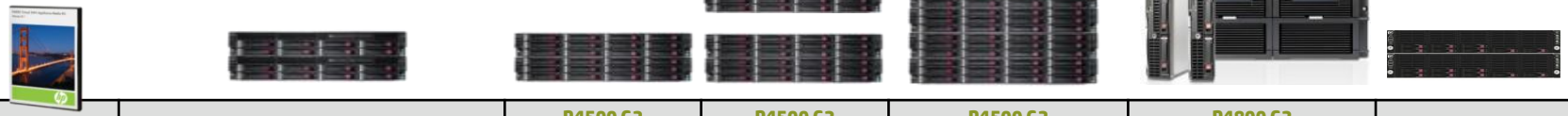
HP LeftHand P4000 Storage

Selling TODAY

The Most Integrated & Efficient Storage Solution for Virtual Environments

Built for Virtualization

- Superior application availability with VMware HA and Microsoft Hyper-V
- Streamline solution deployment and management with extensive integration
- Reduce storage costs with scale-out architecture and all-inclusive software



P4000 Virtual SAN Appliance	P4300 G2 Starter SAN - SAS, MDL SAS	P4500 G2 Virtualization SAN - SAS	P4500 G2 Multi-Site-SAN – SAS	P4500 G2 Scalable Capacity SAN – MDL SAS	P4800 G2 BladeSystem SAN – SAS, MDL SAS	P4900 G2 SSD Storage System

What's New?

Announcement in November: Ordering & Shipments Starts 12/04/12

HP StoreVirtual 4000 Storage and LeftHand OS Software	
New Branding	HP LeftHand P4000 → **HP StoreVirtual 4000 Storage** SAN/iQ software → **LeftHand Operating System** (OS)

New Hardware	New Software
3rd generation portfolio – 4x30 models based on ProLiant Gen8	New software – LeftHand OS version 10.0
New SMB/ROBO focused models – 4130 with 4 drives, 4330 with 8 drives	For StoreVirtual VSA – 2x performance enhancement - available now
Fibre Channel support in 4330	

Best-in-Class Storage for Virtualization

Introducing the **NEW** HP StoreVirtual 4000 Storage

Starting DEC 4

Simple

Scalable

Highly Available

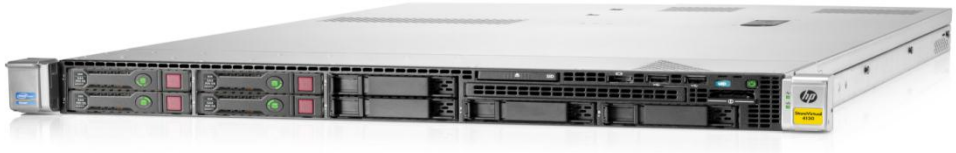
VSA

4130

4330

HP StoreVirtual 4130

Proven Platform Built on ProLiant Gen8



HP StoreVirtual 4130

1x Intel E5-2620 2.0Ghz, six core, 12 threads

8GB RAM – DDR3 1333Mhz

4x 600GB 10K SFF SAS

RAID 5 only – 1.56 TB usable

SmartArray P420i w/ 2GB FBWC

4x 1Gb Ethernet

ILO 4

LeftHand OS 10.0

HP StoreVirtual 4330 & 4330 FC

Proven platform built on ProLiant Gen8

HP StoreVirtual 4330

1x Intel E5-2620 2.0Ghz, six core, 12 threads

32GB RAM – DDR3 1333Mhz

Drive types:

- 8x 450GB 10K SFF SAS – 3.1 TB usable
- 8x 900GB 10K SFF SAS – 6.3 TB usable
- 8x 1TB 7.2K SFF MDL SAS – 6.9 TB usable
- RAID 5, 6, 10

SmartArray P420i w/ 2GB FBWC

4x 1Gb Ethernet

10Gb Upgrade option

2 x 8g FC included with 4330 FC nodes

ILO 4

LeftHand OS 10.0

HP StoreVirtual for iSCSI & Fibre Channel

For customers:

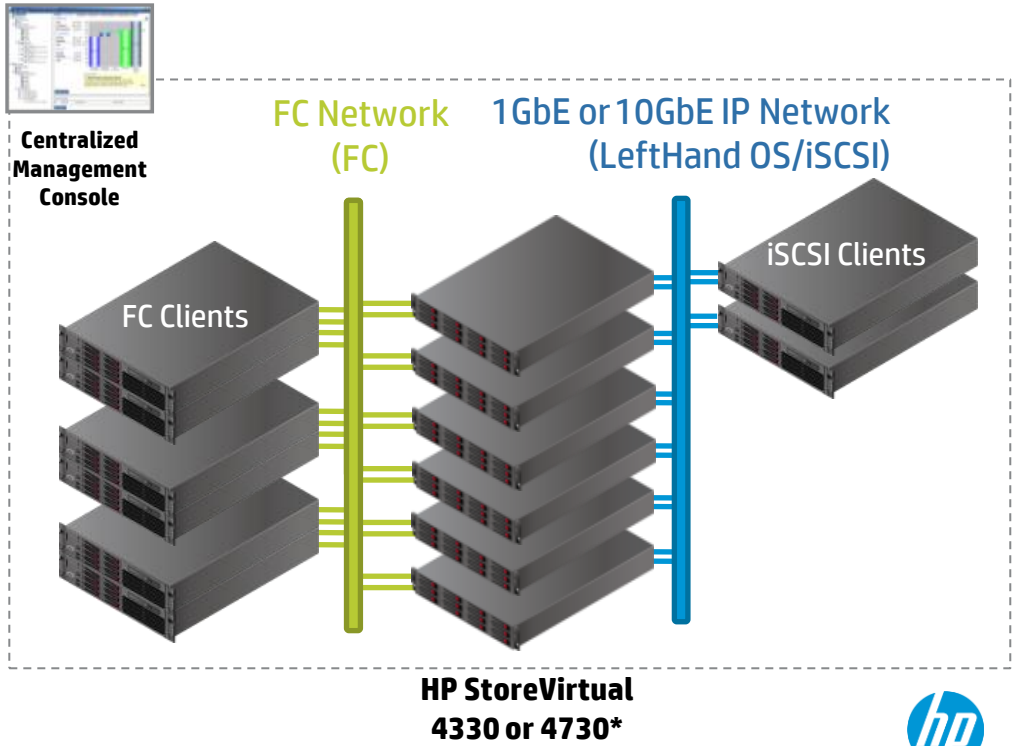
- With disjointed storage pools across FC and iSCSI networks

  Leverage single storage architecture for all applications in the enterprise

- Standardizing on Ethernet-based technologies

  Provide easier migration options when going from Fibre Channel to iSCSI

- Looking for all-inclusive enterprise feature set



*4730 available in February 2013

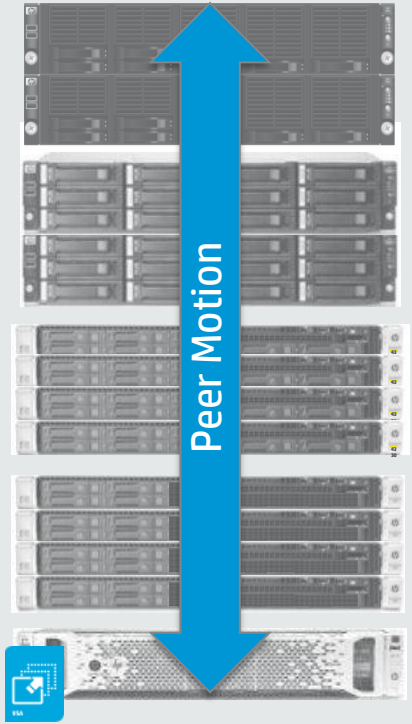
StoreVirtual Peer Motion opens the door to Seamless & non-disruptive data mobility

In 6 Clicks – Seamlessly move volumes between:

Systems, tiers, locations, different form factors and disk types, physical and virtual platforms

In a matter of minutes - Swap out and in entire clusters – upgrade technology non-disruptively

All data remains online and available



P4900 G2

P4500 G2

StoreVirtual 4330

StoreVirtual 4130

ProLiant server

The Industry's First BladeSystem SAN

Purpose built for client virtualization

Simplicity:

- Completely self-contained – no switches needed, no external storage traffic
- Connect to top-of-rack switch and go
- Common management

Storage efficiency:

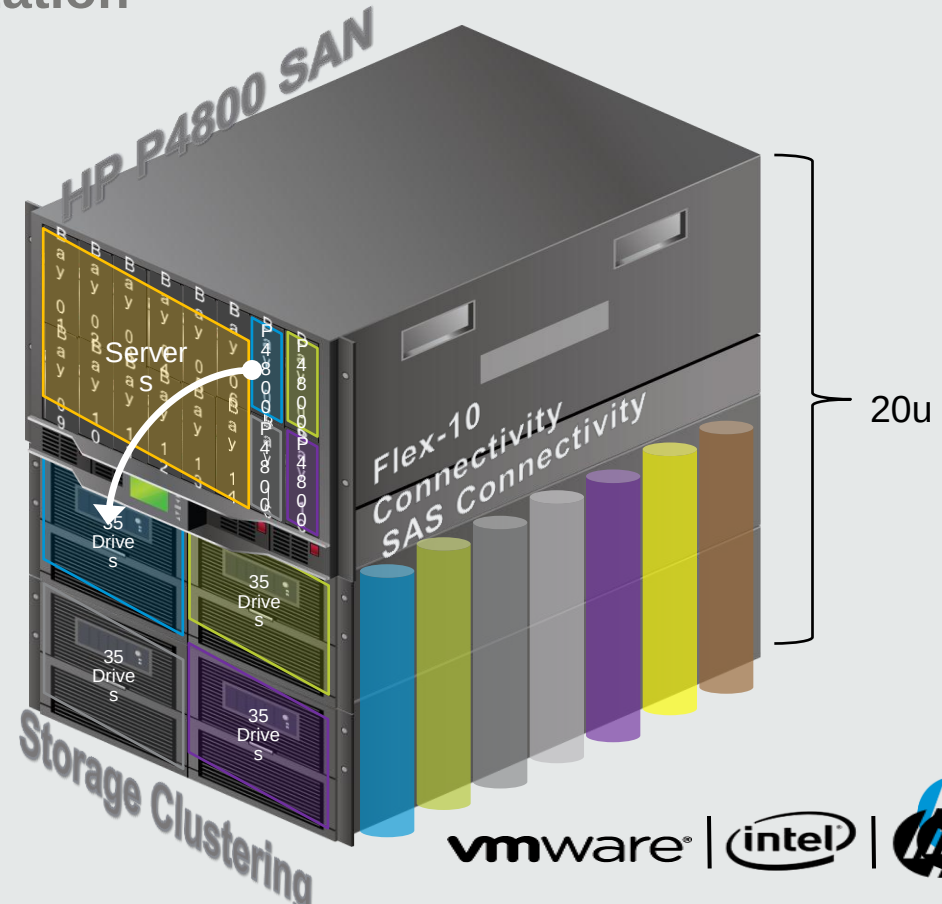
- Density and storage virtualization drives down cost
- Dynamically scale as infrastructure expands

Performance:

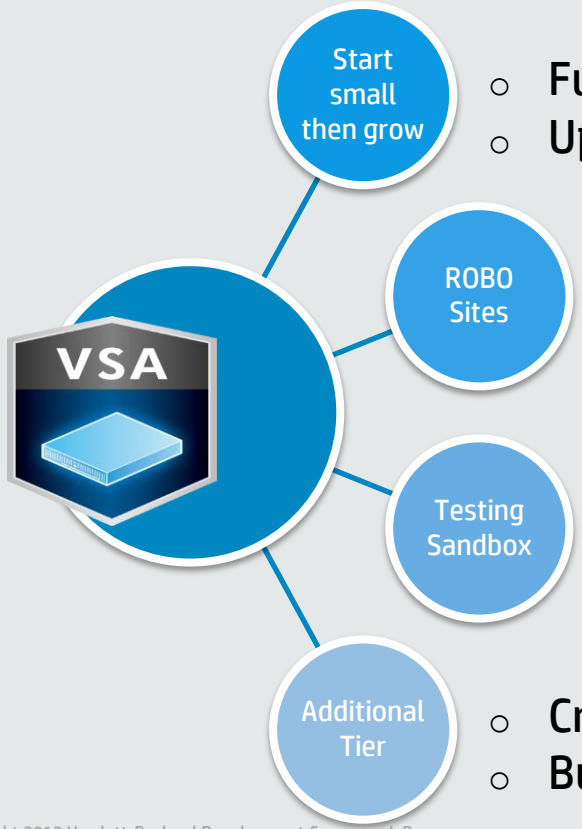
- High speed storage paths
- Dense spindle count

High availability:

- No single point of failure storage architecture
- Non-disruptive software upgrades



Key use cases for the P4000 VSA



- Fully featured shared storage for virtualization
- Upgrade to P4000 appliances online

- HA storage for smaller VM environments
- Affordable disaster recovery

- Repurpose existing DAS or SAN
- Migrate to production P4000 online

- Create SSD tiers for high performance
- Build from blade or server disks

Double your storage, without doubling your storage

HP 3PAR Storage

The Tier-1 storage benchmark for cloud computing

HP 3PAR StoreServ 7000

Introducing HP 3PAR StoreServ 7000

Effortless Tier1 Storage with Midrange Affordability

Effortless: **Reduce time spent managing storage by 90%**
Self-configuring, provisioning, and optimizing via autonomic management

Efficient: **Reduce capacity requirements 50% - Guaranteed.**
Hardware enabled thin technologies, advanced tiering, and thin persistence for both file and block data

Bulletproof: **Tier 1 features now in economy size**
Quad controller resiliency, multi-tenant design, and mixed workload optimization enable double VM density

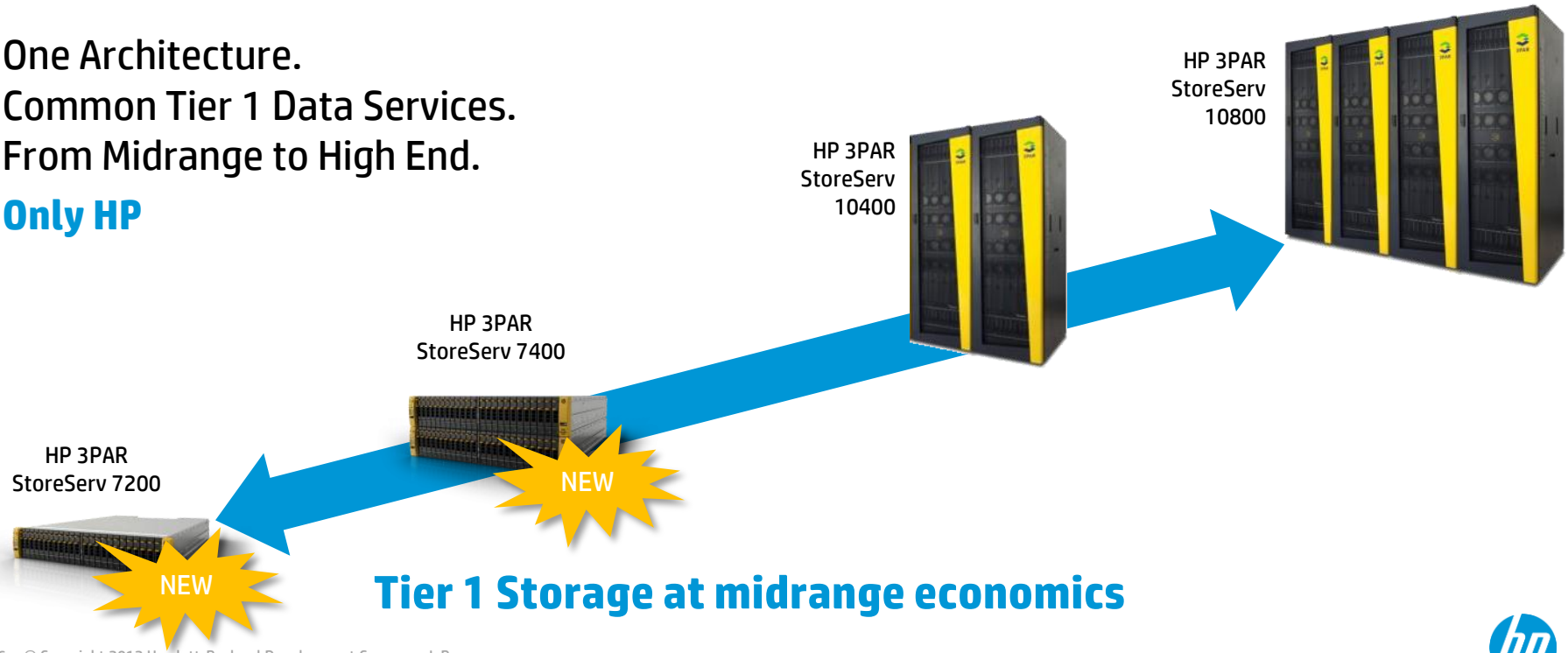
Future-proof: **Grow with freedom in any direction**
Upgrade controllers, processors, disks, ports and federate with HP Peer Motion for virtually limitless scale

Tier 1 Storage at Less than $40K!

NEW: Eliminating class distinctions between Midrange and Tier 1… Storage Without Boundaries

One Architecture.
Common Tier 1 Data Services.
From Midrange to High End.

Only HP



Tier 1 Storage at midrange economics

HP 3PAR StoreServ 7000

Effortless Tier1 Storage with Midrange Affordability

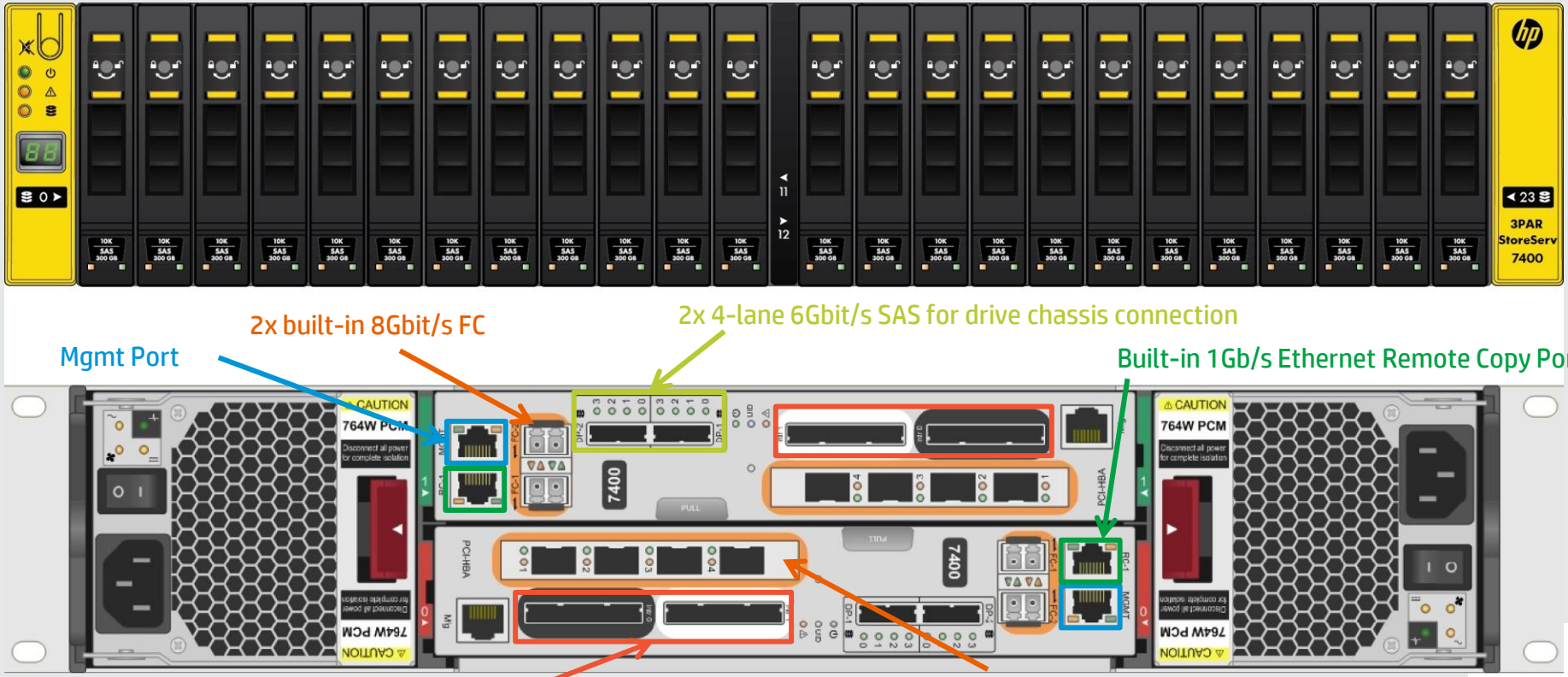
HP 3PAR StoreServ 7200

HP 3PAR StoreServ 7400

Controller Nodes	2	2 / 4
Max SFF drives	144	240/480
Cache	24 GB	32/64 GB
Max. 8GBit/s FC ports	12 = 4 (built-in) + 8 (optional)	24 = 4/8 (built-in) + 8/16 (optional)
Max.10Gbit/s iSCSI/FCOE*	4 (optional)	4/8 (optional)
Built-in IP remote copy port (can also use FC ports)	2	2/4
Controller Chassis	2U with 24 SFF drive slots (2x for a 4node 7400)	
Disk Chassis (can be mixed behind one controller pair)	SFF drive chassis: 24 slots in 2U LFF drive chassis: 24 slots in 4U	
Throughput/ IOPS Estimates (* from SSDs)	2,500 (MB/s)/ 150,000*	4,800 (MB/s)/ 320,000*

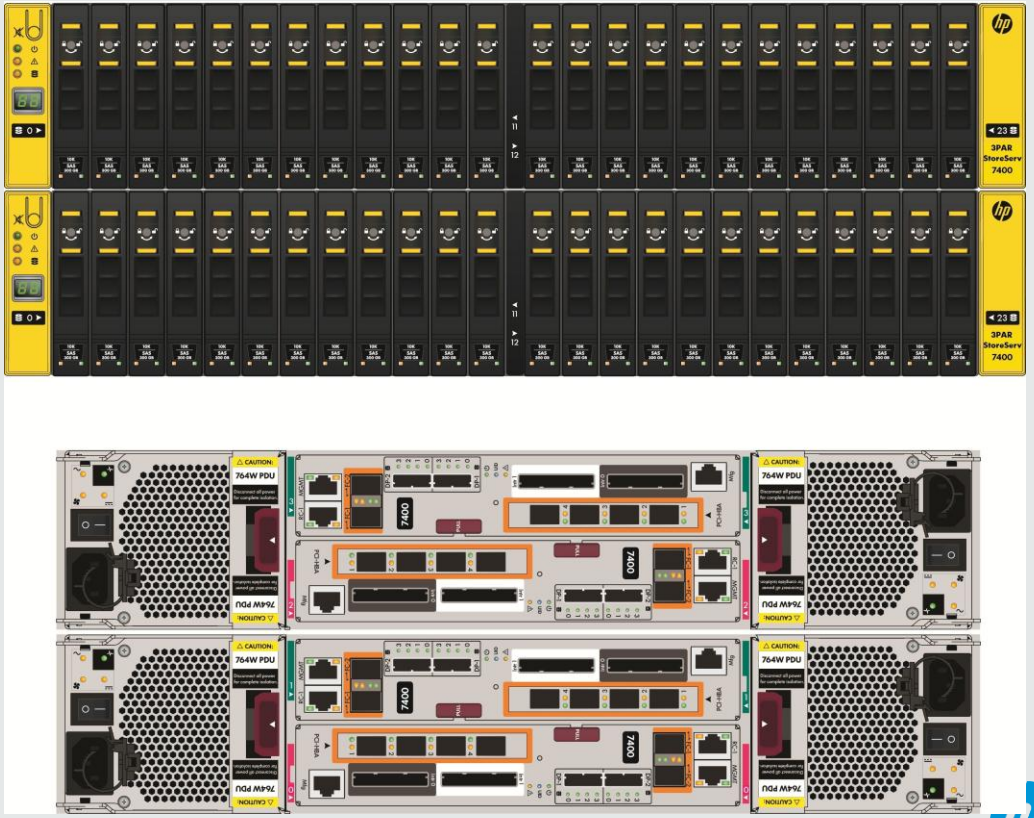
* Throughput figures represent 100% sequential reads/ IOPS figures represent 8K random reads with SSDs

HP 3PAR StoreServ 7000 Controller



HP 3PAR StoreServ 7400 4-node configuration

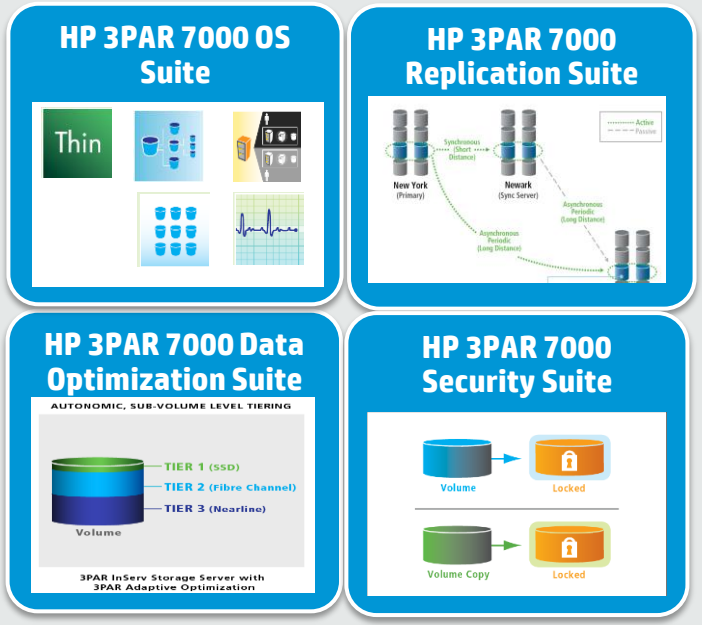
- Non-disruptive upgrade to 4 Nodes in 4U
- Interconnected with cables allows easy growth to 4 nodes
- 4 Node will Cache Persistence re-maps cache in the event of node failure to prevent dreaded “write-through mode” impacting your apps
- Double the performance and capacity by just adding controllers allows you to bring on new applications with no worries



HP 3PAR 7000 Software Suites

Simplified Spindle Suites

- Leverage capacity utilization and ease of use of 3PAR architecture with all Thin Technologies included in OS Suite
- OS Suite also has Smart Start and 180 days worth of Online Import Data Migration licenses for customers upgrading from EVA
- Capacity caps on software for competitively priced large configurations - SW caps: 48 drives and 168 drives; SW Care Packs capped at the 1st drive
- Peer Motion included in the Data Optimization Suite for capability to move and load balance data amongst arrays
- Enhanced multi-tenant and Cloud capabilities included in the Security Suite

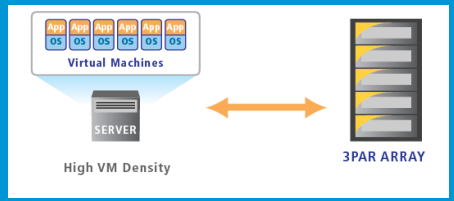


HP 3PAR 7000 Software Suites

Unlimited Array Suites

- Gain greater efficiencies from Storage and Application administrators via “Suite” options for application of choice
- Lower CapEx on Microsoft applications via integration with space savings of Virtual Copy and Volume Shadow Services (VSS)
- Improve user access to data by eliminating the typical backup window seen when using Oracle in mid-range environments
- Lower the cost and time required to manage and protect your VMware vSphere environment running on HP 3PAR storage

HP 3PAR 7000 Application Suite for VMware



HP 3PAR 7000 Reporting Suite

HP 3PAR 7000 Application Suite for Oracle

ORACLE

HP 3PAR 7000 Application Suite for SQL

Microsoft SQL Server

HP 3PAR 7000 Application Suite for Exchange

Microsoft Exchange

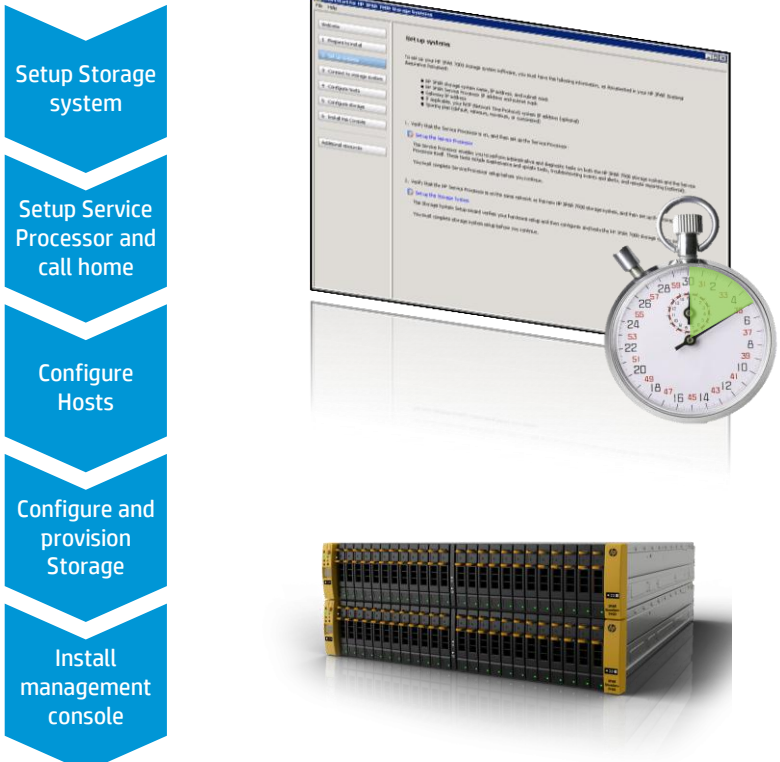
HP 3PAR StoreServ 7000 Smart Start

Effortless Management

1. Simplified EVA style installation and configuration with comprehensive assistance at every step of the process

2. Help for novice storage users in a Windows®, VMware, or Linux environments for self installation

3. Efficient storage presentation by creating LUNs, provisioning the storage, and then presenting it to the server application



Converged File & Block with HP 3PAR StoreServ

Converged Protocol Storage

Common Addressable Pool of Storage - competitive advantage!

- File and block services available from the SAME efficient storage infrastructure to allow most flexibility
- Repurposed on demand to the appropriate services as your business evolves
- Efficient storage utilization with fully integrated 3PAR Thin Reclamation and Windows 2012 DeDuplication
- Encrypted file data from the client down to drive on the 3PAR array with Windows 2012 SMB 3.0 and Bit-Locker Encryptions

- √ Common Pool for File & Block
- √ Thin Provisioning and Reclamation
- √ De-Duplication
- √ Encryption
- √ Integrated Management

Converged Management via Windows Server Manager

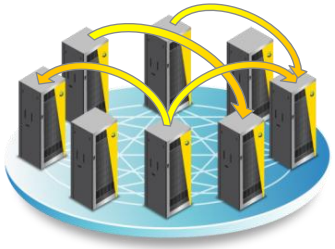
- Enables you to access, manage and monitor file and block services through a single dynamic management interface
- No loss of benefits from the HP 3PAR SW Suites

HP 3PAR StoreServ is Future-proof

One technology at any scale

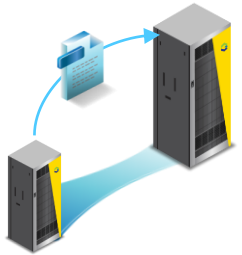
A single federate scale-out architecture and software from SMB to Enterprise

Federated



Respond to changing demands and map workloads to the right resources

Built-in tech refresh



Change the storage lifecycle. Do-it-yourself data migration without service disruption
Now incl. EVA to HP 3PAR StoreServ

Remove storage system boundaries

EVA Customers will feel at home with the 7000!

EVA Success Elements:

- Highest Performance
- Wide-Striping
- LUN Aggregation
- Disk Load Balancing
- Linear Scalability
- Automation
- Hardware-RAID
- Simple Management

3PAR Success Elements:

- Storage Federation
- Controller-Scalability
- Coherence Cache
- Tier 1 Resilience
- Zero Detection
- Native Thin-Technology
- Storage Tiering
- Multi Tenancy

3PAR StoreServ

Identical SW-Stack from Midrange to Enterprise

HP 3PAR StoreServ Storage

Midrange Evolution with the lowest risk upgrade

HP EVA
- Trusted - 100,000 Arrays installed WW
- Recognized for simplicity
- Leading hardware efficiency

Shared DNA
- Virtualization & wide striping
- Capacity efficient snapshots
- Management simplicity
- Leading TCO

HP 3PAR F-Class
- Tier 1 architecture and features
- Clustered scalable controller architecture
- Industry leading efficiency technologies
- Multi-tenancy for mixed workloads

HP 3PAR StoreServ 7000

An Agile Tier 1 Storage Platform at a Mid-Range Price

Built from the two leading storage technologies

HP 3PAR Storage family

The only storage architecture you'll ever need

HP 3PAR StoreServ 7000

HP 3PAR StoreServ 10000

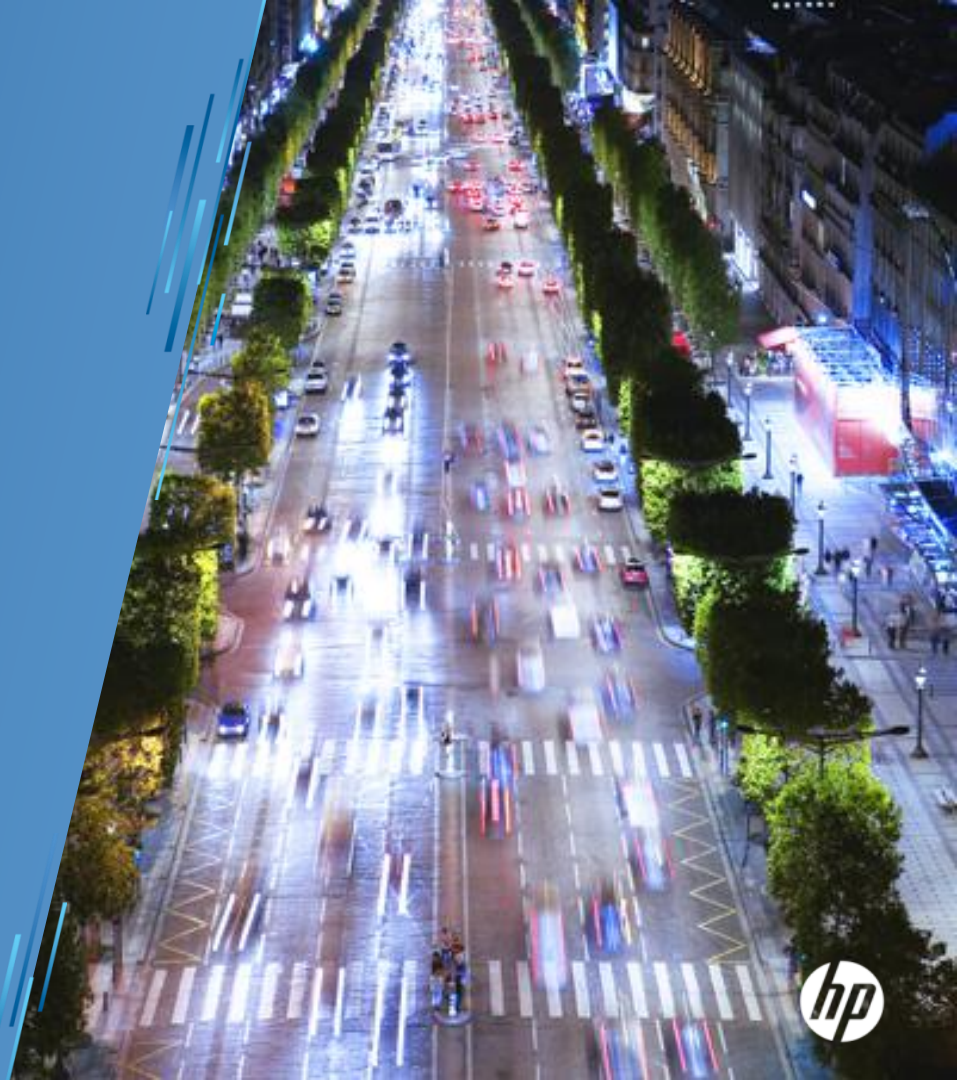
	7200 NEW!	7400 NEW!	10400	10800
Controller nodes	2	2 – 4	2 – 4	2 – 8
FC host ports (8Gbit/s) iSCSI host ports (10Gbit/s) FCoE host ports (10Gbit/s) Built-in remote copy ports	4 – 12 0-4 0-4 2	4 – 24 0-8 0-8 2-4	0 – 96 Post GA Post GA 2	0 – 192 Post GA Post GA 2
Control cache Data cache (Adaptive)	8 GB 16 GB	8 – 16 GB 24 – 48 GB	32 – 64 GB 64 – 128 GB	64 – 256 GB 128 – 512 GB
Disk drives	6 – 144	6 – 480	16 - 960	16 – 1,920
Maximum capacity	250 TB	864 TB	800TB	1.6PB
Throughput/ IOPS (*from SSDs)	2,500 (MB/s) / 150,000*	4,800 (MB/s) / 320,000*	6,500 (MB/s)/ 180,000	13,000 (MB/s)/ 360,000
Benchmark results			-	SPC-1 IOPS: 450,212

World record

Same firmware (InformOS), same features, same management console, same replication software

HP P10000 3PAR V-Class

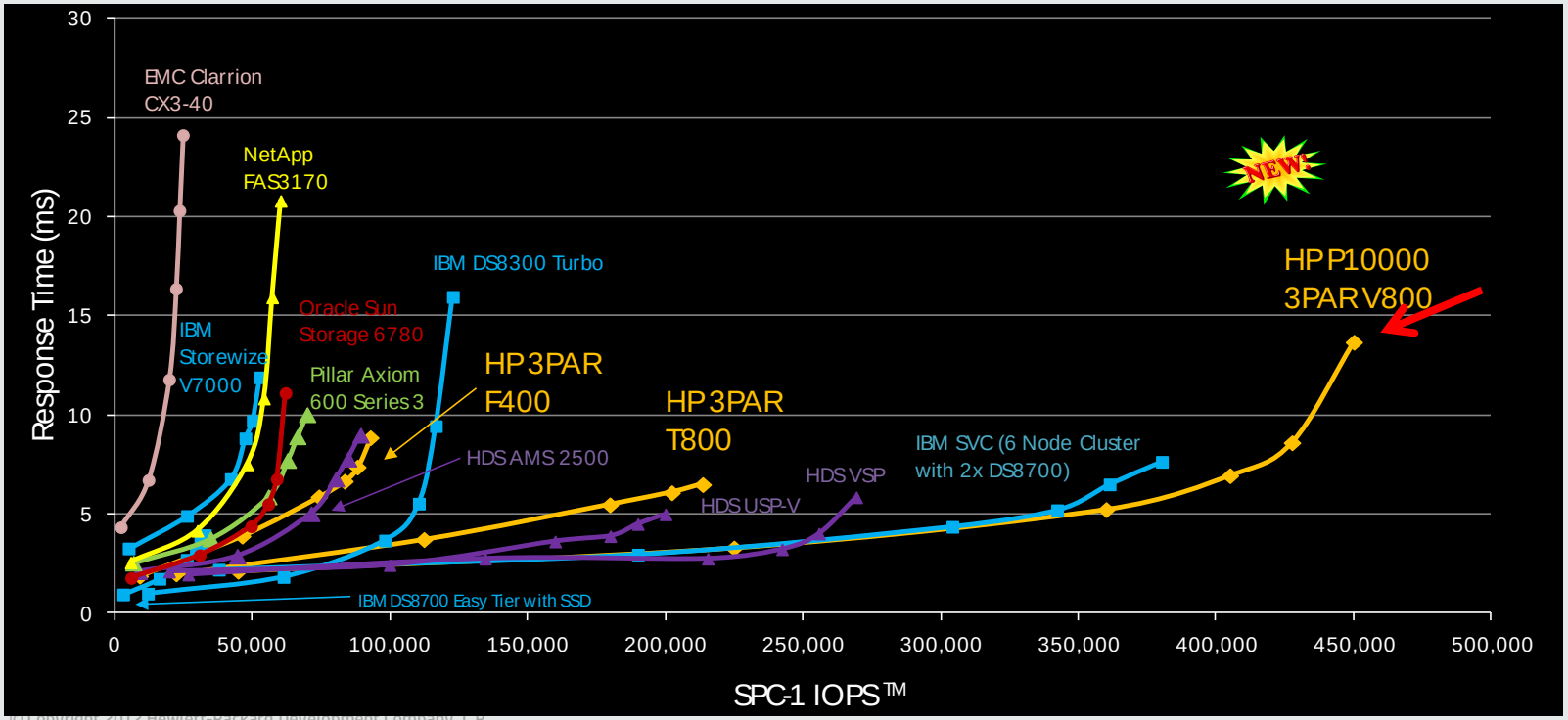
SPC-1 Benchmark Results
Nov 15th, 2011



The detailed results can be found at:

www.storageperformance.org

Scalable performance
SPC-1 Benchmark Comparison



P10000 3PAR V-Class Overview

Built-In Efficiency

In-Line Optimization at Wire Speed:
Fat-to-Thin Gen4 ASIC

Green Power Supplies

High Bandwidth, High Performance

Full 64 bit hardware and software

64 GB/s Memory BW

96 GB/s I/O BW

112 GB/s Backplane BW

Extensive Host I/O Support

8Gb/s Fibre Channel

10Gb/s Fibre Channel over Ethernet*

10Gb/s iSCSI

Massive scalability

Max capacity/drives: 1.6 PBs, 1920 drives

Max Host Initiators: 2048

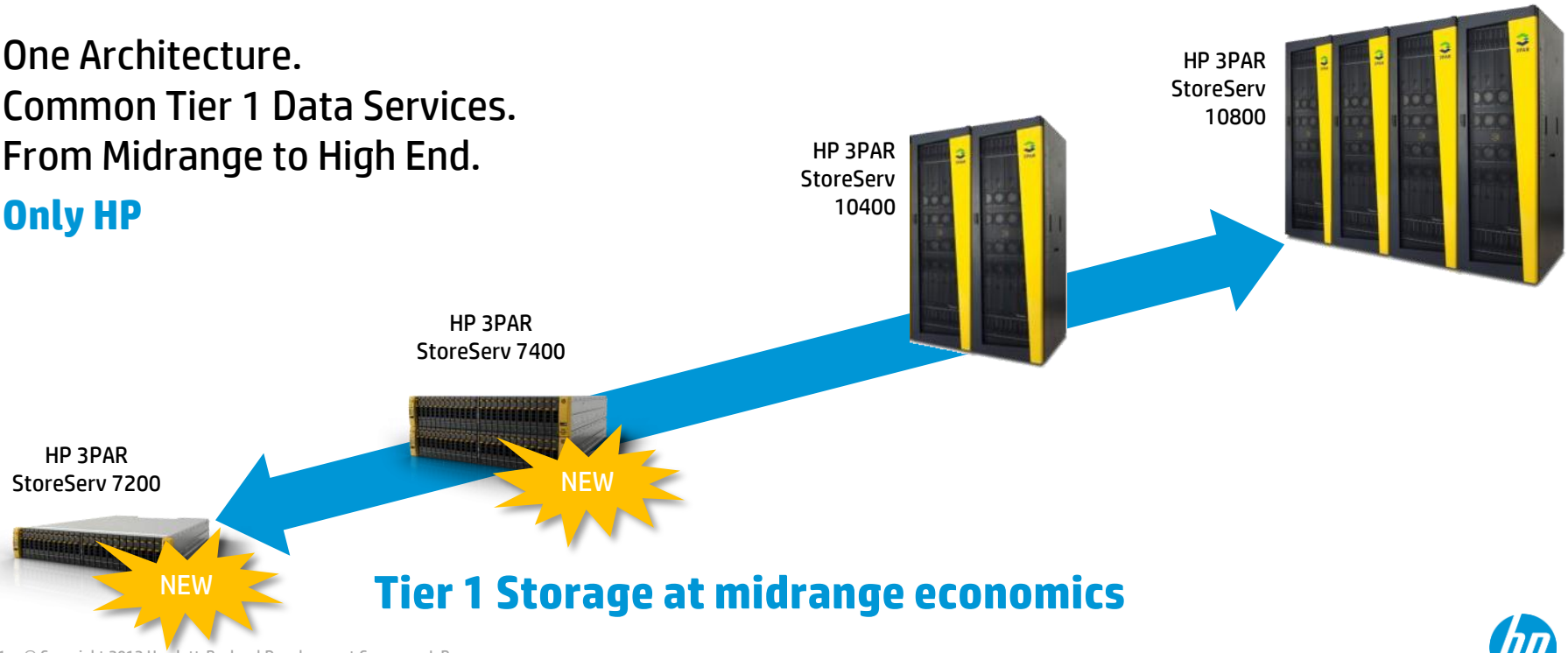
Max Snapshots: 28K

Still the World's Most Powerful Virtualized Array for Enterprise and Cloud Data Centers

NEW: Eliminating class distinctions between Midrange and Tier 1… Storage Without Boundaries

One Architecture.
Common Tier 1 Data Services.
From Midrange to High End.

Only HP



Tier 1 Storage at midrange economics

3PAR StoreServ Storage: One OS Midrange to High-end

	HP 3PAR StoreServ 7200 NEW	F200	F400	HP 3PAR StoreServ 7400 NEW	HP 3PAR StoreServ 10400	HP 3PAR StoreServ 10800
Controller nodes	2	2	2 – 4	2 – 4	2 – 4	2, 4, 6, 8
• Fibre Channel host ports • Optional 1Gb iSCSI host ports • Optional 10Gb ISCSI host ports • Built-in remote copy ports	4 – 12 N/A 0 – 4 2	0 – 12 0 – 8 N/A 2	0 – 24 0 – 16 N/A 2 – 4	4 – 24 N/A 0 – 8 2 – 4	0 – 96 N/A 0 – 16 2 – 4	0 – 192 N/A 0 – 32 2 – 4
GBs control cache	16	8	8 – 16	16 – 32	32 – 64	64 – 256
GBs data cache	8	12	12 – 24	16 – 32	64 – 128	128 – 512
Disk drives	6 – 144	16 – 192	16 – 384	6 – 480	16 - 960	16 – 1,920
Drive types	100/200GB SLC SSD 450/900GB10K SAS 300GB 15K SAS 2/3TB 7.2K SAS	100/200GB SLC SSD 300/600GB 15K FC 300GB 15K SAS* 450/900GB 10K SAS* 1/2TB 7.2K SATA 2TB 7.2K SAS*	100/200GB SLC SSD 300/600GB 15K FC 300GB 15K SAS* 450/900GB 10K SAS* 1/2TB 7.2K SATA 2TB 7.2K SAS*	100/200GB SLC SSD 450/900GB10K SAS 300GB 15K SAS 2/3 TB 7.2K SAS	100/200GB SLC SSD 300/600GB 15K FC 300GB 15K SAS* 450/900GB 10K SAS* 1/2TB 7.2K SATA 2TB 7.2K SAS*	100/200GB SLC SSD 300/600GB 15K FC 300GB 15K SAS* 450/900GB 10K SAS* 1/2TB 7.2K SATA 2TB 7.2K SAS*
Maximum capacity	250TB	128TB	384TB	864TB	800TB	1.6PBs
SPC-1 Benchmark Results			93,050 SPC-1 IOPS	Planned Post GA		450,212 SPCI-1 IOPS

* Uses SAS to FC converter

INNOVATIONS FOR THE CLOUD

Best-of-breed cloud infrastructure

HP Storage
Network Storage Systems

Introducing HP StoreEasy

"AKA X1000, X3000, X5000"

File and application storage made easy

Efficient: **Save money and time**

Scale from hundreds to thousands of users. Use less space with integrated deduplication.

When paired with 3PAR= The industries BEST unified Filed and Block Solution

Secure: **Keep data protected always**

Built-in encryption at rest and in flight, sophisticated access controls, and the ability to run endpoint protection and backup software securely onboard

Highly Available: **Prevent business and user disruption**

Turnkey clustered configurations with transparent failover and online patching for continuous availability

New StoreEasy 1000, 3000 & 5000 Series

- Built on WSS2012
- Powered by ProLiant Gen8

Thousands of users on 50% less capacity

HP NAS Storage Portfolio

Windows solution
Commercial to Enterprise

Archiving/Content Repository Solution

X1000

X3000

X5000

X9000

Architecture	Scale-Up	Scale-Up	Scale-Up	Scale-Out
Connectivity	1GbE, 10GbE	1GbE, 10GbE	1GbE, 10GbE	1GbE, 10GbE, Infiniband
Protocols	CIFS, NFS, HTTP/S, FTP/S, WebDAV	CIFS, NFS, HTTP/S, FTP/S, WebDAV	CIFS, NFS, HTTP/S, FTP/S, WebDAV	CIFS, NFS, IBRIX, HTTP/S, FTP/S, NDMP, WebDAV
Performance	-Up to 1.2 Gb/s throughput (mix read/write random i/o)	Up to 5.0 Gb/s throughput (mix read/write random i/o)	Up to 5.0 Gb/s throughput (mix read/write random i/o)	Up to 3.5 GB/s read, 750 MB/s write throughput per system Near liner scalability, add systems up to 1024 nodes/cluster
Application Sweet spot	-General Purpose File Serving -iSCSI storage for Windows apps -Remote Sites	- General Purpose File Serving -NAS Gateways for FC or iSCSI SANs	-High availability 24 x 7 operation -General Purpose File Serving -iSCSI storage for Windows apps -Remote Sites	-Enterprise archive strategy for migration, consolidation target, and compliance while maintaining performance standards. -Store large amounts of data for extended periods of time
Capacity	10s of TBs	100s of TBs depending on SAN	100s of TBs	Up to 16PB in a single namespace
Key features	Unified (File and Block) Tight Windows integration File De-duplication/Branch Cache (optional) /File Classification Infrastructure Snapshots	Unified (File and Block) Tight Windows integration File De-duplication/Branch Cache /File Classification Infrastructure Snapshots	High Availability Unified (File and Block) Tight Windows integration File De-duplication/Branch Cache /File Classification Infrastructure Snapshots	Policy based data tiering Automatic storage rebalancing Continuous remote replication Array support via gateways (iSCSI/FC) File-based Snapshots Data Retention policies and WORM support w/broad ISV support
Client OS support	Windows & Linux	Windows & Linux	Windows & Linux	Windows & Linux

Introducing HP StoreAll :AKA X9000

Leading scale and intelligence for human information

Simplicity at Scale

Fast installation and simple management at petabyte scale with support for over 1000 nodes and 16PB of capacity

Efficient Consolidation

A single scale-out file and object platform for archive and cloud storage applications, integrated with **HP Autonomy IDOL** and Consolidated Archive

Instant Access

Bringing structure to unstructured data with **HP StoreAll Express Query** – embedded metadata DB with custom metadata for rapid search across billions of files

HP StorageWorks X9000 Network Storage

Virtual storage pool for explosive file growth

New family of **scale-out file serving** solutions for easy management and non disruptive scale

16PB

NEW: Unified management for a single namespace up to 16PB …

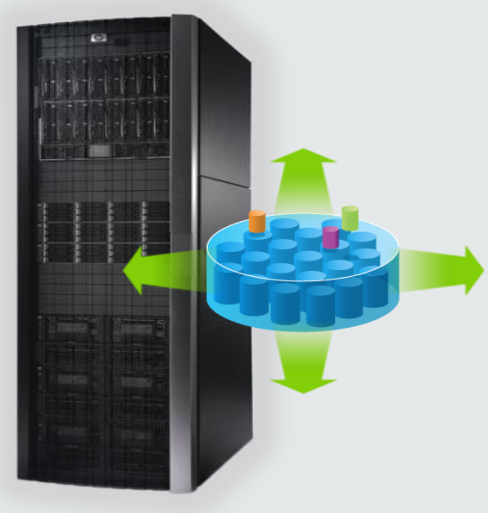
- 3x more than the competition

FUTURE PROOF

NEW: Non disruptive growth and independent scale of performance and capacity.

AUTO

NEW: Automated storage tiering within the single namespace to balance cost and performance.



58

HP X9000 family positioning

X9330 Network Storage System	X9730 Network Storage System	X9300 Network Storage Gateway
		
Scale out appliance	Extreme storage	Gateway for SAN environments
Models optimized for capacity or performance centric workloads	Dense architecture with over 12TB/U	Flexible solution to use with existing SAN storage
21TB SAS or 48TB SATA	Scale capacity in 82TB increments 656TB	Use with HP StorageWorks MSA, EVA, P4000 or 3rd party array/SAN
Highly available file serving nodes	Blade optimized	
Global namespace and storage tiering		

59

No add-on software costs

1. **Scalable performance and capacity**
   Avoid controller bottlenecks
2. **Automated rebalancing**
   Maintain consistent system performance over time
3. **Data tiering**
   Optimize storage efficiency
4. **Continuous remote replication**
   Integrated disaster recovery
5. **Single management UI for all X9000**
   Simplify and consolidate NAS management

60

What's next for Converged Storage?

HP is transforming the industry with Converged Storage

ONE

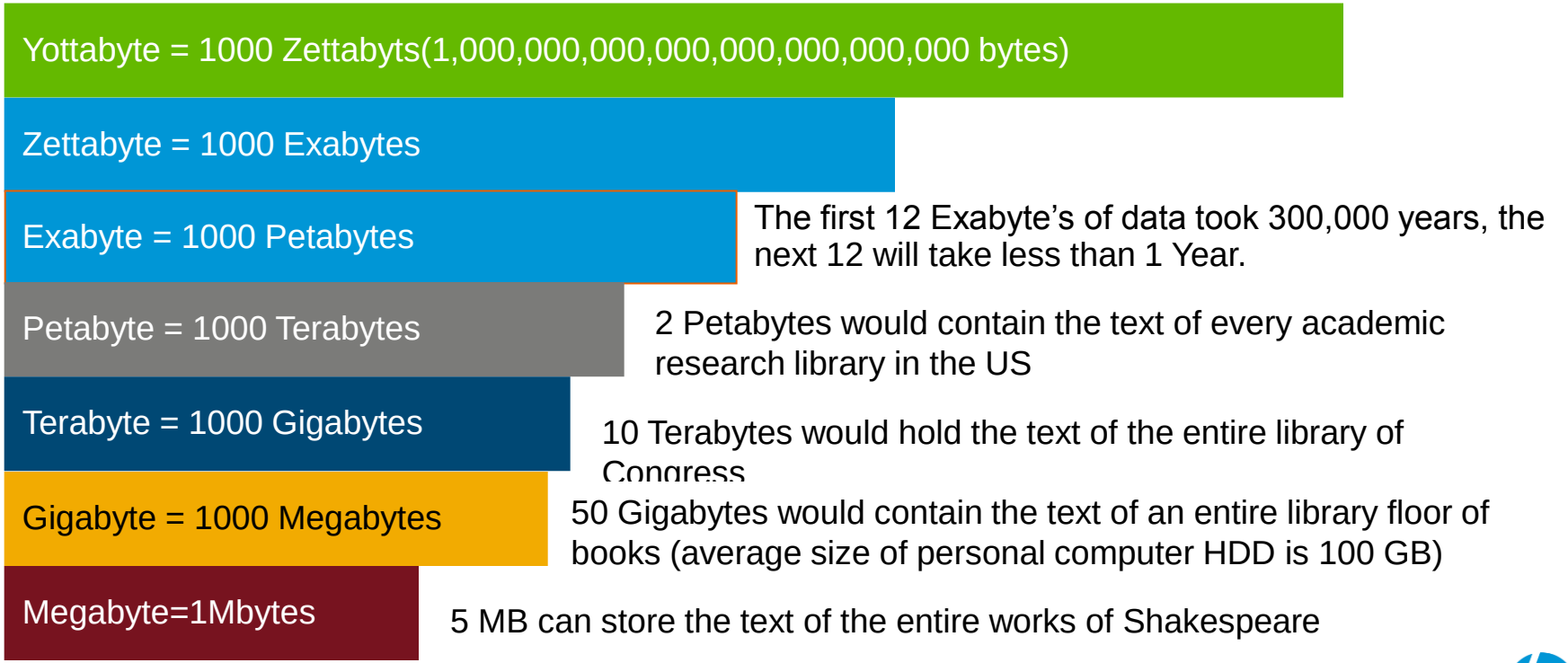
Modern storage architecture

Data Protection architecture

Common technology from midrange to high-end so you can do far more… **with much less!**

Simple | Efficient | Agile

How about a “storage perspective” ?



Source: UC Berkeley Report – “How Much Information” (www.sims.berkeley.edu/how-much-info/index.html)

Yottabyte = 1000 Zettabyts(1,000,000,000,000,000,000,000,000 bytes)

time perspective

“Given good conditions(!), downloading a 1 yottabyte file over a 28.8 Kbps connection would take…

…about 140 billion years.”

Customers Win

Save time and reduce management expense

Common data services from entry-to-enterprise and across primary storage to information retention to information protection

Lower costs and higher utilization

A streamlined storage portfolio improves consolidation and asset utilization, lowers costs, and improves return on investment.

Agility for unpredictable business and technology shifts

Federated, scale-out design non-disruptively responds to new capacity and performance demands.

Thank You

— Making Technology Work for You —