Storage requirements in a virtualized world

HP Converged Storage: Architecture for the next decade

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There is a difference…

What you CAN do and what you SHOULD do….

Application Workload Determines What to Position

	Non-HPC	***HPC***
	Multiple File Reads/Writes Large or Small Files Performance Independent	Single File Reads/Writes Large Files > 1TB High Speed 5GB/s
 MDS600 P4000 X9000 HP Storage	Green Zone Typical Applications Health & Life Sciences • Next generation sequencing (NGS), Genomics, Bio-informatics Media & Entertainment • Broadcast play-out & archive • Animation/Render Farms Government/Public Sector (Content Depots) Financial Services General Purpose Data Center (NFS Replacement)	Red Zone ✗
 Lustre/DDN	Red Zone ✗	Green Zone Typical Applications • Computer-Aided Engineering • Molecular Modeling • High-Energy Physics • General Scientific Research in Gov't/Public Sector labs

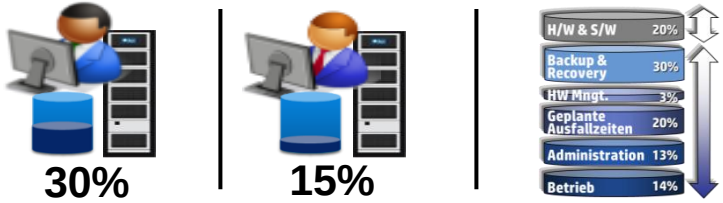
The world is changing…

The next decade will be the “Era of unpredictability” for storage

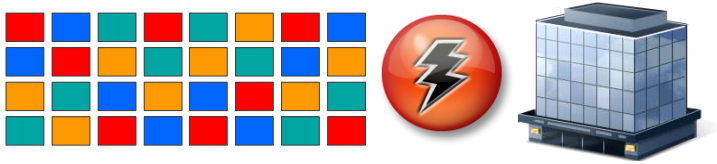
Flexible, scalable IT-environments
with virtual & physical server

Capacity / & performance requirements
will drive the costs

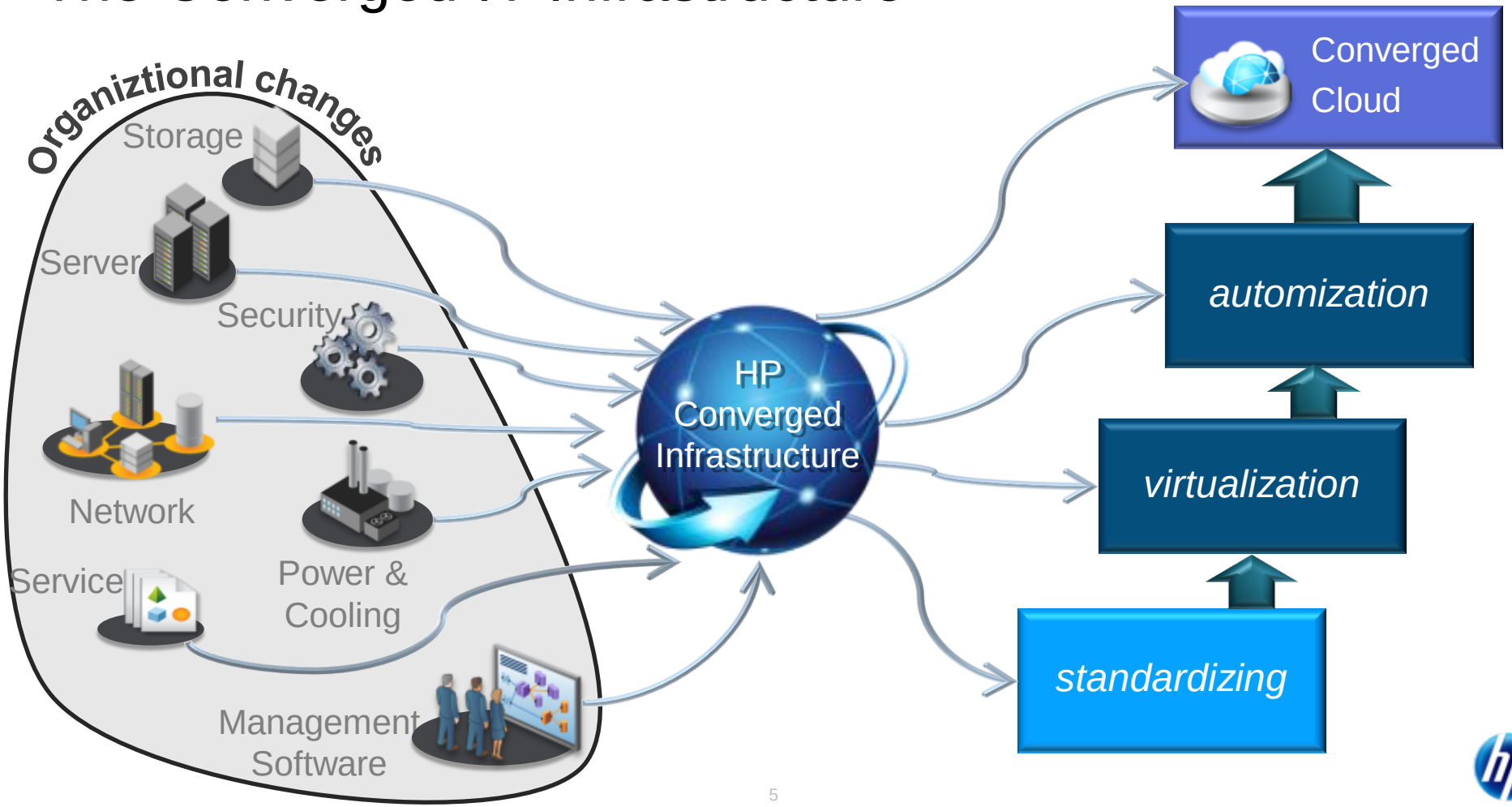
Growing complexity which will occupy
management-/ & capacity resources



Explosive growth
of energy, foot print & inefficiency



The Converged IT-Infrastructure



The HP Storage Strategy

The era of siloed IT is ending

Conventional Storage

Converged Storage

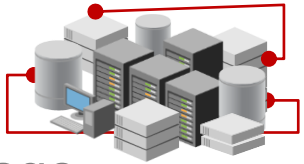
Converged Systems

Virtualization - Challenges

Which requirements a modern storage architecture has to provide? It has to be…

...scalable

...self optimizing



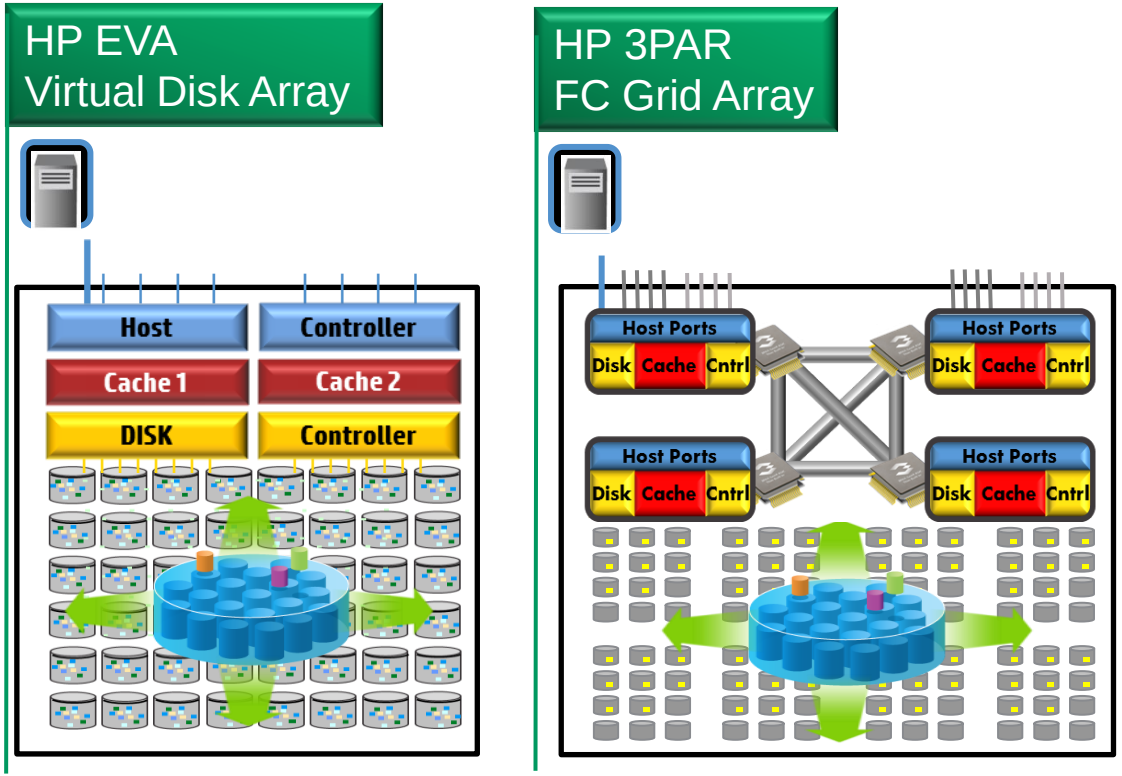
...simple to manage

...intelligent

HP Storage Array Family

	Storage Consolidation P2000 MSA	Virtual IT P4000 LeftHand	Application Consolidation P6000 EVA	Utility Storage 3PAR	Mission Critical Consolidation P9500
					
Architecture	**Dual Controller**	**Scale-out Cluster**	**Dual Controller**	**Mesh-Active Cluster**	**Fully Redundant**
Connectivity	SAS, iSCSI, FC	iSCSI	FC, iSCSI, FCoE	iSCSI, FC, (FCoE planned)	FC, FCoE
Performance	30K random read IOPs ; 1.5GB/s sequential reads	35K random read IOPs 2.6 GB/s sequential reads	55K random read IOPS 1.7 GB/s sequential reads	> 400K random read IOPs; > 10 GB/s sequential reads	>300K random read IOPS > 10GB/s sequential reads
Application Sweet spot	SMB , Enterprise ROBO, consolidation/ virtualization Server attach, Video surveillance	SMB, ROBO and Enterprise – Virtualized inc VDI , Microsoft apps, ITaaS BladeSystem SAN (P4800)	Enterprise - Microsoft, Virtualized, OLTP	Enterprise and Service Provider , ITaaS, Utilities, Cloud, Virtualized Environments, OLTP, Mixed Workloads	Large Enterprise - Mission Critical w/Extreme availability, Virtualized Environments, Multi-Site DR
Capacity	600GB – 192TB; 6TB average	7TB – 768TB; 72TB average	2TB – 480TB; 36TB average	5TB – 1600TB; 120TB average	10TB – 2000 TB; 150TB average
Key features	Price / performance Controller Choice Replication Server Attach	All-inclusive SW Multi-Site DR included Virtualization VM Integration Virtual SAN Appliance	Ease of use and Simplicity Integration/Compatibility Multi-Site Failover	Multi-tenancy Efficient Thin Technologies Performance Autonomic Tiering and Management	Constant Data Availability Heterogeneous Virtualization Multi-site Disaster Recovery Application QOS (APEX) Smart Tiers
OS support	Windows, vSphere, HP-UX, Linux, OVMS, Mac OS X, Solaris, Hyper-V	vSphere. Windows, Linux, HP-UX, MacOS X, AIX, Solaris, XenServer	Windows, VMware, HP-UX, Linux, OVMS, Mac OS X, Solaris, AIX	vSphere, Windows, Linux, HP-UX, AIX, Solaris	All major OS's including Mainframe and Nonstop

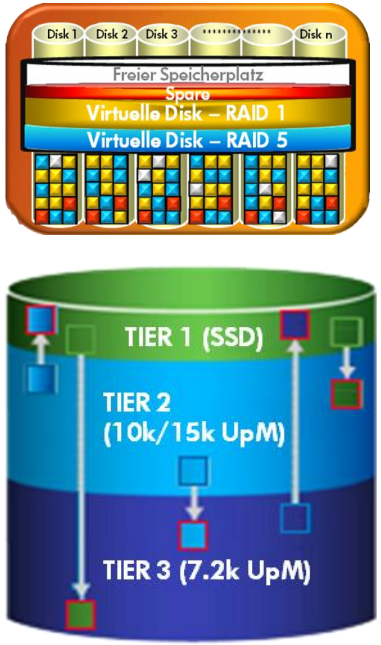
Scalability in each direction: Capacity and Performance



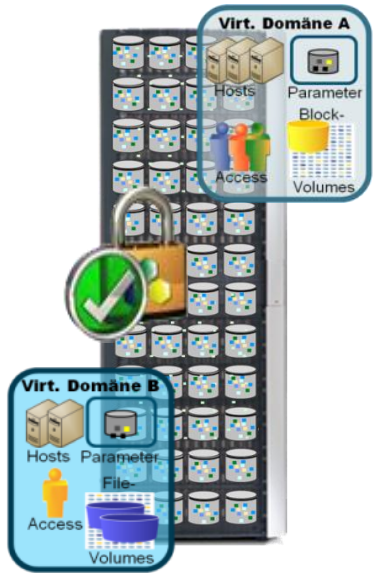
Storage Virtualization

Thin Technologies

Autonomic Optimization



Multi tenancy

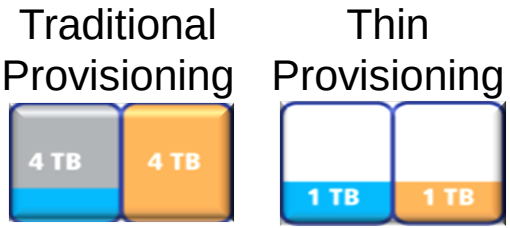


Thin Technologies

Which requirements a native Thin Technology has to provide?

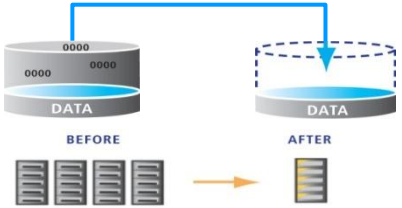
Thin Volume provisioning

- **No prerequisites**
- For **all data services** (like Snapshot or replication)



Fat 2 Thin Volume conversion

- Autonomic **inline conversion**
- **No Post Processing**

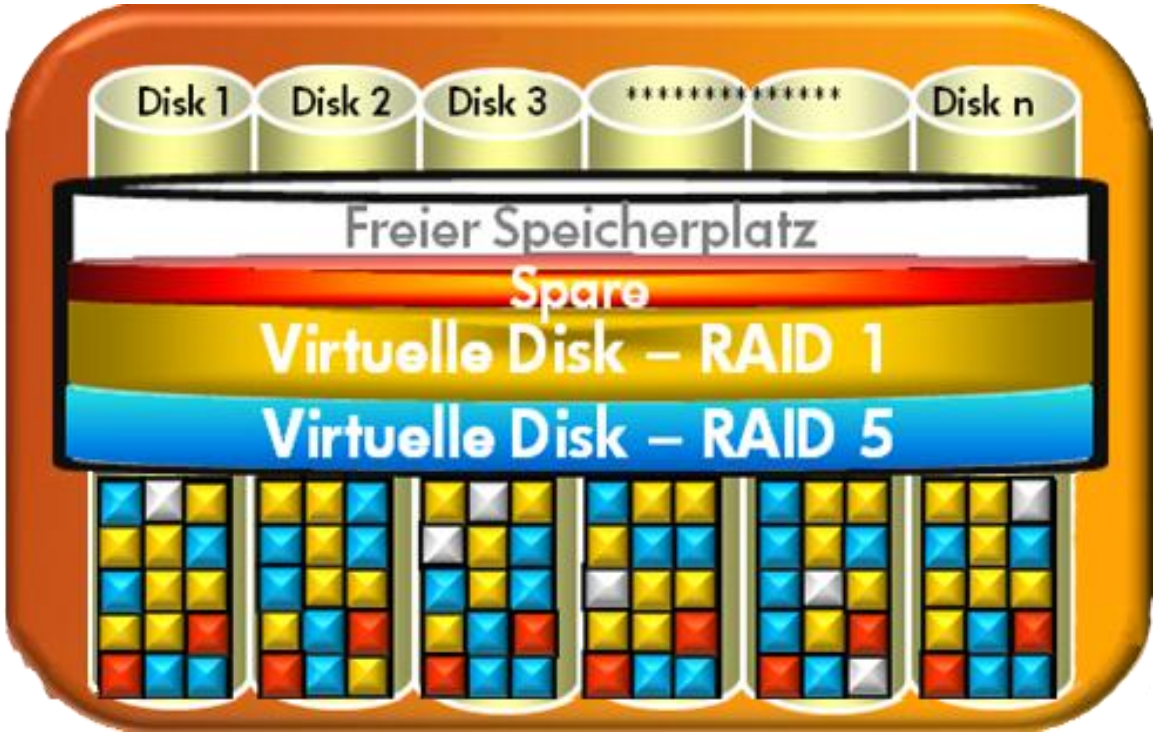


Reclamation of allocated/unused capacities

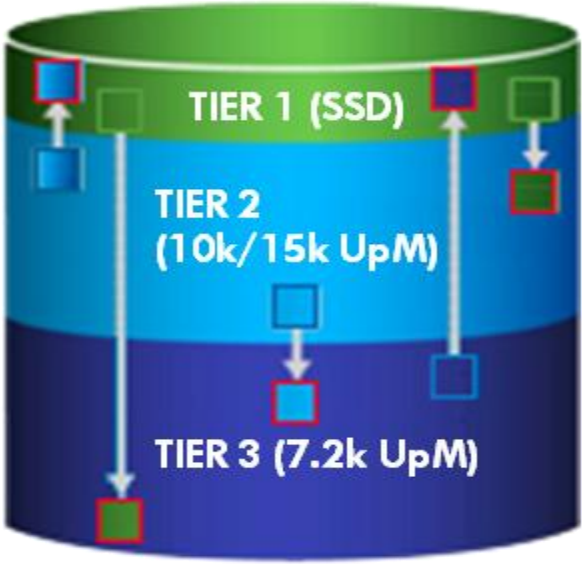
- **Autonomic**
- Initiated via HyperVisor or applications
  (e.g. VMware/Microsoft/Oracle, Symantec)

Dynamic Optimization - 1/2

Wide striping for random I/Os

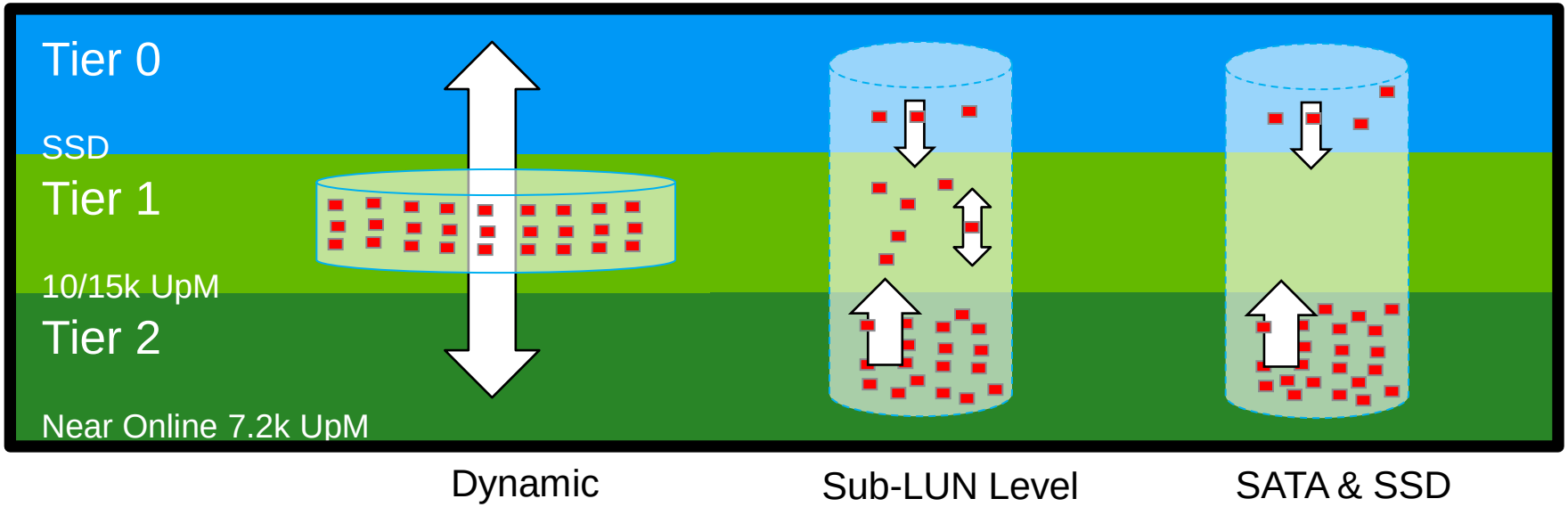


Dynamic Optimization - 2/2



Multi-Tier Volume

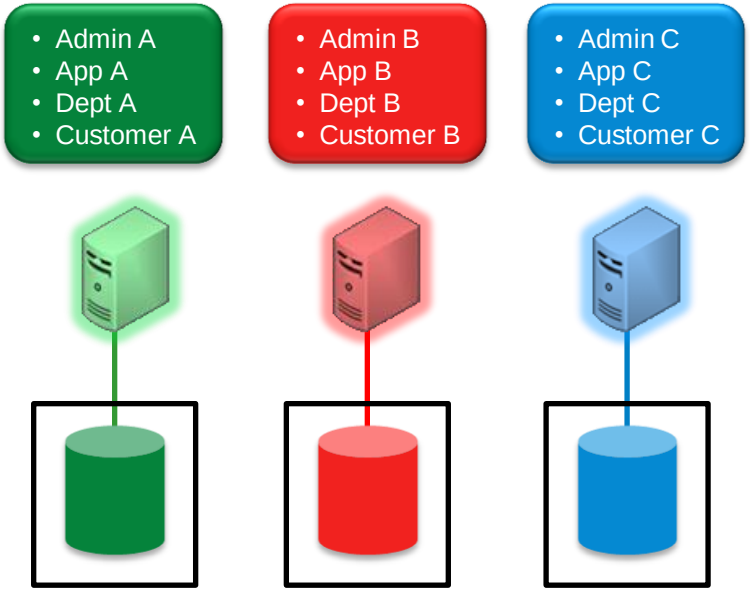
Adaptive LUN Optimization



= data blocks

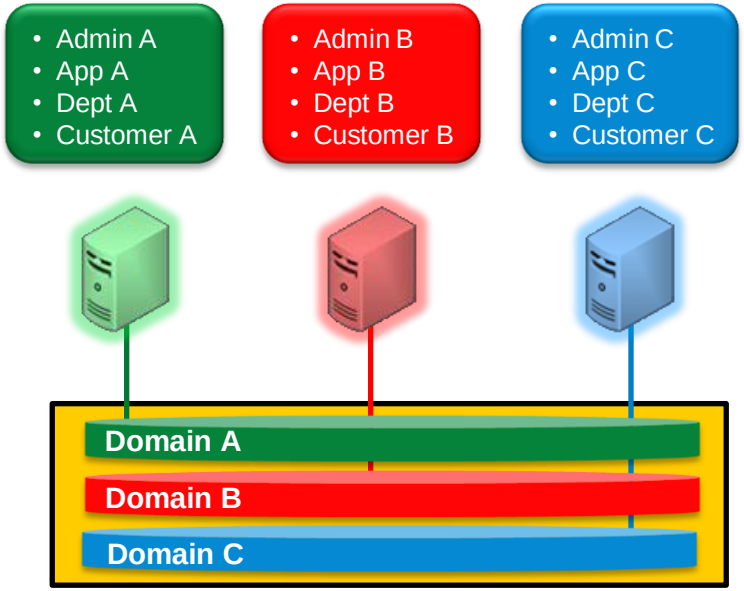
What are HP 3PAR Virtual Domains?

Multi-Tenancy with Traditional Storage



Separate, Physically-Secured Storage

Multi-Tenancy with 3PAR Domains

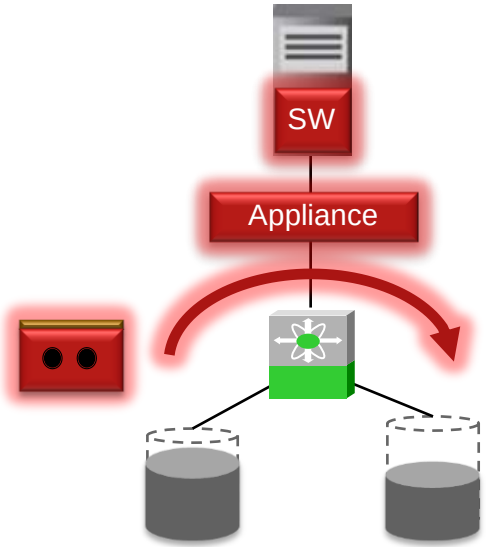


Shared, Logically-secured 3PAR Storage

Converged Migration — HP 3PAR Peer Motion

Traditional Block Migration

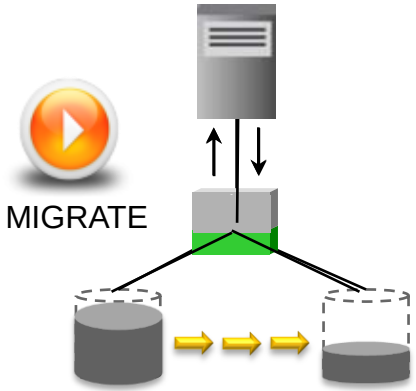
Complex, time-consuming, risky



= Block Migration Approaches

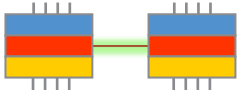
HP 3PAR Peer Motion

1st Non-Disruptive DIY Migration for Enterprise SAN

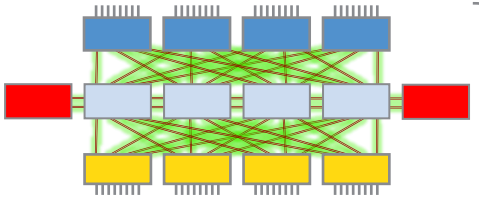


FC Grid Array

Traditionales Modulares Storage

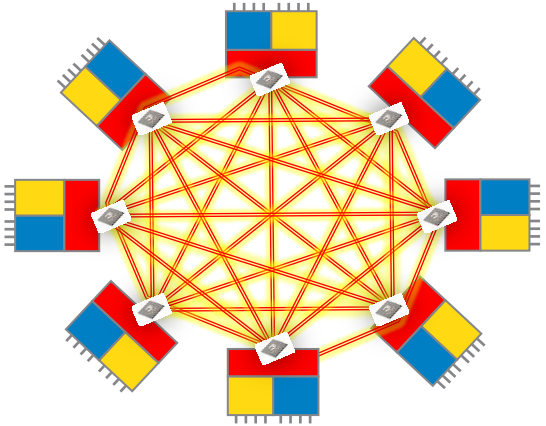


Traditionales Monolithic Storage



Distributed
Controller
Functions

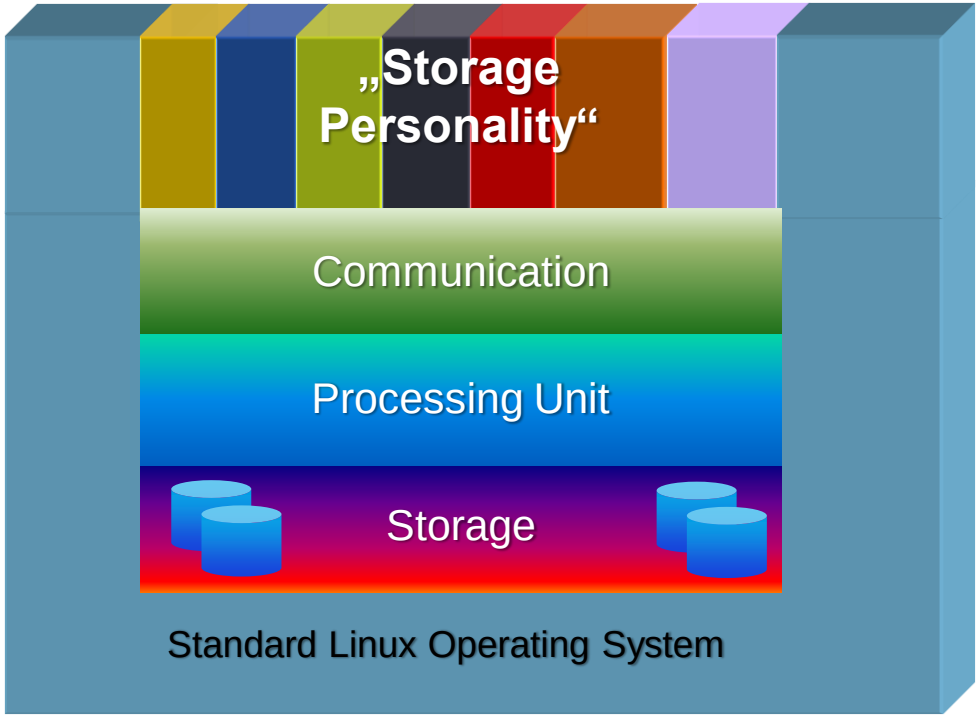
HP 3PAR



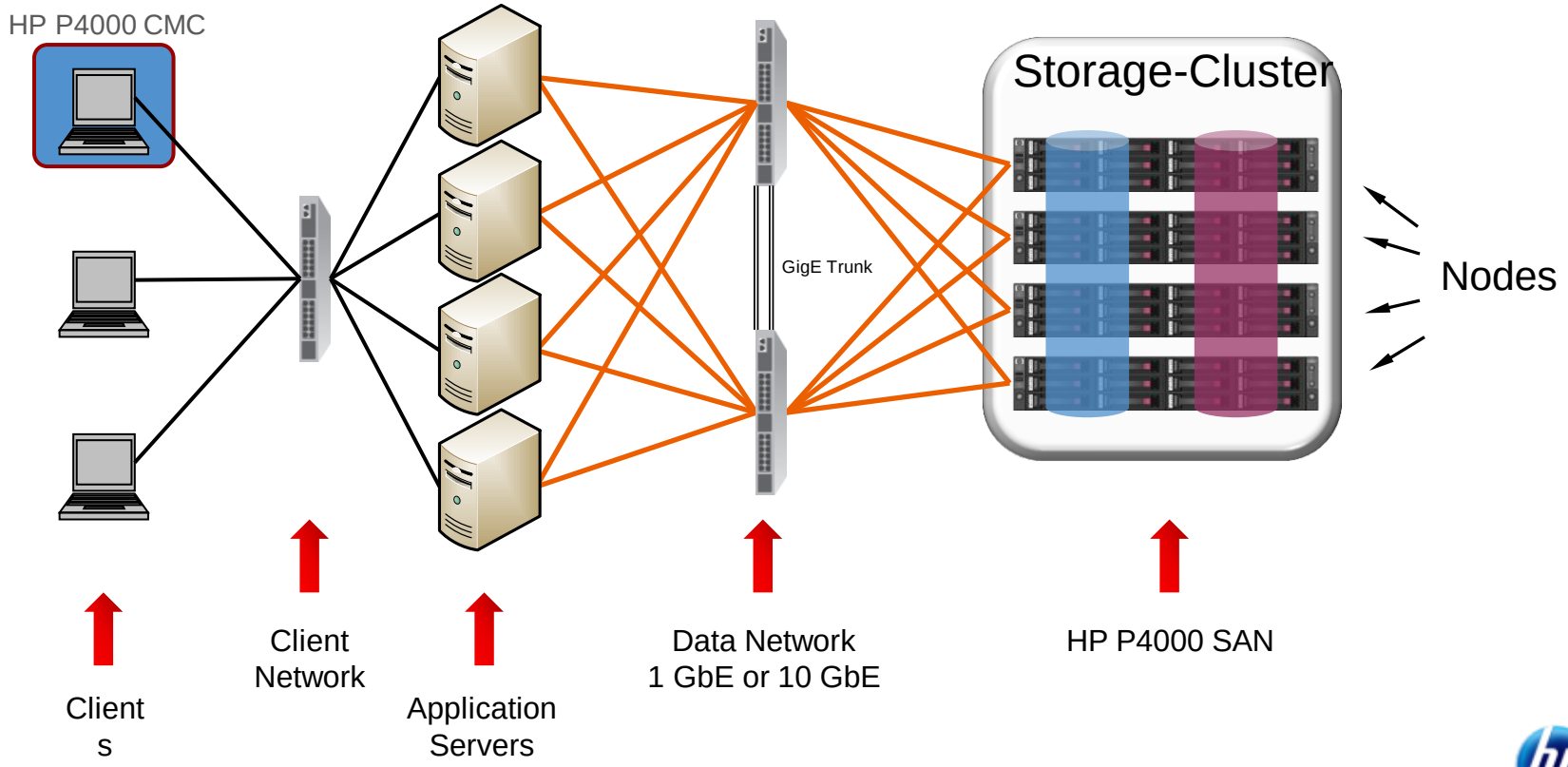
- F-Class: bis zu 4 Controllern
- V-Class: bis zu 8 Controllern

Standardization: Converged Infrastructure

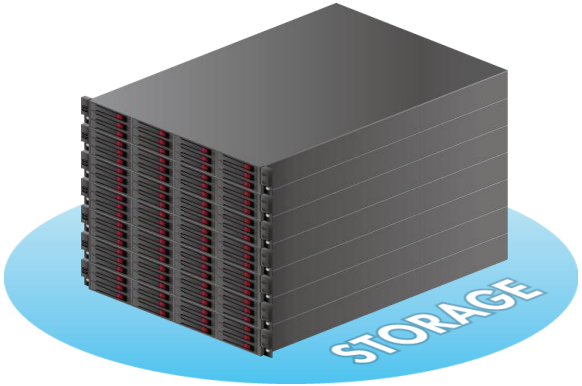
Storage applications capabilities

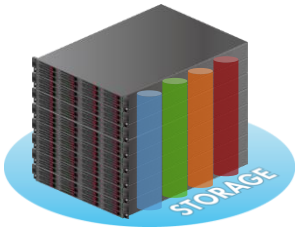


iSCSI SAN – P4000 Architectur

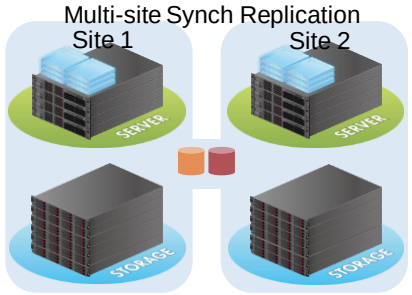


Key functionalities of Lefthand

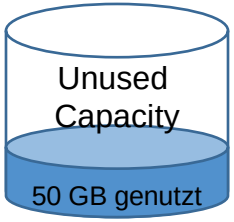




1 Storage Clustering



2 Network RAID

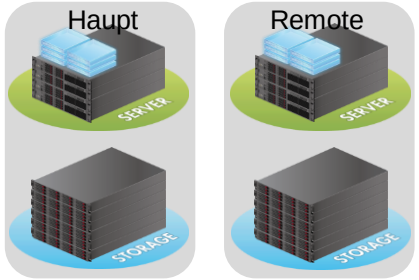


200 GB Volume

3 Thin Provisioning

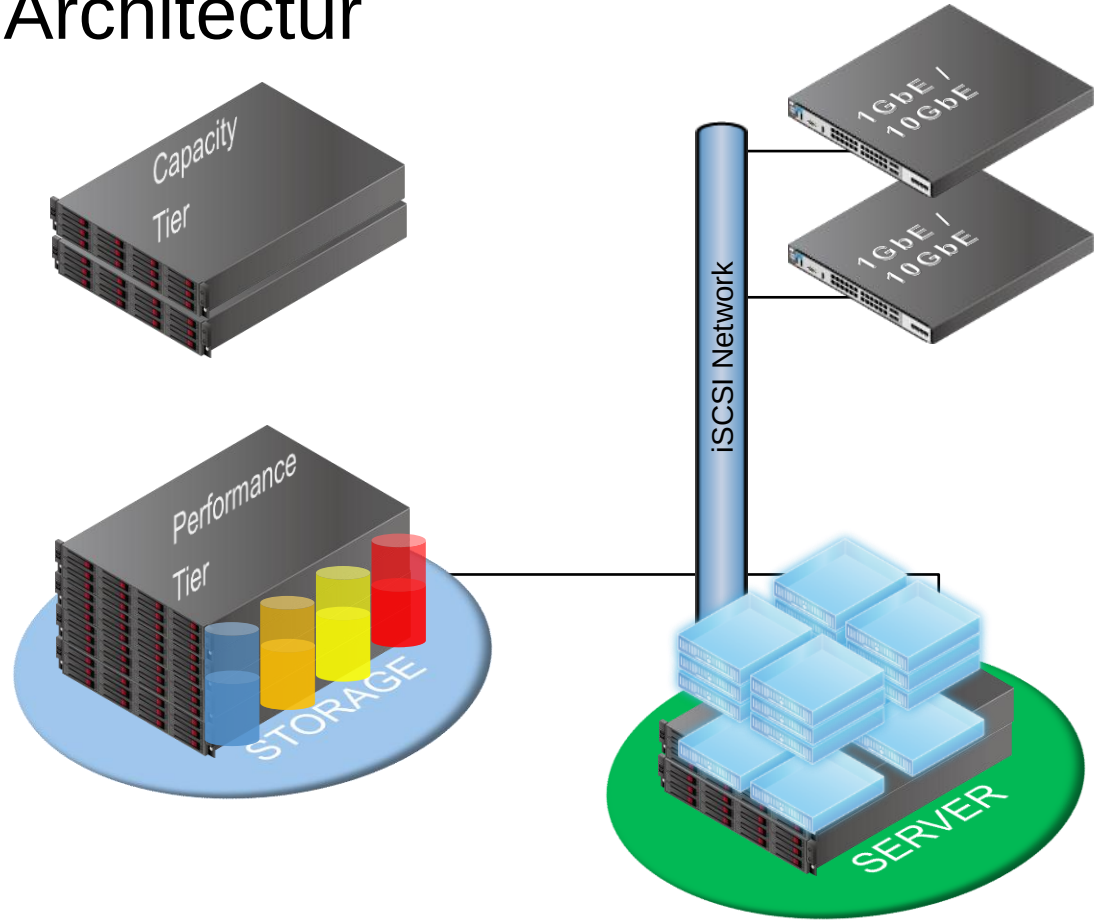
Windows Server 2008 R2 Hyper-V
SQL Server 2008
Exchange Server 2010
vmware
CITRIX

4 Snapshots

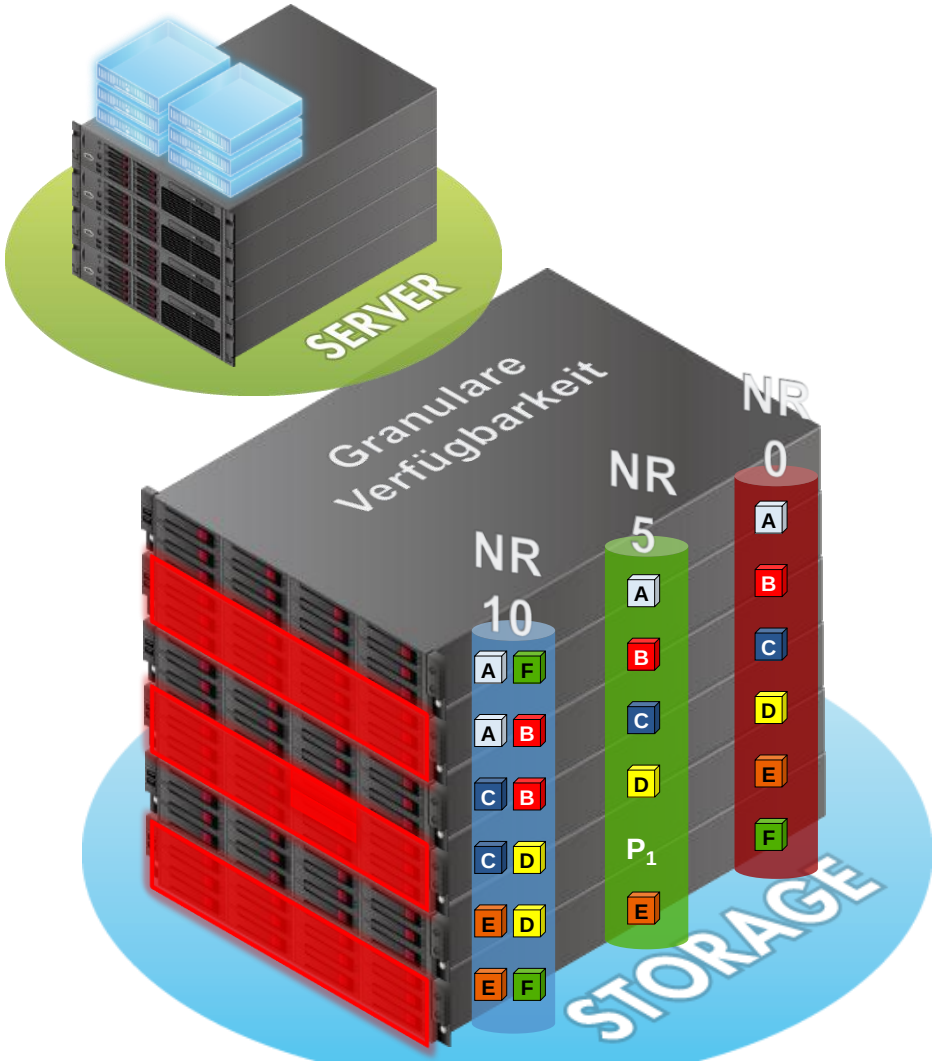


5 Remote Copy

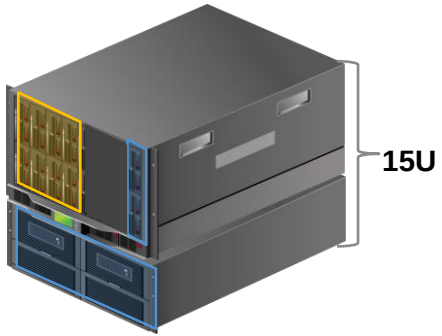
P4000 Architectur



Network RAID

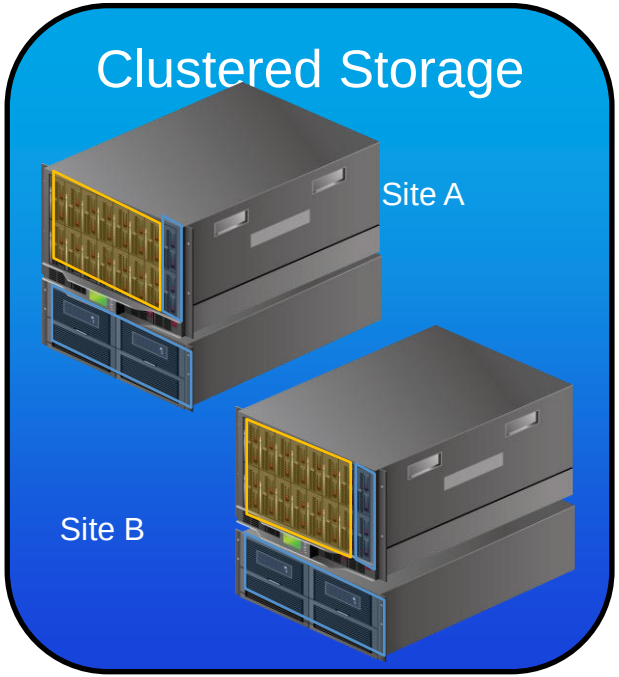


P4800 – Blade Storage



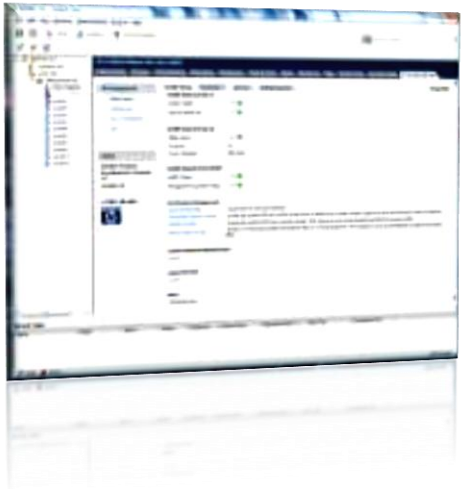
Start small…

…grow…

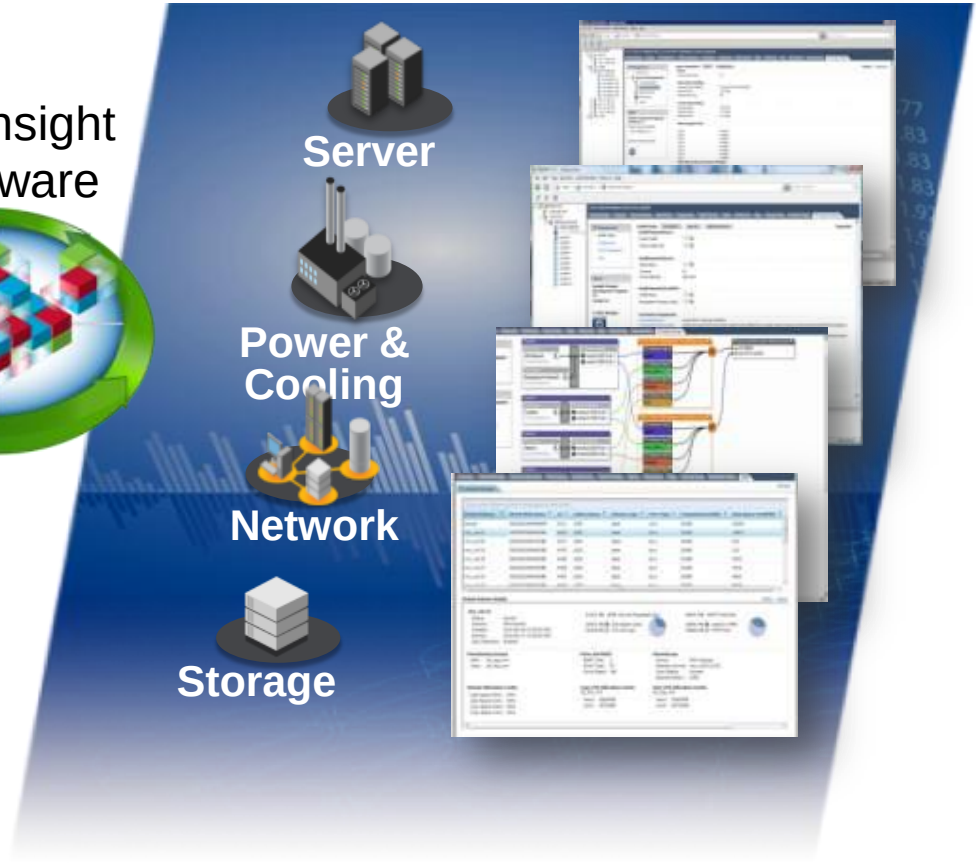


And be available

Integrated Management

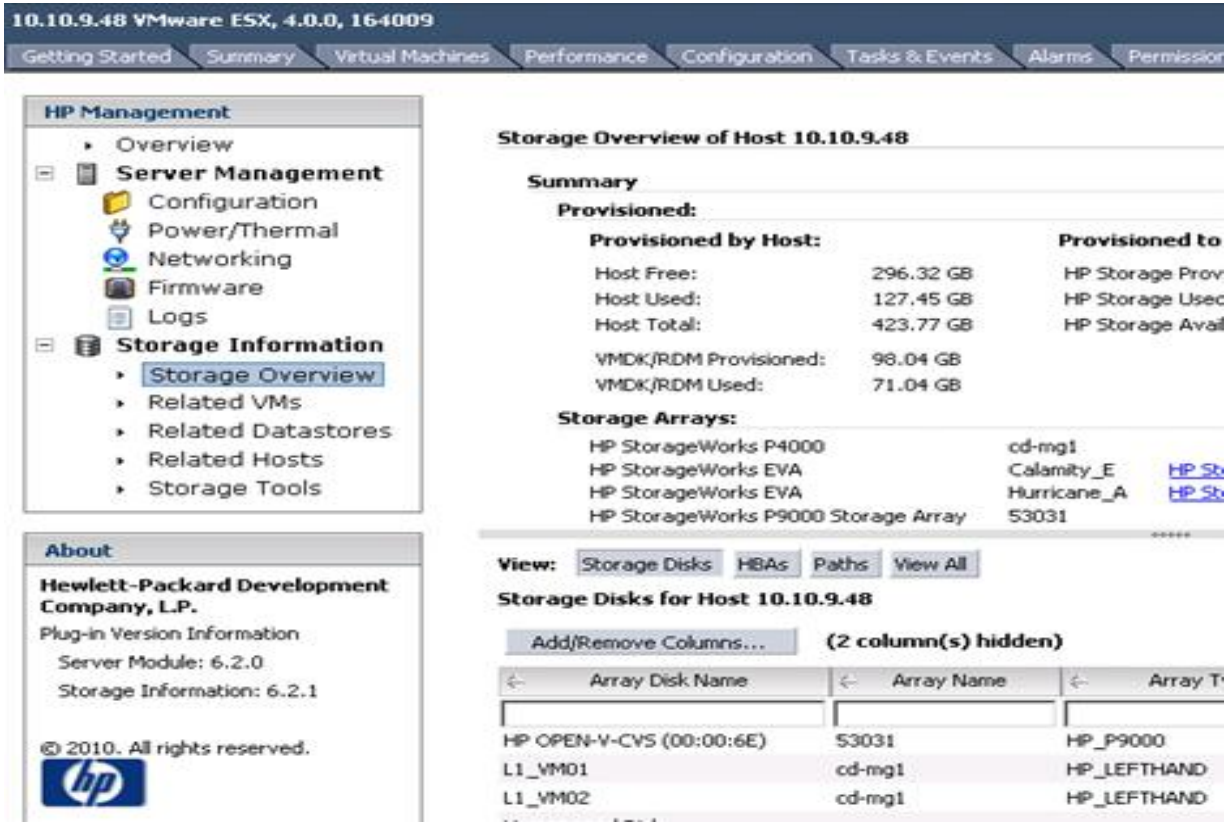


HP Insight Software



One single pane of glas for the HP Converged Infrastructure management application

Management Plug-In for VMware vCenter




THANK YOU