

Welcome! The webinar will start shortly.

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There's a Simpler Way to Manage Storage in Your Virtual Environments

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vmware®
PARTNER
ENTERPRISE
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 PartnerDirect
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Today's Agenda

- Challenges / Remedies
- EqualLogic Virtual Management
- Integrated Management Tools
- Virtual Storage Manager
- Fluid Data Architecture
- Storage Performance Analysis
- Q & A

Today's Speaker

Karl Prince

Dell
Storage Solutions
Engineer



Data Networks Simplifies Enterprise IT



Storage Management Challenges... Remedies

Challenges

- Inefficient utilization of storage capacity and performance
- Complex expansion and upgrade process
- Multiple points and processes for storage management
- Complex provisioning of VMs and data stores
- Disaster recovery and high availability

Remedies

- Tiered, Load Balanced, Thin Provisioned storage
- Peered and model agnostic storage
- Integrated VASA and VAAI management with vCenter
- Provision VMs and Data Stores with vCenter integrated VSM
- Hypervisor consistent local and remote replicas within VSM in vCenter

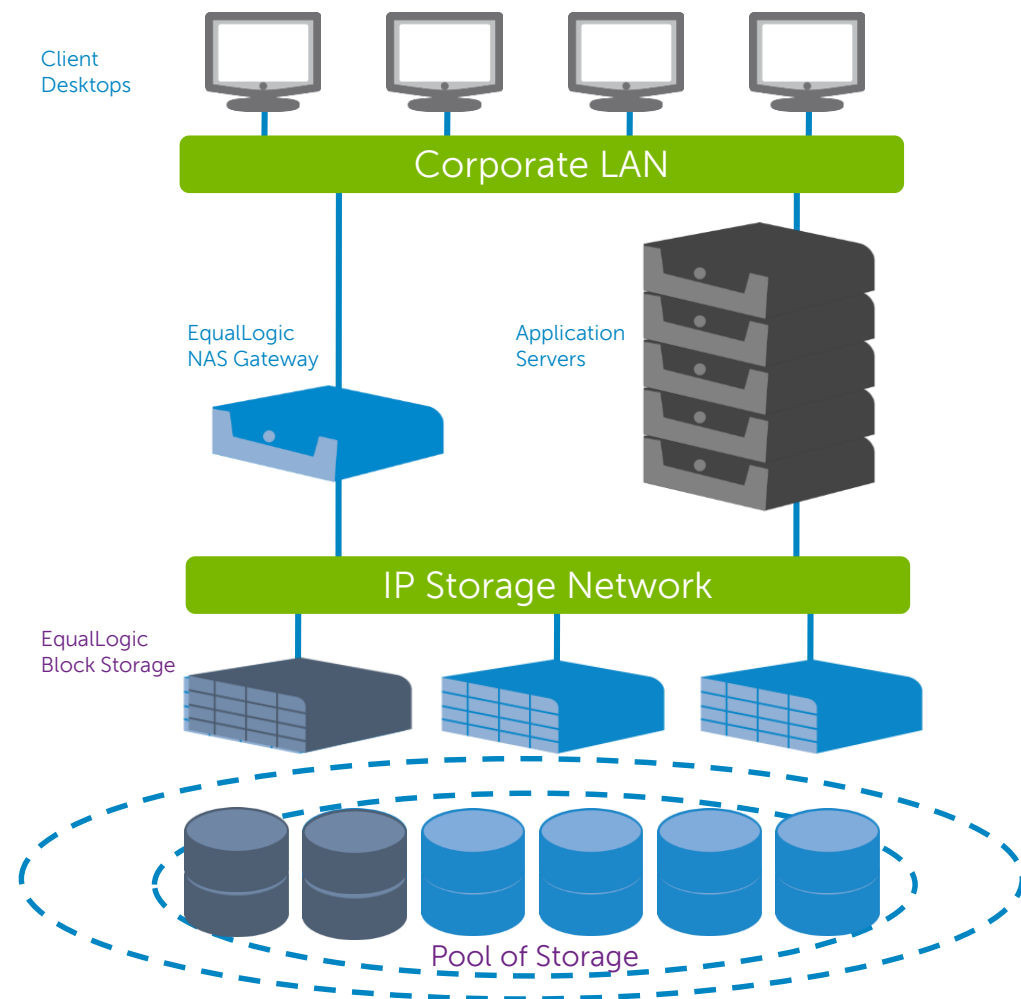
Dell EqualLogic Efficiencies



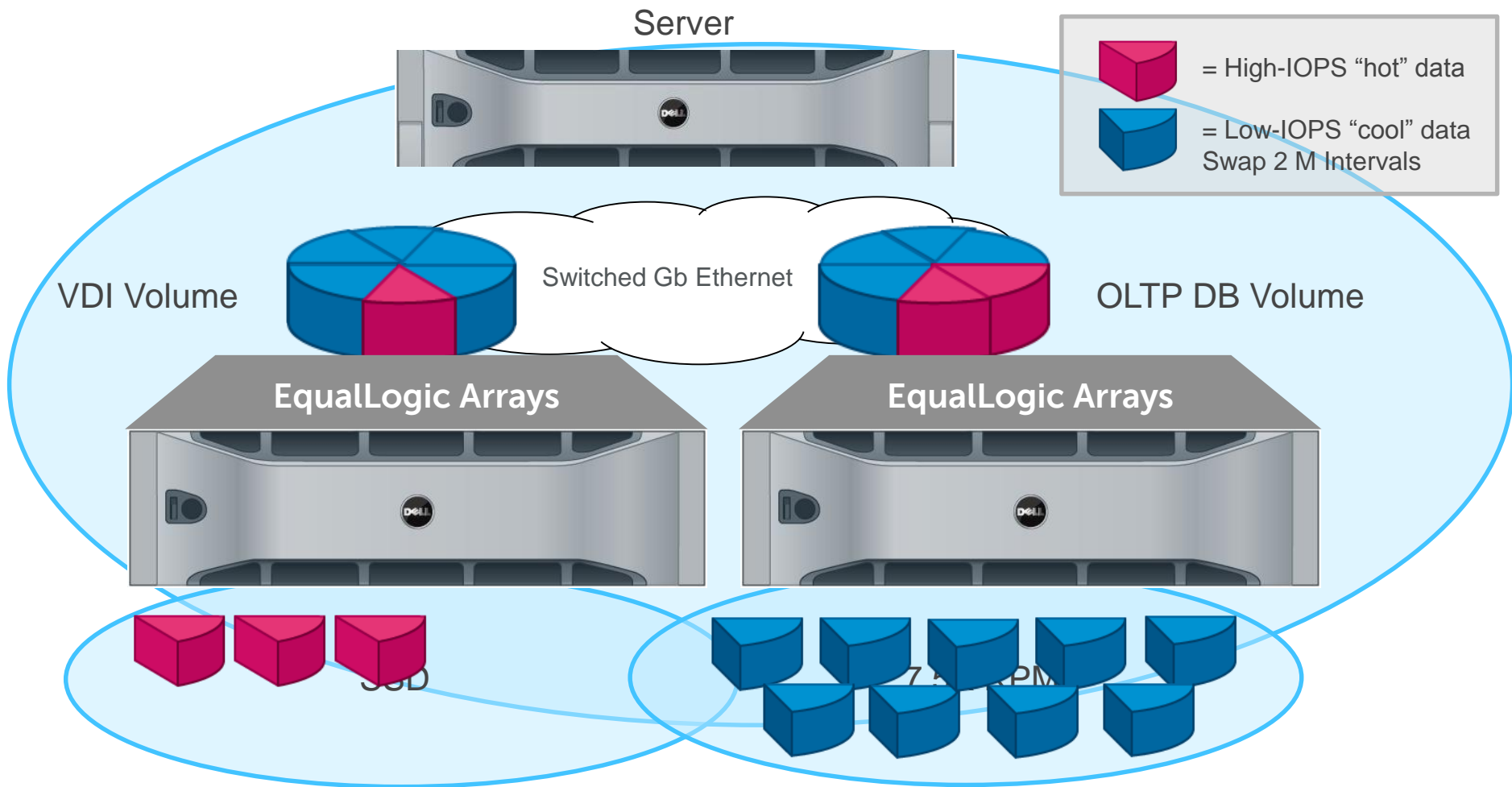
Expand, Upgrade, Redeploy Any Time

Make Changes on the Fly

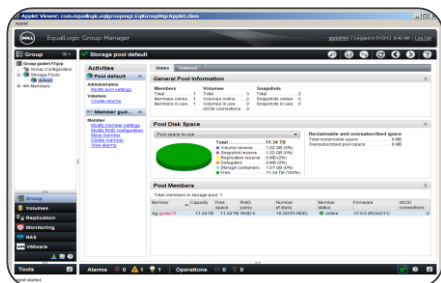
- Expand, upgrade, redeploy and perform other maintenance in live, production environments
- Combine different drive types, RAID levels and product generations to meet your unique requirements



Auto Tiered Load Balancing



All-Inclusive Enterprise-Class Software

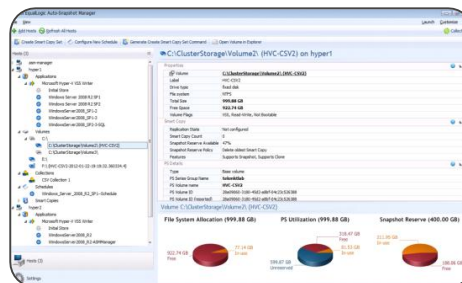


Array Software 7.0

Advanced SAN functionality that automatically virtualizes, streamlines management and optimizes storage resources.

NEW

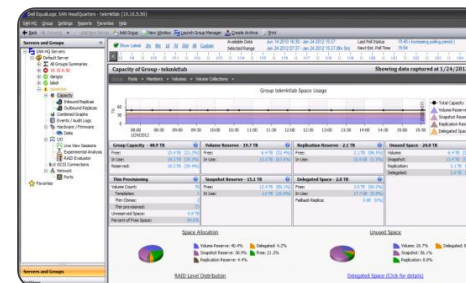
- + 64-bit kernel for PS41x0, PS61x0, PS62x0 arrays
- + New Access Control Policies
- + Updated GUI with Search/Find
- + RAID policy recommendations
- + 4K Sector volumes and support for 4Kn sector disks



Host Integration Tools

EqualLogic software that tightly integrates popular applications and operating platforms from Microsoft®, VMware® and Linux® to enable performance optimization, and streamlined management and operation.

- + HIT/VMware 3.5
- + HIT/Microsoft 4.6
- + HIT/Linux 1.2



SAN HQ 3.0

A full-featured monitoring and analysis tool for EqualLogic PS storage arrays to optimize storage performance and resource allocation

NEW





- + Array SW 7.0 support
- + Enhanced monitoring SupportAssist case status reporting and enhanced automatic case creation and notifications

Streamline management of SAN and NAS with FluidFS NAS firmware

Integrated Management Tools







Application and Hypervisor Integration Tools

	HIT/Linux	HIT/Microsoft	HIT/VMware
Data Protection 	<ul style="list-style-type: none"> Auto-Snapshot Manager/ Linux Edition (ASM/LE) 	<ul style="list-style-type: none"> Auto-Snapshot Manager/ Microsoft Edition (ASM/ME) for MS Exchange, SQL Server, NTFS file systems, Hyper-V, and SharePoint Server Volume Shadow Copy Service (VSS) Provider 	<ul style="list-style-type: none"> Virtual Storage Manager (VSM): Auto-Snapshot Manager/VMware Edition (ASM/VE) Storage Replication Adapter for VMware Site Recovery Manager (SRA SRM)
Integrated Operations 		<ul style="list-style-type: none"> Virtual Disk Service (VDS) Provider High Performance Computing (HPC) iSCSI Provider Storage Management Provider (SMP) 	Virtual Storage Manager (VSM): <ul style="list-style-type: none"> Datstore Management vSphere Storage APIs (VASA) Provider
Performance 	<ul style="list-style-type: none"> Multipath I/O (MPIO) Host Performance and Configuration Tuning Suite (eqltune) 	<ul style="list-style-type: none"> Multipath I/O (MPIO) 	<ul style="list-style-type: none"> Multipath I/O (MPIO), also called Multipathing Extension Module (MEM) for VMware vSphere
Management 	<ul style="list-style-type: none"> Remote Setup Wizard Command Line Interface (RSWCLI) 	<ul style="list-style-type: none"> PowerShell Tools Remote Setup Wizard (RSW) Remote Setup Wizard Command Line Interface (RSWCLI) 	<ul style="list-style-type: none"> Virtual Storage Manager (VSM): Multi-group management

Automate Reliable Data Protection

Improve Business Continuity

- Leverage **snapshots** and **clones** to protect data locally
- Integrate with **backup** applications
- Consider **thin clones** for specialized data distribution requirements
- Implement offsite data protection with **replication**

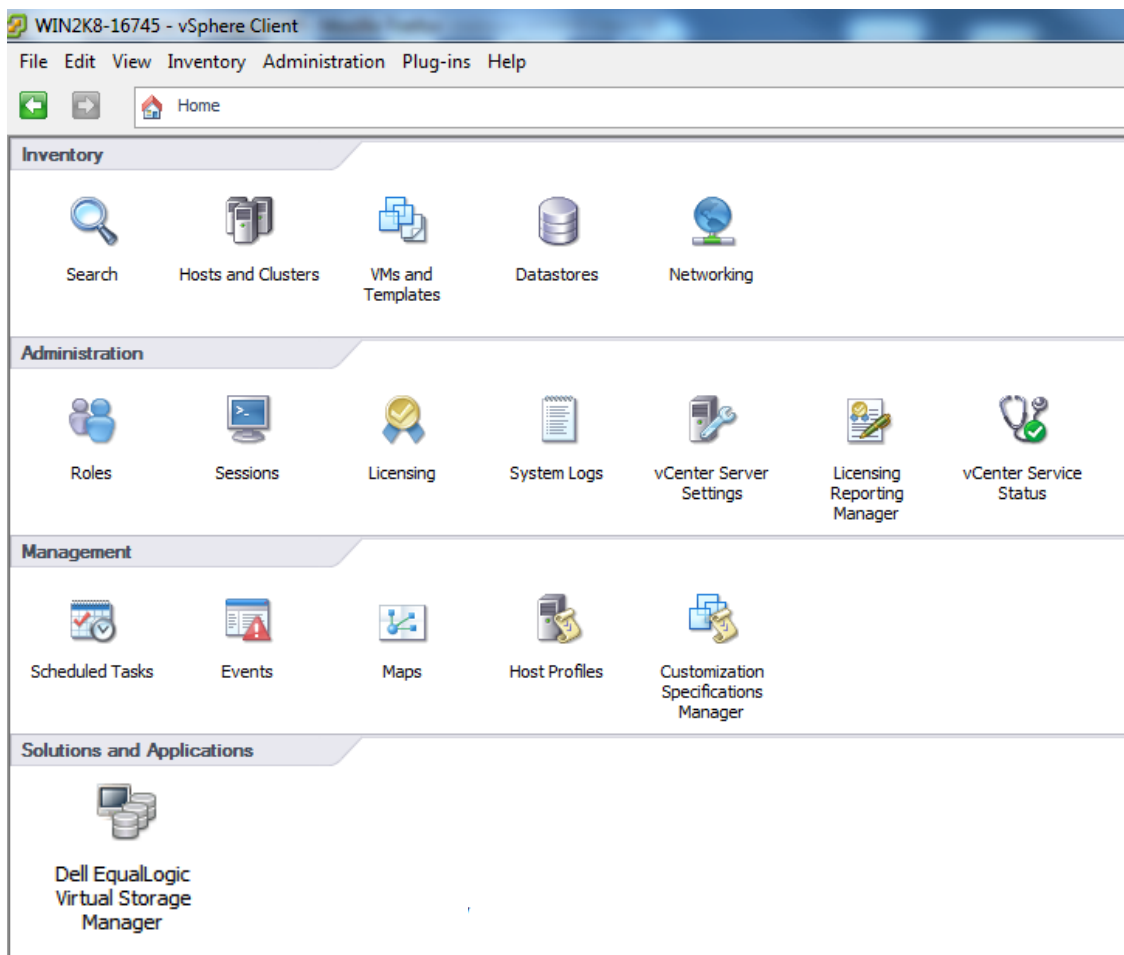
Feature	Description	Use cases
 Snapshot	Space-efficient, point-in-time view of a volume	Rapid recovery for corruption or accidental deletion
 Clone	Full copy of an entire volume	Test environments, reporting servers
 Thin Clone	Creation of space-efficient copies from a volume template	Virtual desktops, development environments
 Replica	Full copy of a volume stored remotely and updated with changes	Disaster recovery, centralized backup

VMware vCenter Integration



VSM Through vCenter

- Dell VASA provider interacts with VMware's Storage Distributed Resource Schedule (SDRS)
- Avoids unnecessary VMware Storage VMotion operations
- Ensures efficient interaction between SDRS and Dell EqualLogic internal load balancing



Navigating VSM

The screenshot displays the Dell EqualLogic Virtual Storage Manager (VSM) interface. The interface is divided into several sections:

- Top Navigation:** File, Edit, View, Inventory, Administration, Plug-ins, Help. A breadcrumb trail shows: Home > Solutions and Applications > Dell EqualLogic Virtual Storage Manager > BSG-Cylons.
- Left Sidebar:**
 - Datastores:** vCenter Server 192.168.X.XX (2)
 - 1of5 (2)
 - r6s16-localDS (2)
 - r6s17-localDS
 - r6s18-localDS
 - Groups**
 - Datastores** (3)
 - Smart Copies**
 - Replication**
 - Scheduled Tasks**
 - VDI Tool**
 - Recent Tasks** (4)
 - Verify Smart Copies
 - Done - Successful
- Main Content Area:**
 - Datastore r6s16-localDS:**
 - Getting Started | Summary | Virtual Machines | Alarms | Volume (5)
 - Actions: (6)
 - Table:**

VM Name	Guest OS	Guest State	Used Space	Quiescable	Smart Copie
Cylon-vCenter	Novell SUSE Linux Enterprise 11 (...)	powered on	17.06 GB	yes	not sup
CylonVSM	Red Hat Enterprise Linux 5 (32-bit)	powered on	17 GB	yes	not sup
CylonWDC	Microsoft Windows Server 2008 ...	powered on	12.98 GB	yes	not sup
 - Virtual machine CylonWDC (10):**
 - Connection state: connected
 - VM version: vmx-07
 - Guest OS: Microsoft Windows Server 2008 R2 (64-bit)
 - Guest state: powered on
 - Health status: good
 - VM image size: 40 GB
 - VM datastore: r6s16-localDS
 - VMware tools: GUEST_TOOLS_CURRENT
 - Fault tolerance: disabled
 - Smart Copies: not supported (Datastore r6s16-localDS is on unsupported storage)
 - Number of Smart Copies: 0
 - Virtual machine Cylon-vCenter (8):**
 - Connection state: connected
 - VM version: vmx-07
 - Guest OS: Novell SUSE Linux Enterprise 11 (64-bit)
 - Guest state: powered on
 - Search:** (9) Name, Target or Status contains: rs
 - Recent Tasks Table:**

Name	Target	Status	Details	Initiated by	vCenter Server	Requested Start Ti...	Start Time	Comple

VSM EqualLogic Groups View

The screenshot displays the vSphere Client interface for a Dell EqualLogic Virtual Storage Manager (VSM) group named 'hitsamkit4'. The interface is divided into several sections:

- Left Navigation Panel:** Shows a tree view of 'PS Series Groups' with 'hitsamkit4' selected. Below it are tabs for 'Groups', 'Datastores', 'Smart Copies', 'Replication', 'Scheduled Tasks', and 'VDI Tool'. A 'Recent Tasks' section shows two successful tasks for provisioning datastores.
- Group Information:**
 - Group Name: hitsamkit4
 - IP Address: 192.168.XXX.XXX
 - Location: default
- Group Disk Space:**
 - Buttons: Group Space Utilization, RAID Distribution, Storage Pool Capacity, Delegated Space Utilization.
 - Group Capacity: 2.61 TB
 - Capacity Breakdown:
 - Reserved for Volumes: 536.97 GB (20.1%)
 - Reserved for Snapshots: 790.78 GB (29.6%)
 - Reserved for Replication: 0 MB (0%)
 - Delegated Space: 362.23 GB (13.6%)
 - Free Space: 981.8 GB (36.7%)
- Collections:**
 - Volumes: 0
 - Snapshots: 0
 - Custom Snapshots: 0
- Group Members Table:**

Member Name	Storage Pool	Health	Member Cap	Free Space	RAID Policy	Number of Disks	Member Status	iSCSI Conn	Firmware
hitsamkit4	default	normal	2.61 TB	2.11 TB	RAID-50	16 (SATA ...)	online	99	V6.0.0
- Recent Tasks Table:**

Name	Target	Status	Details	Initiated by	vCenter Server	Requested Start Time	Start Time	Complete
Provision new datastores for ...		Done - Successful						
Provision new datastores for ...								

Datastore Deployment

Without EqualLogic VSM

- Start from SAN
 - Create a volume
 - Define size
 - Define access parameters
- Move to vCenter
 - Scan for New Volume
 - Format for VMFS file system\
- Basically the Same number of steps for expanding a datastore.

With EqualLogic VSM

- Start and stay in vCenter
 - Click on VSM in vCenter Home
 - Right click on VM and create data store
- Done
- Same single step for expanding a datastore

Datastores View

Datastores

Getting Started | Datastores | Clusters

Actions: ▼

Name	Status	Group Name	Capacity	Space Utilization	PS Series Volume	Used Snap. Space	Replication Type	Replication Status	System Store Capability
abd	accessi...	hitshare4-grp	9.75 GB	8%	abd	0%	None		RAID, SNAP
Datastore...	accessi...	hitshare4-grp	2.75 GB	21%	Datastore298...	0%	None		RAID, SNAP
DM-VC16...	accessi...	hitshare4-grp	99.75 GB	18%	inaccessi...	0%	N/A	N/A	RAID, SNAP
DS-VSM-...	accessi...	hitshare4-grp	4.75 GB	56%	DS-VSM-Cla...	0%	None		RAID, SNAP
DS-VSM-...	accessi...	hitshare4-grp	4.75 GB	50%	DS-VSM-Cla...	0%	None		RAID, SNAP
DS-VSM-...	accessi...	hitshare4-grp	9.75 GB	43%	DS-VSM-Cla...	10%	None		RAID, SNAP
DS-VSM-...	accessi...	hitshare4-grp	4.75 GB	49%	DS-VSM-HIT...	0%	None		RAID, SNAP
DS-VSM-...	accessi...	hitshare4-grp	4.75 GB	11%	DS-VSM-VM...	0%	None		RAID, SNAP
OrvalPatc...	inactive	hitshare4-grp	4.75 GB	27%	inaccessi...	0%	N/A	N/A	RAID, SNAP
OrvalPatc...	inactive	hitshare4-grp	4.75 GB	30%	inaccessi...	0%	N/A	N/A	RAID, SNAP
OrvalPatc...	accessi...	hitshare4-grp	4.75 GB	14%	inaccessi...	0%	N/A	N/A	RAID, SNAP
OrvalPatc...	accessi...	hitshare4-grp	4.75 GB	14%	inaccessi...	0%	N/A	N/A	RAID, SNAP
OrvalPatc...	accessi...	hitshare4-grp	4.75 GB	14%	inaccessi...	0%	N/A	N/A	RAID, SNAP
snap-1f15...	accessi...	hitshare4-grp	9.75 GB	36%	inaccessi...	0%	N/A	N/A	N/A
try3	accessi...	hitshare4-grp	9.75 GB	8%	try3	0%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	9.75 GB	36%	VSM-SC-DS...	49%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	9.75 GB	25%	VSM-SC-DS...	52%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	9.75 GB	15%	VSM-SC-DSF...	14%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	9.75 GB	15%	VSM-SC-DSF...	0%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	9.75 GB	15%	VSM-SC-DSF...	12%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	9.75 GB	15%	VSM-SC-DSF...	0%	None		RAID, SNAP
VSM-SC-...	accessi...	hitshare4-grp	4.75 GB	50%	VSM-SC-MU...	28%	None		RAID, SNAP
VSM-SC-...	accessi...	hitshare4-grp	4.75 GB	71%	VSM-SC-MU...	0%	None		RAID, SNAP
VSM-SC-...	accessi...	hitshare4-grp	4.75 GB	98%	VSM-SC-MU...	85%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	4.75 GB	98%	VSM-SC-MU...	0%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	4.75 GB	14%	VSM-SC-MU...	0%	None		N/A
VSM-SC-...	accessi...	hitshare4-grp	49.75 GB	1%	VSM-SC-MU...	0%	None		N/A

Recent Tasks

Name	Target	Status	Details	Initiated by	vCenter Server	Requested Start Time	Start Time	Completed Time
Remove snapshot	VSM-XP-HW8-...	Completed		com.dell.Equa...	WIN2K8-1671...	4/20/2012 9:32:27 AM	4/20/2012 9:32:27 AM	4/20/2012 9:3...
Recompute Datastore ...	WIN2K8-1671...	Completed		Administrator	WIN2K8-1671...	4/20/2012 9:31:31 AM	4/20/2012 9:31:31 AM	4/20/2012 9:3...

Tasks | Alarms | Administrator

Datastores View

Datastores View

Volume and Snapshot Space

Volume Space
 Volume type: thin provisioned
 Reported volume size: 10 GB
 Volume reserve: 6.15 GB (61.5%)

Utilization of volume space

In-use 5.32 GB	Free	Unreserved 3.85 GB
10%	60%	100%

Snapshot Space
 Snapshot reserve: 12.3 GB (200%)
 Space recovery: delete oldest snapshot
 Number of snapshots: 2

Utilization of snapshot space

In-use 1	Free 10.71 GB
	90%

Access Control List

ISCSI access to the volume: restricted

Applies to	CHAP user	IP address	iSCSI initiator
volume & snapshots	*	*	iqn.1998-01.com.vmware:...
volume & snapshots	*	*	iqn.1998-01.com.vmware:...

iSCSI Connections

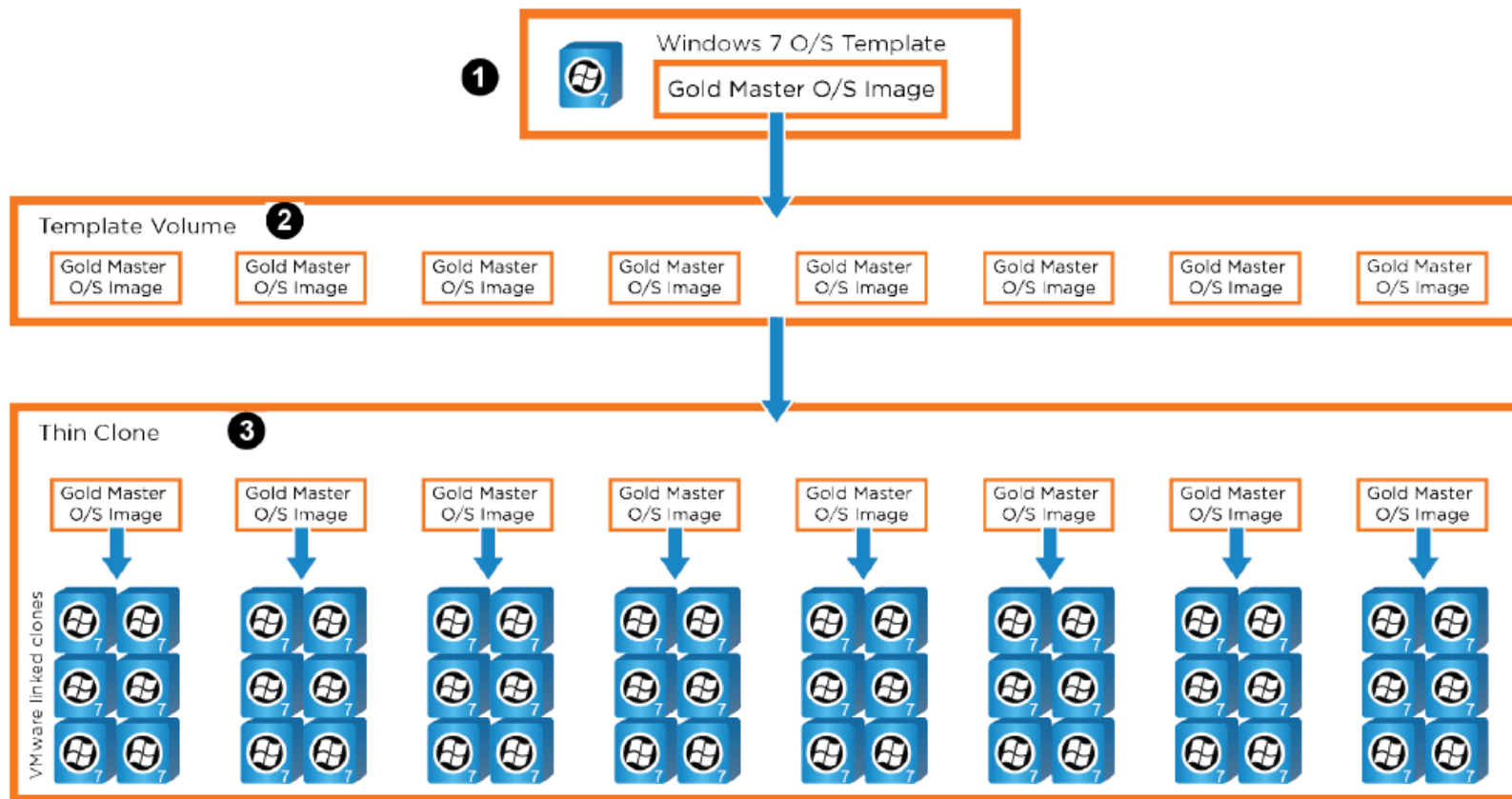
ISCSI target: iqn.2001-05.com.equallogic:0-8a0906-841fd3e07-3d8b0f97d14f394-vsm-smartcopytest08

Initiator address	Connection time	MB read	MB written
10.XXX.XX.63	17 d 20 hr 11 min	614 MB	180 MB
10.XXX.XX.66	17 d 20 hr 11 min	613 MB	184 MB
10.XXX.XX.68	17 d 20 hr 11 min	613 MB	180 MB
10.XXX.XX.69	17 d 20 hr 11 min	613 MB	173 MB
10.XXX.XX.71	17 d 20 hr 14 min	240 MB	0 MB
10.XXX.XX.72	17 d 20 hr 14 min	230 MB	0 MB

Recent Tasks

Name	Target	Status	Details	Initiated by	vCenter Server	Requested Start Time	Start Time	Completed Time
Rescan all HBAs	10.XX.XXX.60	In Progress		Administrator	WIN2K8-1671...	4/20/2012 10:23:37 ...	4/20/2012 10:23:37 ...	
Rescan all HBAs	10.XX.XXX.70	In Progress		Administrator	WIN2K8-1671...	4/20/2012 10:22:17 ...	4/20/2012 10:22:17 ...	

VDI Deployment Tool



1 Prepare the template VM image

2 Create a deployment template

3 Provision the desktop units:

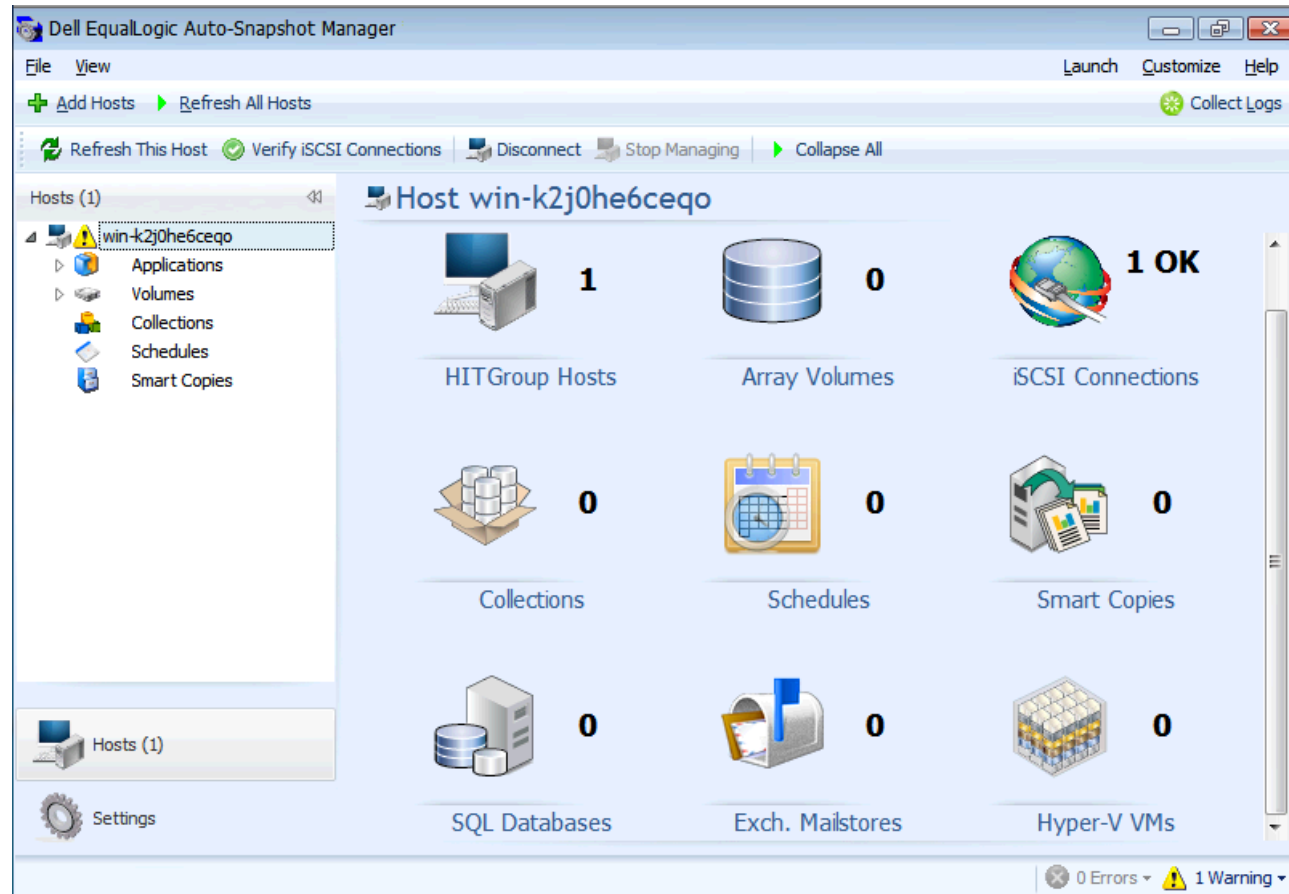
- Create thin clones
- Provision data stores
- Register VMs
- Customize VMs
- Import in VMware View • •

EqualLogic / vCenter Integration

The screenshot shows the vCenter Server interface with the 'EqualLogic' menu option highlighted in the context menu. The interface includes a top navigation bar with 'File', 'Edit', 'View', 'Inventory', 'Administration', 'Plug-ins', and 'Help'. The breadcrumb path is 'Home > Inventory > VMs and Templates'. The left sidebar shows the inventory tree with 'btff-vCenter' and 'BacktotheFuture' folders. The main pane displays a 'Discovered virtual machine' with tabs for 'General Settings', 'Virtual Machines', 'Tasks & Events', 'Alarms', 'Permissions', and 'Maps'. A context menu is open over the 'EqualLogic' option, listing 'Create Smart Copy', 'Create Schedule', and 'Create Smart Clone'. Below the menu, 'Basic Tasks' are listed: 'Create a folder' and 'Create new virtual machine'. On the right, there is a diagram of server racks and a folder icon. At the bottom right, an 'Explore Further' section contains links to 'Learn more about folders' and 'Learn about virtual machines'. The bottom status bar shows 'Recent Tasks' and a search field for 'Name, Target or Status contains:'.

Microsoft Hit Kit 4.6 Auto Snapshot Manager

- Protect and recover SharePoint, SQL Server, Exchange Server and Hyper-V
- EqualLogic snapshots, clones and replication
- Create schedules in a central console
- SCOM Monitoring Plug In



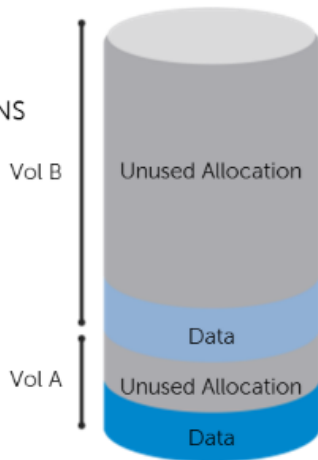
Dell Compellent Fluid Data Architecture



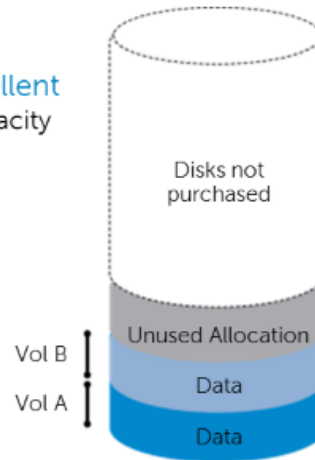
Why / When Compellent?

- Average 40% Storage Savings vs. Legacy "Fat" storage

Legacy
Traditional SANS

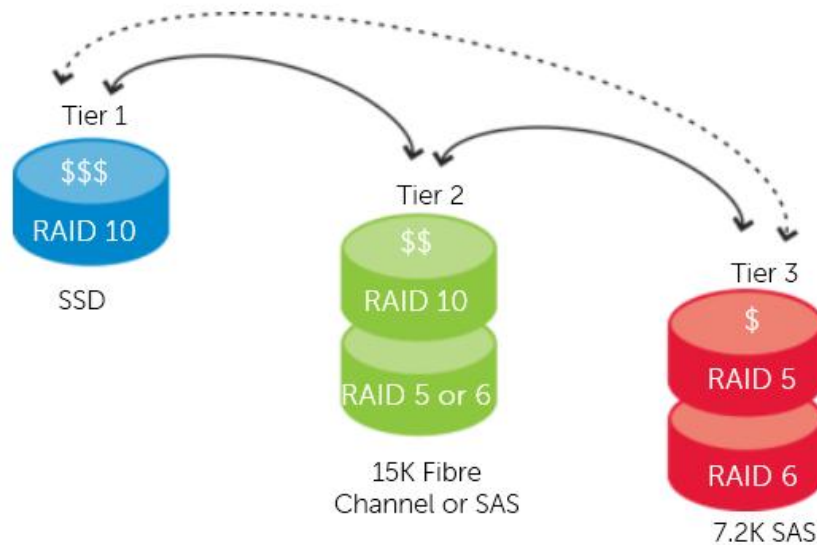


Dell Compellent
Dynamic Capacity
Advantage



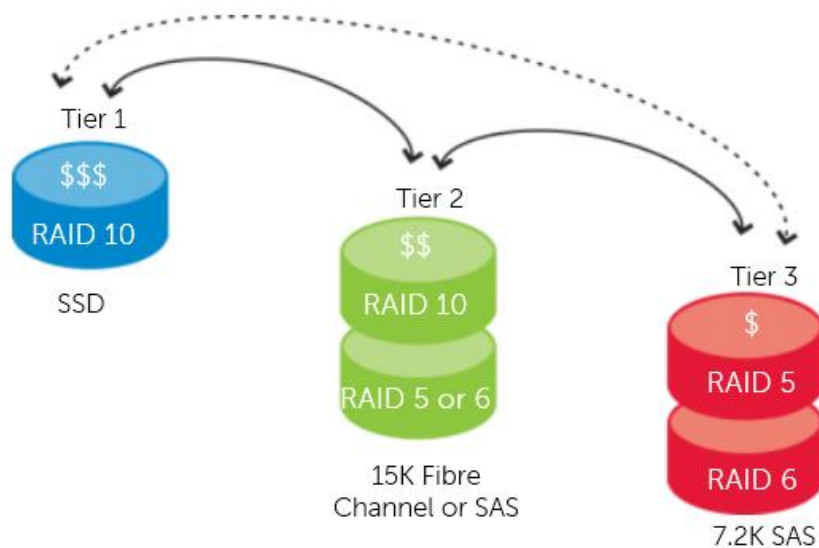
Why / When Compellent?

- 39% Storage Savings vs. all RAID10 storage



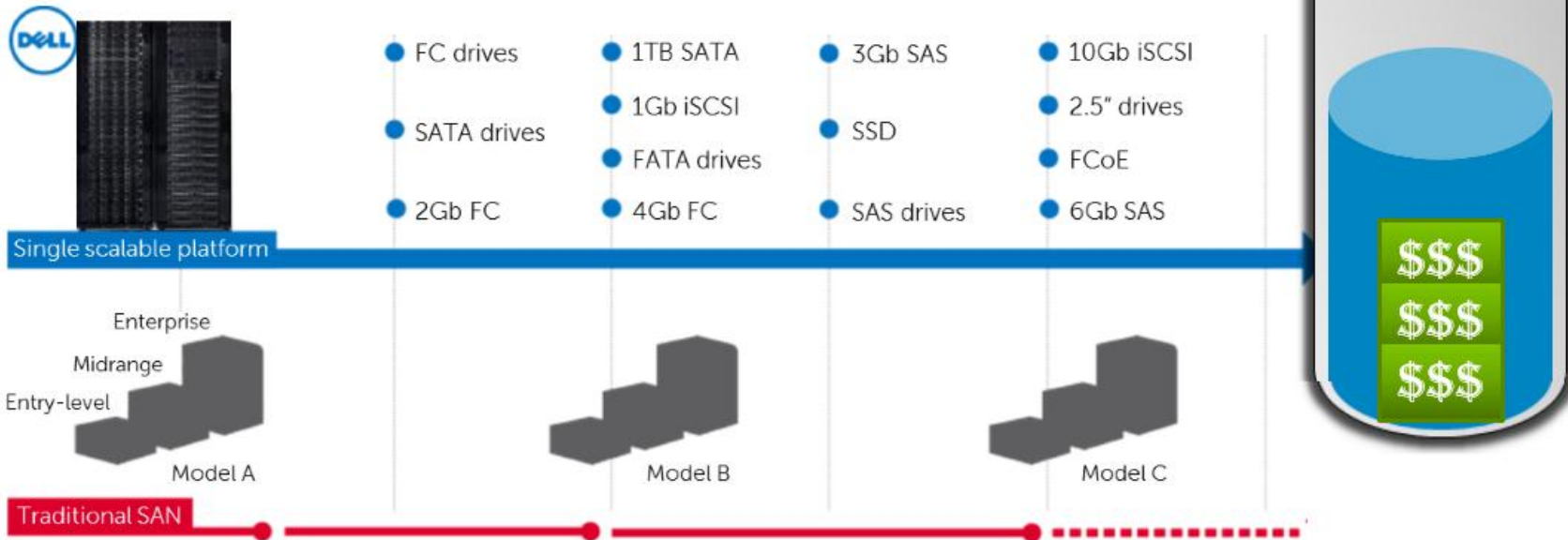
Why / When Compellent?

- 60% Storage Savings with Data Progression



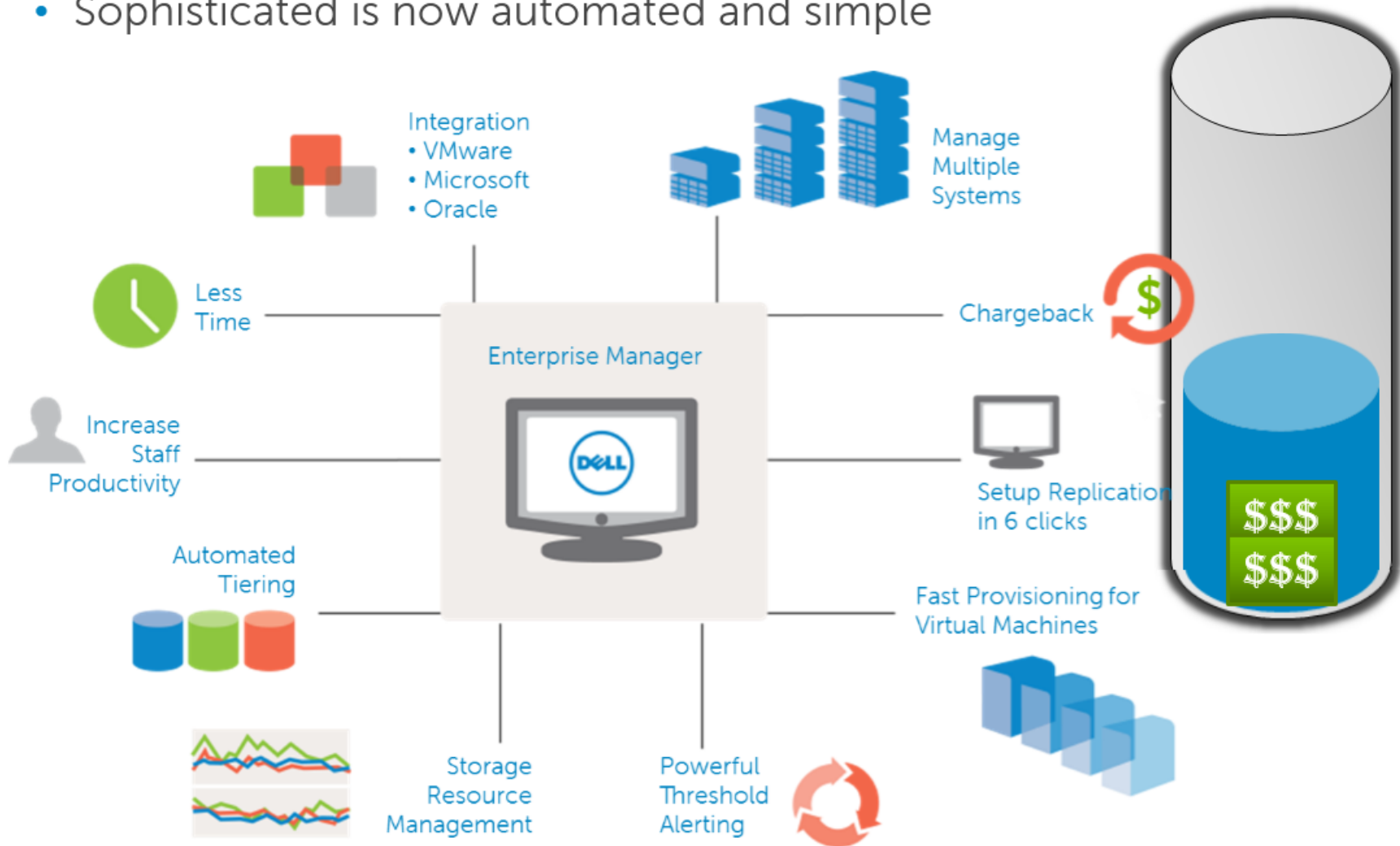
Why / When Compellent?

- 80% 5-Year TCO Savings vs. Non-Persistent Storage

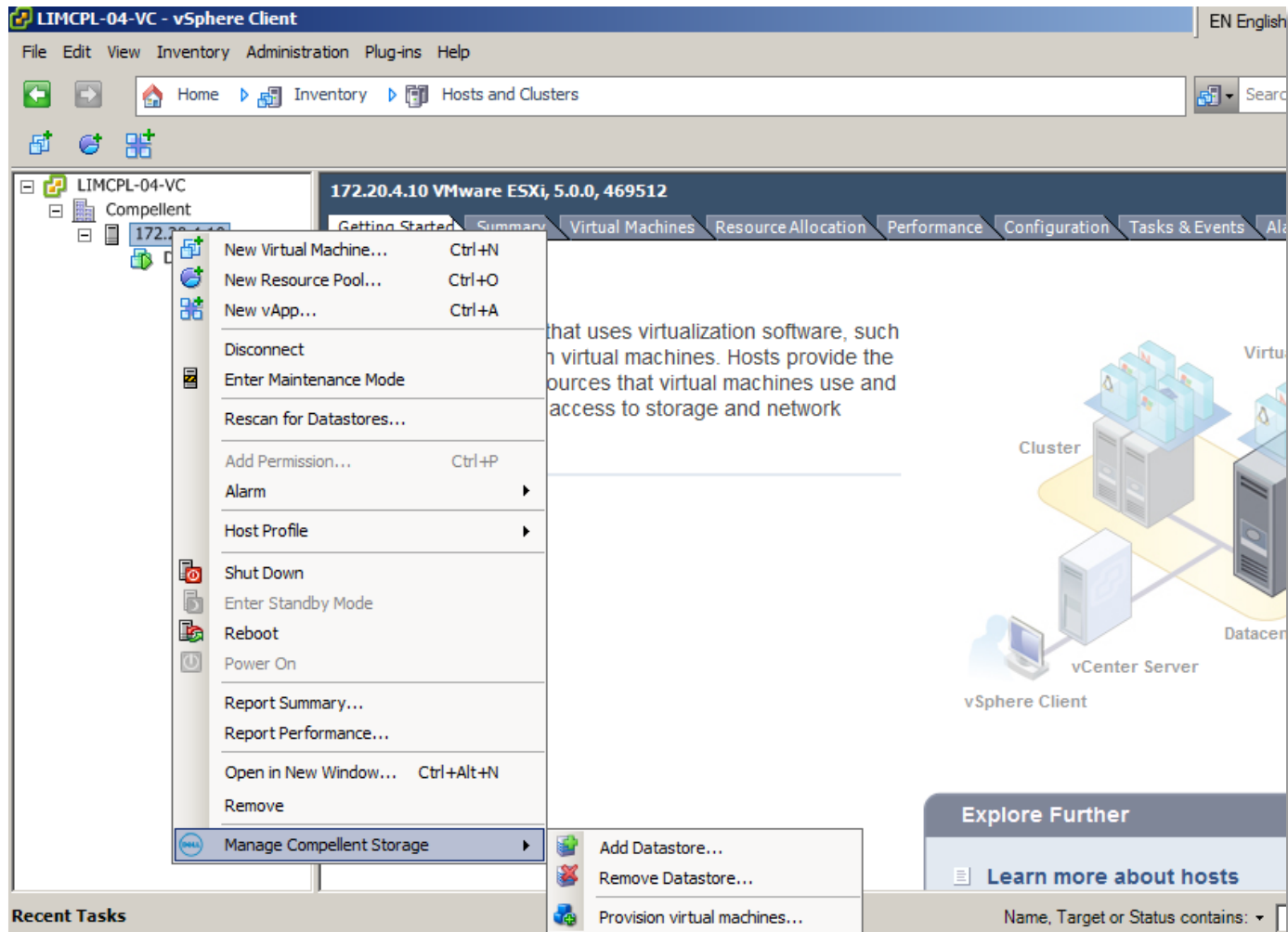


Why / When Compellent?

- Sophisticated is now automated and simple



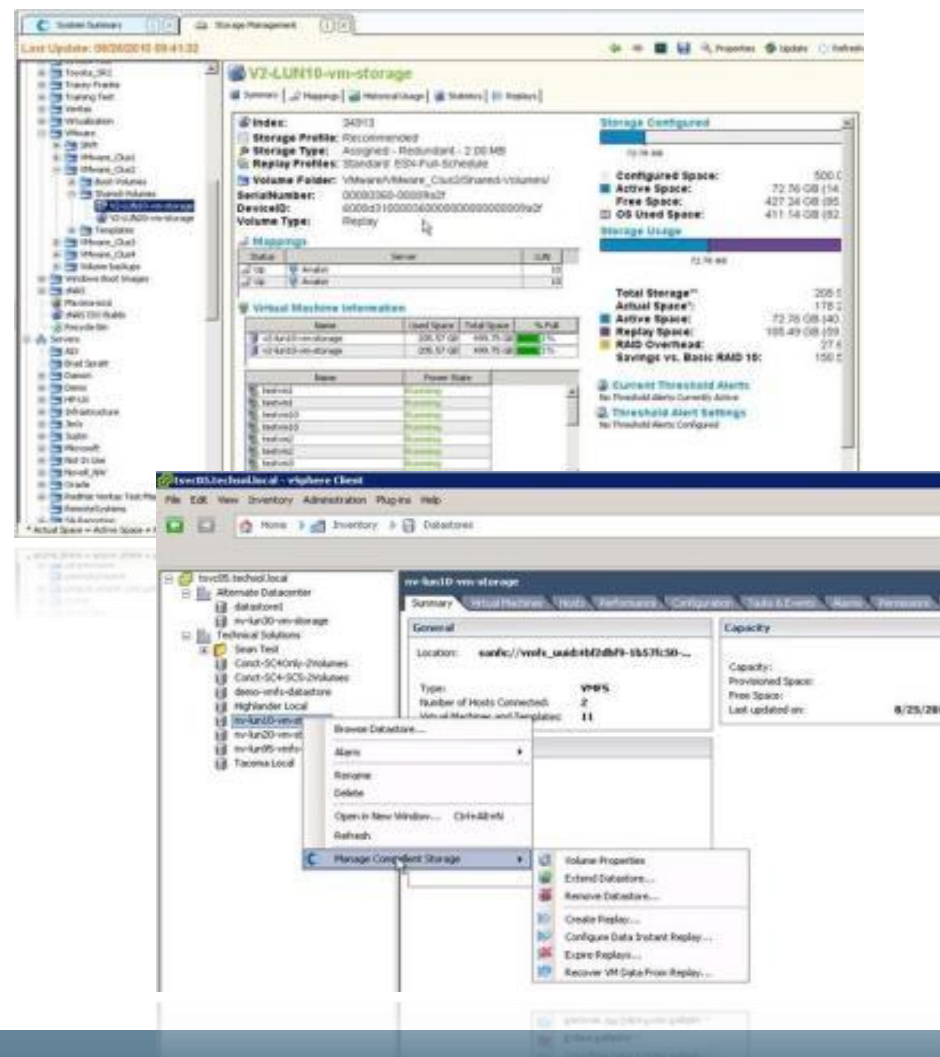
Compellent / vCenter Integration



The screenshot shows the vSphere Client interface for a host named '172.20.4.10 VMware ESXi, 5.0.0, 469512'. The left sidebar shows the inventory tree with 'LIMCPL-04-VC' and 'Compellent' expanded. A context menu is open over the host, listing various actions such as 'New Virtual Machine...', 'Disconnect', 'Shut Down', and 'Remove'. The 'Manage Compellent Storage' option is highlighted, which has opened a sub-menu with options: 'Add Datastore...', 'Remove Datastore...', and 'Provision virtual machines...'. The main pane displays a diagram of the vCenter architecture, showing a 'vCenter Server' connected to a 'vSphere Client' and a 'Cluster' of hosts. A 'Datacenter' is also indicated. Text in the main pane reads: 'that uses virtualization software, such as VMware ESX/ESXi, to run virtual machines. Hosts provide the processing resources that virtual machines use and access to storage and network'. At the bottom right, there is an 'Explore Further' section with a link to 'Learn more about hosts'.

VMware VASA Integration

- vSphere VSP Client Plug in
- SRM 5.5 Plug in
- Plus Enterprise Manager 6.4.2
- Replay Manager Services for VMware
- vStorage API Array Integration (VAAI)

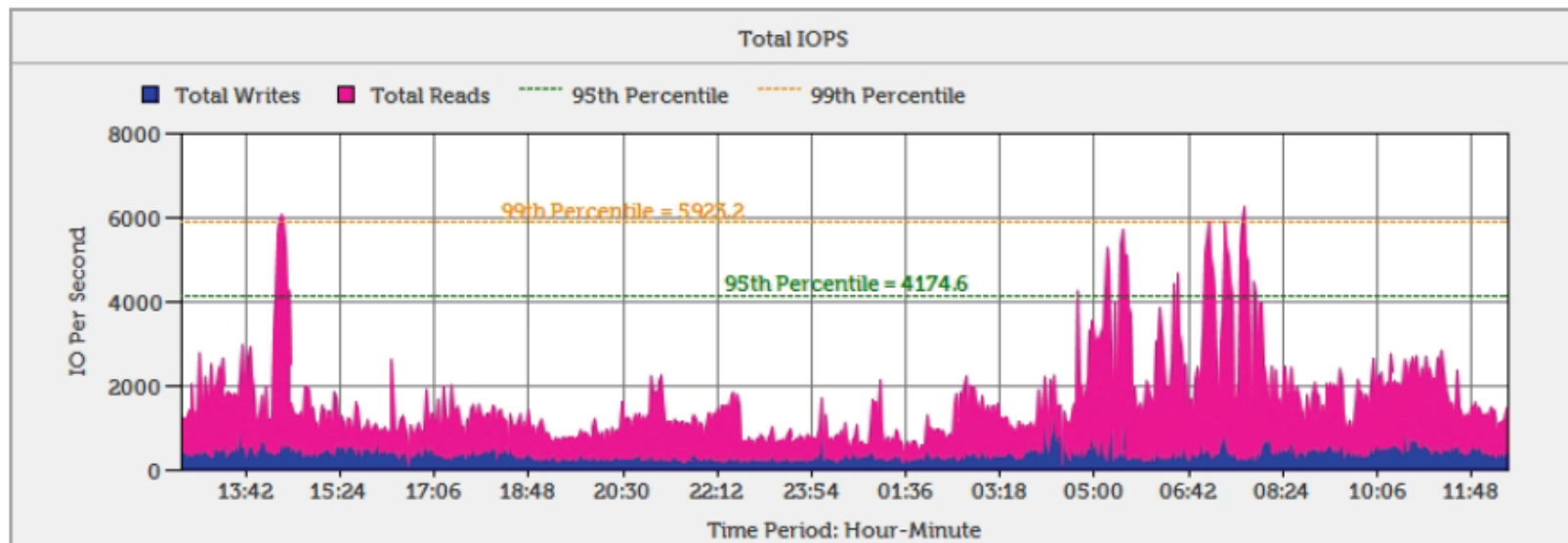


Sizing Your Virtual Storage Solution



Dell DPACK Performance Analysis

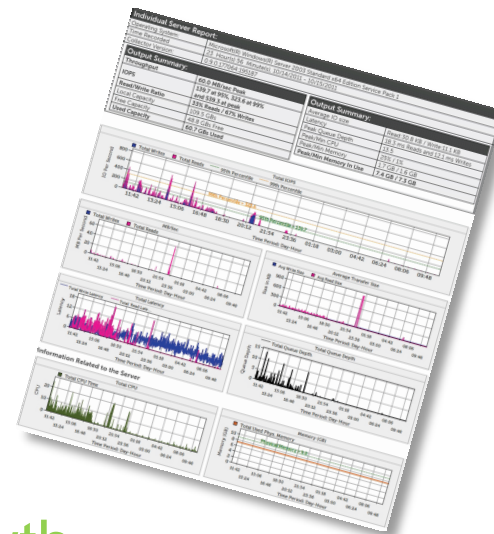
Aggregate Output	
Time Recorded	23 Hour(s) 56 Minute(s), 3/12/2012 - 3/13/2012
Servers Recorded	10
Output Summary:	
Throughput	210.5
IOPS	4174.6 at 95%, 5729.9 at 99% and 6278.9 at peak
Read/Write Ratio	89% and 11%
Total Capacity:	37445.0 GBs
Free Capacity	6209.4 GBs Free
Used Capacity	31235.6 GBs Used



Recommended Solution

DPACK Report Shows

- Requirement of 4175 IOPS at 95 percentile
- Used capacity roughly 32 TB
- Read Write Ratio about 90%R and 10%W



Load Balance Solution Considering Growth

- 1 x PS6100X with 24 X 600GB 10K SAS Drives. Yields roughly 4000 IOPS & 9.4TB usable at R50 with a 90% read and 10% write ratio
- 1 x PS6100E with 24X 1TB 7.2K NLSAS Drives. This will yield roughly 1848 IOPs & 31TB usable at R50 with the same R/W ratio

This configuration will yield roughly 5848 IOPS with 40.4 TB usable

Next Steps

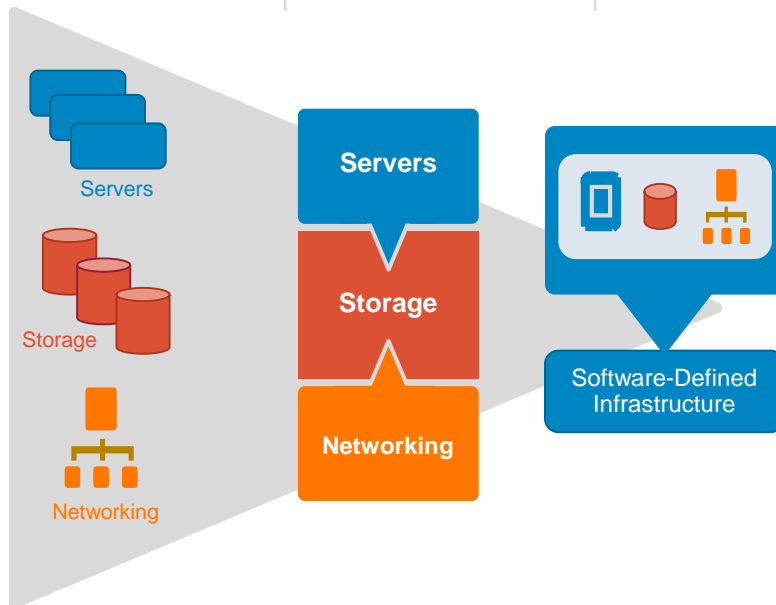
- Engage Data Networks and the Dell Storage Specialist for an onsite Whiteboard Session
- Run DPACK Performance Assessment Tool
 - Run IOKIT file and send back to us for a full storage utilization report
- Data Networks delivers assessment report and in-depth recommendations tailored to your environment
- Demonstration of Dell's EqualLogic and or Compellent storage systems functionality



Next Series, Convergence Enabling Optimization

A practical vision of Future-Ready IT is now with Active Systems Manager

	Best-of-breed systems	System of Systems	Fully integrated & software-driven
CapEx	\$	\$\$	\$
OpEx	\$\$\$	\$	\$



Key enablers

- Service oriented, template based infrastructure and workload automation
- Software-defined storage and networking
- Flexible next generation modular platforms

Key benefits

- Enable service-centric IT
- Bridge the gap efficiently between legacy apps modern IT
- Increase business agility

Defined by software, accelerated by the **right** hardware. The Optimized Enterprise, future-ready IT!

Thank You!

MD - State Government

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