

未來就緒融合架構- 儲存運算一體安全新趨勢

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儲存運算一體-超融合架構(HCI)



Then

HYPER-CONVERGED



Now

儲存運算一體-超融合架構(HCI)



Fast
network

Virtual
SAN

超融合架構(HCI) 漸漸成為主流趨勢

>60%

Of customers to adopt HCI by 2017 ³

75%

Of HCI deployments in the core data center ³

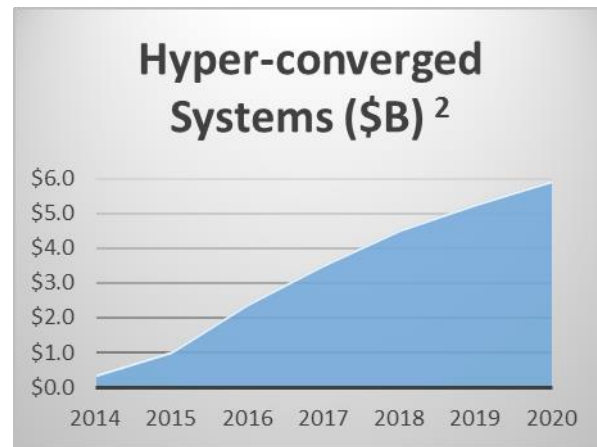
60% CAGR through 2019 ²

30%

Of enterprise storage capacity will be SDS or HCI by 2019 ⁴

>40%

Of Global 2000 enterprises will be involved in POC studies for SDS by 2017 ⁵



1 IDC. "Worldwide Hyperconverged Systems 2015-2019 Forecast"

2 IDC WW Quarterly Converged Systems Tracker, 2016 Q2 Forecast Release, 13 October 2016

3

4 Gartner Group, "Top Five Use Cases and Benefits of Software-Defined Storage", 01 April 2016 Gartner

5 Gartner Group, "How to Determine Whether Software-Defined Storage Is Right for Your Organization", Julia Palmer, 13

July 2015

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未來就緒融合架構大補帖

Broadest in the industry

Do-it-yourself (拼裝車)

Appliances

Engineered Solutions

Reference Architectures

Factory integrated node



Dell Red Hat OpenStack / Ceph RA



Microsoft Storage Spaces Direct RA

New

Windows 2016



Dell VSAN Ready Nodes RA

Update

VSAN 6.5



Dell VSAN Ready Nodes

New

R630 / R730 all flash
R430 Hybrid



Dell XC Series Powered by Nutanix

New

Broadwell



Dell Ready Bundle for Microsoft Azure Stack

17Q2 GA

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使用各有獨特優勢的合作夥伴解決方案，部署web-scale融合式專用設備，
以便於更快、更高效地交付“x即服務”

企業級基礎架構

優化的硬體和監控

專用設備和捆綁
解決方案

端對端解決方案
架構

全球服務與支援



vmware' VSAN

NUTANIX



Storage Spaces

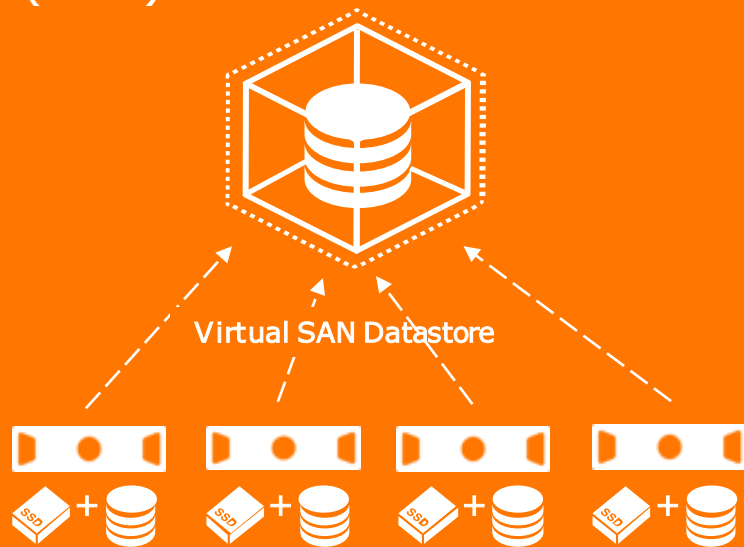


redhat



VMware Virtual SAN是什麼?

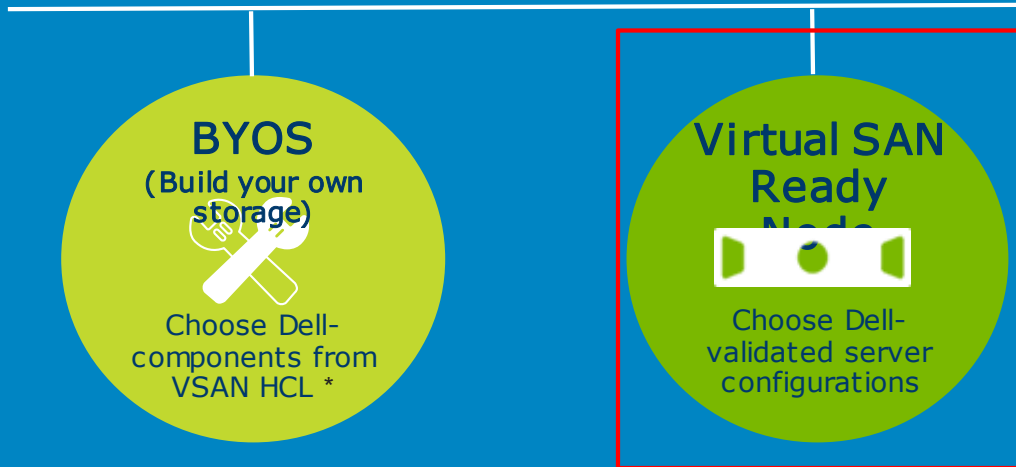
VMware Virtual SAN是一個超融合的存儲架構 that delivers a simple, elastic, and efficient storage solution optimized for virtual machines (VMs).



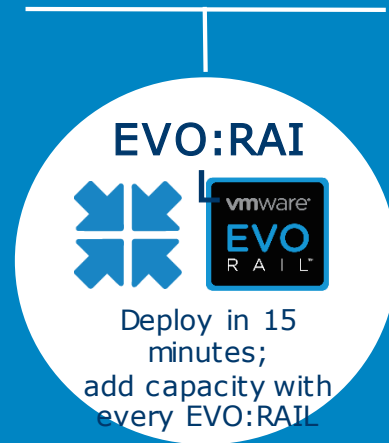
- Storage **scale out** architecture built into the hypervisor
- Aggregates locally attached storage from each ESXi host in a cluster
- **Dynamic** capacity and performance scalability
- **Flash optimized** storage solution
- Fully integrated with vSphere and interoperable
 - vMotion, DRS, HA, VDP, VR...
- **VM-centric** data operations

多種模式的Virtual SAN部署選擇

客戶配置



融合架構



最靈活

最易於使用

*VMware strongly recommends using certified Ready Nodes that are validated to provide predictable performance and scalability for your Virtual SAN deployment, if you want to BYOS use certified components.

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Virtual SAN with certified Dell components

Choose individual components ...

Dell PowerEdge server on vSphere Hardware Compatibility List



SSD or PCIe



SAS/NL-SAS/ SATA HDDs



HBA/RAID Controller



...using the VMware Virtual SAN Compatibility Guide (VCG)

- Components must be chosen from Virtual SAN HCL, using any other components is unsupported – see Virtual SAN VMware Compatibility Guide
- VMware continues to update/add list of the available Ready Nodes, please refer to Virtual SAN VMware Compatibility Guide

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Virtual SAN Hardware Quick Reference Guide

How to use this document

- Identify your selected configuration requirement for use on your server.
- Use the table below to determine the appropriate component that meets your needs.
- For more information on the components listed in this guide, please refer to the product page for each component or visit the VMware Virtual SAN HCL website.

Virtual SAN 6.0 All-Flash Hardware Guidance

	SAS	NL-SAS	SATA	SSD
Number of nodes per node	100-200	100-200	100-200	100-200
Cache size	100 GB	100 GB	100 GB	100 GB
Cache capacity per node	100 GB	100 GB	100 GB	100 GB
Cache	100 GB	100 GB	100 GB	100 GB
Capacity Margin	100 GB	100 GB	100 GB	100 GB
Cache the host	100 GB	100 GB	100 GB	100 GB
Cache the host	100 GB	100 GB	100 GB	100 GB
Cache the host	100 GB	100 GB	100 GB	100 GB
Cache the host	100 GB	100 GB	100 GB	100 GB
Cache the host	100 GB	100 GB	100 GB	100 GB

Server Device and Model Information

Search Results for: System: "Ready Nodes" Virtual SAN HCL

Product Name	Model	CPU Series	Supported Processors
DELL	Dell Precision 7710	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	Dell R730	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	Dell R730xd	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	Dell R730xd	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	PowerEdge T3000	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	PowerEdge T3000	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	PowerEdge T3000	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	PowerEdge T3000	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	PowerEdge T3000	Xeon E5-2600 v5	E5V E5 E5-2600
DELL	PowerEdge T3000	Xeon E5-2600 v5	E5V E5 E5-2600



什麼是 Virtual SAN Ready Node?

Prescriptive Virtual SAN
Ready Node solution
recommendations...



... categorized into hybrid
and all flash solution profiles

- Dell出售的單個伺服器節點，已預先配置為運行在推薦的硬體外形在vSphere + vSAN堆疊。
- 可包括從戴爾獨特和優化的硬體，並且還可以包括從戴爾軟體來補充vSphere + vSAN。
- 非常適合作為超融合基礎設施堆疊
- 是大型自動化資料中心環境的構建模組
- 允許客戶定制的硬體和軟體配置，以滿足業務需求

為何選擇戴爾的 Virtual SAN Ready Node?

Turnkey solution for accelerating Virtual SAN deployment

Validated server configurations jointly recommended by VMware and Dell



Complete with the prescribed:

- Memory
- Solid-state drive (SSD)
- Hard disk drive (HDD)
- Controller
- Networking
- Pre-loaded with vSphere and VSAN⁽¹⁾

Easy to order and faster time to market



- Single orderable "SKU" per Ready Node⁽²⁾
- Can be quoted/ordered as-is
- Can be customized (always use certified VSAN components on [Compatibility Guide Page](#))

Benefit of choices



- Select from Dell portfolio options
- Choose the Ready Node profiles based on your workload

1) VMware software pre-loaded on most of the Ready Node

2) Find the latest updated list of VSAN Ready Nodes & OEM SKUs on the [Virtual SAN VMware Compatibility Guide Page](#)



Regular vs Factory Installed Nodes

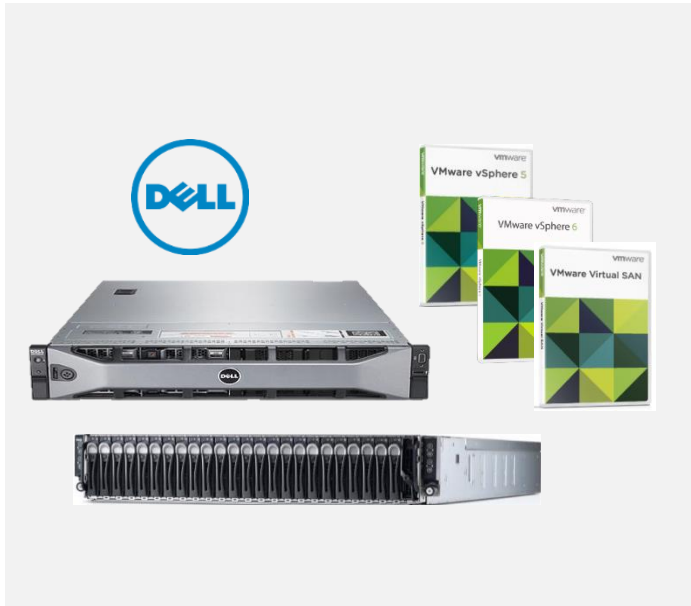
- Factory Installed configs will show up under ESXi Preinstalled option at VMware page
- How is this different than regular ESXI Factory Install (available for regular vSAN Ready Nodes)?
- Merge Center Operations:
 1. BIOS and iDRAC settings configured to VSAN best practice
 2. BIOS boot order is set appropriately depending on drive configuration on a specific platform
 3. Hard drives are cleared off factory partitions
 4. BIOS, Storage and NIC FW updated to match VSAN/ESXi image
 5. ESXi installed on correct boot drive (depending on platform and drive configuration)
 6. Hard drives are configured local
 7. Storage and NIC drivers are updated to match VSAN/ESXi image installed
 8. ESXi configuration settings needed for VSAN best practices
 9. ESXi license reset to a new license to be generated on first boot at the customer site

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戴爾提供哪些Virtual SAN Ready Nodes

Make storage for VMware-virtualized environments quick and easy



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Hybrid Configs	All-Flash Configs
R630 HY-2	R630 AF-4
R430 HY-4	R730 AF-4
R630 HY-4	FX2 FC430 AF-6
R730 HY-6	FX2 FC630 AF-6
R730xd HY-6	FX2 FC830 AF-6
R730 HY-8	R630 AF-6
R730xd HY-8	R730XD AF-6
	FX2 FC630 AF-8
	FX2 FC830-AF-8
	R730 AF-8
	R730XD AF-8



Dell XC Series Appliances

Primary use cases: VDI, private cloud, database, OLTP, data warehouse and big data deployments

Solution benefits

- Multiple configurations including all-flash
- Nondisruptive, pay-as-you-grow scale-out expansion
- 1-click upgrades and data services for

Differentiation

- Up to 53% less power and 69% less datacenter space¹
- 510% average 5 year ROI¹
- 71% less time for ongoing management¹
- Deploy VDI 6X faster at 27% lower cost²

¹[IDC white paper](#)

²[Wikibon analysis](#)

Increase capacity and performance one node at a time

- Nutanix® Acropolis™ software and Prism management

- Support for VMware® ESXi™ Nutanix Acropolis Hypervisor (AHV) and Microsoft® Hyper-V®

Flexible ratios of compute, memory and storage including GPU storage only and all flash



- Multiple 1U and 2U configurations based on Dell PowerEdge™ servers with Intel Xeon v4 processors

XC Series Portfolio Overview

Model	Workload Optimization	Workload Example
XC630-10	Compute Intensive, Performance Intensive	VDI, Test & Dev, Private Cloud, Server Virtualization
XC730xd-12	Storage Heavy	Exchange, SharePoint, Data Warehouse, Big Data
XC730xd-24	Performance Intensive	SQL and Oracle OLTP
XC730-16	Graphics Intensive	Graphics VDI, Media
XC430-4	Short Depth	ROBO, Retail Store; Env's requiring short depth chassis
XC730xd-12C	Cold Tier Storage	Extra cold tier storage for cluster, no compute
★ XC6320	Compute Dense	SaaS, IaaS, Private Cloud, etc.



Windows 2016 “Medium” 4 Node Dell Hyper-Converged Solution

Spaces Direct NAS or Hyper-V 5-200 VM Solution with 1 Node or 2 Drive Failure Support

4 x PowerEdge R630 4 x 800GB SSD's – 6 x 1TB HDD's (Spaces Direct)

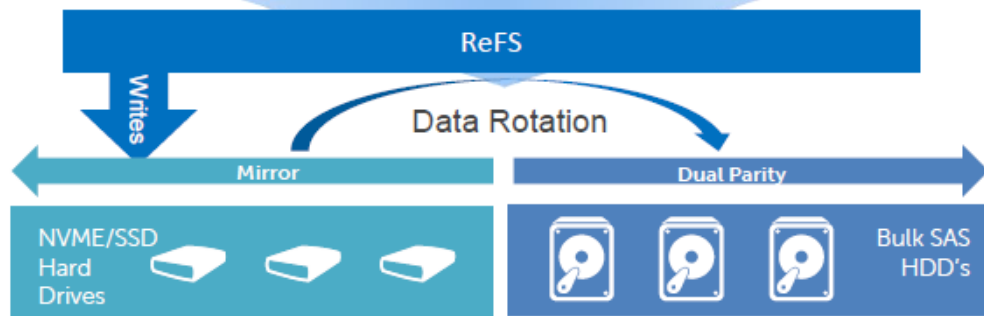
(4 x R630 (8-18 Core) 96-384GBRAM, 300GB RAID 1) 1 x dual 10 GB/1GB Intel and 1 x Dual 10GB Mellanox Connect-X3 PRO RDMA/ For Converged requires 2 x Dual 10GB Mellanox Connect-X3 PRO RDMA

4 x Standard SFP cable per R730XD between two S4048 switches and Mellanox Connect-X3 Pro / dual 10Gb Intel adapters,



1 x H330 HBA , 4 x 800GB SSD's and 6 x 1TB 7.2k drives

3 way mirroring (caters for 2 node or 2 drive failure) Real time Tier (caters for 1 node or 2 drive failures) ,



企业市场营销

- Available capacity for each drive size
- **3 Way Mirror/Rotating Tier**
- 3-way=For 1TB = 8TB
- 3-way=For PCI-SSD 800GB = 4.2TB
- Rotate Dual Parity = 13TB
- **Supports CIFS and NFS**
- **Node Awareness/Node Quorum**
- Column count of 5
- Providing for 400k + IOPS
- **Hyper-V/Fileserver/VDI/SQL**
- Reserve 15% of Pool space for disk rebuilds
- Reduce column count by 1 when creating spaces for auto rebuild of SSD's – or leave for optimal performance and replace SSD on failure before rebuild

Dell Ready Bundle for Microsoft Azure Stack Engineered Solutions

Hyper-Converged architecture

S/M/L Sizing

Connected Stack vs Self Contained (from the factory)

Two Configuration Options:

1. Flexible Capacity
2. Performance Optimized (High IOPS)

Dell or Partner Professional Services

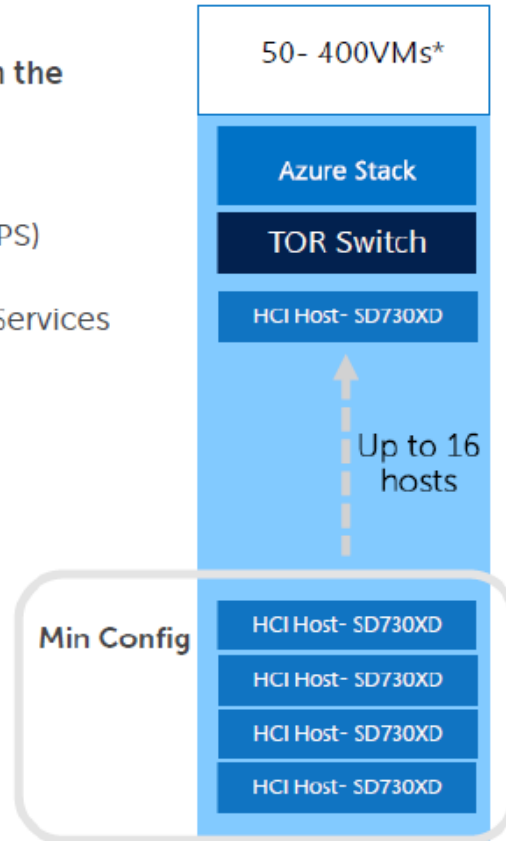
Dell or Partner Deployment and Support Services

Single Point of Support

Azure Cloud Services

1. A (0-7) and D series IaaS
2. Security
3. Backup and DR providers (Dell SIM + Microsoft)
4. Storage Providers (Block, Object)
5. Database
6. Mobile Apps
7. DevOps
 - Azure
 - Pivotal CF
8. Metal-as-a-Service

* VM Topology - A1 VM



ISV Options

Load balancers

BCDR

Billing and Chargeback

Component Options

Processor

Memory

Caching Ratio

HDD and SSD Capacity

Infrastructure Options

Backup, Monitoring

Azure Backup, ASR, OMS

Firewalls, Load Balancers

Dell Red Hat OpenStack Cloud Reference Architectures

Target Use Cases

- **Today's Apps** – cloud enabled apps (mobility, eCommerce, social, LOB)
- **Developer self-service** – streamline productivity, IaaS on-demand
- **Application repatriation** – manage Opex, address control issues, data protection
- **Storage as-a-Service** – on-demand storage for \$0.01's per GB

Features

- **Containers and PaaS** – with Red Hat OpenShift
- **Seamless version upgrades** – Liberty going forward
- **VM live migration** – VM issues, its moved
- **Instance high availability** – Pacemaker, fencing, auto restart
- **Host maintenance mode** – Gracefull removal and re-introduce nodes
- **Storage flexibility** – multiple storage backends simultaneously
- **Elastic Ref. Arch.** – Scale 0.5 - 3 racks, mix and match exxpansion
- **High Availability** – across services, networking, hardware
- **Networking** – Neutron SDN, 10GB, OVS, vLAN, highly resilient
- **PowerEdge 13G** – (Broadwell) optimized price-performance, efficiency
- **Co-Engineered** – unique Dell and Red Hat joint investment
- **Validated** – Dell and Red Hat, design, tested, validated
- **Extended Support** – collaborative, HW-Dell, SW-Red Hat

Components

- **Dell PowerEdge R430/630/R730/R730xd**
- **Dell Networking S3048-ON/4048-ON**
- **Red Hat OpenStack Platform 9**
 - Red Hat Enterprise Linux 7.2
 - Red Hat OpenStack (Mitaka)
- **OpenStack Neutron**
- **Red Hat Ceph V1.3 Block/Object**
- **Dell and Red Hat Services**
- **Validated** optional extensions



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*Please consult latest Ref. Architecture for details



Dell Ready Bundle for Red Hat OpenStack Engineered Solutions

Primary use cases: Managed cloud hosting, carrier network function virtualization (NFV), large-scale cloud-native applications, public or large-scale IaaS, scale testing, large-scale software-defined storage

Solution benefits

- Agile, open, and flexible IT services on a validated, complete, supported architecture
- Cutting-edge cloud services and automation, designed and deployed for you
- Capturing the latest innovation in open-source cloud

Differentiation

- Automated deployment with OpenStack Triple O, Heat, Ironic
- Resilience and continuity with Ceph integration, instance high availability, services high availability, host maintenance mode, in-place version upgrades
- Docker containers via Red Hat OpenShift
- Scale compute and storage independently

Red Hat OpenStack Platform

Red Hat Ceph 1.3 Storage

Compute/controller nodes: Dell PowerEdge R430, R630, R730, or R730xd servers

Hyperconverged storage nodes: Dell PowerEdge R730xd servers

Dell Networking S3048/S4048-ON switches

Core architecture: 10 nodes, 10Gb networking, 0.5 rack, scale out to 3 racks

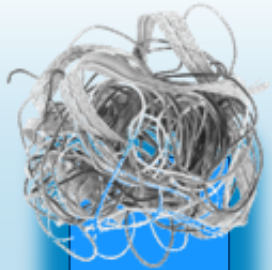
Support for multiple simultaneous storage back ends (Dell SC and PS series)

Validated extensions for PaaS, SDN, cloud and application management

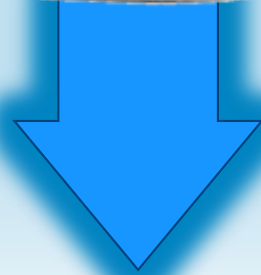
Services: Deployment, Integration, ProSupport, ProSupport Plus



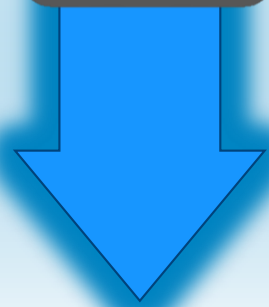
Why Hyper-Converged?



Complexity



Cost



Risk

業務問題：成本

成本最低的 HCI 解決方案

- 享有伺服器端經濟效益
- 總持有成本 (TCO) 節省 50%
- All-Flash 的每一可用 GB 成本低至 \$1 美元



已實現每個應用程式的資金支出和營運成本分別節省 50% 和 60%



「我們用 Virtual SAN 取代傳統儲存方式後，成功將我們的儲存成本減少了 60%」

伺服器端經濟效益和較小佔用空間帶來的優點

傳統儲存裝置



• 伺服器儲存



磁碟 (硬碟)



每 GB
\$0.49 美元*



每 GB
\$0.10 美元

快閃記憶體
(固態硬碟)



每 GB
\$22.48 美元*



每 GB
\$1.85 美元

網路



每連接埠
\$1235 美元



每連接埠
\$364 美元

- ✓ 免除光纖通道網路
- ✓ 整合在較小佔用空間上
- ✓ 更低的電力/散熱/營運成本
- ✓ 支付較少伺服器端元件費用

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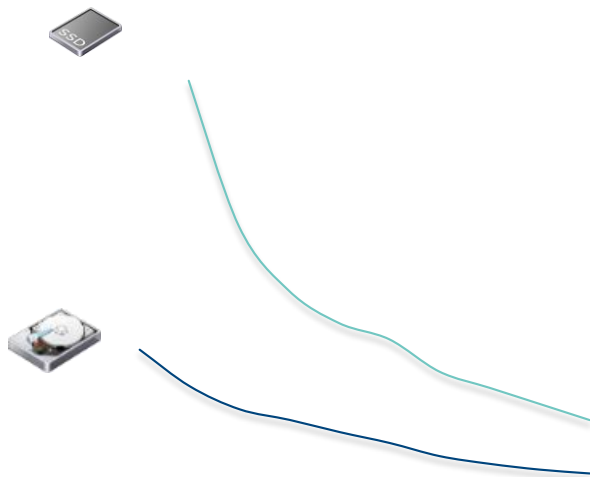
資料來源：Gartner「競爭力剖析與廠商/經銷商比較」公開網站所示價格

*10GbE 和光纖通道的比較

*每 GB 的美元成本僅指原始 GB 容量的磁碟價格



輕鬆受惠於持續下滑的儲存成本曲線



- 延後購買的時間而能受惠於快速下降的價格
- 配合運算同時擴充儲存
- 充分利用陸續上市的新硬體技術

用多種空間使用效率提升功能大幅削減儲存容量成本

- 多種空間使用效率提升功能會共同發揮作用，將資料集的大小減少多達 10 倍

重複資料刪除與壓縮

- 以軟體為基礎
- 對 CPU 和記憶體資源的衝擊微乎其微 (<5%)，所以能維持虛擬機高效能
- 最佳效率：高精密的 4K 區塊大小
- 即使資料增加、新增更多虛擬機，優點依然持續

7 倍

用重複資料刪除與壓縮功能將
儲存量減少高達 7 倍

100%

可用儲存容量增加率
FTT=2

或

50%

可用儲存容量增加率
FTT=1

業務問題：效能

效能最佳的 HCI 解決方案

- 內嵌於核心的儲存
- 每個 All-Flash 多達 100,000 次 IOPS
- 彈性和線性延展性

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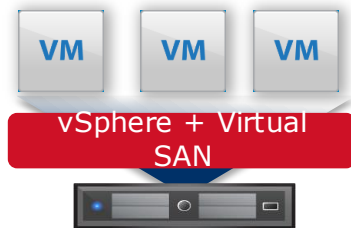
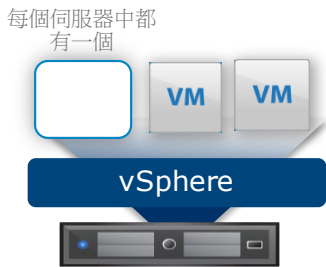


「我們還接到診間打電話來告訴我們說，應用程式執行速度加快許多。感覺好像我們移轉到 Virtual SAN 的應用程式越多，就有越多部門要求加入這個環境。」



「使用者之前在舊環境中需要 30 到 45 分鐘才能完成的工作，現在只需不到 5 分鐘就能完成。這為我們的老師空出了寶貴時間，讓他們可以將時間用來幫助學生。」

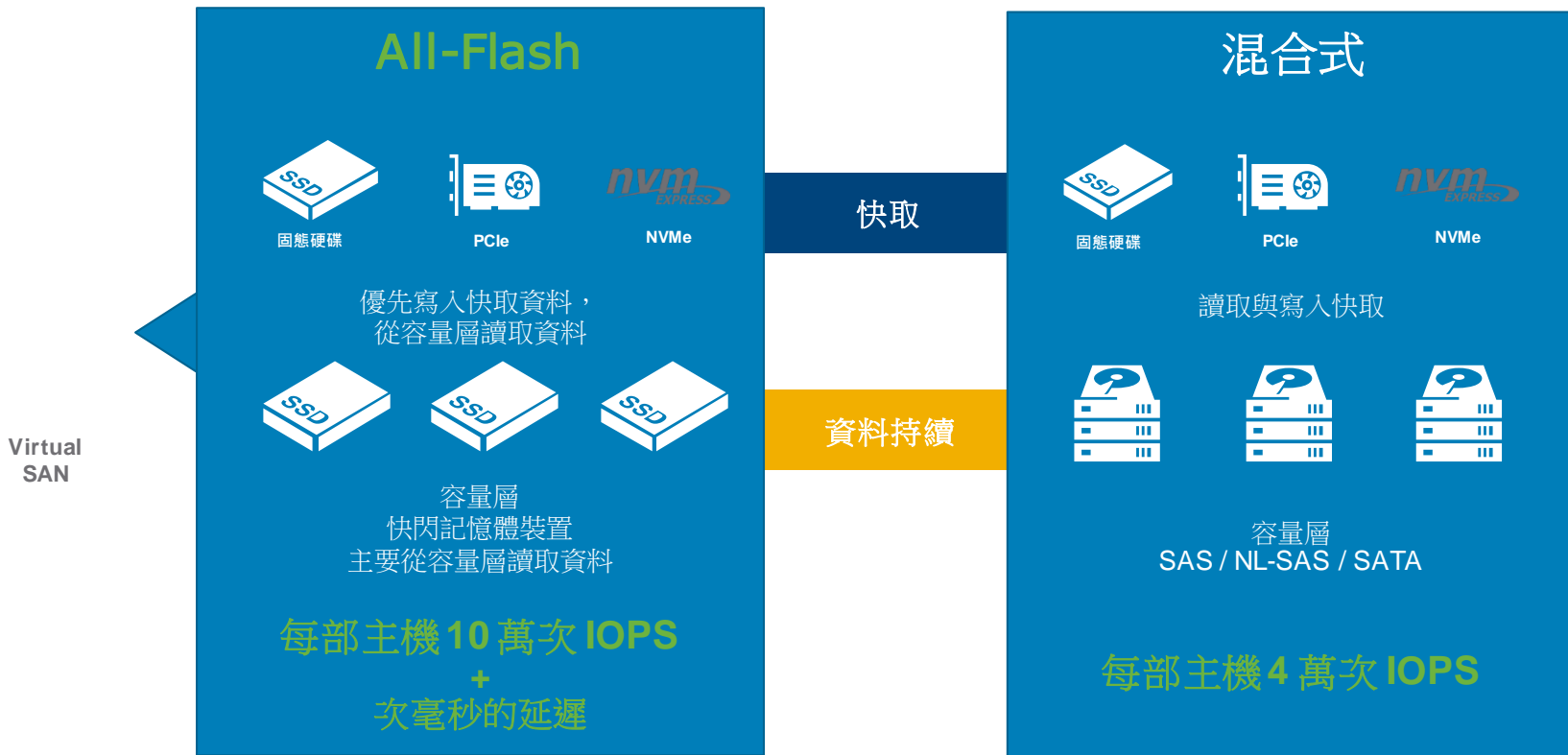
單一超融合式軟體堆疊的效率



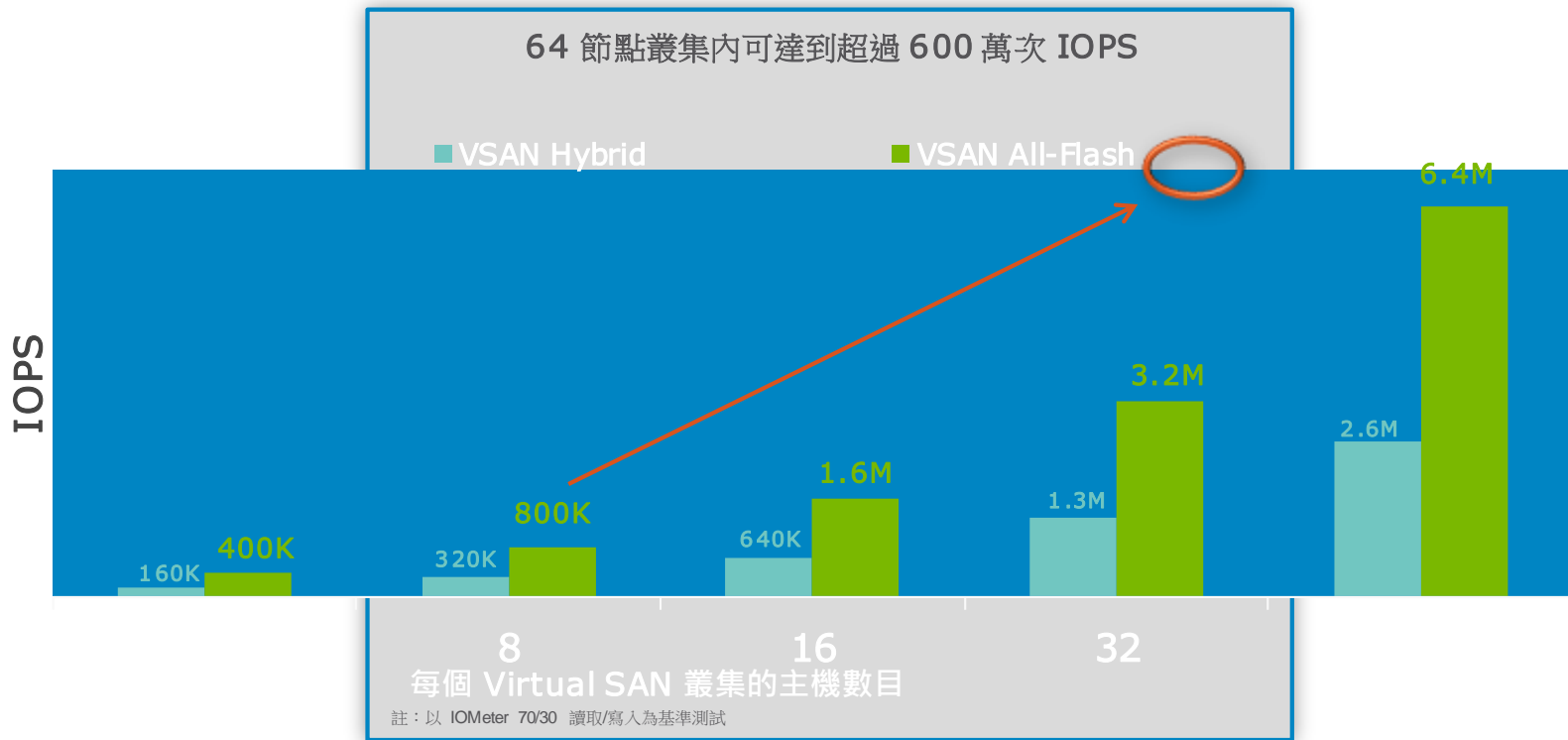
- ✗ 造成虛擬應用裝置的額外負荷
- ✗ 資料路徑長
- ✗ 外加式整合

- ✓ 內嵌於核心內，提供最佳化的 I/O 資料路徑
- ✓ 是資源利用上的主要優點
 - 2 倍的 CPU 效率和 3 倍的記憶體效率
- ✓ 所有功能均原生運作
 - 原生 vMotion 和 DRS

分層式 All-Flash 和混合式選項



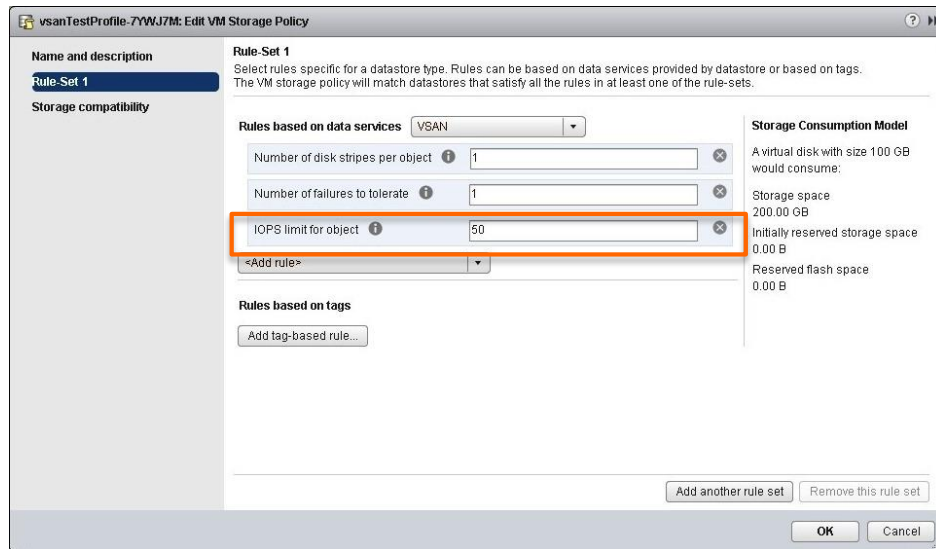
透過彈性和 線性延展性，可達到超過 600 萬次 IOPS



服務品質



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- 提供每個虛擬機/虛擬磁碟 IOPS 使用量的完整能見度
- 按一下就能設定限制
- 排除網路干擾問題
- 可精密地管理效能 SLA：不需依照虛擬機佈建順序



整合管理套件: OpenManage Integration for VMware vCenter

Monitor, manage, configure and deploy PowerEdge servers within vCenter

Deployment and provisioning

- Zero Touch™ bare-metal hypervisor deployment without PXE leveraging iDRAC with Lifecycle Controller

Updates

- Distribution of BIOS and firmware updates through the vCenter console

Hardware maintenance

- Online access and renewal of hardware warranty

Monitoring and alerting

- Deep detail for inventory, monitoring and alerting
- Recommended vCenter actions based on Dell hardware alerts



Streamline tools and tasks for management and deployment of Dell PowerEdge servers in VMware vCenter virtualized environments

校園應用場景



虛擬桌面(VDI)

- Low upfront costs based on commodity x86 servers
- Predictably scale compute and storage with growing user counts



關鍵應用

- All-flash, high-performance storage for up to 90K IOPS per host
- Enterprise-class availability with continuous availability



管理群集 備份&災難復原

- Deploy management clusters on simple, low TCO infrastructure
- Support IT operations with low-cost, simple storage

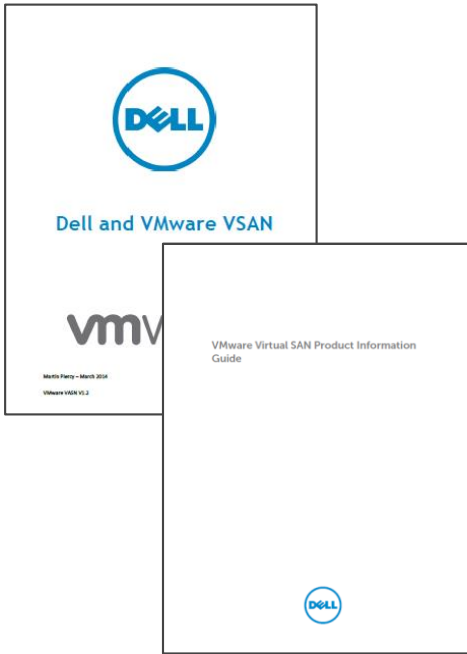


遠端分支 測試&研發

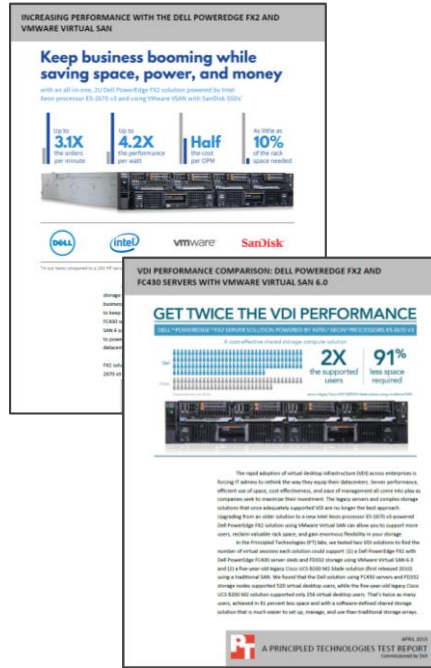
- Powerful, simple storage for limited IT staffs or expertise
- 2-node configuration for low cost, ROBO solution

Dell is ready to assist

Dell product guides



Independent testing reports



Dell Tech Center | Virtualization





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