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9 December 2015 | Taipei, Taiwan

Server SAN 的逆襲與軟體定義儲存大戰略

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儲存服務趨於多樣化

熱外緣 (Hot Edge)

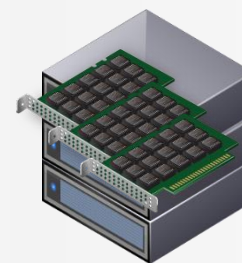
- CPU/記憶體綁定
- 低延時
- 快閃記憶體助力



混合
(Hybrid)



全閃盤
(All-SSD)



全快閃記憶體
(All-Flash)



Server
SAN

冷核心 (Cold Core)

- 面向容量
- 更多採用商用硬體
- 水準擴展，跨地域
- 擴展到雲



水準擴展
Scale-Out

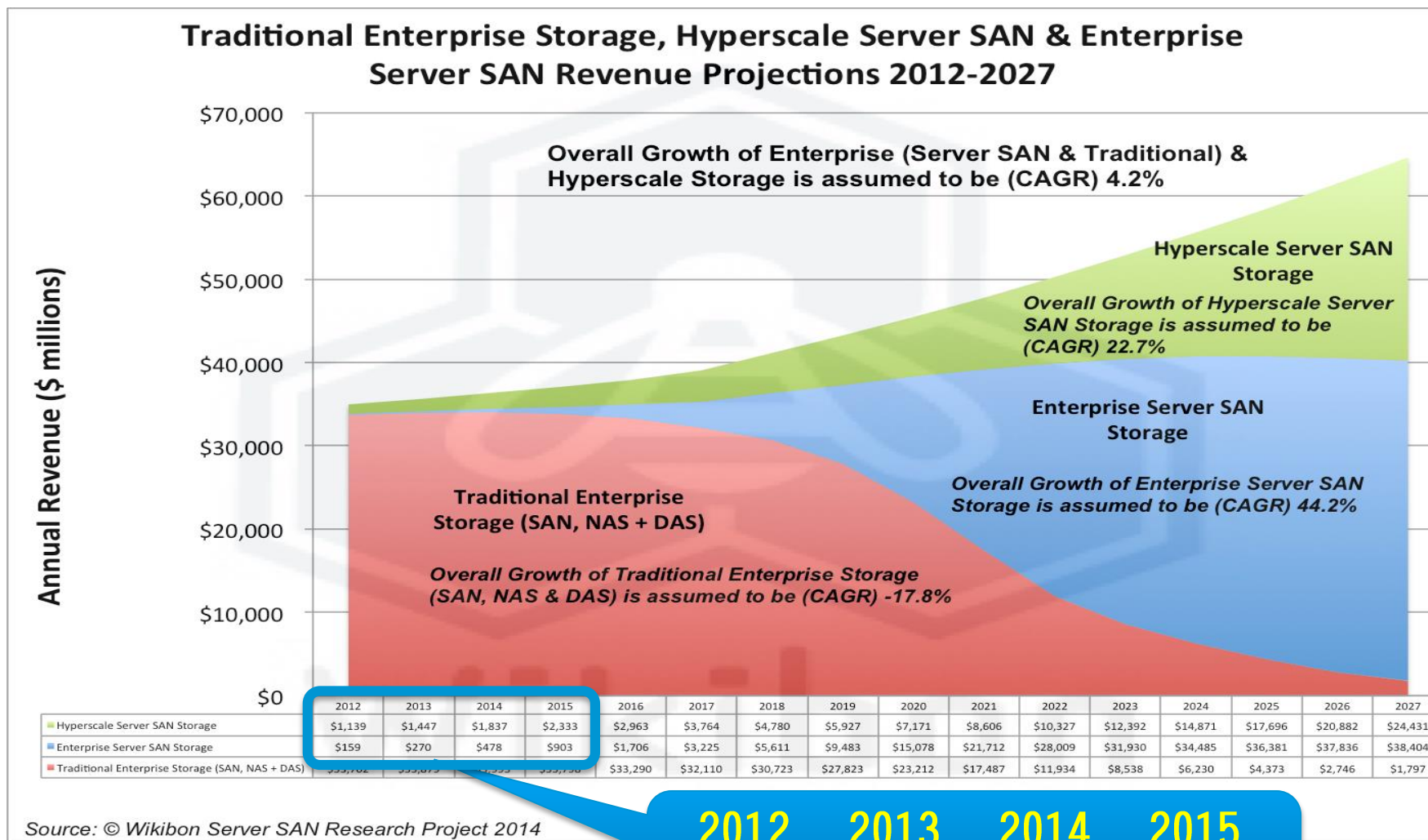


雲儲存
Cloud Storage



物件儲存
Object Storage

Server SAN技術發展迅猛

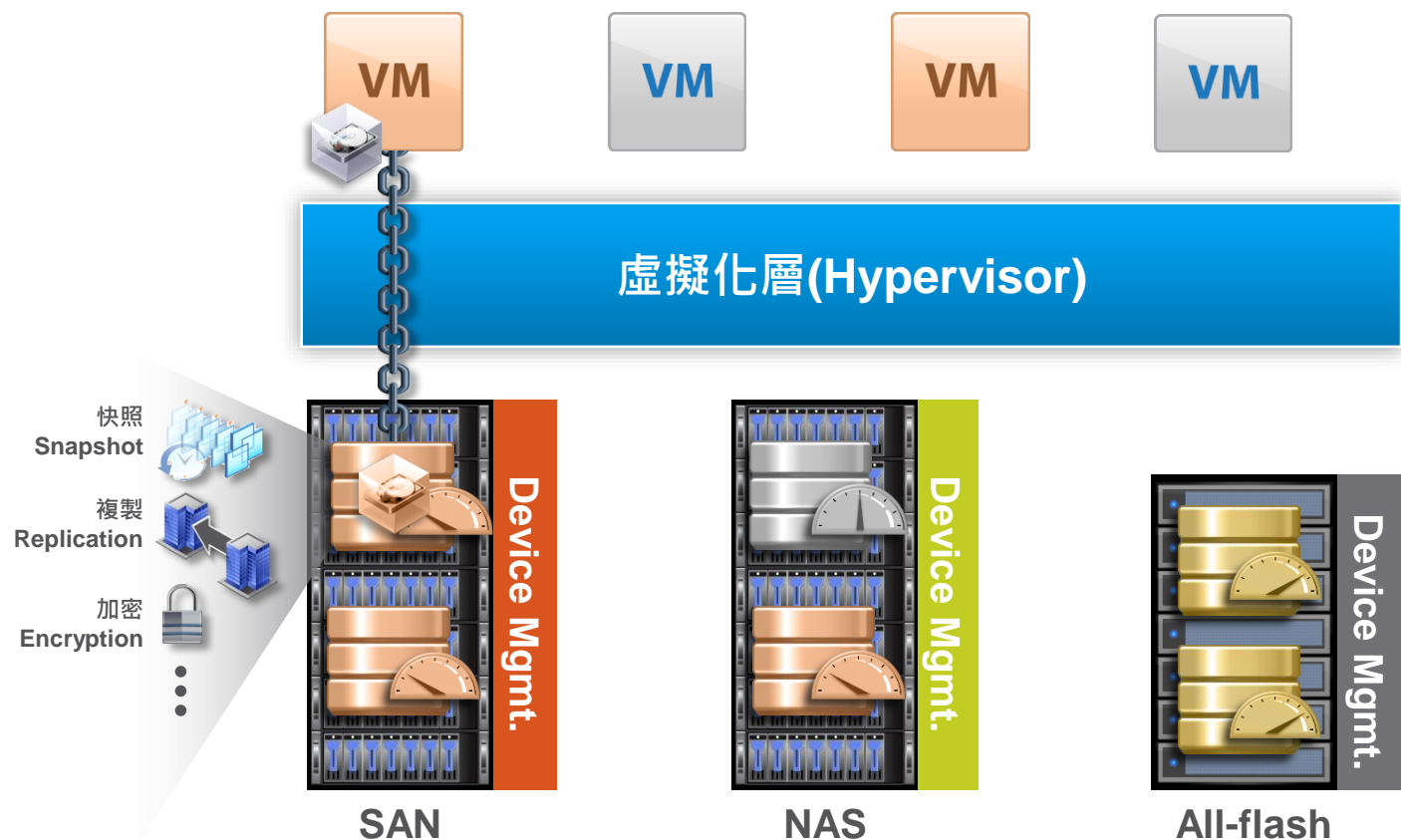


Source: © Wikibon Server SAN Research Project 2014

2012 2013 2014 2015
\$159 \$270 \$478 \$903

到2018, 40%的
中型企業將使用
集成系統替換掉
全部資料中心伺
服器和儲存。
——Gartner

傳統儲存管理模式帶來諸多挑戰



儲存資源消費者所面對挑戰:

- 較長的置備週期
- 難於做出調整
- 缺少精細化控制
- 複雜的故障分析
- 頻繁的資料移轉

儲存服務提供者所面對挑戰:

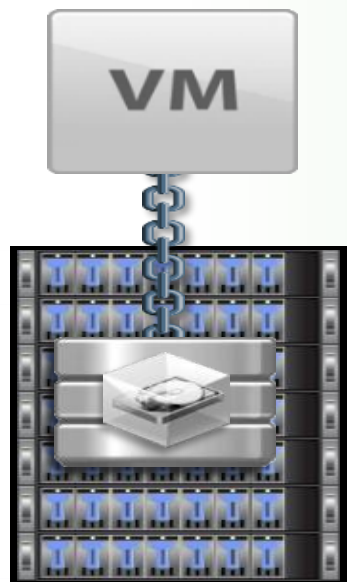
- 碎片化的設備管理
- 粗放的容量和資料服務分配
- 複製的LUN/卷管理

軟體定義儲存應運而生



傳統外置儲存 vs. 軟體定義的儲存

傳統儲存



全新控制層

從以硬體為中心轉向以
應用/虛機為中心

軟體定義的儲存(SDS)



- 策略驅動的自動化
- 跨陣列的通用性
- 動態控制

全新資料層

從專用硬體轉向行業標
準硬體



- Server SAN
- 經過快閃記憶體加速
- 分散式

儲存控制器普遍X86化，所以SDS在RAS(可靠性、可用性、可服務性)上與傳統儲存相差不大；

軟體定義儲存架構

App/VM

App/VM

App/VM

App/VM

App/VM

App/VM

App/VM

App/VM

Hypervisor/作業系統/雲端: VMware, Hyper-V, Linux, Openstack, AWS, Azure...

軟體定義儲存-控制層級

VMware SPBM, Openstack Cinder, EMC ViPR, ProphetStor Federator,...

軟體定義儲存 – 資料層級

基於本機儲存方案

Server SAN
(Hyperscale, more than 3 nodes,
include VSA, PSA)

Hyper Converged

傳統儲存
SAN/NAS

(外接儲存方案)

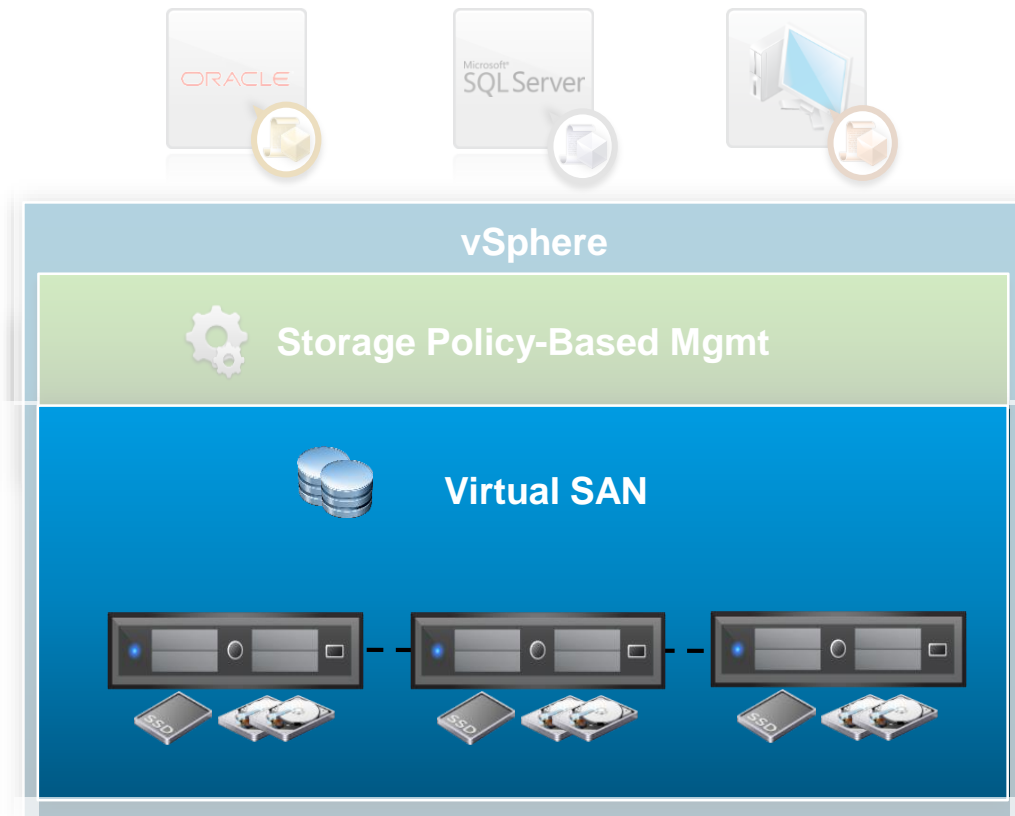
雲端/
物件儲存

(eg: VSA:
Storage
Controller on VM)

其他

VMware 軟體定義儲存 – 資料層

Hypervisor整合性的VSAN提供軟體定義儲存的中心



Hyper-Converged Infrastructure



From single x86 platform

為什麼現在熱門?

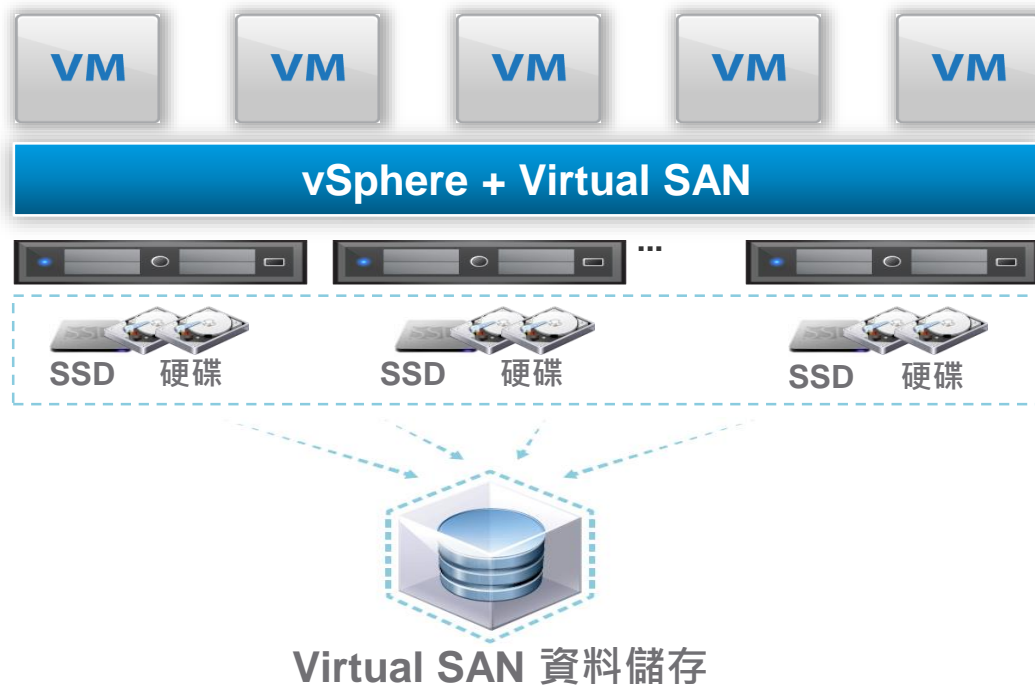
- 越來越高的CPU處理器內核密度
- 伺服器端閃存裝置興起
- 閃存裝置介面標準化(i.e. NVMe)

優點

- 讓資料趨近於運算資源, 提供更快存取
- 精細彈性化向外擴展
- 更經濟的儲存方案

VMware Virtual SAN 6

聚合了虛擬化管理程式的極其簡單的虛擬機器儲存



概述

- 軟體定義的儲存針對虛擬機器進行了優化
- 聚合了虛擬化管理程式的體系結構
- 可在任何標準 x86 伺服器上運行
- 將 HDD/SSD 池化為共用資料儲存
- 提供企業級的可擴展性和性能
- 通過按虛擬機器設置的儲存策略進行管理
- 與 VMware 產品體系深度集成

提供優異的效能架構

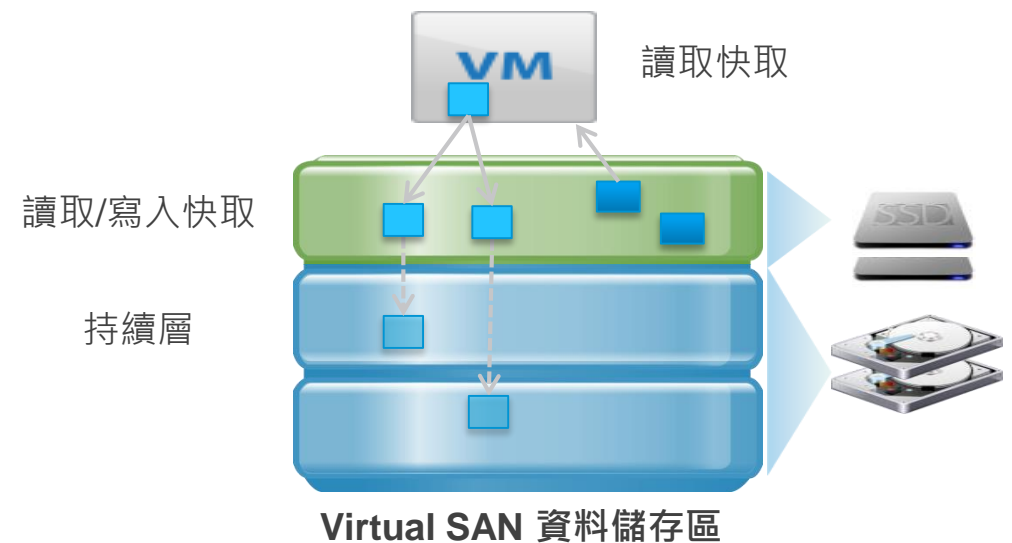
Virtual SAN 內嵌在 vSphere 核心中，能盡可能縮短 I/O 資料路徑

內嵌於虛擬管理程式中



- 不需要虛擬應用裝置
- 簡化資料路徑
- 提供最佳的資料配置及 I/O 最佳化，以提升效能

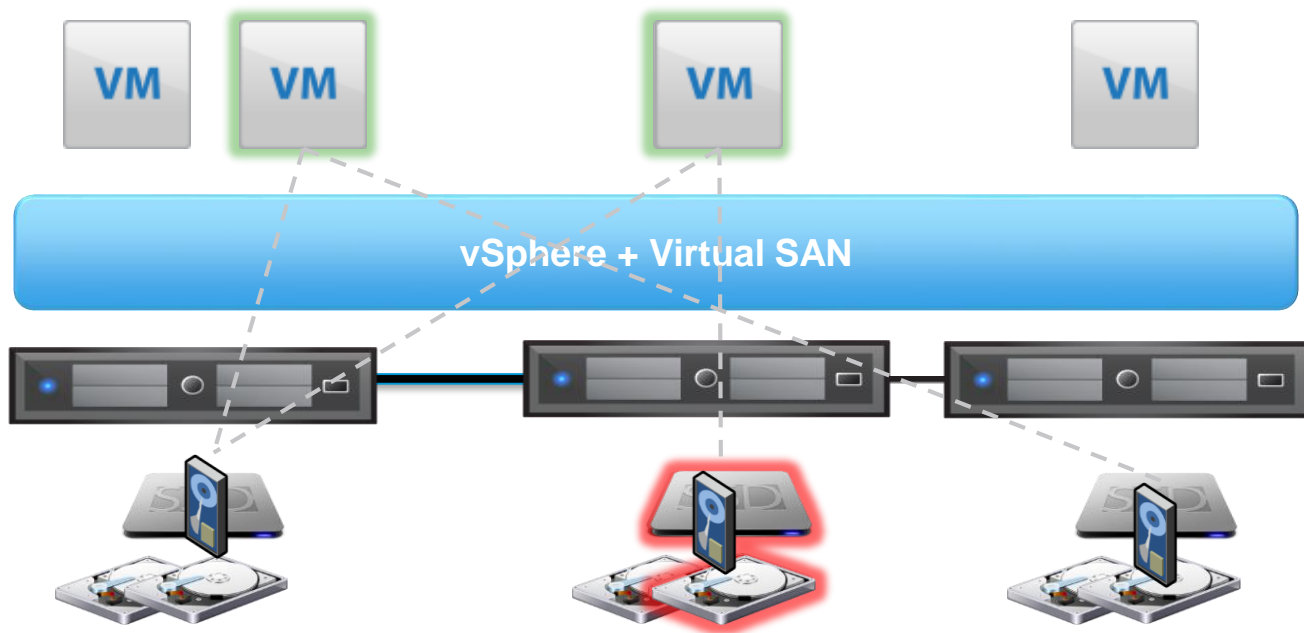
快閃加速的架構



- 寫入緩衝區可加速寫入效能
- SSD 提升讀取效能
- 資料保存在硬碟上

Virtual SAN 具有預防任何硬體故障的高度彈性

Virtual SAN 的設計能確保資料不會在故障時遺失

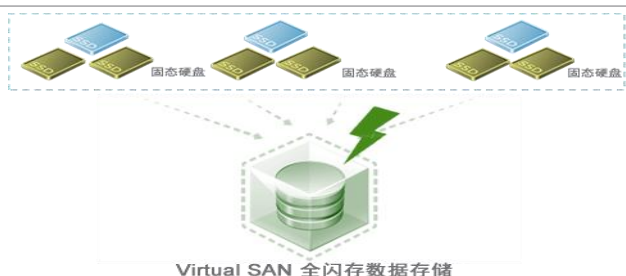


Virtual SAN 彈性：

- ✓ 極容易透過原則設定
- ✓ 以每個虛擬機為基礎提供
- ✓ 在磁碟、網路或主機故障時零資料遺失
- ✓ 確保磁碟或網路故障時零停機時間
- ✓ 可與 vSphere HA 及維護模式交互運作
- ✓ 模組化基礎架構能透過錯誤修正模式提供有效的資料中心運作

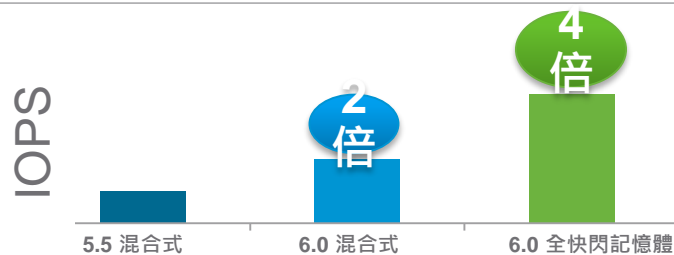
Virtual SAN 6.0 的新功能特性

全快閃記憶體



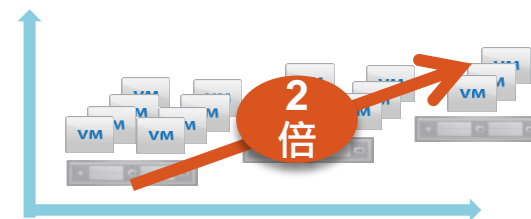
- 具備固態硬碟持久性的**全快閃記憶體**數據儲存
- 可預測的高性能
- 帶固態硬碟分層的經濟高效的全快閃記憶體體系結構

性能提高 2 倍 至 4 倍



- 使用 Virtual SAN **混合式**時 IOPS 提高兩倍
 - **最高 40K IOPS/主機**
- 使用 Virtual SAN **全快閃記憶體**時 IOPS 提高 4 倍
 - **最高 90K IOPS/主機**

可擴展性提高兩倍



- **可擴展性提高兩倍**：每個集群多達 64 個節點
- **虛擬機密度增加 50%**
 - **混合**：150 個虛擬機器/主機
 - **全快閃記憶體**：200 個虛擬機器/主機

快照、克隆及 更多...

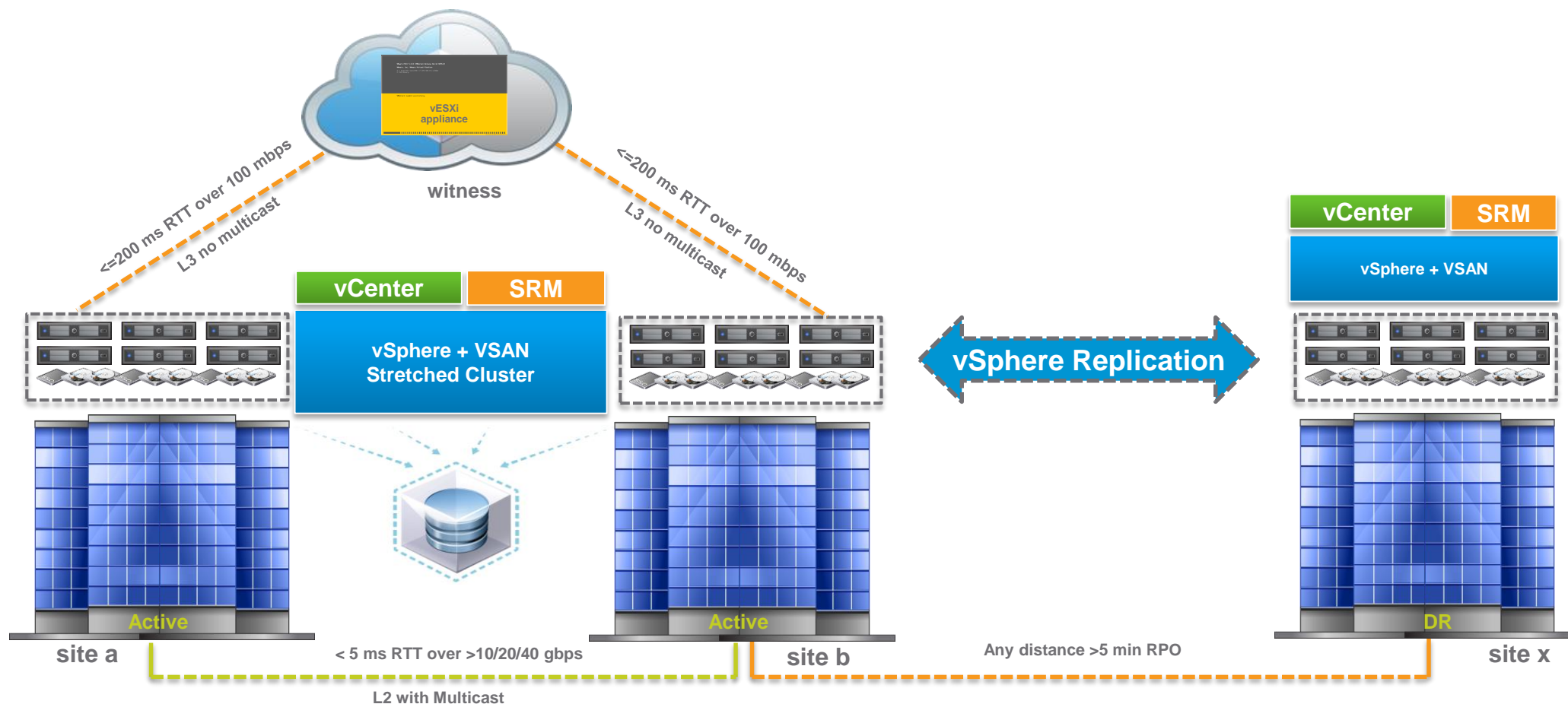


- 全新 Virtual SAN **快照**和**克隆**
- 基於硬體的**校驗**和**與加密**支持
- **支援刀鋒體系結構**
 - 支持僅刀鋒直連式 JBOD
- **可感知機架**：可容忍機架故障
- **磁盤故障排除**：LED 開/關以檢測故障磁片

VSAN 6.1 九大特性

一、VSAN支援儲存雙活 (Stretched Cluster)

結合vSphere Replication、SRM實現兩地三中心的高級容災

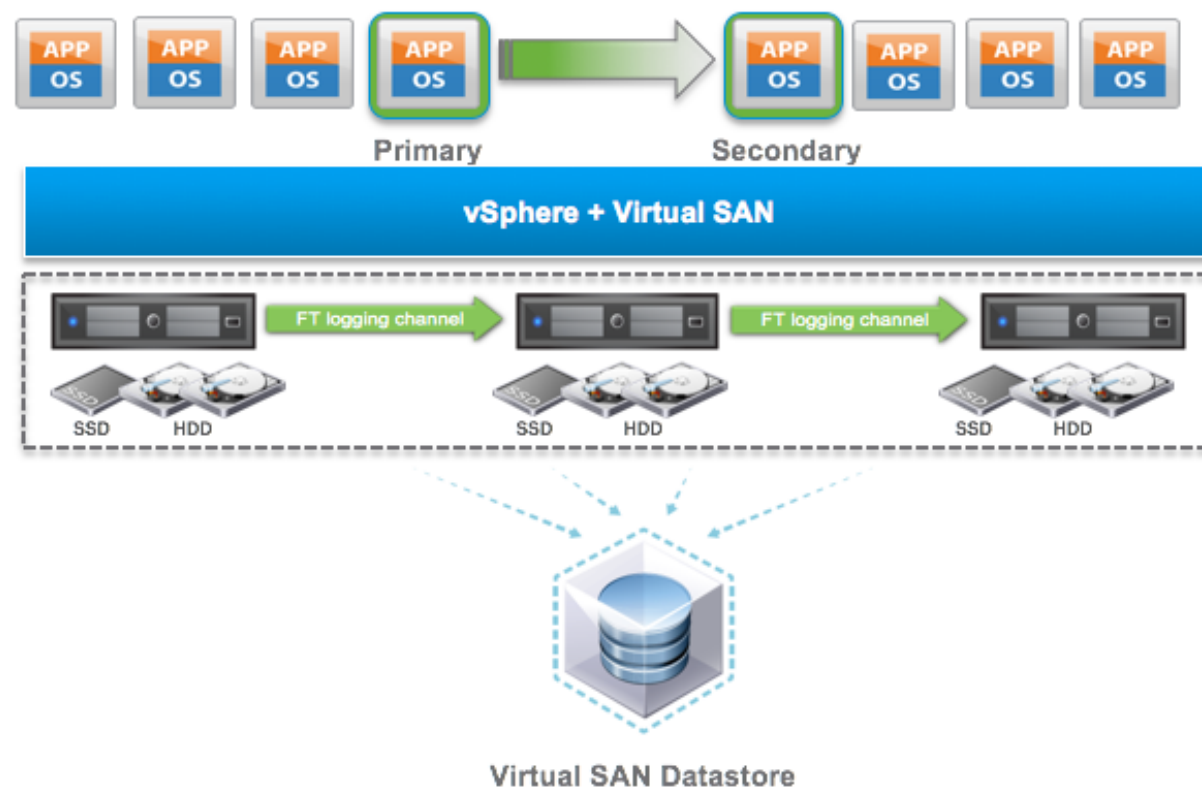


- VSAN的延伸集群，還需要Witness節點，這個節點只存放中繼資料，不儲存業務資料，它的作用是和兩個網站建立心跳機制，當其中一個網站故障或網站間發生網路磁碟分割的時候，Witness可以判斷發生了什麼，並決策如何確保可用性。

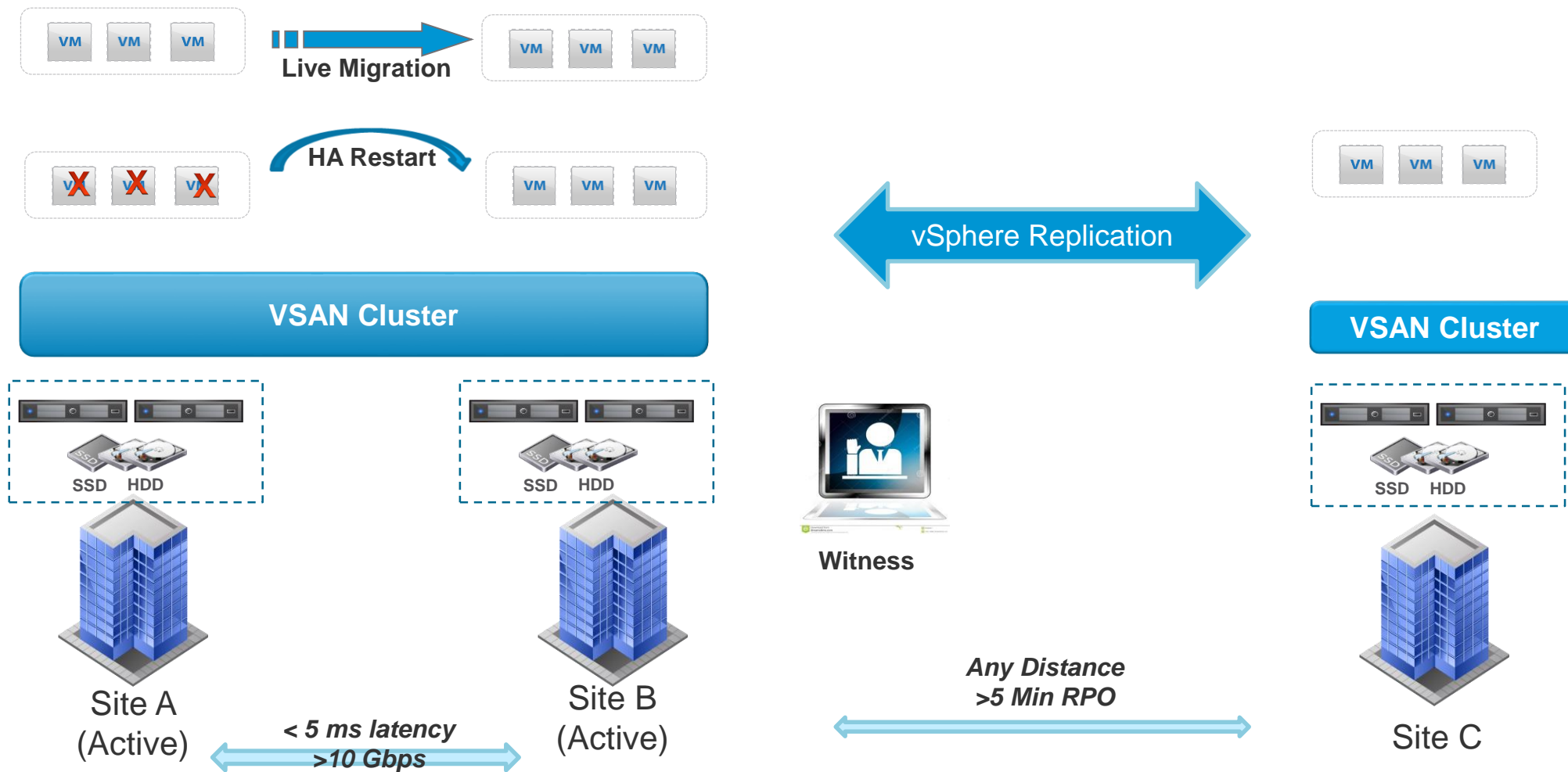
二、VSAN支持多核虛擬機器的容錯 (SMP-FT)

vSphere的Fault Tolerance功能，並且最多可達4個CPU，提高了關鍵業務應用在硬體故障(如主機故障)下零停機的持續可用性。

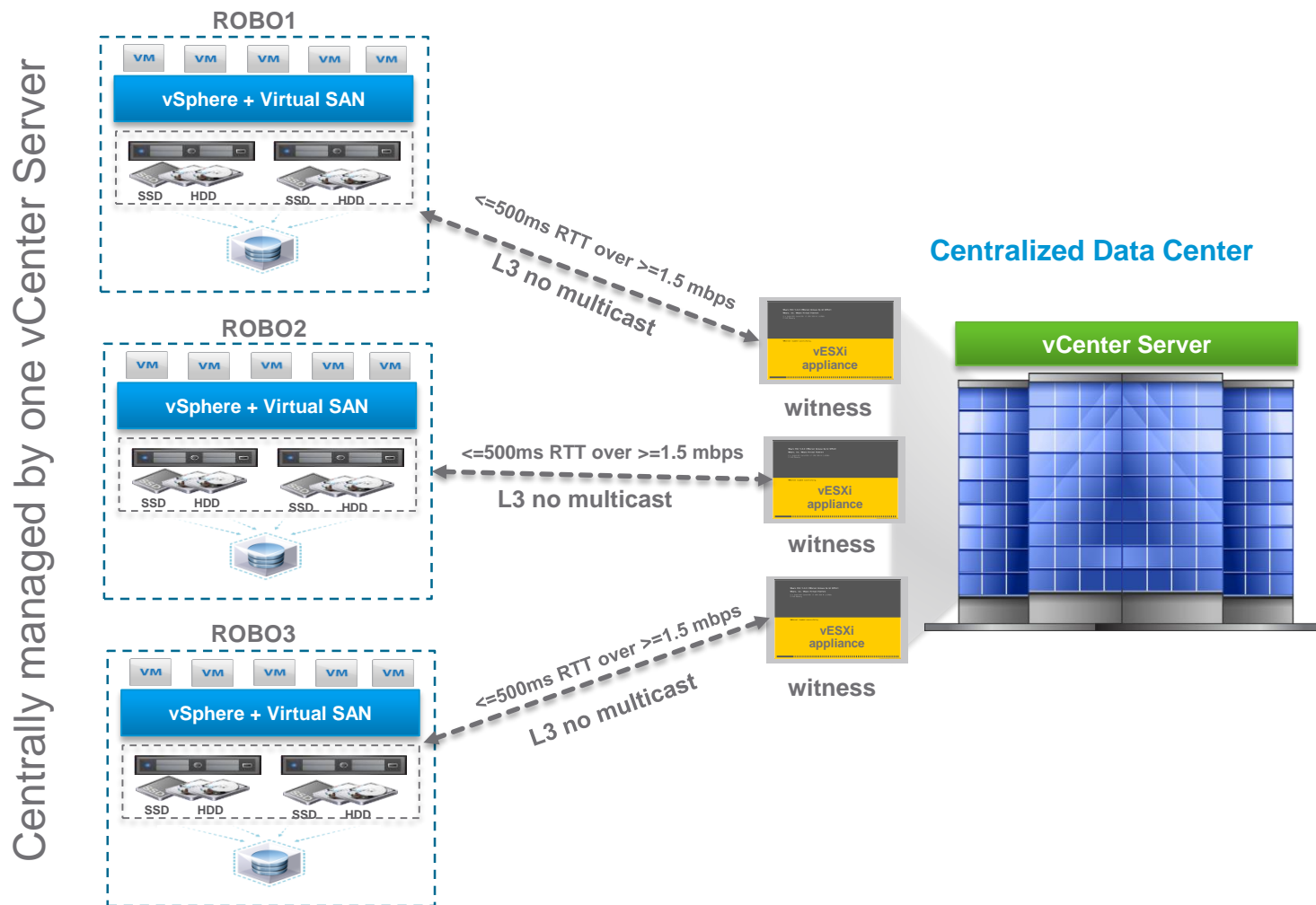
這一技術，具有重要的意義，在一定程度上，可以彌補某些應用所缺乏的集群高可用性，也以vSphere的集群高可用和VSAN的高可用(多副本)來部分替代以往成本高昂的應用高可用的方案。



三、VSAN容災技術的RPO最低可達5分鐘



四、VSAN支持兩節點的VSAN集群(用於遠端或分支辦公室)

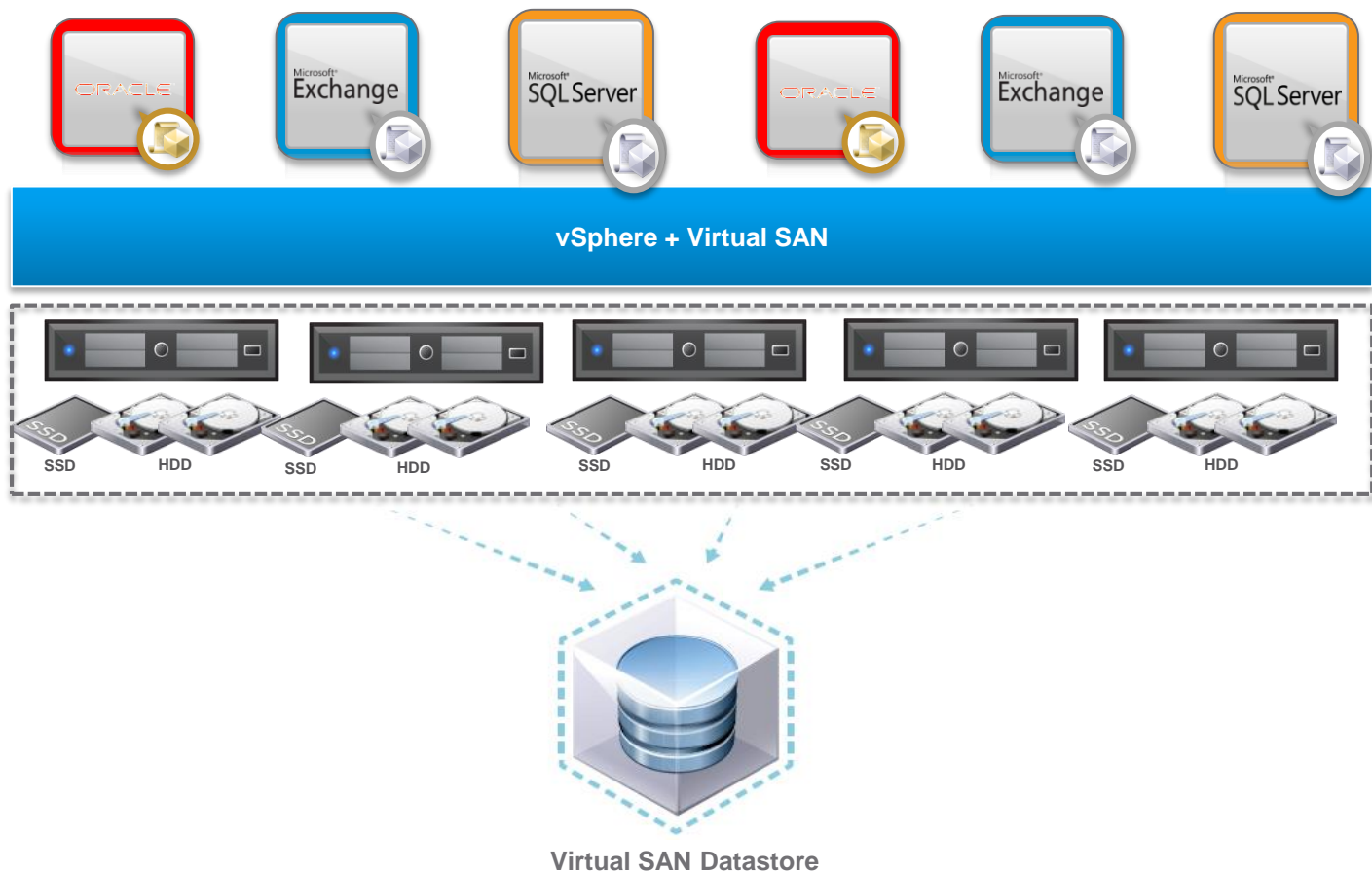


2-Node ROBO 方案概覽

- 每個節點獨自成為一個故障域
- 每個VSAN集群有有一個witness
- Witness節點是一個ESXi的appliance (VM，也即虛機)
- 所有網站由一個vCenter統一管理
- 打補丁和軟體升級都 vCenter來處理
- 如果有N個分支辦公室，就需要有N個witness(ESXi appliance)

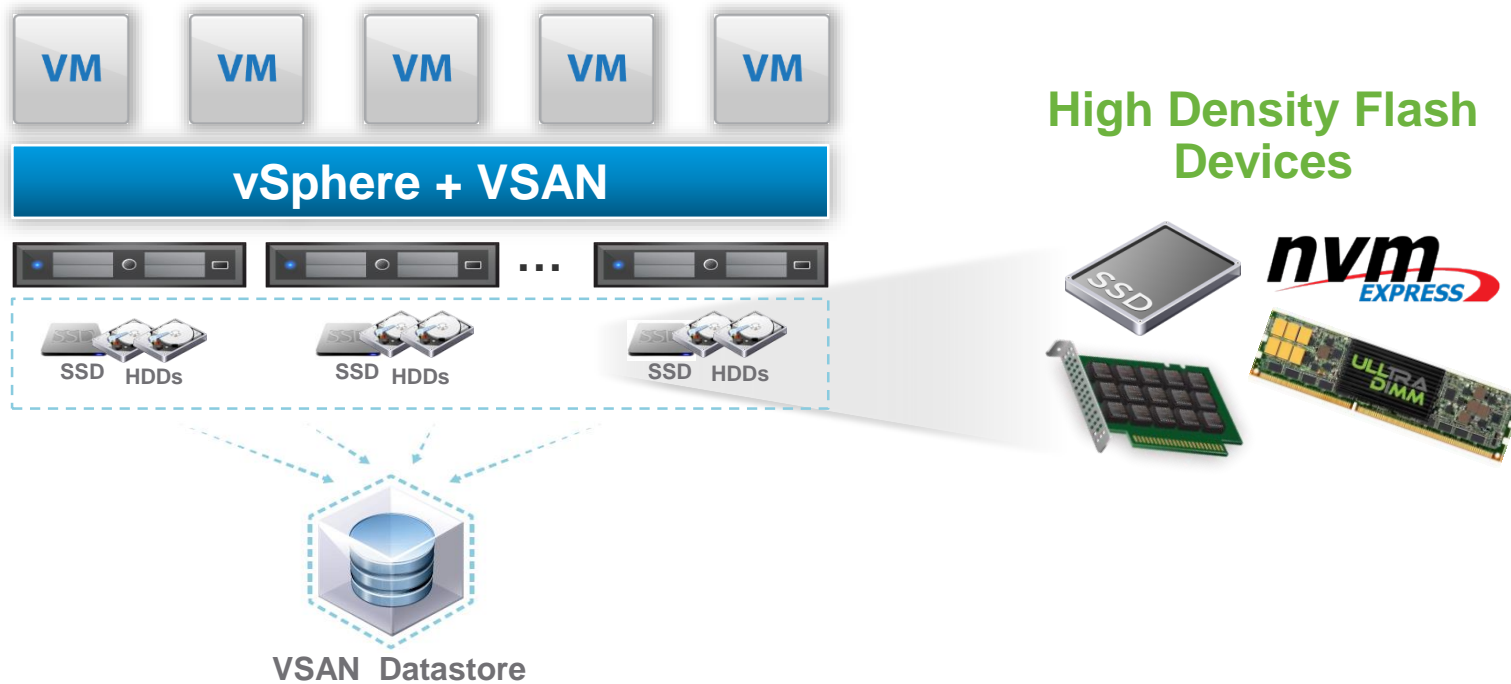
五、VSAN支持Oracle RAC和 WSFC集群技術

Oracle RAC/ WSFC Cluster



- Oracle Real Application Cluster (RAC) support
 - Enabled through multi-writer support (KB 2121181)
- Microsoft Windows Server Failover Cluster
 - Exchange Data Availability Groups (DAG) with file share witness quorum ONLY
 - Exchange DAG with FCI(Failover Cluster Instance) not supported on Virtual SAN
- Microsoft Windows Server Failover Cluster
 - SQL Server AlwaysOn Availability Group (AAG) with file share witness quorum ONLY
- SQL Server AlwaysOn with FCI not supported on Virtual SAN

六、VSAN支持ULLtra DIMM SSD和NVMe SSD

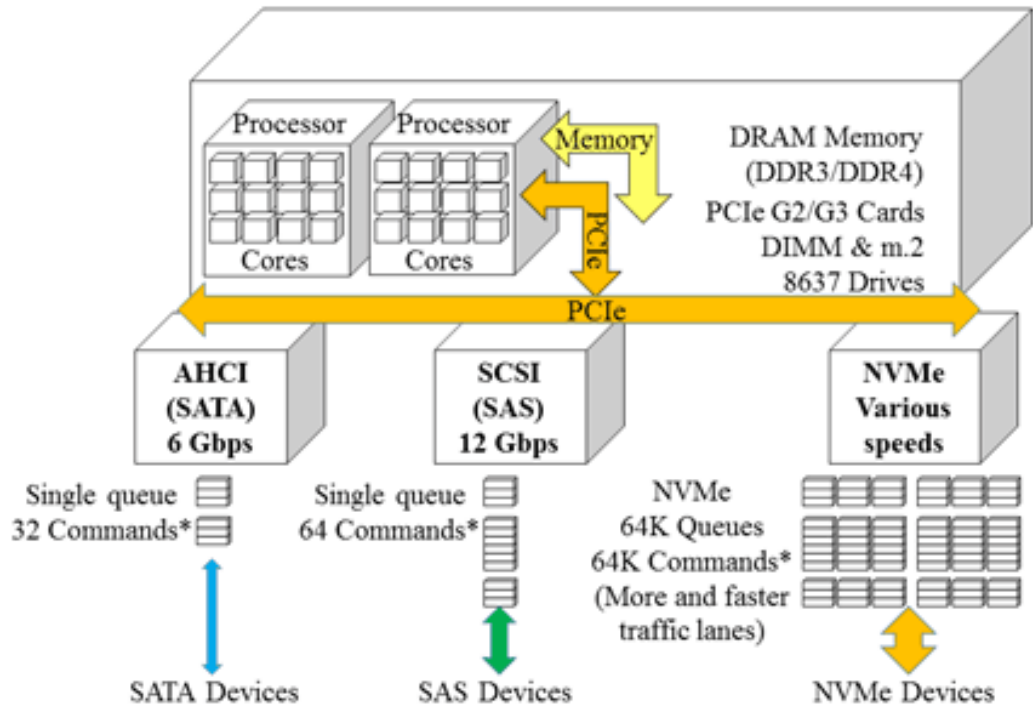


- Less than 5us write latency: 3x improvement vs external arrays
- Deploy VSAN in thin blade form factor
- Achieve ~100k IOPs/host with NVMe

- **SanDisk UltraDIMM™** SSDs connect flash storage to the memory channel via DIMM slots, achieving very low (<5us) write latency
- **NVMe** allows for greater parallelism to be utilized by both hardware and software and as a result various performance improvements

NVMe SSD

利用NVMe SSD，VSAN 32個節點的全快閃記憶體集群，能達到320萬IOPS，也即每個節點約10萬IOPS

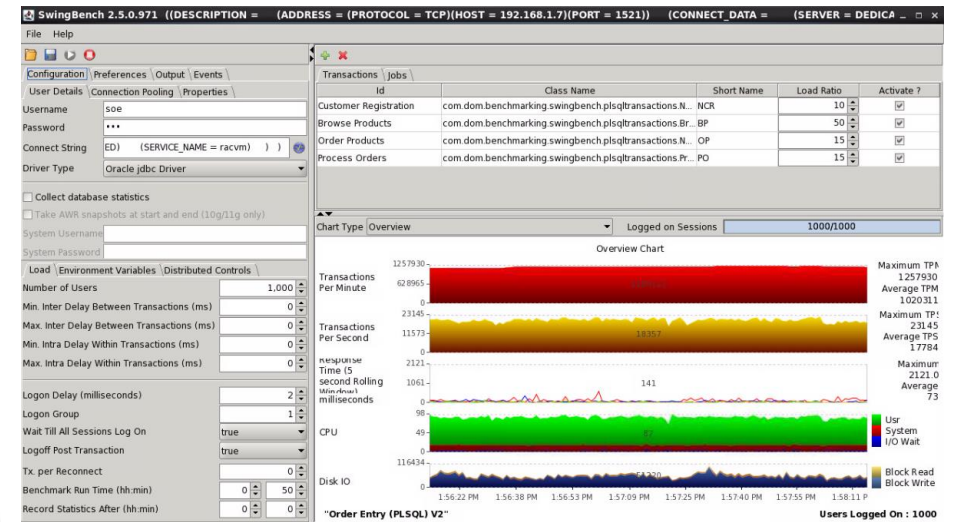


* Protocol Specification, see vendor, device or driver specific implementation notes

NVMe devices

- PCIe flash cards
- 8637 connected devices (NVMe/PCIe, SAS, SATA)
- m.2 flash cards
- Shared external storage

NVMe SSD (Greenliant G-Card)，在1000併發用戶數下，獲得了高達17784的TPS！



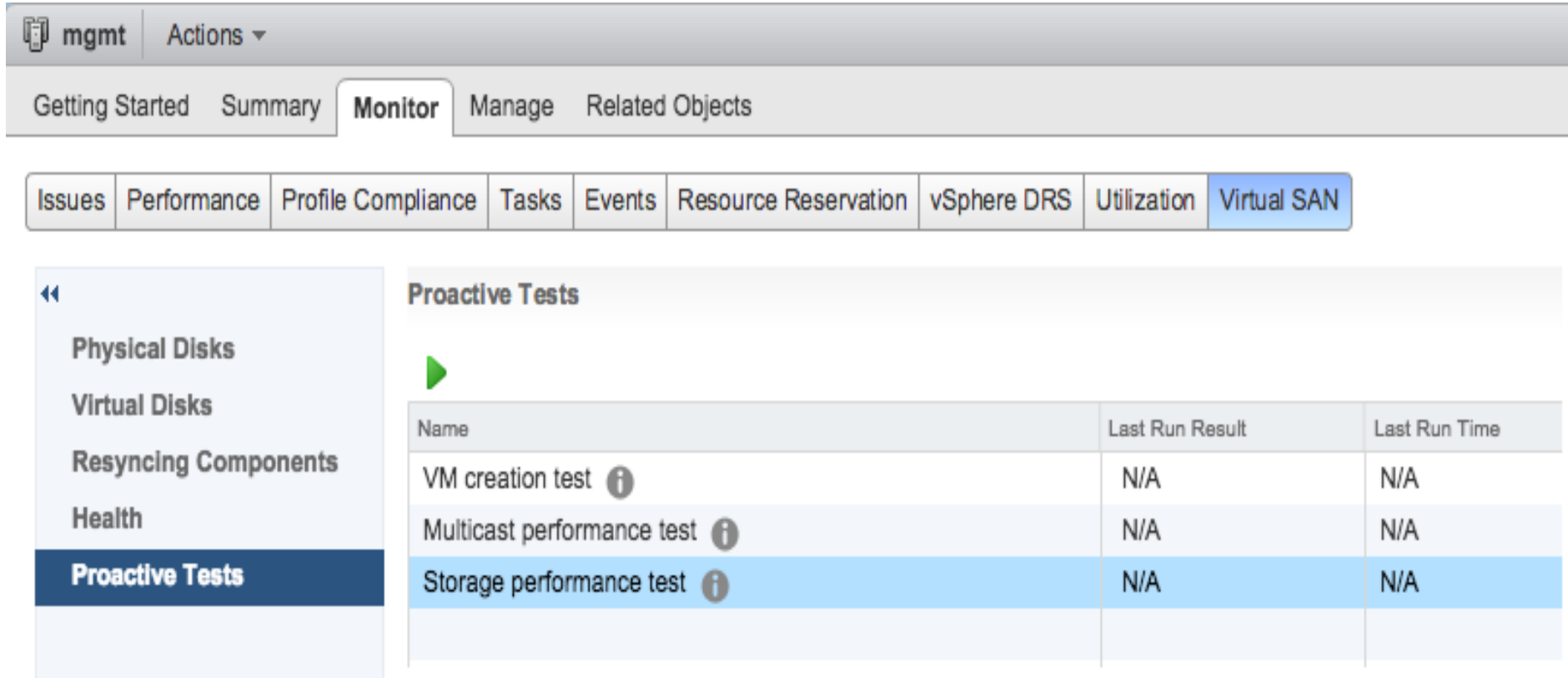
七、VSAN健康檢查外掛程式(Health Check Plug In) 更新

The screenshot displays the VMware vSphere Health Service configuration interface. The left sidebar shows the navigation menu with 'Health' selected. The main content area is divided into several sections:

- Health Service:** Health service status is Enabled, version is 6.1.0, and the health check interval is 60 minutes. An 'Edit settings ...' button is present.
- HCL Database:** Last updated is Today. Buttons for 'Update from file...' and 'Get latest version online' are available.
- Support Assistant:** Last upload time is --. A button for 'Upload Support Bundles to Service Request...' is present.
- External Proxy Settings:** Configure the proxy to access the internet when you use Virtual SAN CEIP (Customer Experience Improvement Program), Virtual SAN Support Assistant and get latest HCL database online. Fields for Host name, Port, User name, and Proxy setting type are shown, all with a '-' value. An 'Edit...' button is present.

- Central health reporting via VC alarms across large environments:
 - Updated HCL Information
 - Periodic health checks – configurable (defaults to 60 minutes)
 - Health check failures triggers corresponding health and alarms
 - SNMP support, custom scripts, emails via vCenter Alarms

預先健康檢測技術



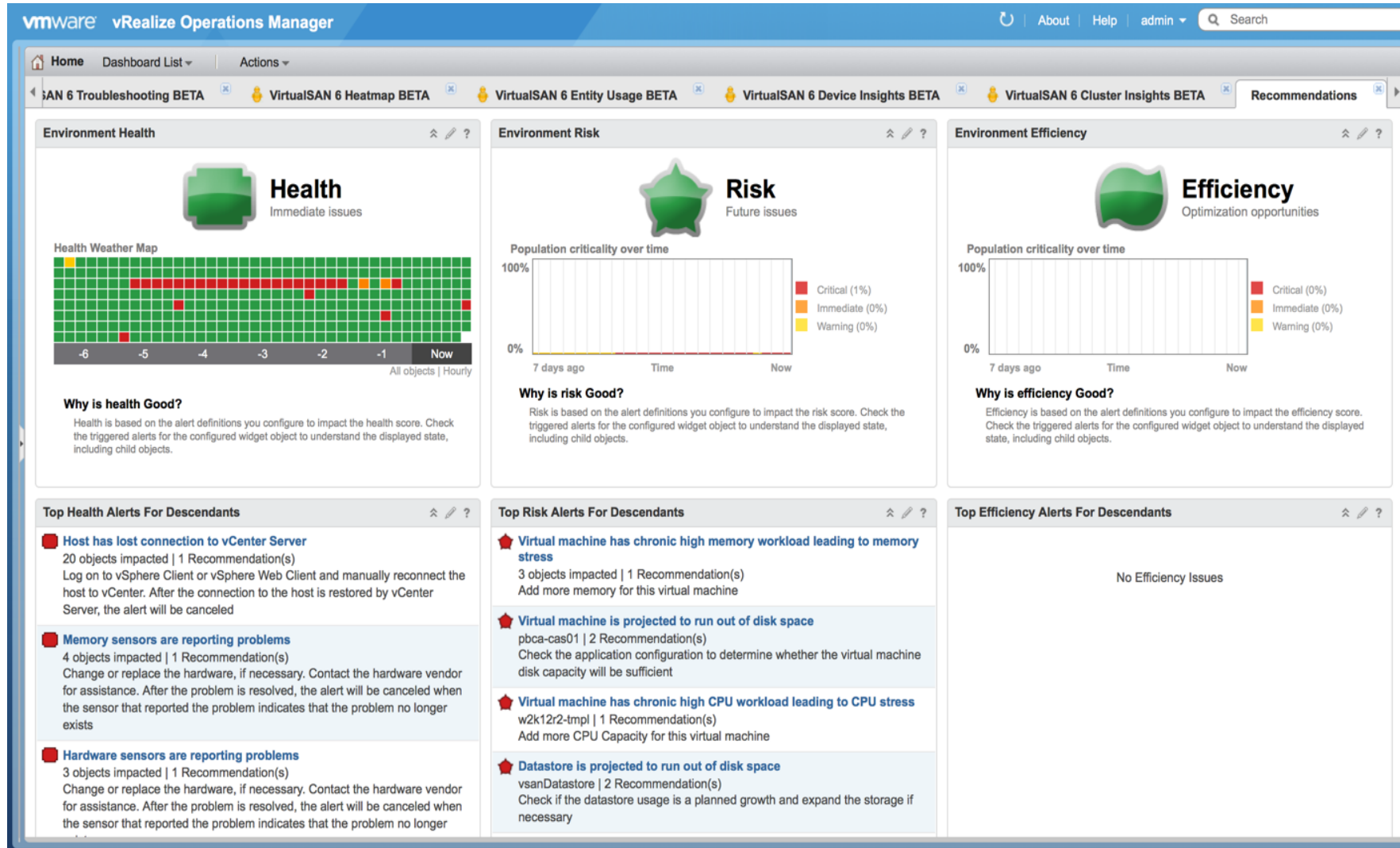
The screenshot shows the VMware vSphere Proactive Tests interface. The top navigation bar includes 'mgmt' and 'Actions'. Below it, a secondary navigation bar has 'Getting Started', 'Summary', 'Monitor' (selected), 'Manage', and 'Related Objects'. A third navigation bar lists various monitoring categories: 'Issues', 'Performance', 'Profile Compliance', 'Tasks', 'Events', 'Resource Reservation', 'vSphere DRS', 'Utilization', and 'Virtual SAN' (selected). On the left, a sidebar menu lists 'Physical Disks', 'Virtual Disks', 'Resyncing Components', 'Health', and 'Proactive Tests' (selected). The main content area is titled 'Proactive Tests' and features a green play button icon. Below the icon is a table with three columns: 'Name', 'Last Run Result', and 'Last Run Time'. The table contains three rows of test data.

Name	Last Run Result	Last Run Time
VM creation test ⓘ	N/A	N/A
Multicast performance test ⓘ	N/A	N/A
Storage performance test ⓘ	N/A	N/A

Proactive Tests:

- VM creation test – test the ability to successfully create VMs in the cluster
- Multicast performance test – access connectivity as well as suitable multicast speed between hosts
- Storage performance test – test the stability of the cluster under heavy IO load

八、vRealize Operations for VSAN管理套件



Virtual SAN Management Pack for vRealize Operations

Virtual SAN 6.1 new integration with vRealize operations delivers a comprehensive set of features to help manage Virtual SAN:

- Global View
- Health Monitoring and Availability
- Performance Monitoring
- Capacity Monitoring and planning

全域監控

The screenshot displays the VMware vRealize Operations Manager interface. The main area is titled 'VirtualSAN Topology' and shows a hierarchical view of system components, each represented by a grid of colored icons (green for healthy, yellow for warning, red for error). The components include:

- VirtualSAN Cluster (6 of 6)
- Host System (31 of 31)
- Virtual Machine (97 of 97)
- VirtualSAN Datastore (6 of 6)
- Host Adapter (20 of 20)
- Disk Group (20 of 20)
- Solid State Device (20 of 20)
- Magnetic Disk (83 of 83)
- EsxPnic (36 of 36)

On the right side, there is an 'Alert List' table and a 'Metric Chart' area. The alert list shows several critical alerts:

Status	Criticality Level	Object Name	Alert Info	Alert Impact	Object Type	Type	Sub-Type	Duration
Warning	Critical	wdc-sabu-srv...	Objects are n...	Health	Storage Devi...	Application Al...	Availability	05h:3
Warning	Critical	dhcp-9fc8df2...	Virtual machi...	Health	Virtual Machine	Storage Alerts	Performance	36m:3
Warning	Critical	NetApp VAS...	Virtual machi...	Health	Virtual Machine	Storage Alerts	Performance	36m:3
Warning	Critical	metadata_pro...	Virtual machi...	Health	Virtual Machine	Storage Alerts	Performance	36m:3
Warning	Critical	octo-sabu-srv...	Virtual machi...	Health	Virtual Machine	Storage Alerts	Performance	36m:3
Warning	Critical	VIO-DB-0	Virtual machi...	Health	Virtual Machine	Storage Alerts	Performance	36m:3

Below the alert list, the 'Top Issues' section highlights several critical problems:

- The host has lost connectivity to a dvPort**
6 objects impacted | 1 Recommendation(s)
Replace the physical adapter or reset the physical switch. The alert will be canceled when connectivity is restored to the dvPort
- ESXi host has detected a link status down on a physical NIC**
5 objects impacted | 1 Recommendation(s)
ESXi disables the device to avoid the link flapping state. You might need to replace the physical NIC. The alert will be canceled when the NIC is repaired and functioning. If you replace the physical NIC, you might need to manually cancel the alert
- The host has lost redundant connectivity to a dvPort**
5 objects impacted | 1 Recommendation(s)
Replace the physical adapter or reset the physical switch. The alert will be canceled when connectivity is restored to the dvPort

- **Global View** - provides visibility across multiple Virtual SAN clusters for monitoring, alerts and notifications

縮短除錯時間

VirtualSAN Cluster partitioned most likely due to multicast issue in cluster

VirtualSAN Cluster partitioned most likely due to non-matching upstream and downstream multicast addresses on all hosts in the cluster

Recommendations

Check the upstream and downstream multicast addresses on all the VirtualSAN hosts

Alert Information

Object Name: VSAN-C-SQL
Control State: Open
Assigned User: -
Alert Type: Hardware (OSI)
Alert Subtype: Availability
Status: Active
Impact: Health
Criticality: Critical
Start Time: 4/28/15 7:10 PM
Update Time: 4/28/15 7:10 PM
Cancel Time:

What is Causing the Issue ?

VirtualSanCluster VSAN-C-SQ...

VirtualSanCluster VSAN-C-SQ...

Event source: VSAN-C-SQL
Source event object name: VirtualSanCluster VSAN-C-SQL detected network partitioning
Source event name: VirtualSanCluster VSAN-C-SQL detected network partitioning
Source event status: All hosts in the cluster unable to communicate due to partitioning.
Device Description: [w3-sabu-sm-010.eng.vmware.com] are partitioned [w3-sabu-sm-009.eng.vmware.com] are partitioned [w3-sabu-sm-011.eng.vmware.com] are partitioned [w3-sabu-sm-012.eng.vmware.com] are partitioned

Event source: VSAN-C-SQL
Source event object name: VirtualSanCluster VSAN-C-SQL detected multicast address issue
Source event name: VirtualSanCluster VSAN-C-SQL detected multicast address issue
Source event status: Hosts in the cluster have different Multicast addresses set

- Get prescriptive guidance for remediation, including automated actions
- Multiple symptoms combined to provide an in-depth root cause analysis

九、VSAN支援雲環境原生應用(Cloud-native Application)

<http://www.yellow-bricks.com/2015/09/03/vmworld-session-vsan-software-defined-storage-platform-of-the-future-sto6050/>

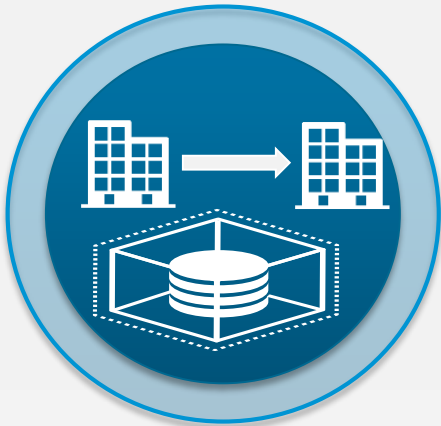
VMware vSphere Integrated Containers and VMware Photon Platform enabled these new types of applications.

Next being discussed is the potential to **leverage VSAN not just for virtual machines, but also for containers, having the capabilities to store files on top of VSAN**. A distributed file system for cloud native apps is now introduced. Some of the requirements for a distributed file system would be a scalable data path, clones at massive scale, multi-tenancy and multi-purpose.

VMware is also prototyping a distributed file system and have it running in their labs. It sits on top of VSAN and leverages that scalable path and uses it to store its data and metadata.

VSAN 6.1新特性匯總

Enterprise Availability and Data Protection



- ✓ Stretched Cluster with RPO=0, metro-distance
- ✓ Support for SMP-FT
- ✓ 5 min RPO vSphere Replication
- ✓ Support for Oracle RAC and Microsoft MSCS

Advanced Management & Troubleshooting



- ✓ Health Check plug-in for HW monitoring, compliance
- ✓ vRealize Operations integration (capacity planning, root-cause analysis)
- ✓ Support cloud-native apps

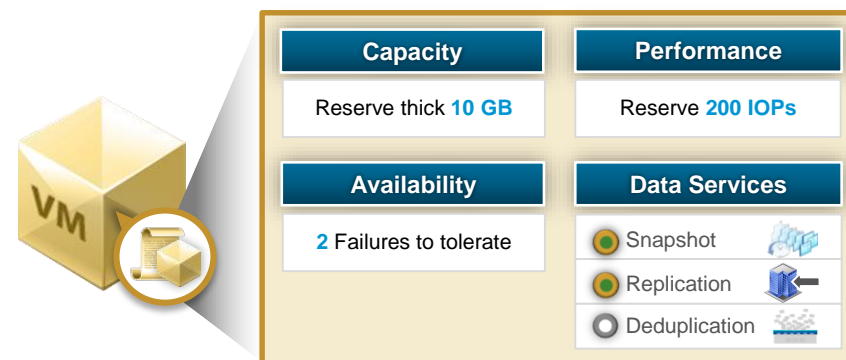
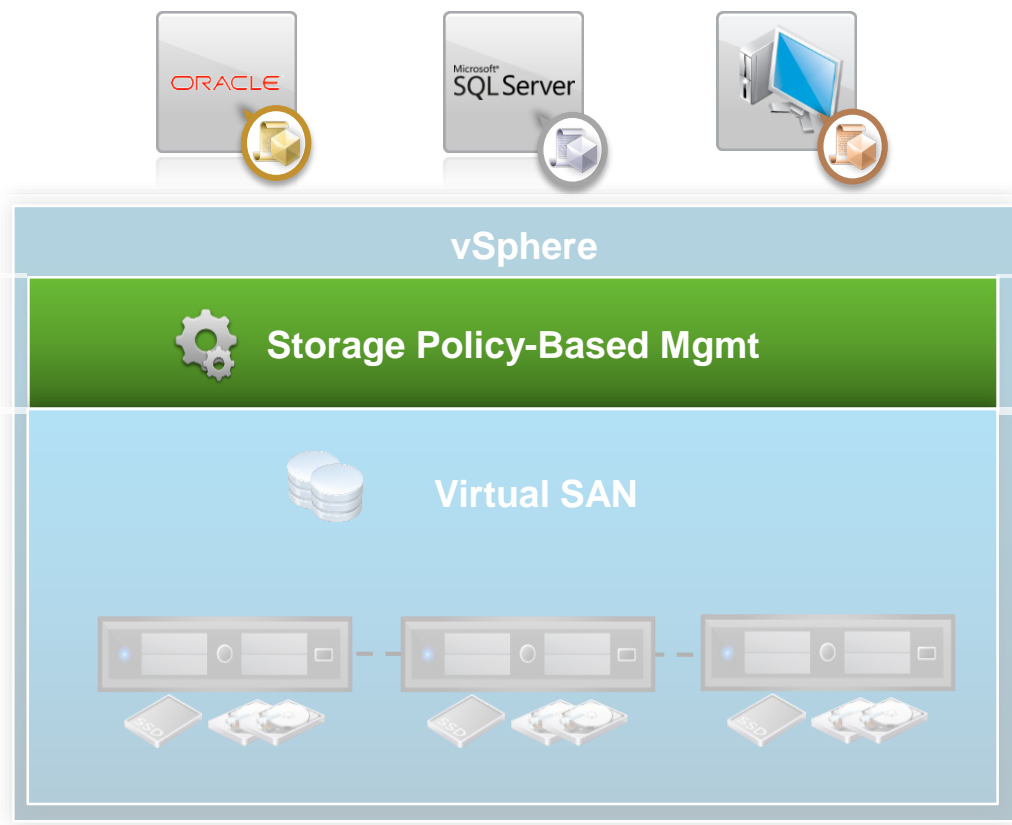
New Hardware Options



- ✓ 2-node clusters for ROBO
- ✓ New SSD HW options:
 - Intel NVMe
 - Diablo Ultra DIMM

VMware 軟體定義儲存 – 控制層

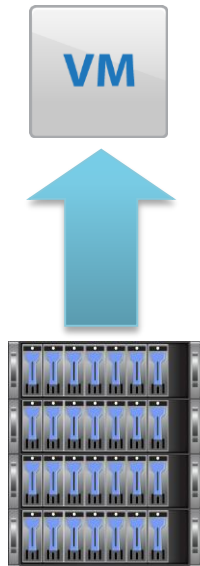
儲存管理策略提供應用程式為中心的儲存自動化



- 智慧化佈署
- 提供虛擬積級別的精細控制
- 透過政策自動化擴展
- 透過 *vSphere Virtual Volumes* 擴展儲存陣列

軟體定義儲存讓應用程式負責主導

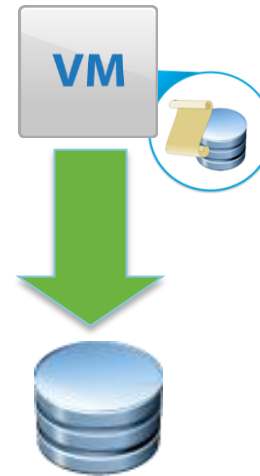
透過以應用程式為中心的方法簡化且自動化的儲存管理



現況

- 從原有資料儲存遷移虛擬機器
- 刪除所涉及的LUN或卷
- 創建一個滿足新的儲存要求的新的LUN (不同的RAID等級)
- 重新以VMFS格式來格式化LUN
- 將虛擬機器重新遷移回新的資料儲存

- ✗ 過度佈建 (寧願安全不要遺憾！)
- ✗ 浪費資源、浪費時間
- ✗ 頻繁的資料移轉



SDS

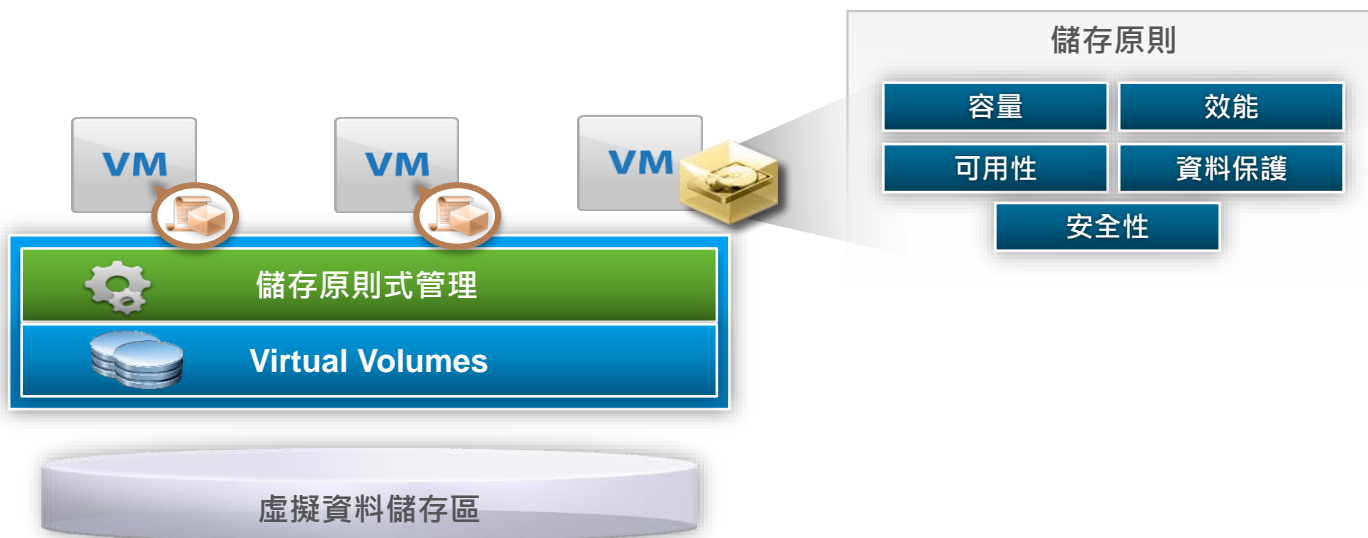
- 修改現有的關聯到該虛擬機器的儲存策略
- 創建一個全新的策略，再將新策略關聯到該虛機！

自動佈建並維持資源與資料服務

Virtual SAN
共用資料儲存區

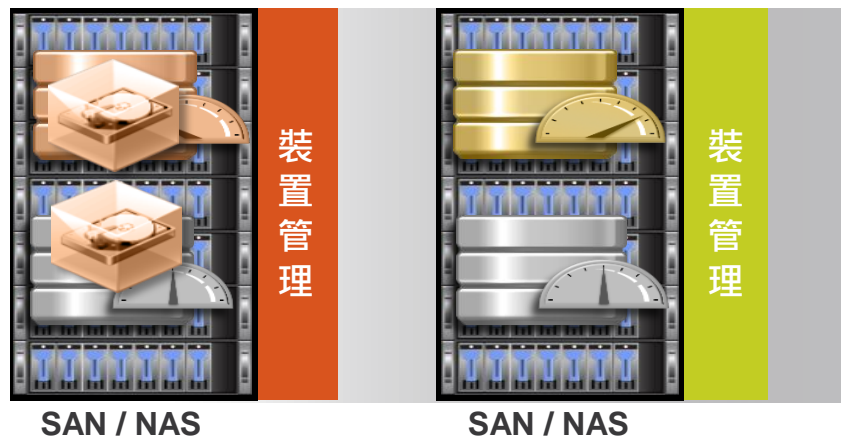
- ✓ 無過度佈建
- ✓ 較省資源、較省時間
- ✓ 變更簡易

VMware 針對外部儲存裝置所打造的軟體定義的儲存願景



儲存原則式管理

- 以虛擬機為中心的原則導向控制平台
- 動態的儲存服務組成
- 智慧型配置與透明的修正過程
- 在所有異質裝置中均通用



已發布的功能

- 快照 (Snapshot)
- 複寫 (Mirroring)
- 重複資料刪除 (Deduplication)
- 服務品質 (Quality of Service)

Virtual Volumes

- 虛擬磁碟在外部儲存裝置上以原生方式表示
- 以每個虛擬機為單位的精密原生陣列資料服務控制
- 不再需要 LUN/磁區

VMware vSphere Virtual Volumes

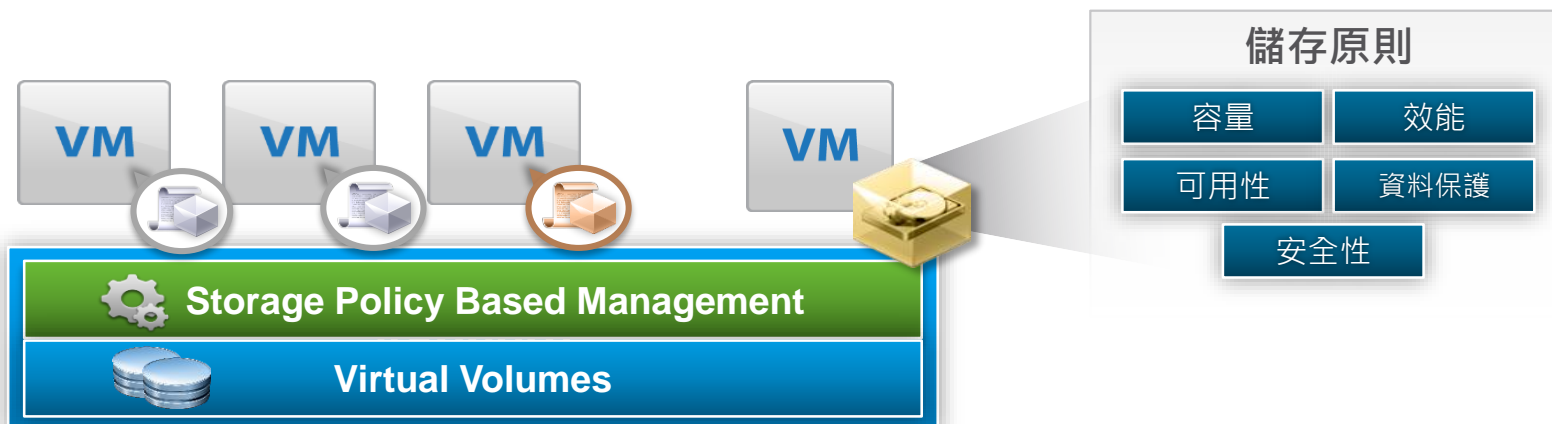
虛擬機感知儲存裝置的整合架構



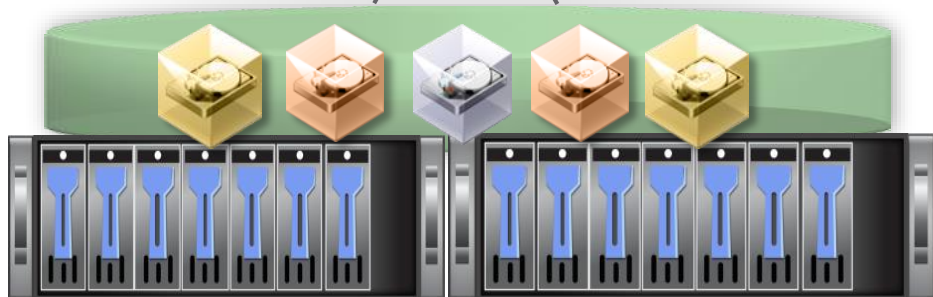
概觀

- 虛擬磁碟在陣列上以原生方式呈現
- 使用陣列式資料服務實現虛擬機精密儲存作業
- 將 vSphere Storage Policy Based Management 機制延伸至儲存商業網路
- 可支援現有的儲存 I/O 通訊協定 (FC、iSCSI、NFS)
- 採用業界 T10 標準
- 獲得主要儲存廠商支援的全業界計畫
- 包括在 vSphere 之內

Virtual Volumes 架構



VASA Provider



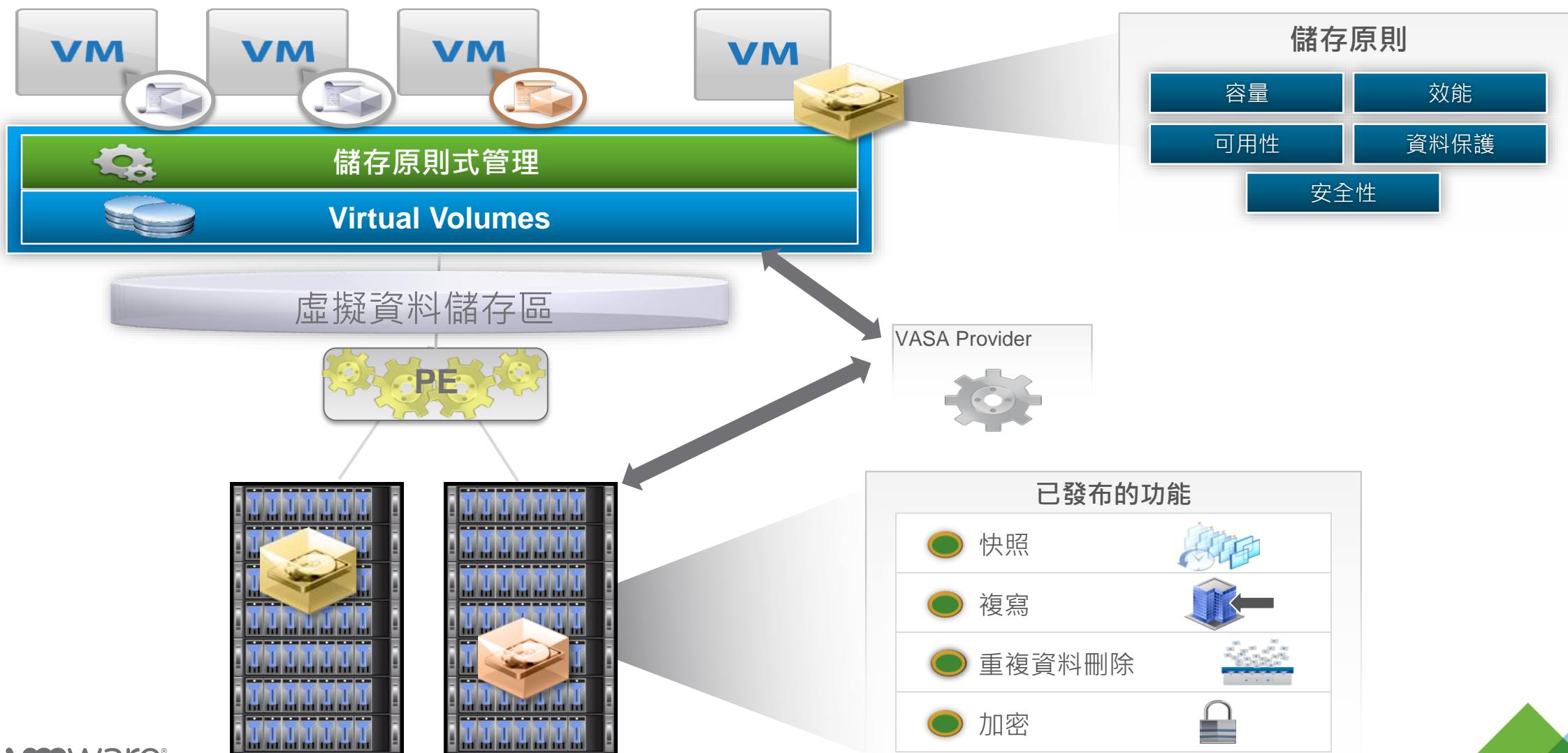
已發佈的功能

- 快照
- 複寫
- 重複資料刪除功能
- 加密

概觀

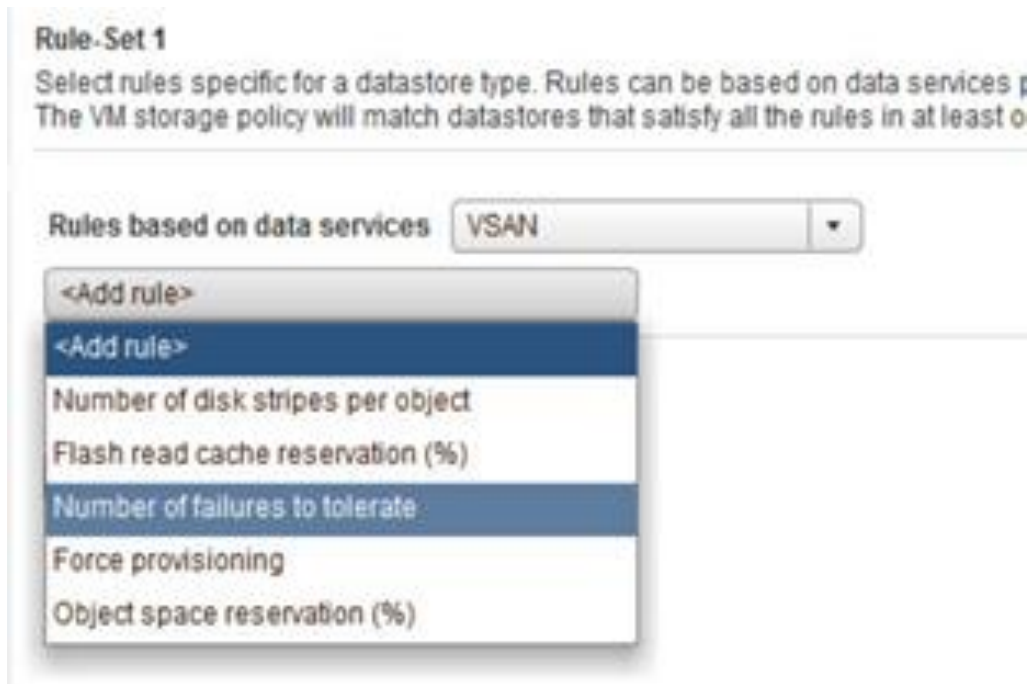
- 無需檔案系統
- ESX 的陣列管理是透過 VASA (vSphere APIs for Storage Awareness) API
- 將陣列依照邏輯分割到稱為「儲存容器」的容器中
- 虛擬機磁碟稱為「虛擬磁區」(Virtual Volumes)，是以原生方式儲存在儲存容器上
- 從 ESX 到陣列的 IO 則是透過稱為「通訊協定端點 (PE)」的存取點進行
- 資料服務會卸載到陣列
- 透過儲存原則式管理架構管理

啟用依照每個虛擬機原則的控制平台

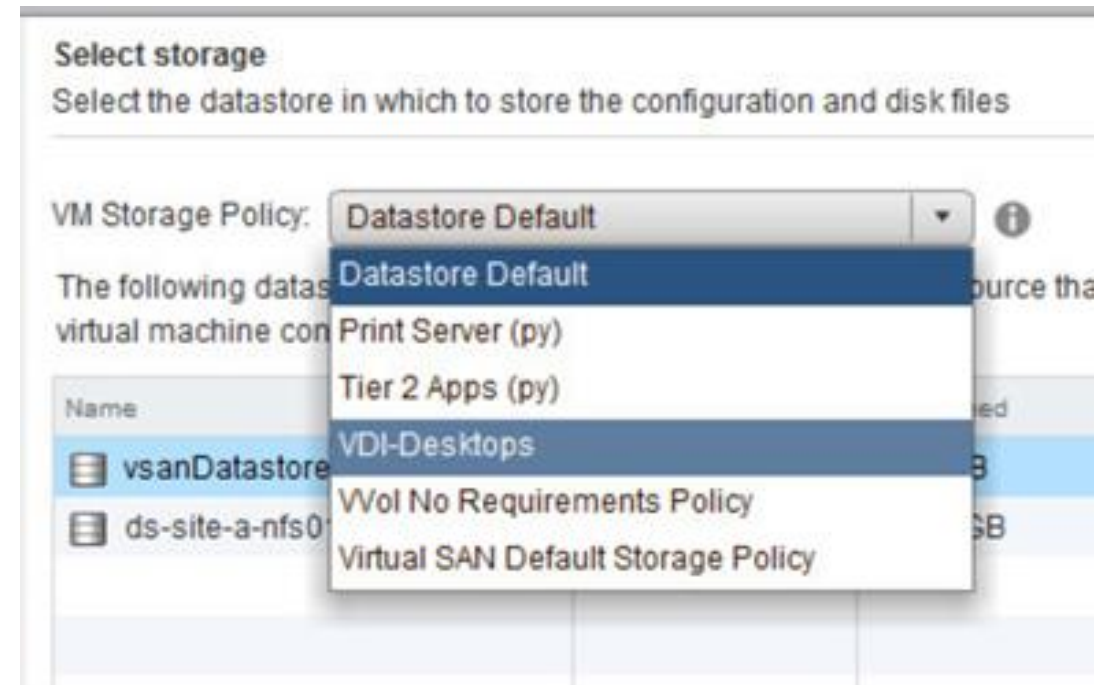


VMware SPBM之VSAN – 以應用/虛機為中心

創建虛擬機器的儲存策略
(儲存管理員或雲管理員的高級工作)



創建新虛機時，可選儲存策略



VMware SPBM之Virtual Volumes

1 Name and description

2 Rule-Sets

2a Rule-Set 1

3 Storage compatibility

4 Ready to complete

Rule-Set 1

Select rules to create your VM storage policy.

- The VM storage policy will match datastores that satisfy any of the rule sets.
- A rule set will match datastores that satisfy all of the selected rules.

Rules based on common capabilities

VMware common namespace - Space Efficiency

Thick

Thin

<Add capability>

Rules based on vendor-specific capabilities NimbleStorage

<Add capability>

Application policy

Protection schedule (hourly)

Protection schedule (daily)

Protection schedule (weekly)

Data encryption

Variable Block Size Support

Built-in Data Protection Snapshot/Replication Offload

Per VVol Level Encryption

Add another rule set Remove this rule set

Back Next Finish Cancel

Performance Policy

Set volume block size to a power of two between 4096 and 32768 bytes. Compression and cache are either on or off.

Name Veeam

Storage Block Size 4KB (4096) in bytes

Compression

Caching

OK Cancel

Create a volume collection

Introduction > Synchronization > Schedules > Volumes

Schedules specify how frequently snapshots should be taken and how many snapshots should be retained for the volumes assigned to this volume collection.

Replication allows you to efficiently copy snapshots to another Nimble array (the "replication partner") for disaster recovery.

Advanced

"RPO10MINS" PROTECTION SCHEDULE

Schedule Name RPO10mins

Repeat Every 10 minutes

Starting at 12:06 HH:MM AM

Repeat Until 11:59 HH:MM PM

On the following days Mon Tue Wed Thu Fri Sat Sun

Number of snapshots to retain locally 148

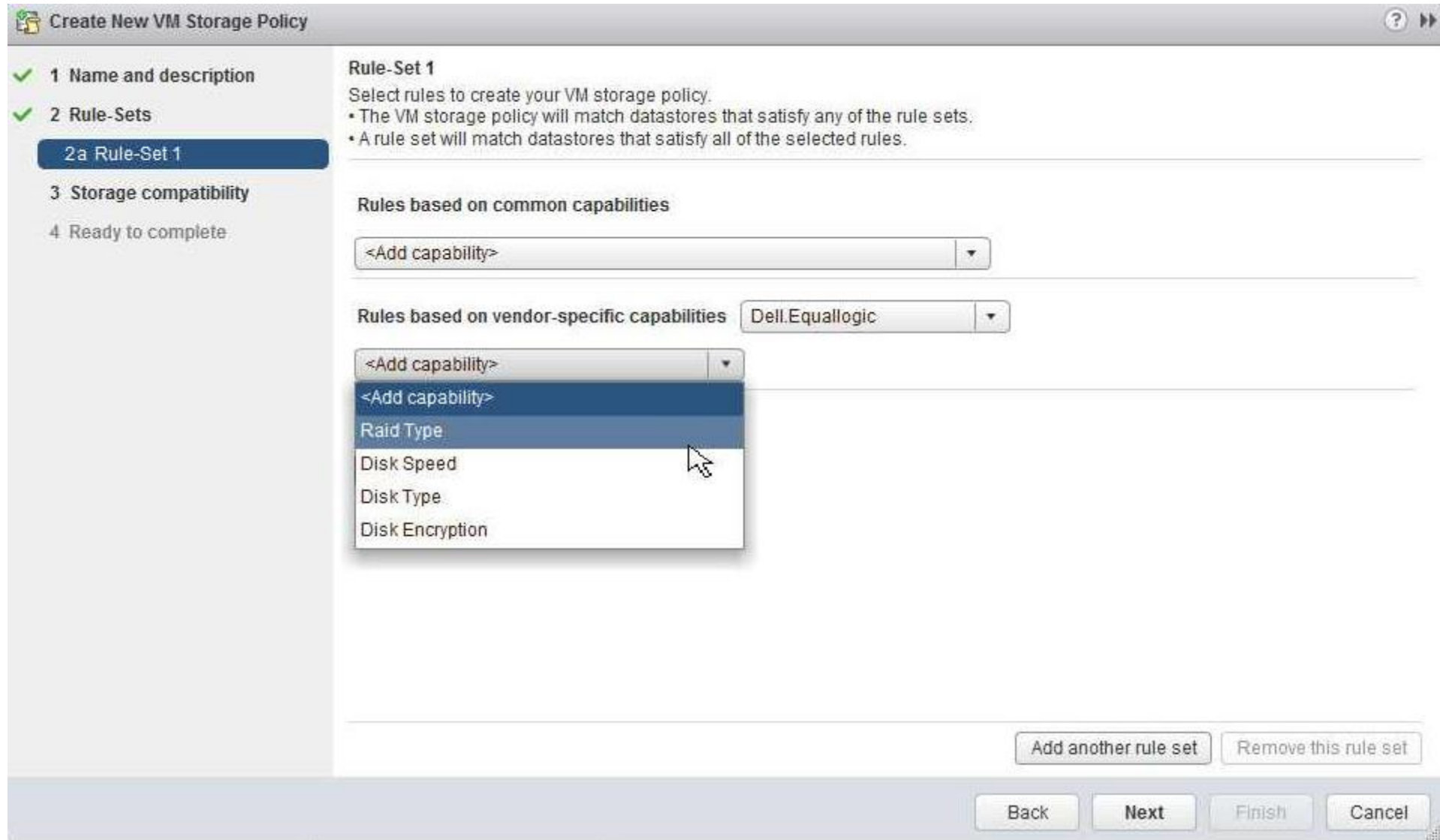
Synchronization None

Replicate to None

Add another Schedule

Back Next Finish Cancel

VMware SPBM之Virtual Volumes



VMware SPBM之Virtual Volumes

Objects

Create New VM Storage Policy

1 Name and description

2 Rule-Sets

2a Rule-Set 1

3 Storage compatibility

4 Ready to complete

Rule-Set 1

Select rules to create your VM storage policy.

- The VM storage policy will match datastores that satisfy any of the rule sets.
- A rule set will match datastores that satisfy all of the selected rules.

Rules based on common capabilities

<Add capability>

Rules based on vendor-specific capabilities Dell.Equallogic

Disk Speed

- 5,400
- 7,200
- 10,000
- 15,000

RAID Type

- 0
- 1
- 5
- 6

<Add capability>

Add another rule set Remove this rule set

Back Next Finish Cancel

VMware SPBM之Virtual Volumes

Create New VM Storage Policy

1 Name and description
2 Rule-Sets
2a Rule-Set 1
3 Storage compatibility
4 Ready to complete

Rule-Set 1
Select rules to create your VM storage policy.
• The VM storage policy will match datastores that satisfy any of the rule sets.
• A rule set will match datastores that satisfy all of the selected rules.

RAID Type *i*

- 0
- 1
- 5
- 6

Disk Type *i*

- 1
- 2

Disk Encryption *i*

signpost.label
Indicate if the disk(s) that the Vvol is resident on is encrypted.

<Add capability>

Rules based on tags

Add tag-based rule...

Add another rule set Remove this rule set

Back Next Finish Cancel

解決方案的優勢 – Virtual Volumes 與 SPBM

更迅速佈建儲存裝置



- 快速儲存裝置佈建
- 可隨著動態組成和修改儲存服務
- 精密的儲存服務層級控制
- 自助佈建

簡單的儲存管理作業



- 以自動化的方式將資料服務具現化
- 通用的儲存管理功能
- 透過原則導向架構的簡易管理方式

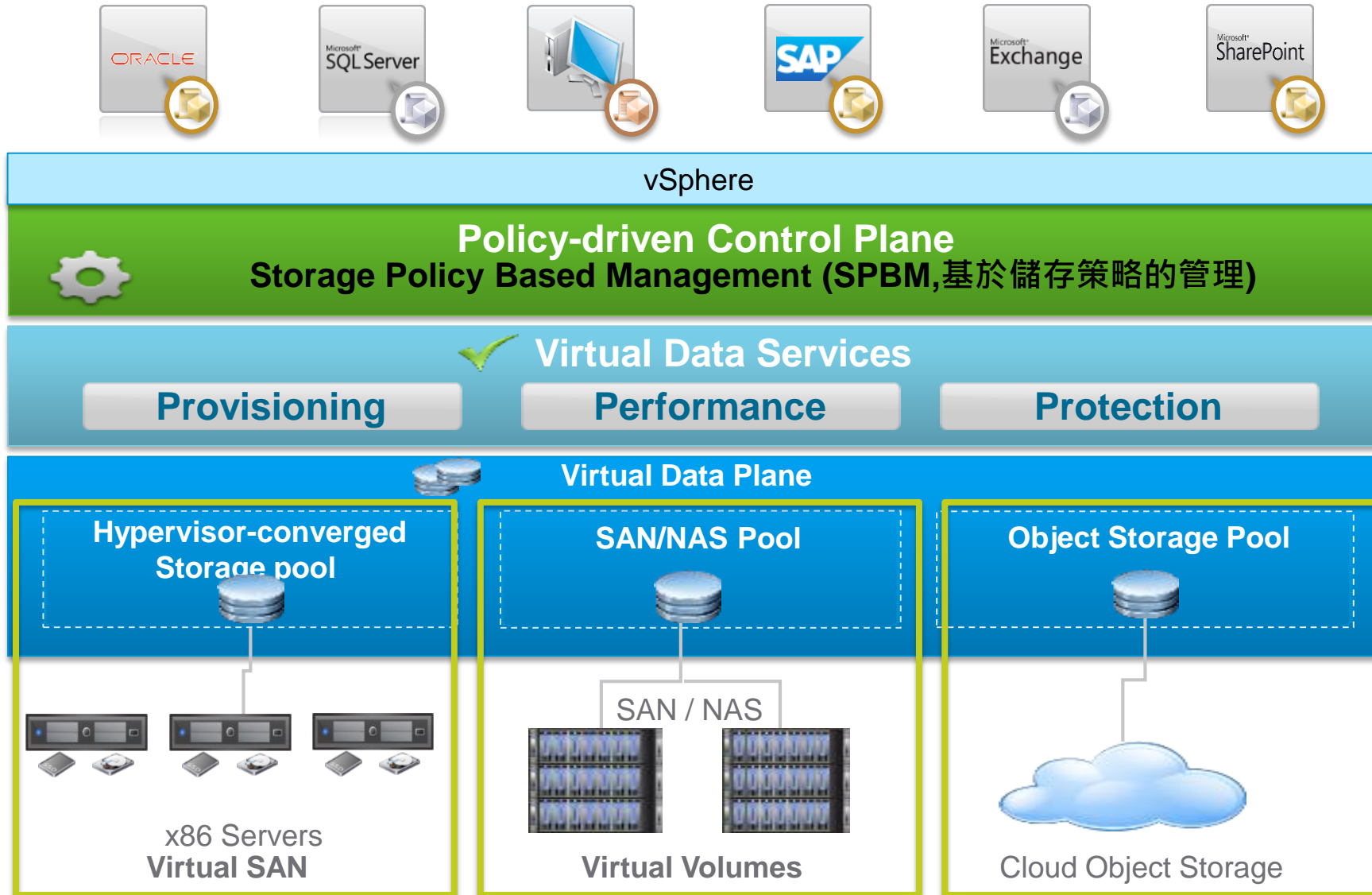
可降低儲存裝置總持有成本 (TCO)



- 提升容量利用率
- 不再因過度佈建資料服務而造成資源浪費
- 可減少管理費用

Summary

軟件定義儲存(SDS)大戰略 - VMware SPBM 包括VSAN和Virtual Volumes



不到15個月，VSAN擁有了2000多用戶，而且橫跨各個行業

2000+ Customers

“ In my experience VMware solutions are rock solid...we're ready to nearly double our VSAN deployment. ”

“ It really did work as advertised...the fact that I have been able to set it and forget it is huge! ”



VSAN Ready Nodes & 查詢部件是否在VSAN相容列表內

<http://www.vmware.com/resources/compatibility/search.php?deviceCategory=vsan>

Build Your Own based on Certified Components.

www.vmware.com/resources/compatibility/search.php?deviceCategory=vsan

What are you looking for: Compatibility Guides Help Current Results: 0

STEP 1: Refer to the "Virtual SAN Hardware Quick Reference Guide" for guidance on how to build a Virtual SAN Ready Node.

STEP 2: To build a Virtual SAN Ready Node:
Select your Virtual SAN Ready Node of choice based on following certified Ready Nodes.

Ready Node Types: All

Ready Node Supported Releases: All, ESXi 6.0 U1, ESXi 6.0, ESXi 5.5 U2, ESXi 5.5 U1

Ready Node Vendors: All, Cisco, DELL, Fujitsu, Hitachi, HP

Ready Node Profile: HY-2 Series, HY-4 Series, HY-6 Series, HY-8 Series, AF-6 Series, AF-8 Series

Ready Node Generation: All, Gen1 - 6G, Gen2 - 12G

Ready Node Server Type: All, Blade, Rackmount

Keyword:

Posted Date Range: All

Raw Storage Capacity (TB): All

查詢部件是否在VSAN相容列表內

VMware strongly recommends using certified Ready Nodes that are validated to provide predictable performance and scalability for your Virtual SAN deployment. If you would still like to build your own Virtual SAN with certified components, then click [Build Your Own based on Certified Components.](#)

Looking for information on VMware product compatibility by version? [See the Product Interoperability Matrix](#)

Looking for help with sizing your environment for Virtual SAN? Start with a Partner-led VSAN Assessment to validate Virtual SAN's benefits for your organization. Go to our [VSAN Assessment Tool](#)

Looking for help with sizing your environment for Virtual SAN? Go to our [Sizing and TCO calculator](#)

Looking for products verified and supported by partners? [Partner Verified and Supported Products](#)

Interested in certifying a new Ready Node that is not listed here or do you have queries about the Virtual SAN certification process? Please email vsan-hcl@vmware.com

Are you a VMware developer? [Check out the Developer Center.](#)

VSAN Ready Node New Branding and Profile Driven Models

– Benefit of choices

- Provides flexibility and can be customized for capacity, memory, CPU cores etc
- ~80% of customer demand can be met with a finite set of Ready Nodes

Current Profile Name	New Profile Name
Hybrid Profiles	
Hybrid-Server-Low	HY-2 Series
New Hybrid Profile (New Economic Ready Node)	HY-4 Series
Hybrid-Server-Medium	HY-6 Series
Hybrid-Server-High	HY-8 Series
Hybrid-VDI-Linked Clones	HY-8 Series
Hybrid-VDI-Full Clones	HY-8 Series
All Flash Profiles	
All Flash-Server-Medium	AF-6 Series
All Flash-Server-High	AF-8 Series
All Flash-VDI-Linked Clones	AF-8 Series
All Flash-VDI-Full Clones	AF-8 Series

VSAN Ready Nodes Series

	HY-6 Series	HY-4 Series	Low
Number of VMs per node	Up to 50	Up to 30	Up to 20
IOPs per node	Up to 20K	Up to 10K	Up to 4K
Raw storage capacity per node	8 TB	4 TB	2 TB
CPU	2 * 12 core	2 * 8 core	1 * 6 core
Memory	256 GB	128 GB	32 GB
Capacity Tier HDD	8 * 1 TB NL-SAS 7.2K RPM	4 * 1 TB NL-SAS 7.2K RPM	2 * 1 TB NL-SAS 7.2K RPM
Caching Tier Flash	2 * 200 GB SSD Performance Class D or above Endurance Class C or above	1 * 200 GB SSD Performance Class C or above Endurance Class B or above	1 * 200 GB SSD Performance Class B or above Endurance Class B or above
I/O Controller	Queue Depth >=256	Queue Depth >=256	Queue Depth >=256
NIC	10GbE	10GbE	1GbE

READY
FOR **ANY**
vForum2015