VASA and vVols

White Paper

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PREFACE

Executive Summary

In virtualization and cloud environments, the ever-increasing data production and demand continue to grow, resulting in an increasing demand for storage device that offer enough capacity for all application. Considering the consumption of limited IT resources, it is necessary to find ways to help IT manager for easy management and let the IT manager to finish something more value.

The VASA (vStorage APIs for Storage Awareness) is a software component that first introduced in vSphere 5. It acts as an information pipeline between storage systems and the vCenter Server, enabling you to monitor relevant storage system status. VASA Provider collects data from your storage systems and delivers information about storage topology, LUN and volume attributes, and events and alarms to the vCenter Server. Although VASA Provider is transparent to you after installation and configuration are completed, the information sent by VASA Provider to the vCenter Server can help you make key decisions regarding the placement of virtual machines into datastores in the vCenter Server.

Now, QSM 3 is fully compatible with VASA, VVOL and release the first version of QSAN VASA Provider. QSAN storage and VMware ESXi provide an efficient and cost-effective solution. It also optimizes IT resources and provides agility solutions for ever-increasing data.

Audience

This document is applicable for QSAN customers and partners who are interested in VASA (vStorage APIs for Storage Awareness) for solving the problem of virtualization management. It assumes the reader is familiar with QSAN products and has general IT experience, including knowledge as a system or network administrator. If there is any question, please refer to the user manuals of products, or contact QSAN support for further assistance.

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Technical Support

Do you have any questions or need help trouble-shooting a problem? Please contact QSAN Support, we will reply to you as soon as possible.

- Via the Web: https://www.qsan.com/technical_support

- Via Telephone: +886-2-77206355

- (Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)

- Via Skype Chat, Skype ID: qsan.support

- (Service hours: 09:30 - 02:00, Monday - Friday, UTC+8, Summer time: 09:30 - 01:00)

- Via Email: support@qsan.com

Information, Tip, and Caution

This document uses the following symbols to draw attention to important safety and operational information.

INFORMATION

INFORMATION provides useful knowledge, definition, or terminology for reference.

TIP

TIP provides helpful suggestions for performing tasks more effectively.

CAUTION

CAUTION indicates that failure to take a specified action could result in damage to the system.

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1. INTRODUCTION TO VASA AND vVOLS

vSphere APIs for Storage Awareness, also known as VASA, enable communications between vCenter Server and underlying storage. Through VASA, storage entities can inform vCenter Server about their configurations, capabilities, and storage health and events. In return, VASA can deliver VM storage requirements from vCenter Server to a storage entity and ensure that the storage layer meets the requirements.

VMware vCenter Server plug-ins extend the capabilities of vCenter Server by providing additional features and functions. vSphere APIs for Storage Awareness, also known as VASA, enables communications between vCenter Server and underlying storage. Through VASA, storage entities can inform vCenter Server about their configurations, capabilities, and storage health and events. In return, VASA can deliver VM storage requirements from vCenter Server to a storage entity and ensure that the storage layer meets the requirements. QSAN VASA provider as a plug-in in VMware vCenter enables application-centric granular management and storage-policy-based management for agile, simple and efficient IT services.

1.1. VASA Provider

A Virtual Volumes storage provider, also called a VASA provider, is a software component that acts as a storage awareness service for vSphere. The provider mediates out-of-band communication between vCenter Server and ESXi hosts on one side and a storage system on the other.

The storage provider is implemented through VMware APIs for Storage Awareness (VASA) and is used to manage all aspects of Virtual Volumes storage. The storage provider integrates with the Storage Monitoring Service (SMS), shipped with vSphere, to communicate with vCenter Server and ESXi hosts.

The storage provider delivers information from the underlying storage container. The storage container capabilities appear in vCenter Server and the vSphere Client. Then, in turn, the storage provider communicates virtual machine storage requirements, which you can define in the form of a storage policy, to the storage layer. This integration process ensures that a virtual volume created in the storage layer meets the requirements outlined in the policy.

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1.2. Virtual Volumes

In traditional storage environments, LUNs formatted with VMFS or NFS mount points are used as datastores for virtual machines. Data services are applied at the LUN or file-system level, which means all virtual machines that reside on that particular datastore are also affected.

Using vVols enables storing VM data on individual virtual volumes, which reside on a vVol datastore, also known as a storage container. Data services, such as snapshots and clones, can be applied at a VM-level of granularity and are offloaded to the QSAN system. Note that data reduction is not supported on vVols.

Policies and profiles can be leveraged to ensure VMs are stored on compliant storage. Any VMs that become noncompliant result in an alert to the administrator. The workflow for provisioning a vVol datastore differs from traditional NFS or VMFS datastore provisioning. Figure 5 shows the vVol-datastore provisioning model on QSAN storage.

vVols enable a fundamentally, and more efficient, operational model for external storage in virtualized environments, centering on the application instead of the physical infrastructure. The primary benefits delivered by vVols focus around operational efficiencies and flexible consumption.
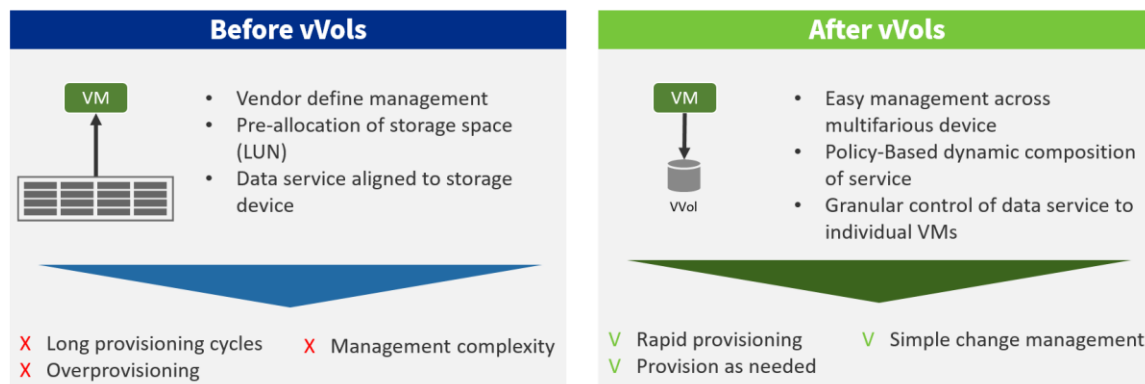

Figure 1-1   Advantages of using vVols

With vVols, that fundamentally changes. vSphere administrators use policies to express application requirements to a storage array. The storage array responds with an individual storage container that precisely maps to application requirements and boundaries.

The following topology shows that how this architect works between vCenter Server and ESXi and other components of your storage environment.
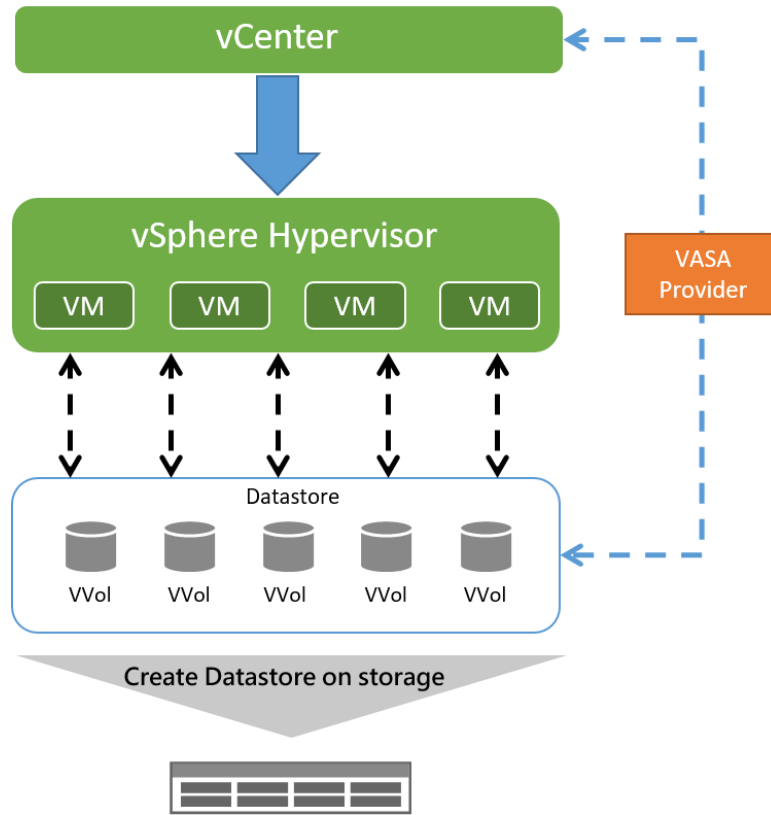
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Figure 1-2　vVol Datastore Configuration Model

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2. BENEFIT

As businesses increase the investments in data-centric initiatives, these investments do not only create additional burdens for IT managers, but also make technical expertise away from administrator positions. For example, when a business has an urgent need for people with higher-order skills to do things such as support business applications, incorporate automation, and oversee data mining programs, but most of IT manager are busy from monitoring, managing and solving company devices issue. Which means fewer people are available to look after the IT ecosystem, and either company increase the man power on IT nor let these personnel shortages problem be left unchecked and slow down business development.

So, storage and virtual infrastructure administrators need better automation and abstraction capabilities in order to keep pace with the demands of the business and regain time to work on other tasks. vVols provides notable automation and abstraction advantages to any IT organization, enabling IT to better support the rest of the business:

- **Integrated management:** VASA and vVols simplify infrastructure management and provisioning by intergrating multiple datastores on different platforms into one single management platform, which is easily leveraged by IT administrators. vVols minimizing the need for traditional LUN management and greatly reduces the burden on IT administrators.

- **Comprehensive functionality**: With VMware's storage policy-based management (SPBM), virtualization admins can match VMs with the right storage functionality. That makes vVols allow a VM administrators to continue leveraging the specific benefits of a given storage solution—features such as snapshots, clones, and replication. These capabilities are now up to VM level, not just in inefficiently LUN level. With vVols IT administrators can get more efficient on this function, which increases the value of their existing storage assets.

- **Improved storage efficiency:** With vVols, storage capacity can be allocated on demand and administrators can have more control over storage provisioning. Which means storage capacity is no need to be pre-allocated to each host to predicted possible expansion. With direct access to storage, storage can achieve immediately space reclamation and improve overall storage efficiency.

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3.   SETUP QSAN VASA PROVIDER

3.1.   Setup QSAN VASA Provider

1.   Download from QSAN Download center.
2.   Double click the setup file.
3.   Enter the installation and follow the process.
4.   Click Next.
5.   Accept the license agreement.
6.   Click Install.
7.   Wait for the installation complete and click finish.

INFORMATION

To install VASA Provider, please make sure you have installed the latest JAVE JRE (The Java Runtime Engine) first.

3.2.   Setup your VASA Provider

1.   After installation, double click the application.

INFORMATION

This application will not run in background, please keep it on.

2.   You can set up the port number (default 8080), and click apply.

3. After apply success, turn the launch service button to On and press VASA website to enter web UI.

4. Use default username and password to login.

   ▪ **Username:** username
   ▪ **Password:** password

5. After login, you see Setting and Registered.

   ▪ **Setting:** You can change login information / Generate Signed Certificate / URL to join vCenter.
   ▪ **Registered:** Add / manage device in VASA provider.

6. After setting and registered device, you can go to vCenter to add your datastore in.

INFORMATION

For more detail, please check QSM Software Manual and Setup Guide.

3.3. Add QSAN VASA Provider

1. Go to vCenter > Configure > More > Storage Provider > Add, to add your provider.
2. Finish the content, and click ok.

   ▪ **Name:** You can decide the display name.
   ▪ **URL:** VASA Provider URL, you can copy it from VASA Provider setting page.
   ▪ **Username & Password:** Enter the username and password on your VASA provider.
   ▪ **Use storage provider certificate:** This is not a most done item, you can download from VASA provider setting page and upload here to certificate you device.

3. After add your provider, then go to vSphere > Configure > Storage adapter, Select existing storage adapter > Static discovery > Add If don't have a storage adapter, please add a new one.
4. Fill in the content and click ok.

   ▪ **iSCSI server:** Enter Storage IP.
   ▪ **Port:** NAS iSCSI port, you can find it on QSM UI. Control panel > Block storage>General setting.

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3.4.　Add your VASA Provider

1. Go to Storage and select your vSphere and click Actions > Storage > New Datacenter to add datastore in vCenter.
2. Select VVol and finish the process.
3. After all done, you can create your virtual machine with the datastore, just to select the datastore you add in create virtual machine page.

INFORMATION

For more detail, please check QSM Software Manual and Setup Guide.

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4.   CONCLUSION

It is important for IT administrator to continue expanding knowledge and areas of expertise in order to move on to strategic, higher-value job. This digital business investment keeps increasing, and modern businesses will continue to need more technical talent. IT manager will not only must do more than before, but also have to do so with less people and do it faster than before.

Advanced integration such as vSphere and vVols simplify the tasks of IT administrators, making the core IT tasks simpler and more efficient, saving both personnel and infrastructure resources. As businesses continue move on to becoming more digital, and more dependent on data and IT services. The efficiency of IT operation will play a larger, even pivotal role in determining business competitiveness.

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5. APPENDIX

5.1. Apply To

▪ QSM firmware 3.4.0 and later

5.2. Reference

▪ QSM Software Manual

▪ QSAN VASA Provide Setup Guide

▪ VASA and vVol Tutorial

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