NetApp SANtricity® E-Series VASA Provider 5.5

# User Guide

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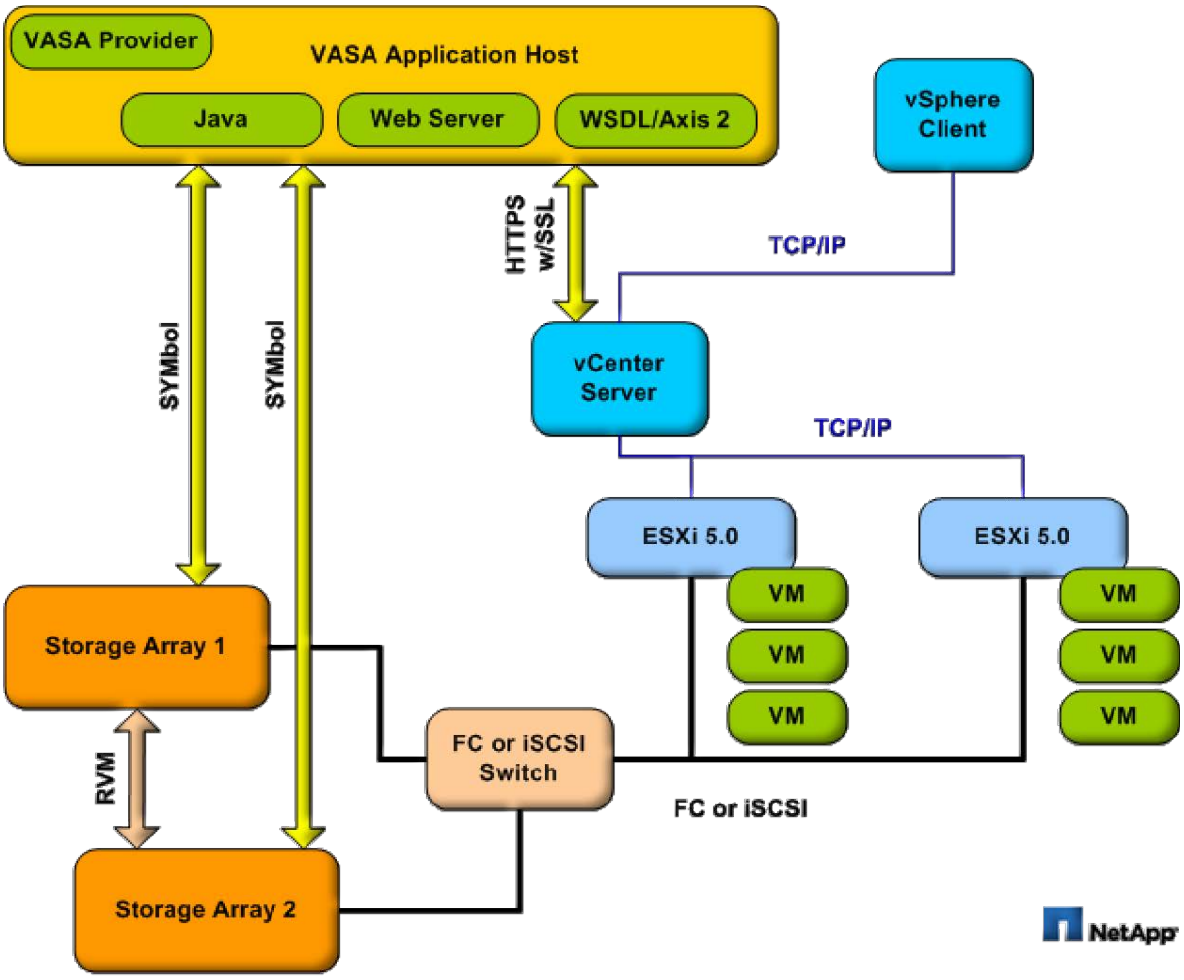
# Overview

The NetApp E-Series VASA Provider is a set of extensible APIs that enable vCenter to see the capabilities of storage array LUNs and corresponding datastores. The VASA Provider is deployed on a standalone Microsoft Windows server and provides responses to VMware vCenter Server queries. Figure 1 illustrates the VASA Provider architecture.

The VASA Provider is the vCenter framework for tighter integration with storage arrays. The VASA Provider enables storage arrays to send information about the type of storage attached to the storage array and the capabilities of the storage array.

With the VASA Provider, you can discover and characterize a datastore's static capabilities. With visibility into capabilities underlying a datastore, you can more-easily select the appropriate disk for virtual machine placement. You can receive alert and event notifications within vCenter from the storage arrays that are monitored by the VASA provider.

**Figure 1 - VASA High Level Block Diagram**




## Provisioning Virtual Machine Storage

Provisioning operations ensure that storage can meet the VM needs.

- Extreme - SSD volumes for the most demanding performance requirements
- Performance – high performance disk drives ( >= 10K RPM)

- Value - Near-line storage for bulk storage needs ( < 10K RPM)
- Extreme-Replicated – Highest availability, highest performance storage
- Perf-Replicated – Highest availability, high performance storage
- Value-Replicated – Highest availability with near-line performance
- Extreme-Thin – A Thin provisioned volume comprised of Solid State Device (SSD) physical drives
- Perf-Thin – A thin provisioned volume comprised of high performance physical drives
- Value-Thin – A thin provisioned volume comprised of less than 10K RPM physical drives

The VASA Provider can manage multiple storage arrays simultaneously. The VASA Provider supports legacy storage arrays

# Profile-Driven Storage

The VASA Provider enables you to perform Profile Driven Storage, which allows rapid and intelligent provisioning of applications, ensures application service levels match the available storage, and provide visibility into your storage pool. The VASA Profiler categorizes volumes by capability and reports capabilities of the storage arrays in the storage profile.

## Policy-Based Storage Management

Policy-based storage management in vSphere 5.x helps you provision virtual machines (VMs) by automating datastore placement decisions for VMs.

## Storage Service Level Agreements

You no longer need to maintain spreadsheets that detail the storage capabilities of each LUN to map correct service level agreements (SLAs) to virtual machines.

Deliver the best-matched resources to the LSA demanded by the VM. This is especially true in the case of storage resources, because storage environments can be heterogeneous, and different types of storage have very different performance and availability characteristics.

Discover and monitor array SLA properties

- Availability
- Security
- Performance
- Leverage array services to enforce storage VM SLAs
- Create end-to-end storage SLA guarantees for VMs

# Storage Distributed Resource Scheduler

The VASA Provider extends VMware's Distributed Resource Scheduler (DRS) functionality to data storage by enabling Storage Distributed Resource Scheduler (SDRS) to operate on a group of datastores with similar capabilities. The VASA Provider enables SDRS to determine whether a storage array support SDRS migration and whether SDRS recommends migration.

# VASA Session Communications

All communications between the vCenter Server and the VASA Provider use Secure Sockets Layer (SSL) certificates. The VASA Provider can use a self-signed certificate or certificate issued by a certificate authority (CA).

# Downloading and Installing the VASA Provider

This section describes how to download and install the VASA Provider.

## Prerequisites

The VASA provider must be installed on a separate Microsoft Windows host from the vCenter Server. For a complete and up-to-date listing of all compatible operating systems, applications, storage arrays, and firmware for the SANtricity plug-in, refer to the NetApp Interoperability Matrix Tool.

## Downloading the NetApp E-Series VASA Provider

The VASA provider is a self-extracting, self-installing file for the Microsoft Windows environment that you can obtain from the following URL: http://<*VASA Provider URL*> (Not available for NetApp version at this time).

### Installing the NetApp E-Series VASA Provider

To install the VASA provider, download the installation bundle and copy to the host system to be used. Run the installation bundle to launch the installation wizard. Accept the license agreement and follow the prompts.

- The default installation path is: **C:\Program Files (x86)\NetApp\VASA Provider for E-Series**

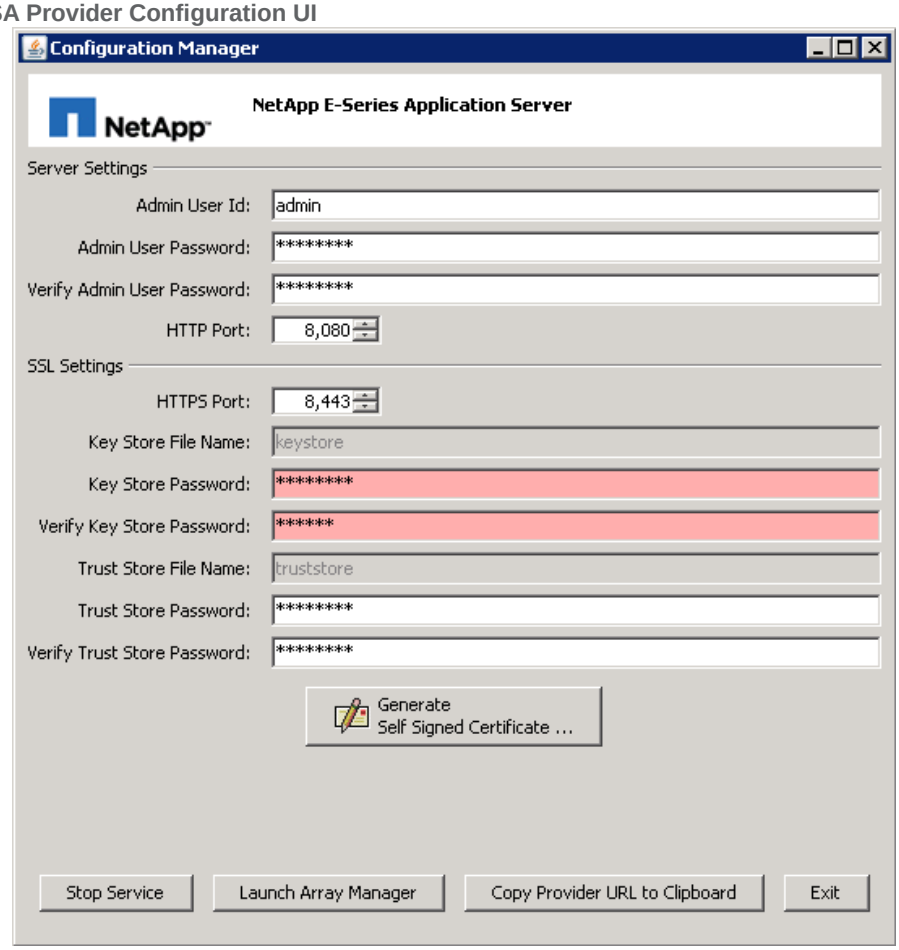
After the installation is complete, verify that the installation was successful.

- Verify that an error log entry was generated during the installation process. The error log entry shows whether the installation was successful or unsuccessful.
- Verify that the NetApp E-Series VASA Provider appears on the Add or Remove Programs list in the Windows Control Panel.

### Configuring the VASA Provider

After installation of the VASA E-Series Provider, execute the VASA Provider for E-Series Configuration Manager.exe file to configure the VASA provider for your environment. Figure 2 show the Configuration Manager used to configure the NetApp E-Series VASA Provider application server.

**Figure 2 - VASA Provider Configuration UI**




1. **Enter** the admin user ID to be used for the provider
2. **Enter** the password for this user ID (twice)
3. **Verify** or **change** the HTTP port number to be used
4. **Verify** or **change** the HTTPS port number to be used
5. **Enter** the key store name for the SSL certificates
6. **Enter** the key store password (twice)

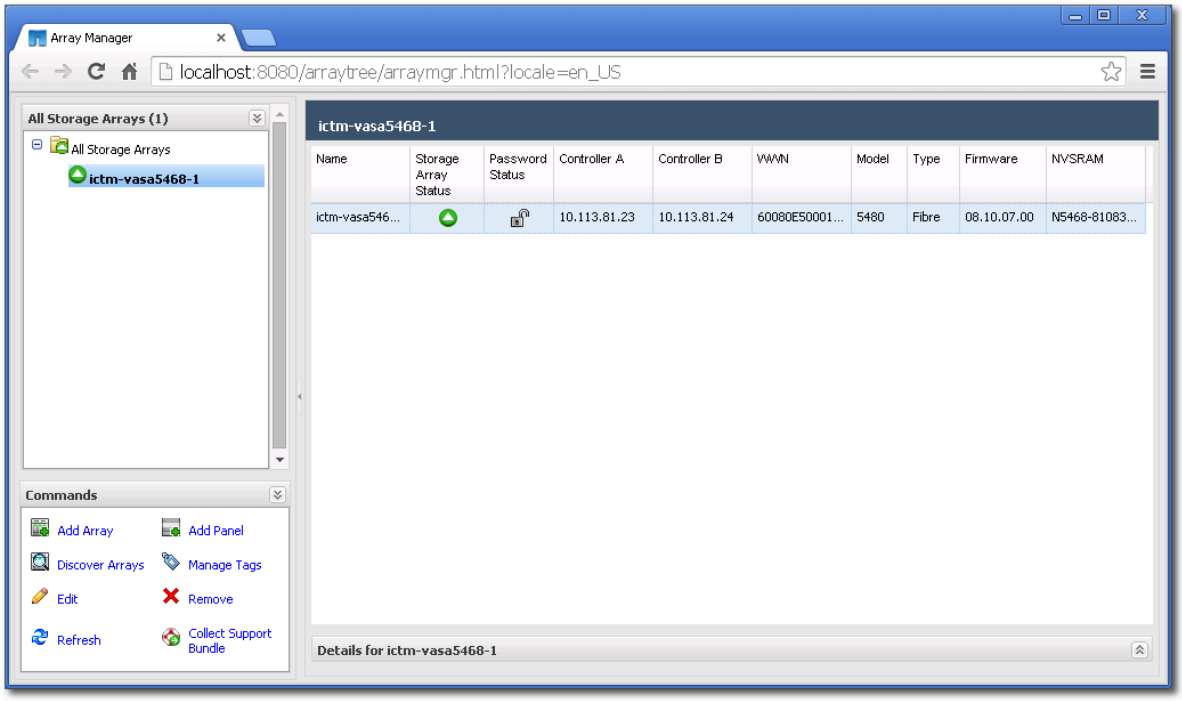
   **NOTE:** If the passwords within the Configuration Manager do not match, the input box background will turn red.
7. **Enter** the trust store file name for the SSL certificates
8. **Enter** the trust store password (twice)
9. **Click** Generate Self Signed Certificate button to generate the SSL certificates
10. **Enter** the certificate information
11. **Click** the Start Service button to start the NetApp VASA provider service (Optional) **Click** Copy Provider URL to Clipboard
12. **Click** the Launch Array Manager button to start the storage array manager

## Configuring Storage Arrays to be Monitored

The Storage Array Manager allows for the management of the storage arrays that will be monitored by the NetApp E-Series VASA Provider. The Storage Array Manager is a web application that may be accessed from a web browser using the following URL or launched directly from the Configuration Manager.

http://<host_address>:8080/arraytree/arraymgr.html?locale=en_US

**Figure 3 - Storage Array Manager**




To add storage arrays that will be monitored by the VASA provider, perform the following actions:

1. (Optional) **Click** Add Folder icon and enter the name of the folder for the storage array group.
2. **Select** the folder or *Storage Configuration* heading in the left panel.
3. **Click** Add Array icon and **enter** the IP addresses for the array controllers and password (if required).
4. Repeat steps 1-3 for all storage arrays that will be monitored by the VASA provider.

## Registration Procedure

After configuring the storage arrays to be managed by the VASA provider, you must configure vCenter Server to connect to the VASA provider.

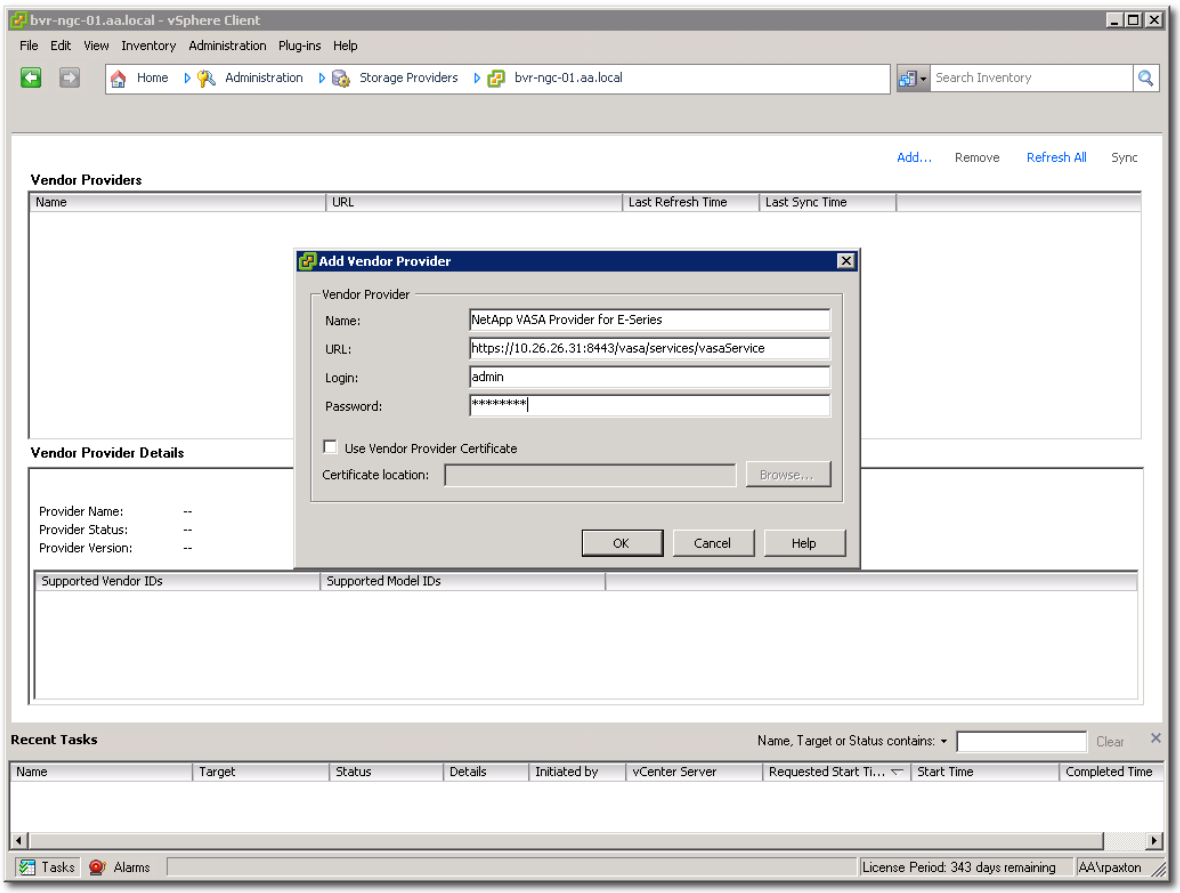
Perform the following actions to register the VASA provider with vCenter:

1. Log into vSphere Client and connect to the vCenter Server to add the VASA provider to
2. From the Home screen, **click** on the Storage Providers icon
3. **Click** Add to register a new provider
4. **Enter** the name to use for the provider
5. Perform one of the following steps
   a) **Paste** clipboard content from the Configuration Manager
   b) **Enter** the URL of the VASA Provider service (Example: **`https://kswa-vasa3-prov:8443/vasa/services/vasaService`**)

**NOTE:** "**`/vasa/services/vasaService`**" must be appended to the host URL. **`https`** is used to specify secure HTTP connection and **8443** is the default HTTPS port number for the VASA provider.

6. **Enter** the admin user ID as configured with the VASA Provider Configuration Manager
7. **Enter** the password for the login ID
8. **Click** OK to register the provider

Figure 4 - Provider Registration




# Using the NetApp E-Series VASA Provider

After registering the VASA provider, you should see a list of the managed storage arrays in the Vendor Provider Details window. To verify the operation of the VASA provider:

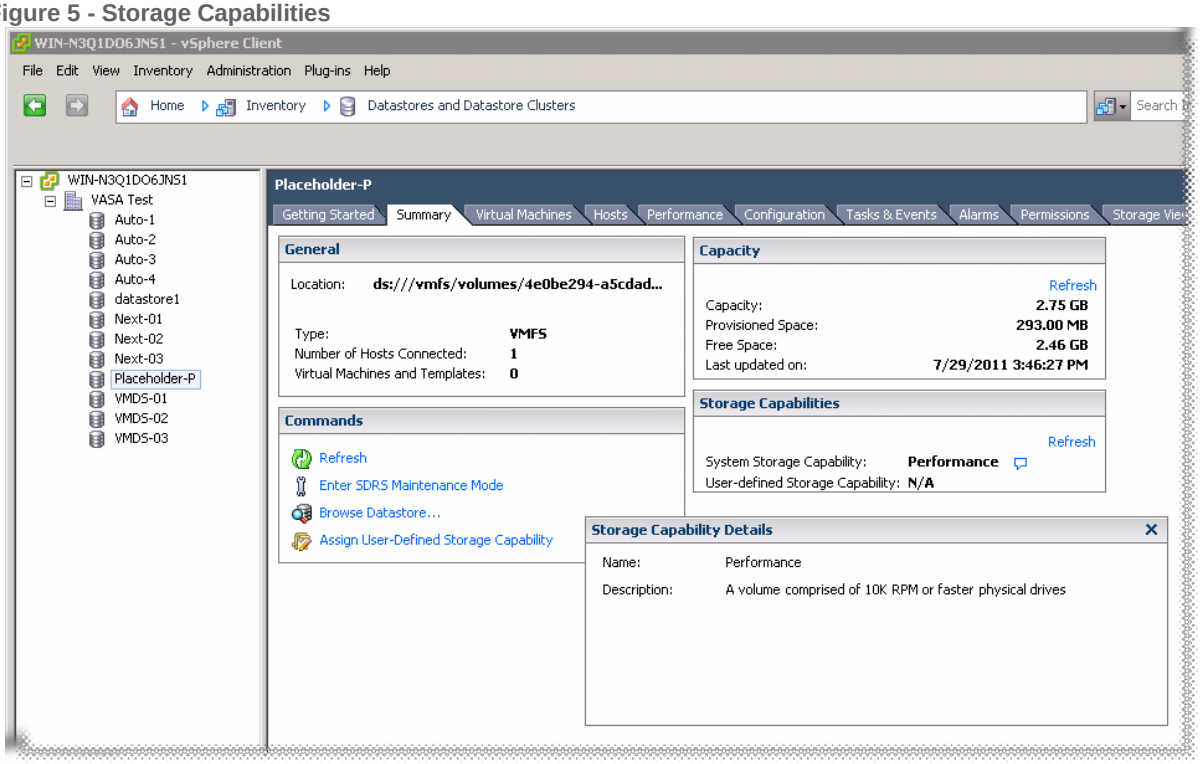
1. **Select** Datastores and Datastore Clusters from the Home view in the vSphere Client
2. **Select** a datastore residing on a storage array monitored by the VASA provider
3. **Click** the Summary tab

You should see a capability category for the System Storage Capability. These capabilities are generated by the VASA provider based on the following criteria:

Table 1 - Storage Capabilities

| Capability | Description |
|---|---|
| **Extreme** | Storage array volumes comprised of Solid State Drives (SSD) |
| **Performance** | Storage array volumes comprised of 10K RPM or faster physical drives |
| **Value** | Storage array volumes comprised of less than 10K RPM physical drives |
| **Replicated** | Any of the above capabilities that are remotely mirrored. Replicated will be appended to the above capability (e.g., Perf-Replicated) |
| **Thin** | Any of the above capabilities that are thin provisioned. Thin will be appended to the above capability (e.g., Perf-Thin) |

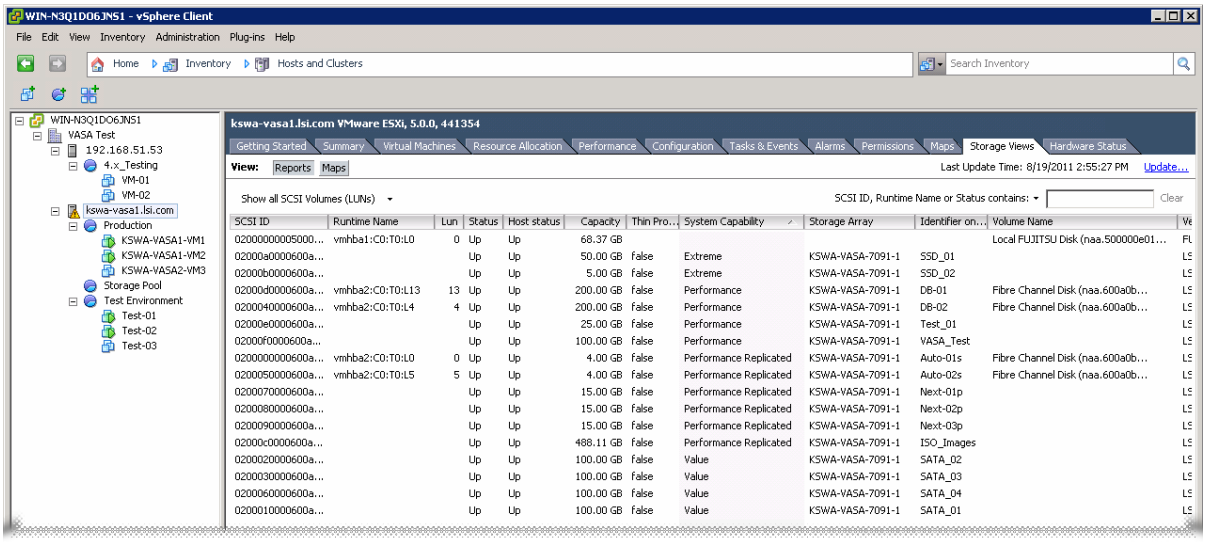
**Figure 5 - Storage Capabilities**




Clicking on the blue speech balloon link will display the description for the capability listed.

Selecting the Storage Views tab and then selecting Show all SCSI Volumes (LUNs) will display a list of SCSI IDs, LUNs, status, capacity, capability, storage array, etc.

**Figure 6 - Storage Views**




# VM Storage Profiles

VM Storage Profiles allow the creation of storage profiles that can be used to select datastores based on user selected criteria. To enable VM Storage Profiles, perform the following actions:

1. **Click** on VM Storage Profiles from the vSphere Client Home view

2. **Click** on Enable VM Storage Profiles
3. **Click** on Create VM Storage Profile
4. **Enter** the properties for the new profile and **click** Next
5. **Select** the storage capability to be associated with the profile and **click** Next
6. **Review** the summary information and **click** Finish

   See Figure 7 for sample VM Storage Profile creation.

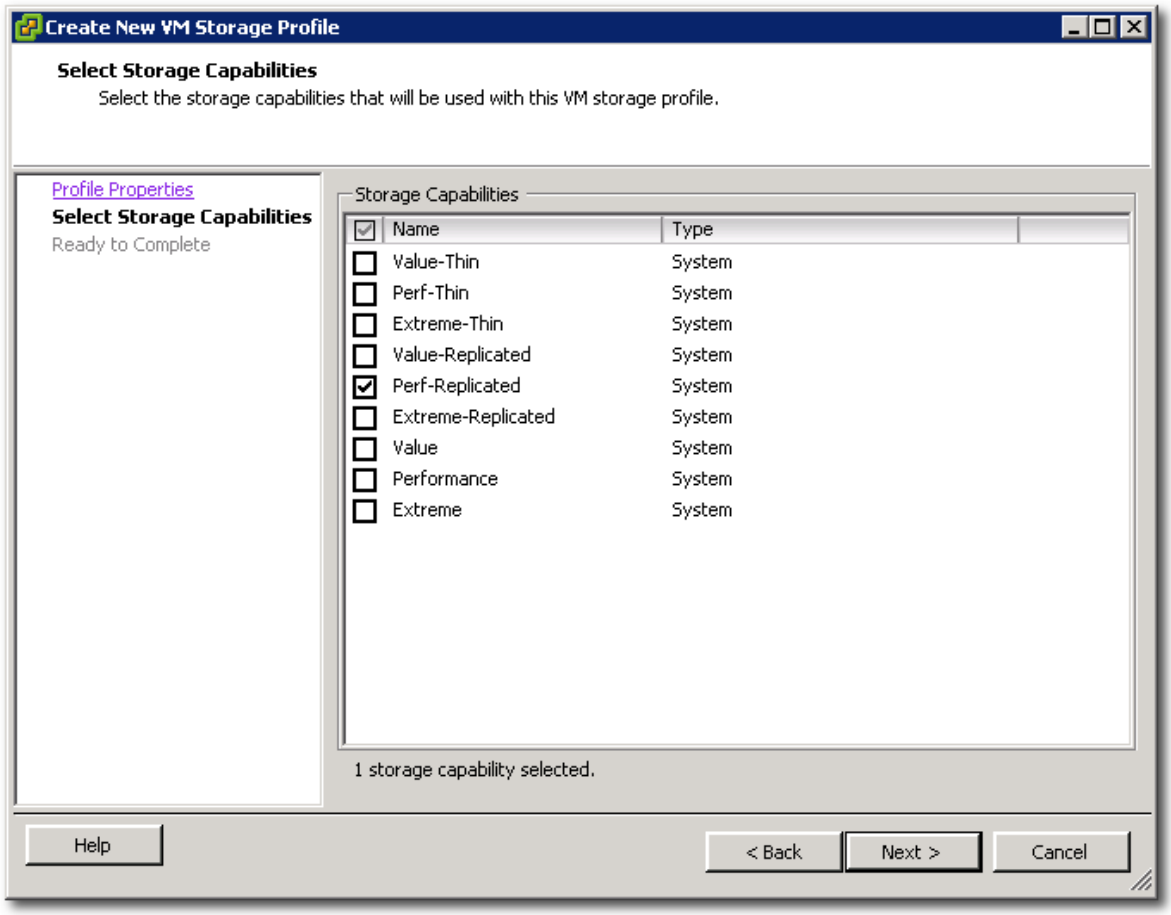
## Assigning VM Storage Profiles to VMs

After creating the VM Storage Profile(s), you can then assign a VM storage profile to an existing virtual machine by:

- **Select** the VM to be configured from the Hosts and Clusters view
- **Right click** on the VM and select VM Storage Profile -> Manage Profiles
- **Select** the VM Storage Profile to be used from the Home VM Storage Profile drop-down box
- **Click** on the propagate to disks button
- **Click** OK to apply changes
- **Click** Refresh in the VM Storage Profiles window on the Summary tab for the selected VM The assigned profile should be displayed along with the compliance status of the VM.

To assign a profile to a VM during the creation process, select the VM storage profile to be used from the drop-down box during the Storage selection phase. Select the desired VM Storage Profile, datastores will be grouped by compatible and incompatible based on the profile selected.

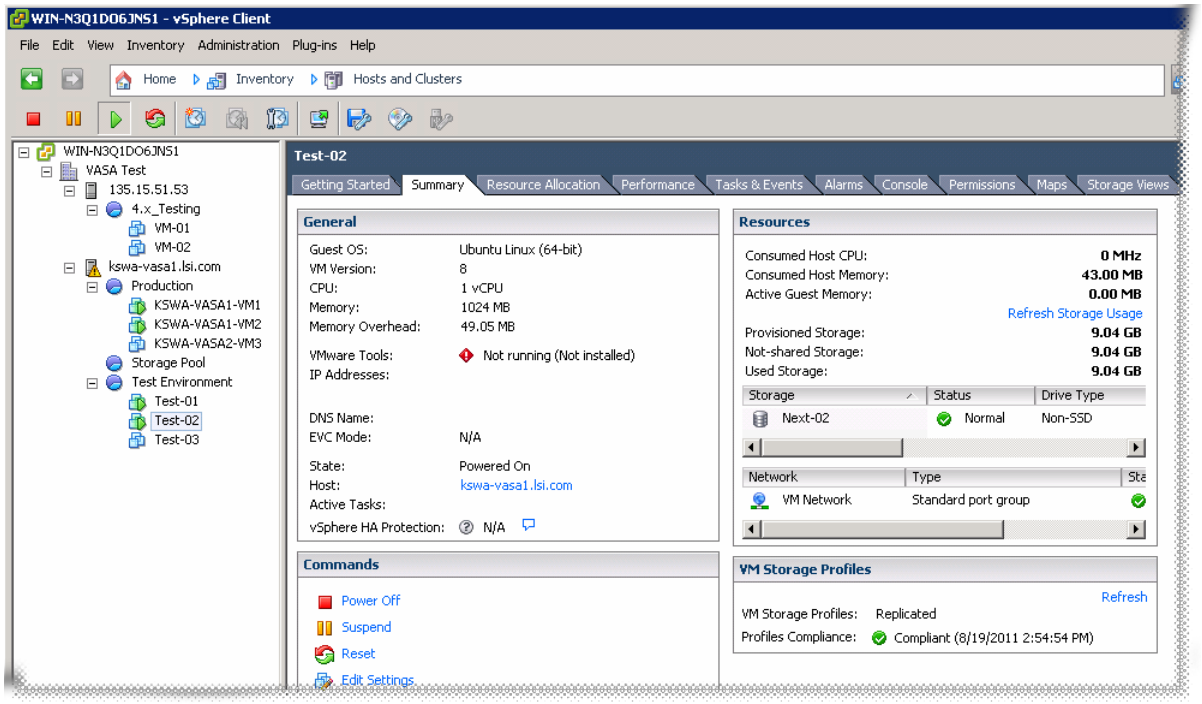
**Figure 7 - Create VM Storage Profile**



### Checking Storage Profile Compliance

After assigning a VM storage profile to a VM, you may verify its compliance by selecting the VM from the Host and Clusters view and selecting the Summary tab and observing the VM Storage Profiles box. (See Figure 8) Click the Refresh link if necessary to update the status.

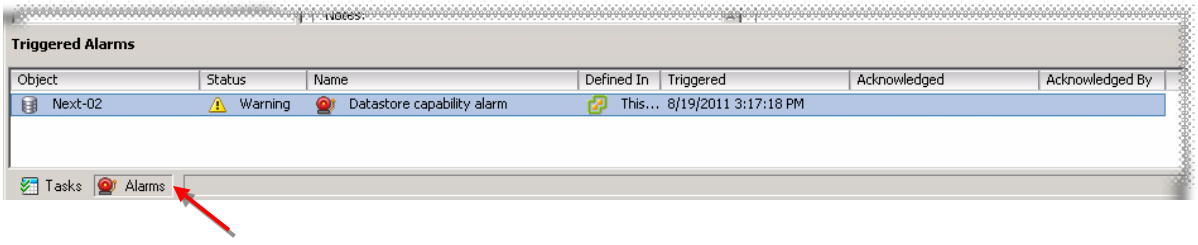
**Figure 8 - VM Storage Profile**




# Storage Array Alerts and Events

The NetApp E-Series VASA Provider will also propagate storage array alerts to the vCenter Server Event monitor. Alerts will be displayed on the Alert tab for the respective property or by switching from the Tasks view to the Alarms view at the bottom of the vSphere Client (see Figure 9). Events may be viewed by clicking on Events icon from the vSphere Client Home view.

**Figure 9 - Triggered Alarms**




# Troubleshooting Tips

The NetApp E-Series VASA Provider is a fairly simple application with few options to modify. One thing to note is that the default startup type for the **`NetApp App Server`** service is set to Manual and will not be automatically started if the provider host is rebooted. This may be changed based on user preference.

## Common Issues

Table 2 - Common Issues

| Issue | Possible Resolution |
|---|---|
| Unable to connect to the provider host. | • Verify proper URL link for storage provider has been registered.<br>• Verify firewall settings allow for configured ports (default 8080 and 8443).<br>• Verify provider service is started on provider host. |
| No Datastore capabilities being displayed. | • Verify valid vendor ID and model ID are listed for the registered storage provider in vCenter.<br>• Verify storage arrays to be monitored have been added to the array manager.<br>• Verify the VASA provider service is running on the provider host. |
| Unable to access the Array Manager. | • Verify proper URL link for Array Manager (default http://localhost:8080/arraytree/arraymgr.html?locale=en_US on provider host.)<br>• Verify firewall settings allow for configured ports.<br>• Verify the VASA provider service is running on the provider host. |
| Event messages do not display description information. | • This is a known issue with the VASA APIs and will be resolved with a U1 patch from VMware. |

## Troubleshooting Logs

If further troubleshooting is required to resolve issues in the field, technical support will require the working log directory to be zipped up and sent in for analysis. This directory is located on the provider host at **`C:\Program Files (x86)\NetApp\E-Series VASA Provider\working\logs`** on x64 hosts and **`C:\Program Files\NetApp\E-Series VASA Provider\working\logs`** on x86 hosts. Create an archive bundle of this directory if requested by technical support.

## Configuration Reset

If the provider configuration needs to be reset to a clean configuration, the following procedure may be used:

1. **Stop** the NetApp App Server service on provider host.
2. **Delete** the **db** directory under **C:\Program Files (x86)\NetApp\E-Series VASA Provider\working** directory.
3. **Delete** the **tmp** directory under **C:\Program Files (x86)\NetApp\E-Series VASA Provider\working** directory.
4. **Start** the NetApp App Server service on the provider host.

   This will remove the alert information and cached data from the VASA provider application server, but retain the monitored storage array information.

# Uninstalling the VASA Provider

You can uninstall the VASA Provider in two ways.

- In the **Add and Remove Programs** list on the Windows Control Panel, select the VASA Provider application.
- Use the VASA Provider uninstaller at the following location:

After the VASA Provider uninstall process is complete, verify that all application files and folders were deleted.

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