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Quick-start Guide to Configuring VMware Virtual Volumes for Systems Powered by IBM Spectrum Virtualize

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Quick-start guide

This IBM® Redpaper™ publication provides a quick, yet comprehensive, guide to configuring Virtual Volumes (VVols) for systems powered by IBM Spectrum™ Virtualize. You are guided through the configuration of the storage system, IBM Spectrum Control™ Base Edition, and the VMware vSphere Web Client. These three components are key to enabling the Virtual Volumes management framework.

Figure 1 shows a high level overview of the three key components that enable the Virtual Volumes management framework.

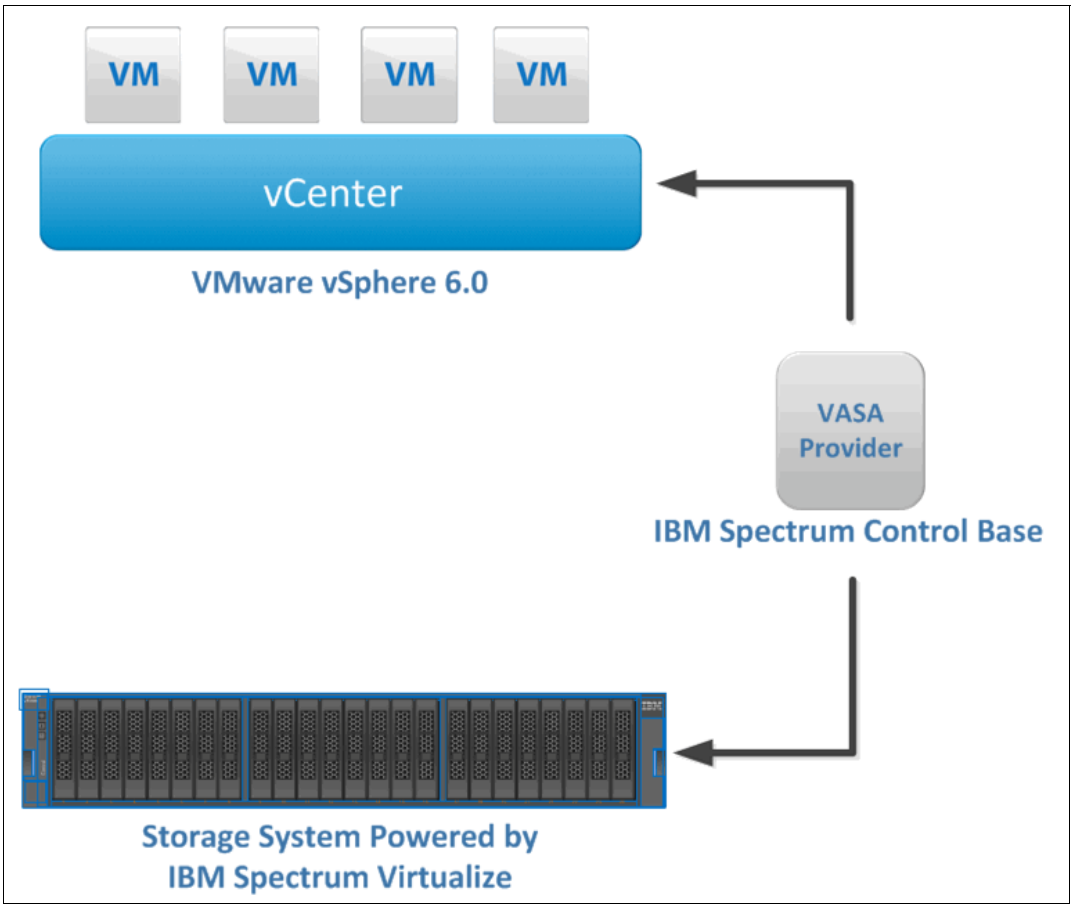

Figure 1 Overview of management framework

Prerequisites

Certain prerequisites must be met before you attempt to implement Virtual Volumes in your environment.

Compatible storage systems

Virtual Volumes can be implemented with the following storage systems:

- IBM SAN Volume Controller
- IBM Storwize® Family
- IBM FlashSystem™ V9000

Code levels

Three core software components are needed for the implementation of Virtual Volumes. The minimum code level required for each component is in the following list:

- VMware vSphere 6.0 (or later):
  - VMware ESXi version 6.0
  - VMware vCenter Server 6.0 or vCSA 6.0 (vSphere Web Client 6.0)
- IBM Spectrum Control Base version 2.2.1 (or later)
- Compatible storage system powered by IBM Spectrum Virtualize™ version 7.6.0 (or later)

NTP server settings

Ensure that a Network Time Protocol (NTP) server is configured across the following components:

- Storage system
- IBM Spectrum Control Base
- vSphere environment

NTP is a requirement for Virtual Volumes. You will not be able to proceed with the configuration until the NTP server settings are configured. This ensures that time settings are consistent across the entire VVols environment.

Server configuration for IBM Spectrum Control Base

IBM Spectrum Control Base can be deployed on a physical or virtual server. We suggest using a virtual machine in order to take advantage of features such as VMware High Availability.

The server that hosts IBM Spectrum Control Base must satisfy the following requirements:

- 64-bit dual-core CPU
- At least 4 GB of RAM
- At least 16 GB of free disk space
- Red Hat Enterprise Linux (RHEL) 6.3-6.6 (x64) operating system

Licensing requirements

IBM does not require an additional license in order to enable Virtual Volumes on a storage system powered by IBM Spectrum Virtualize.

Note: Be aware that VVols functionality uses IBM FlashCopy®. Therefore the appropriate FlashCopy license for your storage system must be applied before implementing VVols.

Example configuration

The following system configuration was used for the examples cited in this paper:

- VMware vSphere version 6.0u1
  - VMware vCSA version 6.0u1
  - VMware ESXi version 6.0u1
- IBM Spectrum Control Base version 2.2.1
  - Deployed in an active/standby configuration on Red Hat Enterprise Linux 6.5 (virtual machines).
- IBM Storwize V7000
  - Powered by IBM Spectrum Virtualize, version 7.6.0.

Installation and configuration

For the purposes of these instructions, the assumption is that your storage system has at least one parent pool configured and the system is running version 7.6.0 of IBM Spectrum Virtualize or later.

Enabling VVols

Complete the following steps to enable VVols:

1. In the management GUI for your storage system, navigate to **Settings** → **System** and select **VVol** from the list.

   The VVOL toggle switch is displayed (Figure 2 on page 4), which you can use to enable or disable VVols on your storage system.

   Note: Although the figure shows the **VVOL** label, depending on the specific code level on your storage system, the GUI might show as **VVol** or **VVols**.

2. Toggle **VVol** to the **ON** position to start the Virtual Volumes configuration.

   Note: If you are unable to toggle VVol to the **ON** position, ensure you have at least one parent pool configured and NTP configured on your storage system.

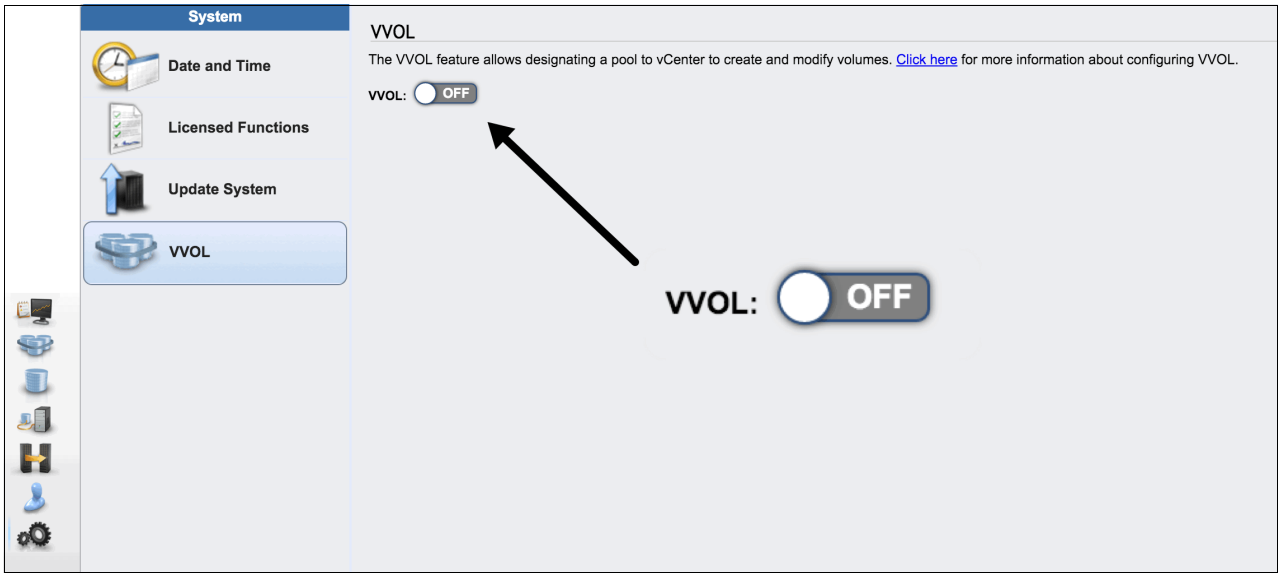

Figure 2 Storage system: Toggle on the VVOL management GUI

A wizard starts, which can help you with the steps to complete setting up of VVols on your storage system. Figure 3 shows the Enable VVOL dialog. Here, we selected the parent pool on which to locate our utility volume as well as creating our user for IBM Spectrum Control Base.

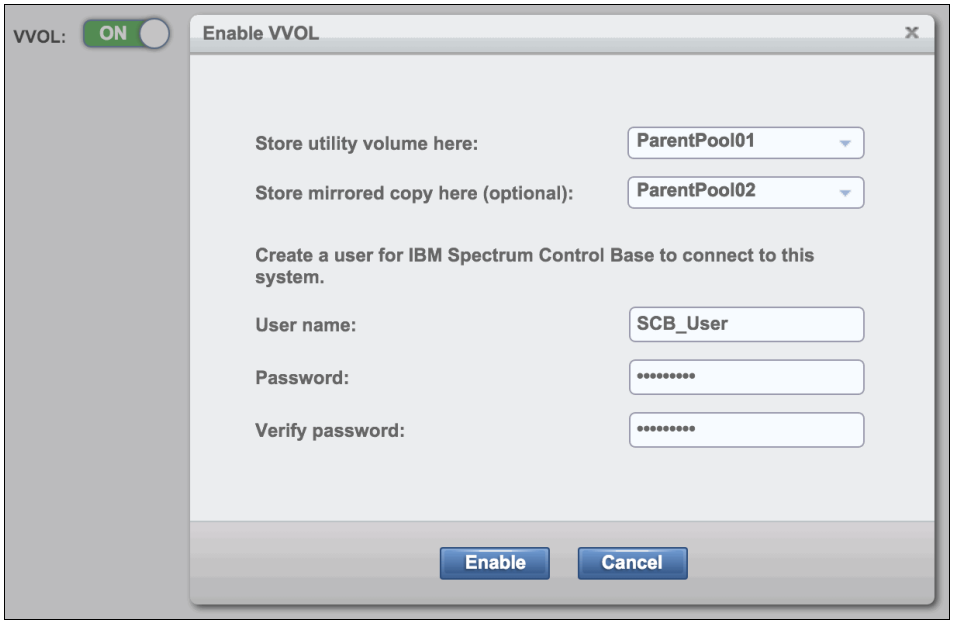

Figure 3 Storage system: Enable VVOL dialog

3. Select an available parent pool on your storage system for your utility volume. As an optional task, select an additional parent pool where you want your utility volume to be mirrored, as illustrated in Figure 4 on page 5.

Figure 4 Storage system: Selecting parent pools

Note: The utility volume contains a database that is critical to your VVols environment. For redundancy, we suggest mirroring your utility volume to a second parent pool that is in a separate failure domain. For example, use a parent pool that is made from MDisks that are presented from different storage systems or a different I/O group.

4. Create a user for IBM Spectrum Control Base to communicate with the storage system and then click **Enable**, as shown in Figure 5. This user account will automatically be added to the security role *VASAProvider*.

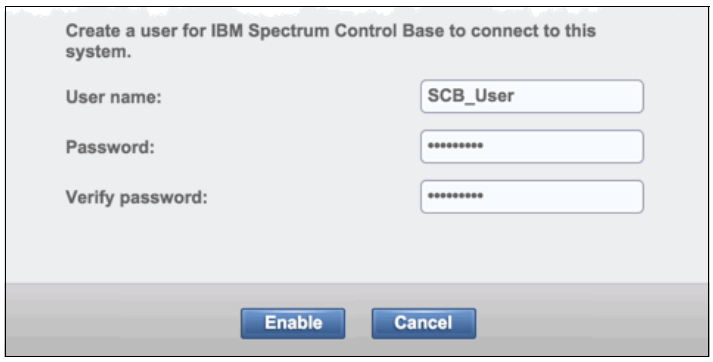

Figure 5 Storage system: Creating the user

Tip: These credentials will be required during the configuration of IBM Spectrum Control Base.

A confirmation window (Figure 6) indicates that VVol is enabled.

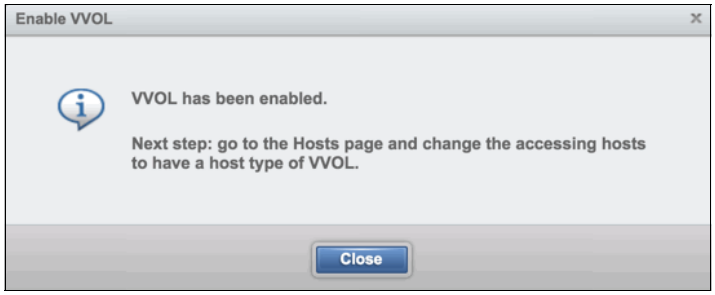

Figure 6 VVol is enabled confirmation message

Important: The VASA Provider role is reserved for use strictly by the IBM Spectrum Control Base server. Do not log in to the GUI or CLI as a user with `VASAProvider` privileges. Do not perform *any* manual tasks as the VASAProvider user, unless specifically advised to by IBM Support.

Enabling ESXi hosts for VVols

Existing ESXi hosts on your storage system must be enabled for VVols before you can use Virtual Volumes in the vSphere Web Client. If you are adding new ESXi hosts to your storage system, the same VVols enablement steps apply.

1. Enable VVols on your existing host (or hosts) by selecting the ESXi host object from the *Hosts* view and then select **Action** → **Properties** → **Edit**. Here you can change the host type to VVol as depicted in Figure 7. You must repeat these steps for each ESXi host you want to enable for VVols.

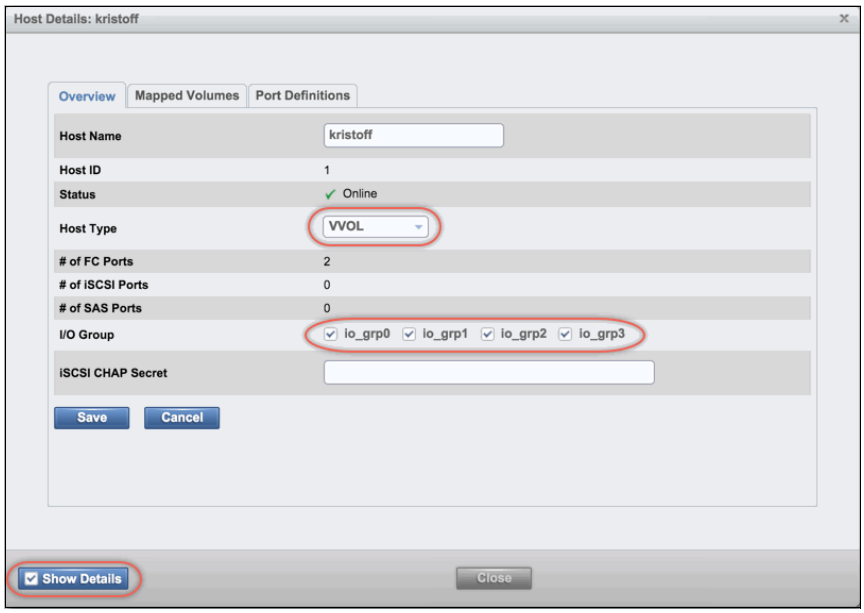

Figure 7 Storage system: Enable host type VVol

Note: Existing hostmap configurations are unaffected by enabling your ESXi hosts for VVols. However, you might need to enable host access to all I/O groups if they are not already configured.

2. To add a new ESXi host to the system (optional), select the **Hosts** view and **Add Host** to open the Add Host window (Figure 8 on page 7). Use the following steps to complete the configuration:
   a. Select the connectivity type for the host.
   b. Enter a name for the host.
   c. Input the port details. Click the plus sign (**+**) button (Show Details) to see more options.
   d. In the Host type field, select **VVol**.
   e. Click **Add** to complete the task.

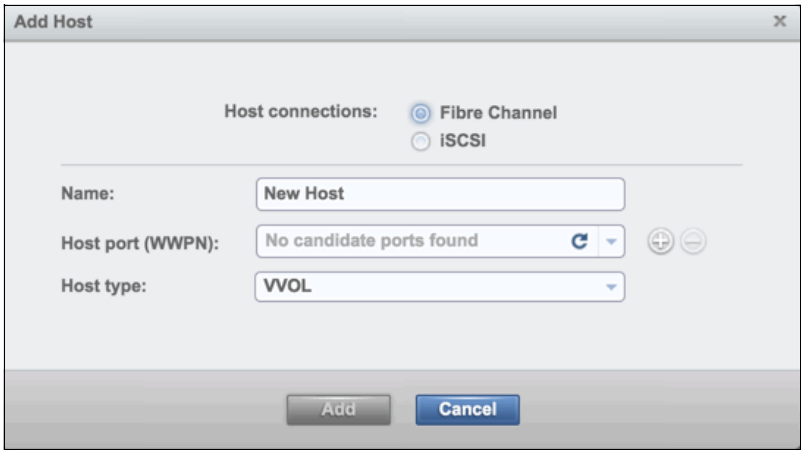

Figure 8 Storage system - Add Host dialog

Setting up your storage system is completed. Now, you can configure the IBM Spectrum Control Base instance, as described in the next section.

Configuring IBM Spectrum Control Base

IBM Spectrum Control Base plays a pivotal role in the communication between your vSphere environment and the storage system. This section guides you through the installation and configuration options for installing IBM Spectrum Control Base.

Note: The assumption is that you already have a virtual machine, provisioned with VMware Tools installed, and configured with an NTP server. Additionally, you completed all the steps in “Installation and configuration” on page 3 and are ready for the installation of IBM Spectrum Control Base.

Downloading IBM Spectrum Control Base installation files

Download the latest IBM Spectrum Control Base installation files from Fix Central:

`https://ibm.biz/ibm-scb`

Extract the files to a temporary folder (for example, `/scb_install`) on your IBM Spectrum Control Base virtual machine (SCB VM). Example 1 on page 8 shows the typical installation files for IBM Spectrum Control Base after they are extracted.

Authenticity: Downloading the installation package from a trusted, SSL-protected resource, such as Fix Central, ensures authenticity and integrity. If you have any doubt about the authenticity of the package, see the *IBM Spectrum Control Base Edition User Guide* (which you can download also from Fix Central). The user guide describes how to use the Signing Key to validate the package.

Example 1 IBM Spectrum Control Base installation files

```
ibm_spectrum_control-2.2.1-xxxx-x86_64.bin
nginx-1.6.2-1.el6.ngx.x86_64.rpm
postgresql92-9.2.10-1PGDG.rhel6.x86_64.rpm
postgresql92-contrib-9.2.10-1PGDG.rhel6.x86_64.rpm
postgresql92-libs-9.2.10-1PGDG.rhel6.x86_64.rpm
postgresql92-server-9.2.10-1PGDG.rhel6.x86_64.rpm
```

Installing IBM Spectrum Control Base

Tip: Now is a good time to ask your vSphere administrator to clone your SCB VM to a template. You can later use the template to deploy further instances of IBM Spectrum Control Base server as part of an HA Group.

Complete the following steps:

1. Change to the folder on your IBM Spectrum Control Base server where you extracted the installation files. Start the installation of IBM Spectrum Control Base by using the **`rpm -iv *.rpm`** command at the command prompt.

   The output is shown in Example 2.

   *Example 2 Example output of command rpm -iv *.rpm*

   ```
   warning: nginx-1.6.2-1.el6.ngx.x86_64.rpm: Header V4 RSA/SHA1 Signature, key ID
   7bd9bf62: NOKEY
   warning: postgresql92-9.2.10-1PGDG.rhel6.x86_64.rpm: Header V4 DSA/SHA1
   Signature, key ID 442df0f8: NOKEY
   warning: uuid-1.6.1-10.el6.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID
   fd431d51: NOKEY
   Preparing packages for installation...
   postgresql92-libs-9.2.10-1PGDG.rhel6
   postgresql92-9.2.10-1PGDG.rhel6
   uuid-1.6.1-10.el6
   postgresql92-contrib-9.2.10-1PGDG.rhel6
   postgresql92-server-9.2.10-1PGDG.rhel6
   nginx-1.6.2-1.el6.ngx
   ```

2. Install the `.bin` file by typing the following command (your file version might be newer):

   ```
   ./ibm_spectrum_control-2.2.1-xxxx-x86_64.bin
   ```

3. When prompted, enter **1** to accept the agreement. After a minute or two, you see the `Installation completed successfully` message.

Changing the IBMSC administration account

As part of the installation process, a user account named *IBMSC* is created for administration purposes. To avoid unauthorized access to the IBM Spectrum Control Base server be sure to change the default password.

To modify the IBMSC user account, enter the **`passwd ibmsc`** command at the command prompt, and then provide a new password.

This is the last task to run at the command line. All further steps are run from the IBM Spectrum Control Base server web interface.

Note: Configuring a second IBM Spectrum Control Base instance is required for redundancy and is suggested. For details, see “Configuring additional IBM Spectrum Control Base servers for high availability” on page 24.

Accessing the IBM Spectrum Control Base web interface

Complete the following steps:

1. Open a web browser and connect to your IBM Spectrum Control Base server’s web interface by using the following web address:

   `https://<SCB Server Name>:8443`

   You might need to *trust* the certificate before continuing to the login page.

   The login page then opens, as shown in Figure 9.

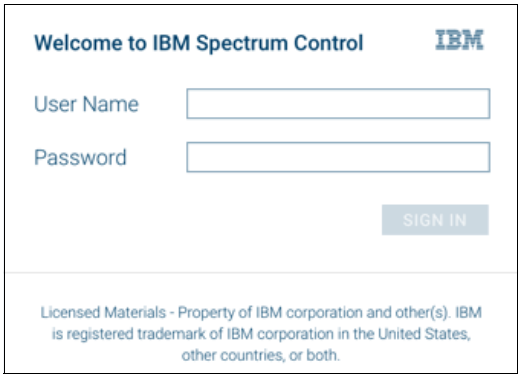

Figure 9 IBM Spectrum Control web interface login

2. Log in to the IBM Spectrum Control Base web interface with the following default credentials:
   - User name: `admin`
   - Password: `admin1!`

An overview of the IBM Spectrum Control Base web interface

The first time you log in to the IBM Spectrum Control Base web interface, the Welcome window opens. Click past this until you see the IBM Spectrum Control Base home view, as shown in Figure 10. To help familiarize yourself with the components and views before continuing with the configuration, read through this section.

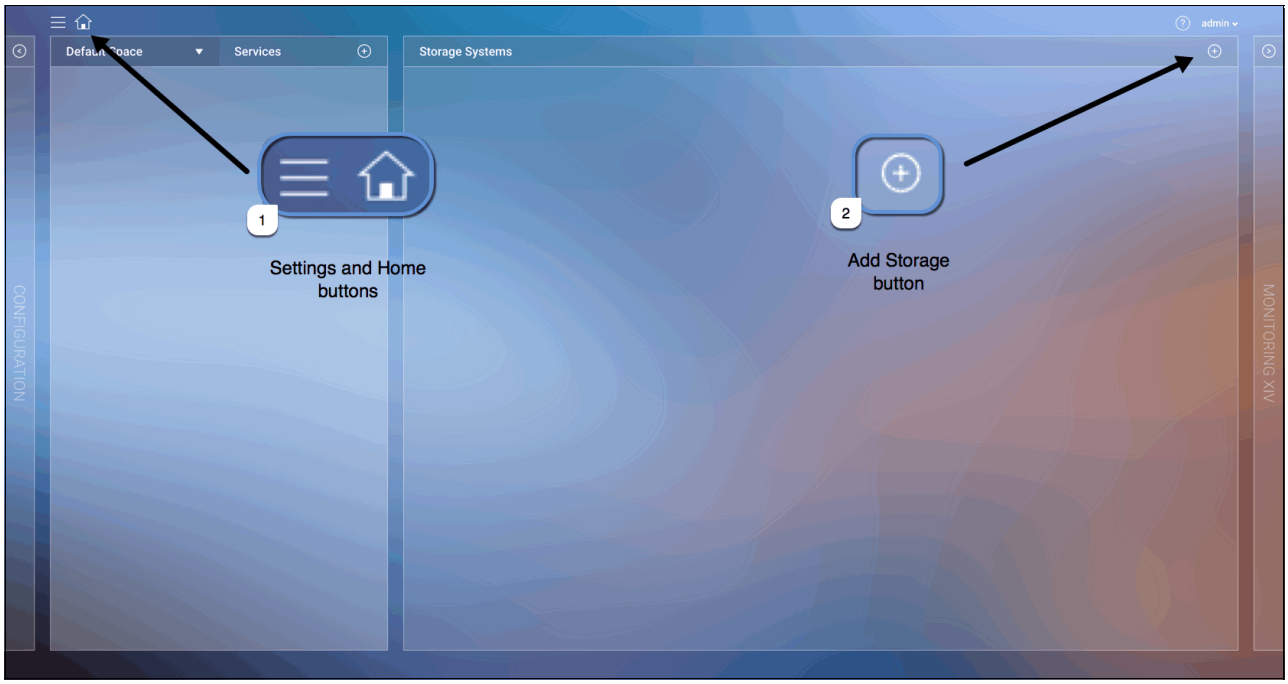

Figure 10 IBM Spectrum Control Base: Home view

The IBM Spectrum Control Base web interface consists of four management panes. The default *home* view shows the *Spaces and Services* pane on the left and the *Storage Systems* pane on the right, as pictured in Figure 10. For clarity, the figure shows the locations of the **Settings, Home,** and **Add Storage** buttons

Note: The remaining two panes for *Applications* and *Monitoring* are not required for configuring Virtual Volumes and are outside the intended scope of this paper.

Table 1 summarizes the functionality of the IBM Spectrum Control Base GUI elements.

Table 1 IBM Spectrum Control Base GUI elements

GUI element	Description
	The Settings button. Use this button to access the Settings menu.
	The Home button. Click this button to display the Home page (Spaces, Services and Storage Systems view).
	The Add button. Click this button to add new objects like storage systems and storage services.
	The Edit button, which is displayed when you select or highlight an object. Click this button to configure the object (system, pool, server, and more) or remove it.
	The Remove button. Click this button to remove a storage element or delete a user from the User list.
	The Help button. Click this button to display the Welcome page, which is also available after login.
	The right and left navigation pointers. They indicate if additional panes are available to the right or to the left of the current pane.
	The Resource Attach button. It is available, when an unattached storage resource is selected in a Storage Resources table. Click this button to attach the storage resource to a previously selected storage service.
	The Resource Detach button. It is available when an attached storage resource is selected in a Storage Resources table. Click this button to detach the storage resource from a previously selected storage service.

After changing the default administrator password as described in the next section, we configure the following items, in order, by using the IBM Spectrum Control Base web interface:

1. Storage Credentials
2. VASA Credentials
3. General Settings
4. Server Certificate
5. Adding a storage system
6. Adding a storage space
7. Adding a storage service
8. Defining and attaching storage resources

Changing the default administrator password

Before configuring the items shown in the previous list, change the default password for the administrator account:

1. Click the **Settings** button and select **Users** in the drop-down menu.
2. In the Users section, click the **admin** user account to highlight it. Two icons become available (Edit and Delete) as shown in Figure 11.

Figure 11 IBM Spectrum Control Base: Users selection box

3. Click the **Edit** icon to modify the *admin* user properties. In the window that opens (Figure 12), you can change the password.

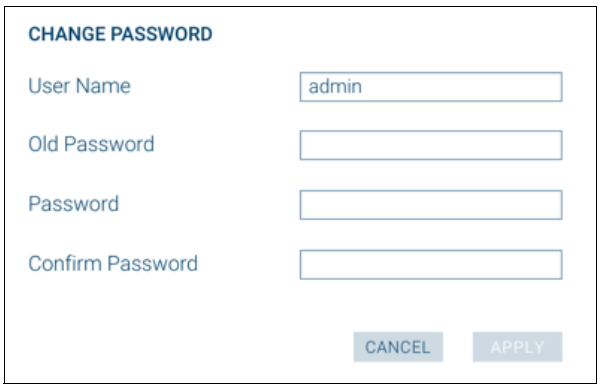

Figure 12 IBM Spectrum Control Base: Change password

4. Enter the existing password, which is `admin1!`, and then enter a new password for your admin user. Click **Apply** and then click **Close**.

Storage Credentials

Previously (Figure 5 on page 5), you created a user on your storage system for use by IBM Spectrum Control Base. By setting these credentials in IBM Spectrum Control Base, you allow communication to the storage system to perform various tasks, one of which will be adding the storage system into IBM Spectrum Control Base.

1. Click the **Settings** button and select **Storage Credentials** from the Settings menu.
2. In the Storage Credentials section (Figure 13), enter the user name and password of the IBM Spectrum Control Base user account created on the storage system, and then click **Apply**.

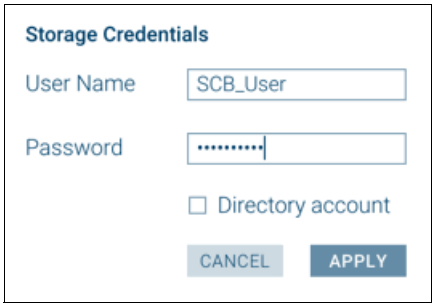

Figure 13 IBM Spectrum Control Base: Storage Credentials

Note: The storage credentials *must* exist on *all* storage systems that you intend to connect to your IBM Spectrum Control Base server.

VASA Credentials

The VASA credentials are defined in IBM Spectrum Control Base and used by the VMware vSphere Web Client to connect to the IBM Spectrum Control Base server.

1. Click the **Settings** button and select **VASA Credentials** from the Settings menu.
2. In the VASA Credentials section (Figure 14), enter a user name and password, and then click **Apply**.

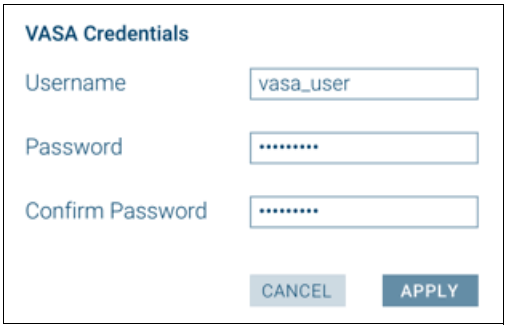

Figure 14 IBM Spectrum Control Base: VASA Credentials

Tip: The VASA user credentials are required later when you add the SCB Storage Provider in the vSphere Web Client.

General Settings

Do not be fooled by the seemingly innocuous title; this step is of particular importance to the configuration of high availability (HA) for your VVols environment.

1. Click the **Settings** button and select **General Settings** from the Settings menu.
2. In the General Settings section (Figure 15), enter the *fully qualified domain name (FQDN)* of your IBM Spectrum Control Base server, and enter the name for the *HA Group*. For this example, we use the group name of `vvol_db`. Then click **Apply**.

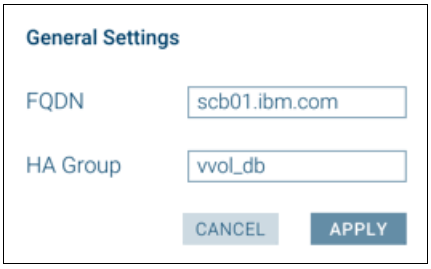

Figure 15 IBM Spectrum Control Base: General Settings

Note: High availability of IBM Spectrum Control Base relies on the HA Group.

Server Certificate

During the installation of IBM Spectrum Control Base, an SSL certificate is generated with generic information. To provide secure communication between your IBM Spectrum Control Base server and the vSphere Web Client, generate a new certificate with the FQDN of your IBM Spectrum Control Base server.

Figure 16 on page 15 shows the Server Certificate for our test IBM Spectrum Control Base server.

Figure 16 IBM Spectrum Control Base: Server Certificate

Complete these steps:

1. Click the **Settings** button and select **Server Certificate** from the Settings menu.
2. Enter the FQDN of your IBM Spectrum Control Base server.
3. Enter a common name for your IBM Spectrum Control Base server.
4. Enter the IP address of your IBM Spectrum Control Base server.
5. Choose a certificate validity period.
6. Click **Generate**.

An alert message prompts you to refresh your browser (Figure 17).

Figure 17 IBM Spectrum Control Base: Reload web page

Adding a storage system

Adding a storage system to IBM Spectrum Control Base relies on having correctly entered the storage credentials. If you have not yet configured your storage credentials, see “Storage Credentials” on page 13.

1. Click **Add** on the *Storage Systems* pane. See “An overview of the IBM Spectrum Control Base web interface” on page 10 if you are unsure as to the location of the button to add storage.
2. In the Add New Array section (Figure 18) that opens, enter the management IP or host name of the storage system, and select the storage system type. This example uses an IBM Storwize V7000 storage system with a host name of `cheech-cl`.

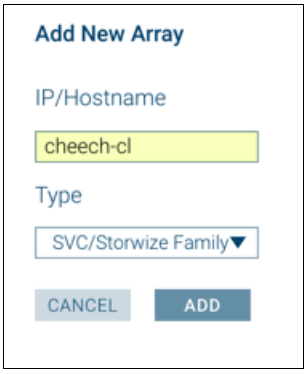

Figure 18 IBM Spectrum Control Base: Add New Array

3. Click **Add**. If the credentials are correct, the storage system is added to the Storage Systems pane (Figure 19 on page 17).

Case-sensitive: If you receive the following message, check the user name and password entered in “Storage Credentials” on page 13.

```
Unable to connect to the storage array due to a credentials error
```

Remember that *both* the user name and password are case-sensitive.

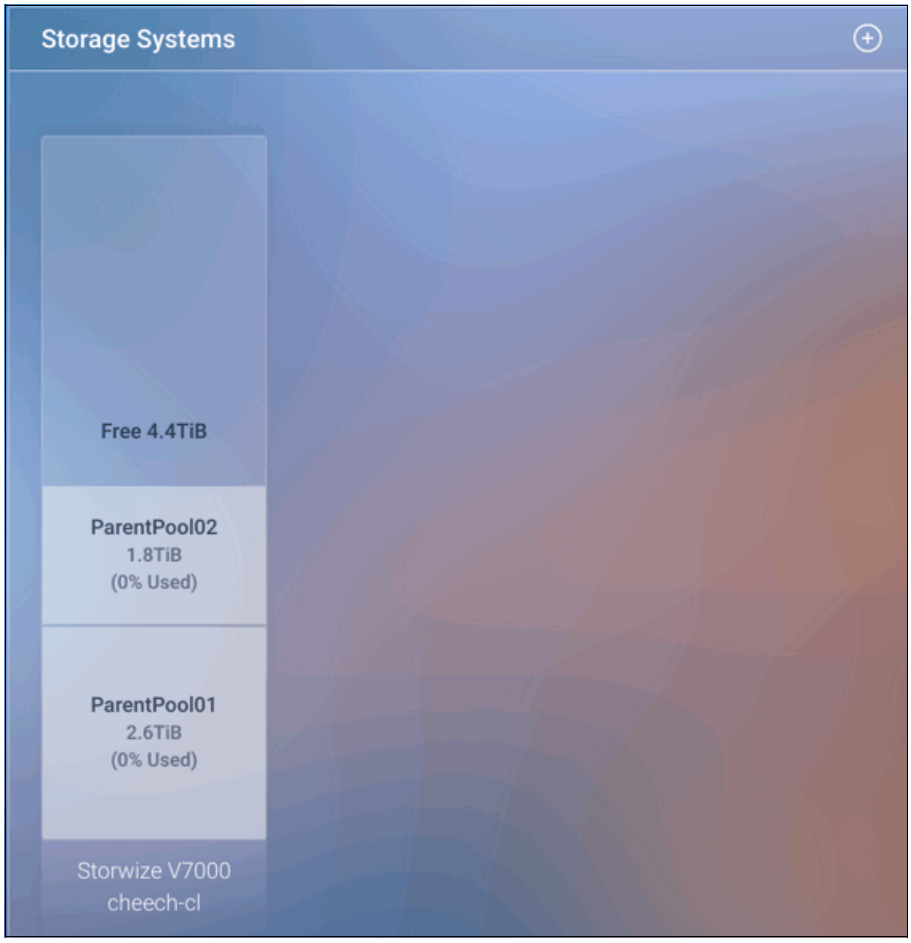

Figure 19 IBM Spectrum Control Base: Storage Systems pane with a storage system

Adding a storage space

Creating a storage space in IBM Spectrum Control Base allows you to present storage resources to the vSphere Web Client. Create a storage space:

1. In the *Spaces and Services* pane, click **Spaces** → **Add New Space** (Figure 20).

> **Default Space:** The drop-down for storage space selection shows the name of the currently selected storage space and the default is *Default Space*.

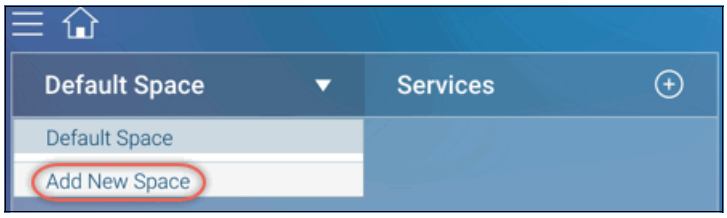

Figure 20 IBM Spectrum Control Base: Adding a storage space

2. Enter a name and description for the new storage space and then click **Apply**. This example uses the name `SC01` (storage container), as shown in Figure 21 on page 18.

Figure 21 IBM Spectrum Control Base: New Space

3. You can confirm you successfully added new storage space by clicking the *Spaces* drop-down list and selecting your new storage space. See Figure 22.

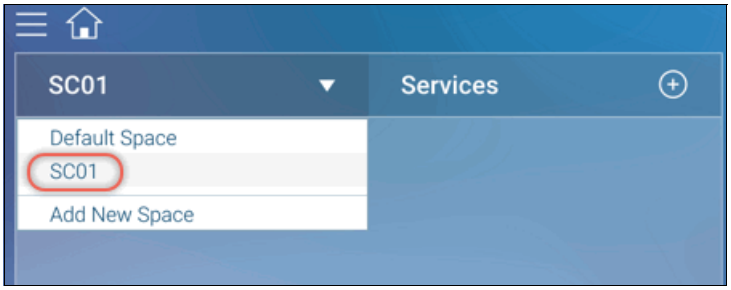

Figure 22 IBM Spectrum Control Base: Spaces list

Adding a storage service

Now that you have created storage space, the next step is to define the service or services the space will be offering up to the vSphere Web Client. Essentially, a *storage service* advertises the capabilities of your storage resources, such as encryption, to the vSphere Web Client via the storage space.

1. Click the *Spaces* drop-down list and select your new storage space (Figure 22).
2. Click the **Add** button on the *Storage and Services* pane (Figure 23).

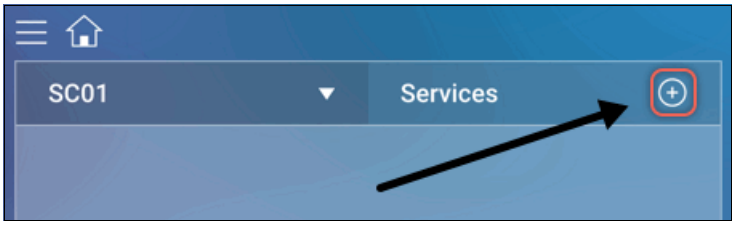

Figure 23 IBM Spectrum Control Base: Add service button

3. Provide a name and description for your new service (Figure 24 on page 19). This example uses `SC01_Service` as the name of the new storage service.

   Be sure to select the **VVol Service** check box.

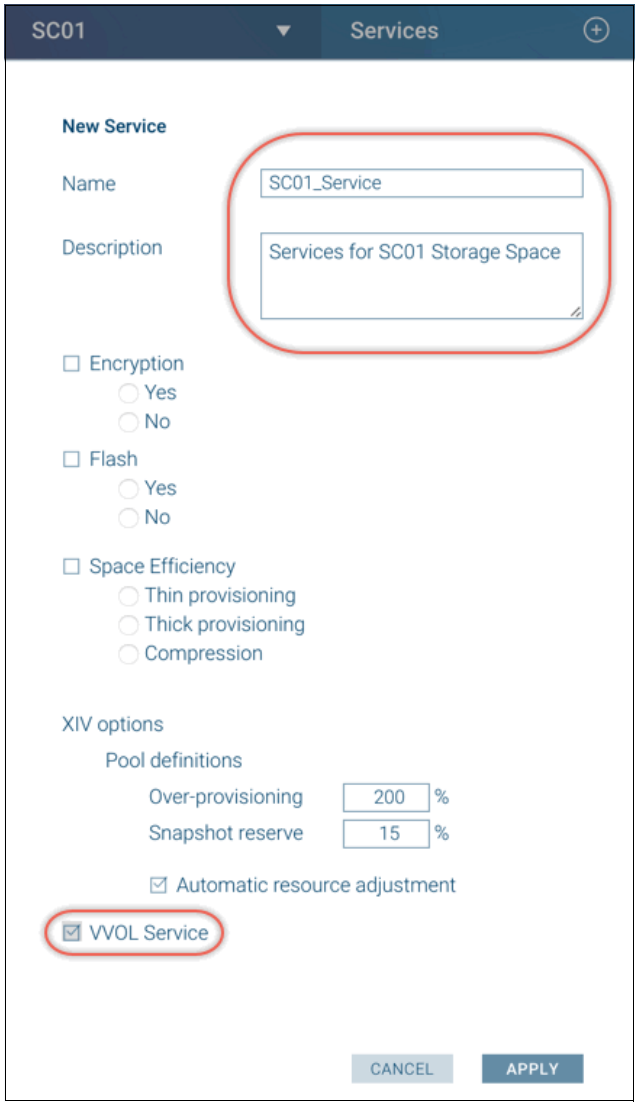

Figure 24 IBM Spectrum Control Base: New storage service configuration

4. Click **Apply**. You now have a *storage space* with a *storage service* configured, similar to that shown in Figure 25.

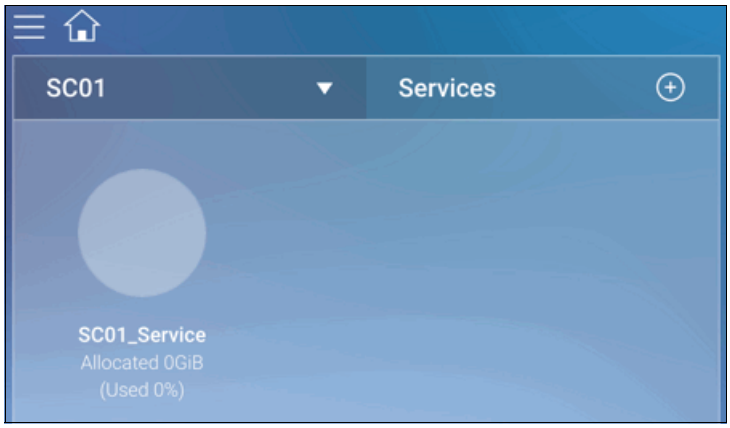

Figure 25 IBM Spectrum Control Base: Spaces and Services view

Defining and attaching storage resources

Now that you have a *storage space* (SC01) with a *storage service* (SC01_Service) defined, you can add storage resources (child pools) to your storage space.

Click the *Spaces* drop-down list and select the *storage space* to which you want to add storage resources. This example uses SC01. The VVols enabled *storage service* you previously configured for the *storage space* is displayed in the pane directly below the *spaces* drop-down.

Use the following steps (shown in Figure 26) to add a storage resource to a storage service:

1. Click on the *storage service* to highlight it.
2. On the Storage Systems pane, hover the mouse pointer over the storage system to display the Edit button.
3. Click **Edit** → **Modify**.
4. The Array Settings section opens. In the Add New Resource section, select a parent pool and specify a size in GiB for the new storage resource (child pool). Click **Add** to complete the *Add New Resource* task. The storage resource is created on the storage system (as a child pool) and attached to the service.

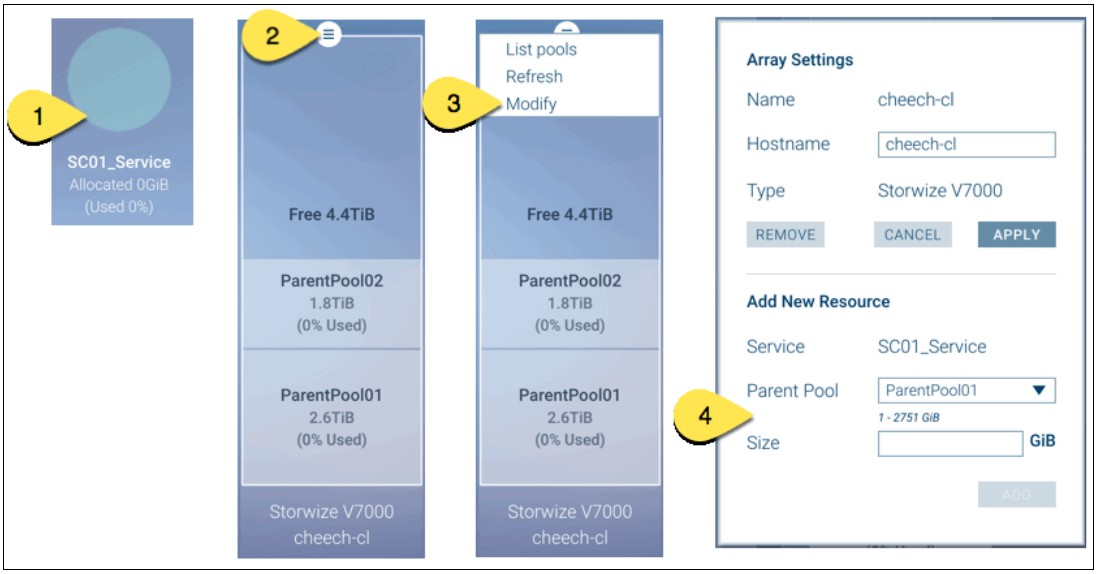

Figure 26 IBM Spectrum Control Base: Adding a storage resource

Summary: This example created a 2500 GiB storage resource (child pool) on storage space *SC01* with the associated storage service *SC01_Service*. This resource is taken from ParentPool01. This, in turn, creates a child pool on our storage system with an automatically generated name. See Figure 27 on page 21

Figure 27 shows the storage resource added to storage space *SC01* with the name `cp_SC01_Service_xxxx`, which is auto-generated. The right sides shows the same storage resource that is shown as the child pool created on the storage system.

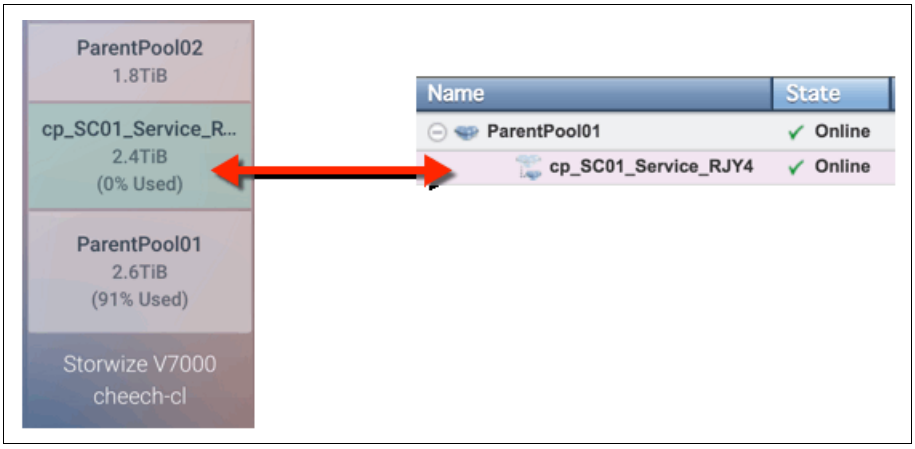

Figure 27 IBM Spectrum Control Base: Storage resource and child pool on the storage system

Configuring VMware vSphere Web Client

The configuration of Virtual Volumes is now complete for our storage system and IBM Spectrum Control Base. As such, the tasks required of the storage administrator are complete.

Next, you configure the vSphere environment. Before you can use VVols, the following tasks *should be performed by the vSphere administrator*. These include adding a storage provider and adding a VVol datastore in VMware vSphere.

Adding a storage provider

Adding a storage provider to the vSphere Web Client provides the last, but pivotal step in configuring your VVols environment. The storage provider is your IBM Spectrum Control Base instance that you configured earlier in this paper. The following steps add the IBM Spectrum Control Base instance as a storage provider in the vSphere Web Client.

1. In your vSphere Web Client *home window* click on **vCenter Inventory Lists**.
2. From the Inventory list on the left, click **resources** → **vCenter Servers**.
3. Select your vCenter Server from the pane on the left.
4. In the pane on the right, click the **Manage** tab and then click **Storage Providers**.
5. Click the green plus (**+**) icon.

   The New Storage Provider window opens and looks similar to Figure 28 on page 22.

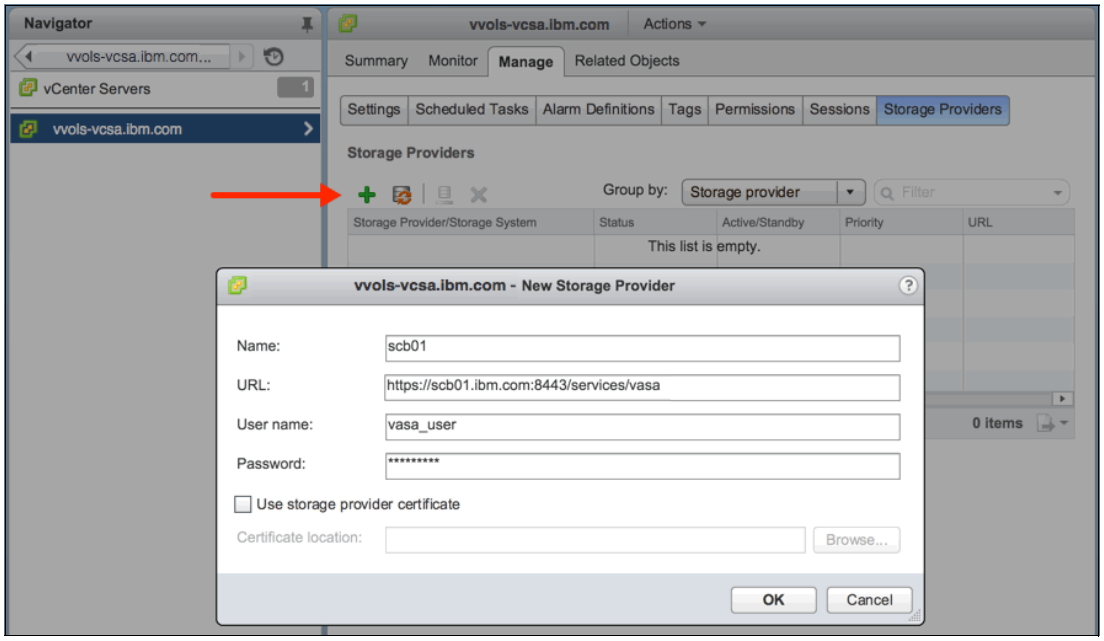

Figure 28 vSphere Web Client: Add New Storage Provider

6. In the New Storage Provider window, enter the following information:
   - A “friendly” name.
   - The URL of your IBM Spectrum Control Base instance with the required port and path details. Example 3 shows a sample.

     Example 3 The URL and port number for adding the storage provider.

     ```
     https://host.domain.com:8443/services/vasa
     ```

   - The user name and password you created in “VASA Credentials” on page 13.
7. Click **OK**. When prompted, select **Yes** to accept the security alert. This process completes in several minutes.

The IBM Spectrum Control Base instance now has established a secure SSL connection to the vCenter Web Client as an *active* storage provider, as shown in Figure 29.

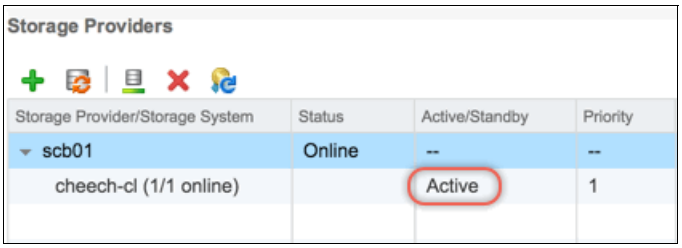

Figure 29 vSphere Web Client: Storage Providers

Adding a VVol datastore in VMware vSphere Web Client

To use the *Storage Space* you defined previously in your IBM Spectrum Control Base instance, you need to add a VVol datastore to the vSphere Web Client.

1. In your vSphere Web Client *Home view,* click **vCenter Inventory Lists** and select **Datastores**.
2. Click the **Create a New Datastore** icon (Figure 30). The *New Datastore* wizard starts.

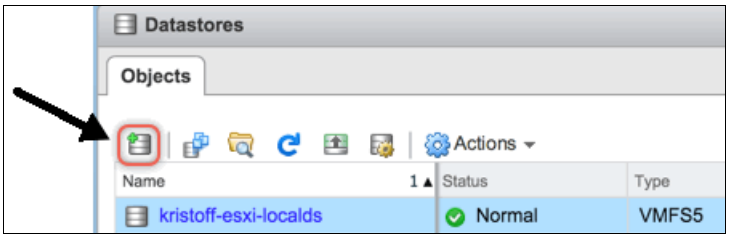

Figure 30 vSphere Web Client: Create a new datastore

3. In the New Datastore wizard, select the placement location for the datastore (the cluster or hosts you want to share the VVols datastore with).
4. Select **VVol** as the datastore type.
5. Select a backing storage container. Any storage spaces defined in IBM Spectrum Control Base should be available to select as a storage container. The storage space names, as configured in the IBM Spectrum Control Base are displayed in the Backing Storage Container field, as shown in Figure 31.

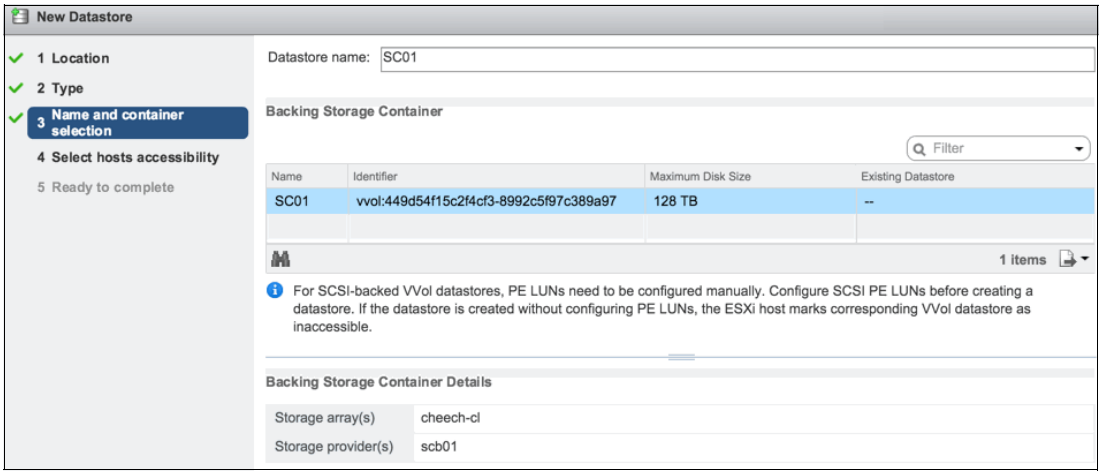

Figure 31 vSphere Web Client: New Datastore

6. Select the hosts that require access to the VVol datastore.
7. Review the configuration options and click **Finish**. Figure 32 on page 24 shows the settings used in our example configuration.

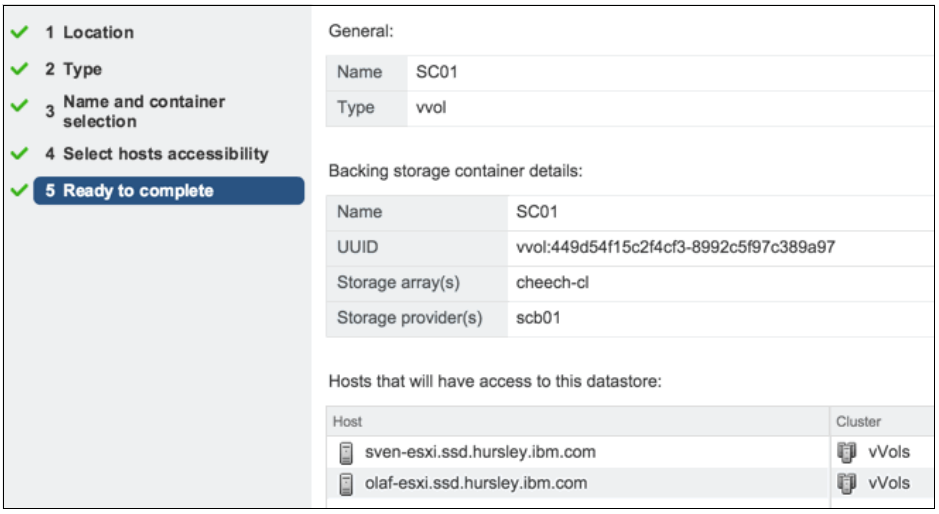

Figure 32 vSphere Web Client: New VVol datastore settings

Figure 33 shows the newly created VVol datastore.

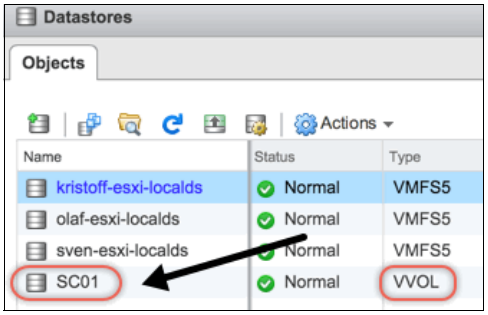

Figure 33 vSphere Web Client: VVol datastore

Setup is complete

The vSphere administrator now has the basics that are required from the storage system in order to start using Virtual Volumes.

Configuring additional IBM Spectrum Control Base servers for high availability

Multiple IBM Spectrum Control Base instances can be configured to manage the same storage system. Doing so ensures the high availability of the *management* of virtual machines specific to your VVols environment. The steps involved in setting up an extra “standby” instance are essentially the same as configuring your initial *active* instance. For completeness, this section covers the required steps again.

Tip: If you created a template of your SCB VM, now is a good time to ask your vSphere administrator to create a new VM from the template for use as your standby IBM Spectrum Control Base server. Do this before starting the following steps.

Downloading the IBM Spectrum Control Base installation files

Download the latest IBM Spectrum Control Base installation files from Fix Central:

https://ibm.biz/ibm-scb

Extract the files to a temporary folder (for example, `/scb_install`) on your IBM Spectrum Control Base virtual machine (SCB VM), also referred to here as *SCB* and the *SCB server*. Example 4 shows the typical installation files for IBM Spectrum Control Base after they are extracted.

Example 4 IBM Spectrum Control Base: installation files

```
ibm_spectrum_control-2.2.1-xxxx-x86_64.bin
nginx-1.6.2-1.el6.ngx.x86_64.rpm
postgresql92-9.2.10-1PGDG.rhel6.x86_64.rpm
postgresql92-contrib-9.2.10-1PGDG.rhel6.x86_64.rpm
postgresql92-libs-9.2.10-1PGDG.rhel6.x86_64.rpm
postgresql92-server-9.2.10-1PGDG.rhel6.x86_64.rpm
```

Installing IBM Spectrum Control Base

Complete the following steps:

1. Change to the folder on your *standby* IBM Spectrum Control Base server where you previously extracted the installation files. Start the installation of IBM Spectrum Control Base by using the **`rpm -iv *.rpm`** command at the command prompt.

   The output is shown in Example 5.

   *Example 5 Output of command rpm -iv *.rpm*

   ```
   warning: nginx-1.6.2-1.el6.ngx.x86_64.rpm: Header V4 RSA/SHA1 Signature, key ID
   7bd9bf62: NOKEY
   warning: postgresql92-9.2.10-1PGDG.rhel6.x86_64.rpm: Header V4 DSA/SHA1
   Signature, key ID 442df0f8: NOKEY
   warning: uuid-1.6.1-10.el6.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID
   fd431d51: NOKEY
   Preparing packages for installation...
   postgresql92-libs-9.2.10-1PGDG.rhel6
   postgresql92-9.2.10-1PGDG.rhel6
   uuid-1.6.1-10.el6
   postgresql92-contrib-9.2.10-1PGDG.rhel6
   postgresql92-server-9.2.10-1PGDG.rhel6
   nginx-1.6.2-1.el6.ngx
   ```

2. Install the **`.bin`** file by typing the following command (your file version might be newer):

   `./ibm_spectrum_control-2.2.1-xxxx-x86_64.bin`

3. When prompted, enter **`1`** to accept the agreement. After a minute or two, you see the `Installation completed successfully` message.

Now you can change the IBMSC administration account, as described in the next section.

Changing the IBMSC administration account

Modify the IBMSC user account by typing the **`passwd ibmsc`** command at the command prompt and entering a new password.

Accessing the IBM Spectrum Control Base web interface

Complete the following steps:

1. Open a web browser and connect to your *standby* IBM Spectrum Control Base server's web interface by using the following web address:

   `https://<SCB Server Name>:8443`

   You might need to *trust* the certificate before continuing to the login page.

   The login page then opens, as shown in Figure 34.

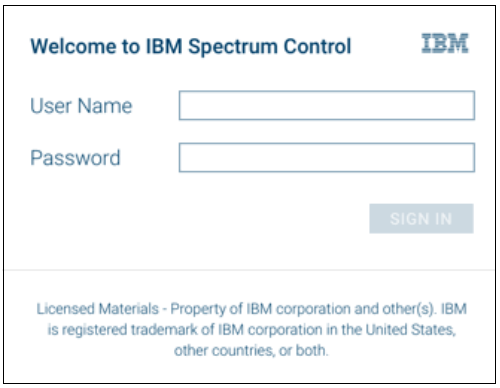

Figure 34 IBM Spectrum Control Base: web interface logon

2. Log in to the standby IBM Spectrum Control Base web interface with the following default credentials:
   - User name: `admin`
   - Password: `admin1!`

Changing the default administrator password

Change the password as follows:

1. Click the **Settings** button and select **Users** in the drop-down menu.
2. In the Users section, click the **admin** user account to highlight it. Two icons become available (Edit and Delete) as shown in Figure 35 on page 27.

Figure 35 IBM Spectrum Control Base: Users selection box

3. Click the **Edit** icon to modify the *admin* user properties. In the window that opens (Figure 36), you can change the password.

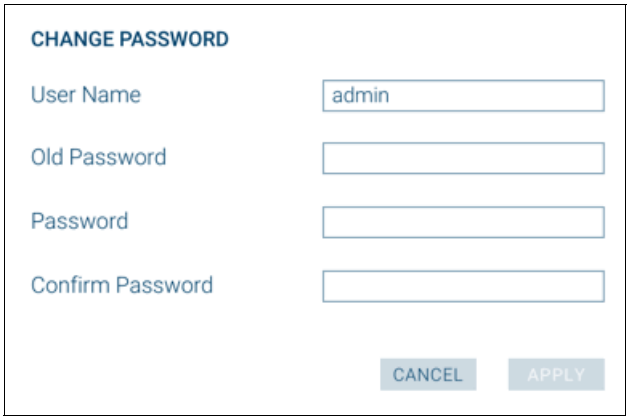

Figure 36 IBM Spectrum Control Base: Change password

4. Enter the existing password, which is `admin1!`, and then enter a new password for your admin user. Click **Apply** and then click **Close**.

Storage Credentials

Previously (Figure 5 on page 5), you created a user on your storage system for use by IBM Spectrum Control Base. Recall those details to complete the Storage Credentials fields.

1. Click the **Settings** button and select **Storage Credentials** from the Settings menu.
2. In the Storage Credentials section (Figure 37 on page 28), enter the user name and password of the IBM Spectrum Control Base user account created on the storage system, and then click **Apply**.

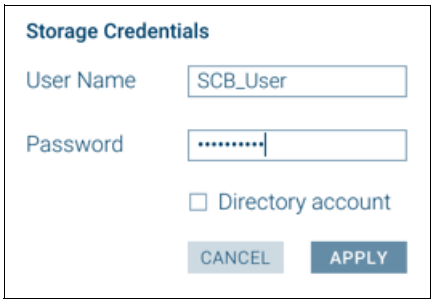

Figure 37 IBM Spectrum Control Base: Storage Credentials

VASA Credentials

The VASA credentials are defined in IBM Spectrum Control Base and used by the VMware vSphere Web Client to connect to the IBM Spectrum Control Base server.

1. Click the **Settings** button and select **VASA Credentials** from the Settings menu.
2. In the VASA Credentials section (Figure 38), enter a user name and password, and then click **Apply**.

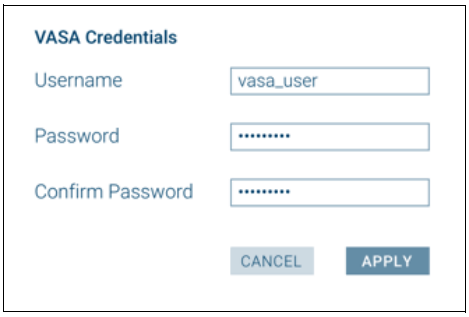

Figure 38 IBM Spectrum Control Base: VASA Credentials

Tip: The VASA user credentials are required later when you add the *standby* IBM Spectrum Control Base Storage Provider in the vSphere Web Client.

General Settings

This step is of particular importance to the configuration of high availability for your VVols environment.

Note: The HA Group name provided to the *standby* IBM Spectrum Control Base instance *must* be identical to the HA Group name that was set when registering the first, *active* IBM Spectrum Control Base instance.

1. Click the **Settings** button and select **General Settings** from the Settings menu.
2. In the General Settings section (Figure 39 on page 29), enter the fully qualified domain name (FQDN) of your *standby* IBM Spectrum Control Base server, and enter the name for the HA Group. The HA Group name must match the HA Group set on the first, *active* IBM Spectrum Control Base instance. Then click **Apply**.

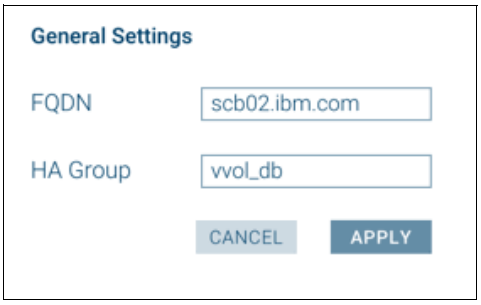

Figure 39 IBM Spectrum Control Base: General Settings

Server Certificate

Figure 40 shows the Server Certificate for our *standby* IBM Spectrum Control Base server.

Figure 40 IBM Spectrum Control Base: Server Certificate

Complete the following steps:

1. Click the **Settings** button and select **Server Certificate** on the Settings menu.
2. Enter the FQDN of your *standby* IBM Spectrum Control Base server.
3. Enter a common name for your *standby* IBM Spectrum Control Base server.
4. Enter the IP address of your *standby* IBM Spectrum Control Base server.
5. Choose a certificate validity period.
6. Click **Generate**.

Adding a storage system

Complete the following steps:

1. Click **Add** on the *Storage Systems* pane. The Add New Array section opens (Figure 41).

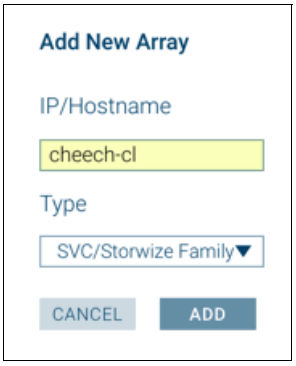

Figure 41 IBM Spectrum Control Base: Add New Array

2. Enter the management IP or host name of the storage system. This will be the same storage system added to the *active* IBM Spectrum Control Base instance.
3. Click **Add**. The storage system is added to the Storage Systems pane (Figure 42).

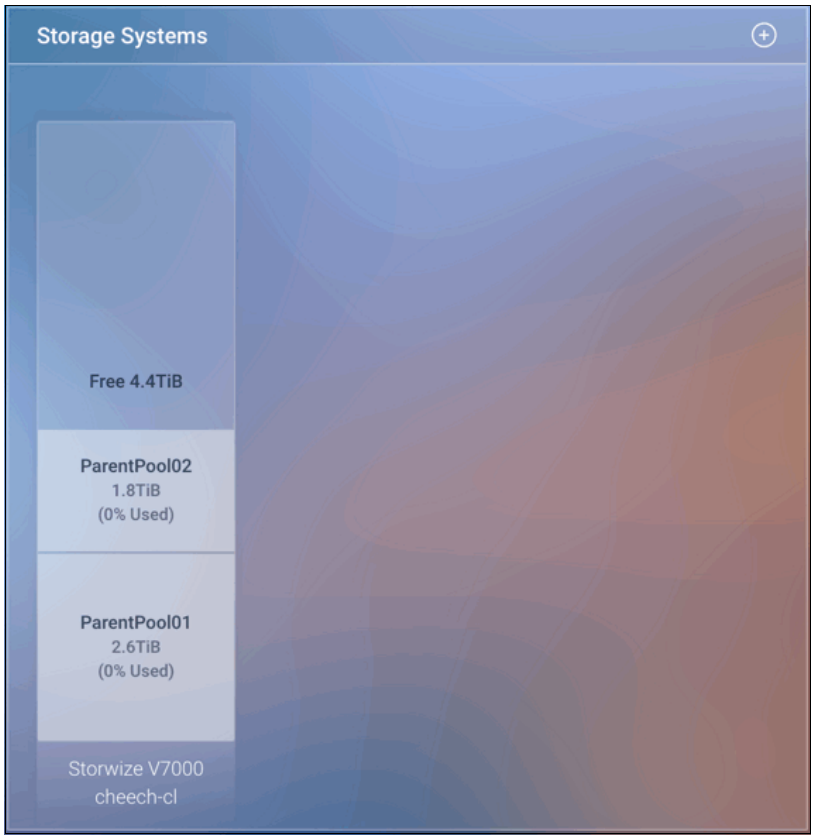

Figure 42 IBM Spectrum Control Base: Storage Systems

The steps for configuring the IBM Spectrum Control Base server are now complete.

Important: Do not configure the *Storage Spaces* or *Storage Services* on your *standby* IBM Spectrum Control Base instance. This information will be populated from the database stored on the storage system if a failover occurs.

Configuring VMware vSphere Web Client

Adding a *standby* storage provider to the vSphere Web Client provides the last, but pivotal step in configuring our storage provider HA Group. The following steps add the standby IBM Spectrum Control Base instance as a storage provider in the vSphere Web Client.

1. In your vSphere Web Client *home window*, click on **vCenter Inventory Lists**.
2. From the Inventory list on the left, click **resources** → **vCenter Servers**.
3. Select your vCenter Server from the pane on the left.
4. In the pane on the right, click the **Manage** tab and then click **Storage Providers**.
5. Click the green plus (**+**) icon.

   The New Storage Provider window opens (Figure 43).

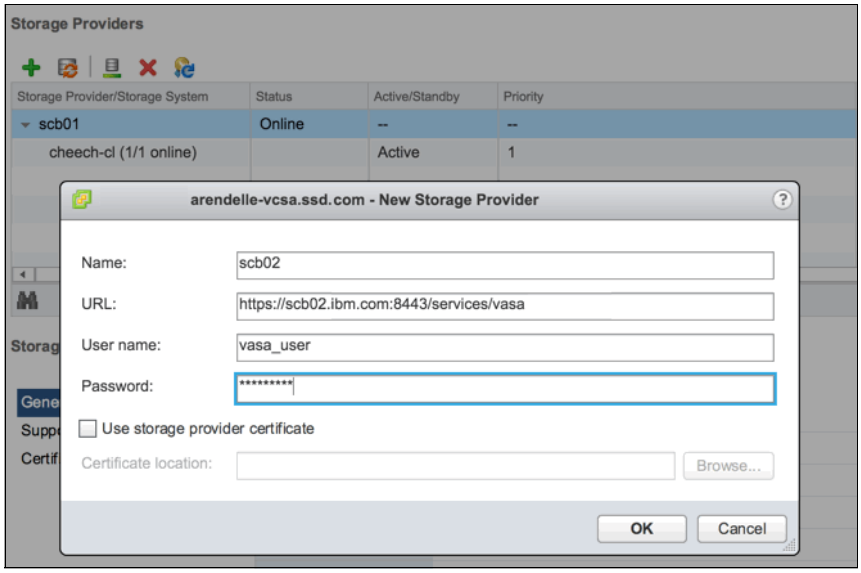

Figure 43 vSphere Web Client: Add standby storage provider

6. In the New Storage Provider window, enter the following information:
   - A “friendly” name.
   - The URL of your *standby* IBM Spectrum Control Base instance, as shown in Example 6.

     Example 6 The URL and port number for adding the standby storage provider.

     ```
     https://host.domain.com:8443/services/vasa
     ```

   - The user name and password you created in “VASA Credentials” on page 28.
7. Click **OK**. When prompted, select **Yes** to accept the security alert.

The IBM Spectrum Control Base instance now has established a secure SSL connection to the vCenter Web Client as a *standby* storage provider. See Figure 44 on page 32.

The vCenter continuously monitors the availability of the active storage provider. If an issue arises with the active storage provider whereby the VASA services stop responding, a failover to the standby storage provider is initiated.

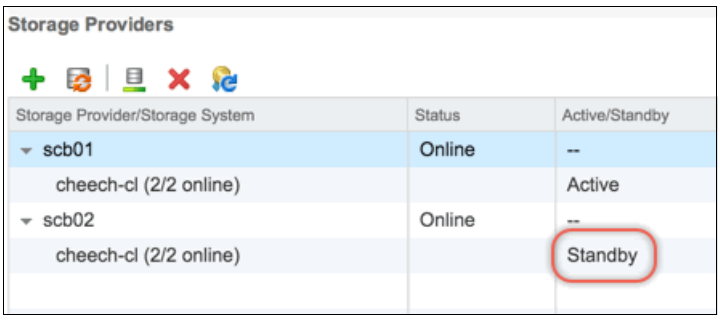

Figure 44 vSphere Web Client: Storage Providers

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