Dell EMC VxFlex OS

Version 3.x

Stateless ESXi Mode Technical Notes

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Running VxFlex OS in ESXi Stateless Mode

This document describes how to run VxFlex OS in ESXi Stateless mode. Topics include:

Stateless ESXi overview

The stateless ESXi feature in vCenter allows managing and monitoring ESXi installations. When a host is configured as stateless, it does not preserve its state across reboots, and prevents live installations of VIBs. Each time the ESXi boots, it is reinstalled from a predefined image. Stateless ESXi simplifies updates to the hypervisor and VIB, since they can be managed from one central point, without the need to update and install each host manually.

VMware provides the PowerCLI tool, which is used to build ESXi image profiles and to apply them to a host using deployment rules. After the image profile is created and the deployment rules are configured, the hosts will boot up and the configured image profile will be installed on each host.

In order to preserve essential settings on the ESXi when it is reinstalled, such as network configuration and kernel module parameters, vCenter manages entities called host profiles. A host profile contains settings that can be applied to multiple hosts. Multiple hosts can be attached to a single host profile, with some customization allowed for each individual host. Some settings, such as the kernel module parameters, are configured per host profile and are applied to all hosts attached to this profile. Other settings, such as IP addresses and IQN identifiers, are configured individually for each host.

Important information for using Stateless ESXi in ScaleIO v2.0.1.4 or later

The VMware stateless ESXi (Host Profile) feature provided in ScaleIO v2.0.1.3 is not compatible with ScaleIO v2.0.1.4 or later. You can continue to use the feature with ScaleIO v2.0.1.3, but to upgrade SDC nodes to v2.0.1.4 or later, you must contact Customer Support.

Previous versions of Dell EMC VxFlex OS were marketed under the name Dell EMC ScaleIO. Similarly, previous versions of Dell EMC VxFlex Ready Node were marketed under the name Dell EMC ScaleIO Ready Node. References to the old names in the product, documentation, or software, etc. will change over time.

Upgrade a setup that includes Stateless ESXi nodes

For full information, see the topic "Upgrade a setup that includes Stateless ESXi nodes" in the VxFlex OS Upgrade Guide.

Configuring VxFlex OS with stateless ESXis overview

Using stateless mode for the ESXis that host the SDCs allows for automated host configuration, and ensures that the hosts are configured consistently.

Before you begin configuring VxFlex OS with stateless ESXis, ensure that:

- The ESXi hosts are connected to the vCenter.
- A vSphere Auto Deploy server is installed.
- A Trivial File Transfer Protocol (TFTP) server is installed for downloaded the ESXi image ZIP file.
- A Dynamic Host Configuration Protocol (DHCP) server is installed for the Auto Deploy server to contact during host startup for provisioning the host with the image profile.

The following steps are necessary to configure the system with stateless ESXis:

1. Use PowerCLI to configure the base ESXi host with the settings you wish to replicate for the remaining ESXis.

   (i) **Note:** Stateless systems cannot run hyper-converged, sharing local storage.

2. Create a profile based on the base ESXi.

3. Edit the profile to configure the MDM IP addresses and other SDC settings.

4. Attach the ESXis to the profile.

5. Verify that the SDCs installed on these ESXis are connected to the VxFlex OS system.

Prepare the base ESXi image

Prepare an ESXi with the base configuration.

Before you begin

Ensure that you have the following:

- vCenter with several ESXis.

- Offline bundle file with the appropriate ESXi image, downloaded from the VMware website.

- The appropriate VxFlex OS SDC module file for your version of ESXi (downloaded from FTP site):

  - for ESXi 5.5: `sdc-2.5.0.xxx-esx5.5.zip`

  - for ESXi 6.0 or 6.5: `sdc-2.5.0.xxx-esx6.0.zip`

About this task

Use VMware's PowerCLI to run the following commands:

Procedure

1. Connect to the vCenter: `Connect-VIServer -Server <VC_IP> -Protocol https -User <VC_username> -Password <VC_password>`

   where:

   - *<VC_IP>* is the IP address of the vCenter server.

   - *<VC_username>* is the username to log in to the vCenter.

   - *<VC_password>* is the password.

   If you encounter certificate issues, run the following:

   ```
   Set-PowerCLIConfiguration -InvalidCertificateAction Prompt
   ```

2. Clean previous deployment rules:

   a. Retrieve the list of deployment rules: `Get-DeployRule`

   b. Delete the list of deployment rules: `Remove-DeployRule --delete`

3. Run `Add-EsxSoftwareDepot` to add the following files to the ESXi depot:

   - Offline bundle with ESXi image

   - VxFlex OS SDC module file

For example, add the ESXi image to the depot:

```
Add-EsxSoftwareDepot "<PATH_to_file>\VMware-
ESXi-6.5.0-201712001-depot.zip"
```

Add the VxFlex OS SDC module file:

```
Add-EsxSoftwareDepot "<PATH_to_file>\sdc-2.5.0.xxx-
esx6.0.zip"
```

Verify the ESXi software depot contents:

```
Get-EsxSoftwareDepot
```

4. Create a new image profile:

   a. Retrieve the full name of the base image that you will be cloning the new image profile from:

   For example:

   ```
   Get-EsxImageProfile | select Name
   ```

   b. Create a new image profile: `New-EsxImageProfile -CloneProfile <IMAGE_PROFILE> -Name "<PROFILE_NAME>" -Vendor DELLEMC`

   where:

   - <IMAGE_PROFILE> is the name of the image profile you want to clone.

   - <PROFILE_NAME> is the name you wish to call the ESXi image profile.

   For example:

   ```
   New-EsxImageProfile -CloneProfile ESXi-5.5.0-2015xxxxx-
   standard -Name "image_profile_2.5" -Vendor DELLEMC
   ```

   c. Display image profile details: `Get-EsxImageProfile`

5. Set the acceptance level of the image profile: `Set-EsxImageProfile -AcceptanceLevel CommunitySupported -ImageProfile <PROFILE_NAME>`

   where <PROFILE_NAME> is the name of the image profile.

   ```
   Set-EsxImageProfile -AcceptanceLevel CommunitySupported -
   ImageProfile "image_profile_2.5"
   ```

6. Add the offline bundles to the current session: `Add-EsxSoftwarePackage -ImageProfile <PROFILE_NAME> -SoftwarePackage <SDC_MODULE_FILE> -Force`

   where:

   - <PROFILE_NAME> is the name of the ESXi image profile created above.

   - <SDC_MODULE_FILE> is the filename of the VxFlex OS SDC module file.

For example:

```
Add-EsxSoftwarePackage -ImageProfile image_profile_2.5 -
SoftwarePackage scaleio-sdc-esx5.5 -Force
```

ⓘ **Note:** To easily obtain the name of the SDC module file, run `Get-EsxSoftwarePackage -Vendor "EMC" | select Name` to copy the filename and paste it in the `Add-EsxSoftwarePackage` command above.

7. Verify that the software packages were added correctly:

```
Get-EsxImageProfile
```

8. Create a rule that assigns the image profile to hosts that have a particular IP address pattern. Note that many different IP address patterns are supported, including IPv4 and IPv6 addresses, and IP address ranges:

ⓘ **Note:** If the vSphere environment already contains ESXi hosts, run the following to collect the first NIC mac address of all hosts. This will allow you to copy it to the `-pattern` parameter: `Get-VMHostNetworkAdapter -Name vmnic1,vmnic2 | select VMhost,name,mac`.

a. Create the new rule: `New-DeployRule -name "<RULE_NAME>" -Item <PROFILE_NAME> -pattern "mac=xx:yy:zz:aa:bb:cc"`

   where

   - *<RULE_NAME>* is a name for the new rule.
   - *<PROFILE_NAME>* is the name of the ESXi image profile created above.

   For example:

```
New-DeployRule -name "rule_image_profile_2.5" -Item
image_profile_2.5 -pattern "mac=90:e2:ba:74:36:6c"
```

   For example, with a different IP address pattern:

```
New-DeployRule -Name "rule_image_profile_2.5" -Item
image_profile_2.5 -Pattern
"ipv4=192.168.110.160-192.168.110.170"
```

b. Add the rule to the working rule set and activate it: `Add-DeployRule <RULE_NAME>`

   where *<RULE_NAME>* is the name of the new rule created above.

   For example:

```
Add-DeployRule rule_image_profile_2.5
```

c. Retrieve the current working rule set: `Get-DeployRuleSet`

9. Check whether each ESXi host is compliant with the new rule by running the following on each ESXi: `Test-DeployRuleSetCompliance`

For example:

```
Test-DeployRuleSetCompliance 192.168.110.161
```

If you encounter an error with the rule compliance, perform the following for the relevant ESXi to clear any previous configurations:

a. Repair the AutoDeploy cache to clear previous rules that may have been attached to the ESXi: `Repair-DeployImageCache`

b. Create a variable for the host:`$<VAR_NAME>=Get-VMHost -Name <HOST_IP_ADDRESS>`

```
$host161=Get-VMHost -Name 192.168.110.161
```

c. Associate the specified image profile with the specified system: `Apply-ESXImageProfile -ImageProfile <NEW_PROFILE> -Entities <ESX_HOST>`

For example:

```
Apply-ESXImageProfile -ImageProfile new_profile -Entities
$host161
```

d. Test and repair the rule set compliance: `$host | Test-DeployRuleSetCompliance | Repair-DeployRuleSetCompliance`

For example:

```
$host161 | Test-DeployRuleSetCompliance | Repair-
DeployRuleSetCompliance
```

e. Retest the rule set compliance: `Test-DeployRuleSetCompliance <HOST_IP_ADDRESS>`

For example:

```
Test-DeployRuleSetCompliance 192.168.110.161
```

10. Reboot the ESXi host.

11. Connect with SSH to the ESXi host and start the SDC manually with temporary parameters:

a. Run the following commands in the ESXi command line:

```
esxcli system module parameters set -m scini -p
"IoctlIniGuidStr=<GUID> IoctlMdmIPStr=<MDM_IP>"
```

where:

- *<GUID>* is a temporary invalid GUID
- *<MDM_IP>* is a temporary invalid IP address for the MDM

For example:

```
esxcli system module parameters set –m scini -p
"IoctlIniGuidStr=12345678-90AB-CDEF-1234-567890ABCDEF
IoctlMdmIPStr=1.2.3.4"
```

b. Load the SDC:

```
esxcli system module load -m scini
```

c. Verify that the SDC has started correctly with the correct version:

```
esxcli system module list | grep scini
```

In the output, columns **Is Loaded** and **Is Enabled** should have the value "true".

d. Verify the correct SDC version is installed:

```
esxcli software vib list | grep sdc
```

Results

The ESXi image profile is created with the necessary rules, but the SDC is not connected to the VxFlex OS cluster until creation of the host profile.

Prepare the host profile

Prepare the host profile settings based on the previously configured ESXi.

Procedure

1. Open the vSphere Web Client.
2. Navigate to the Host profiles view.
3. Click the **Extract Profile from a Host** icon (+).
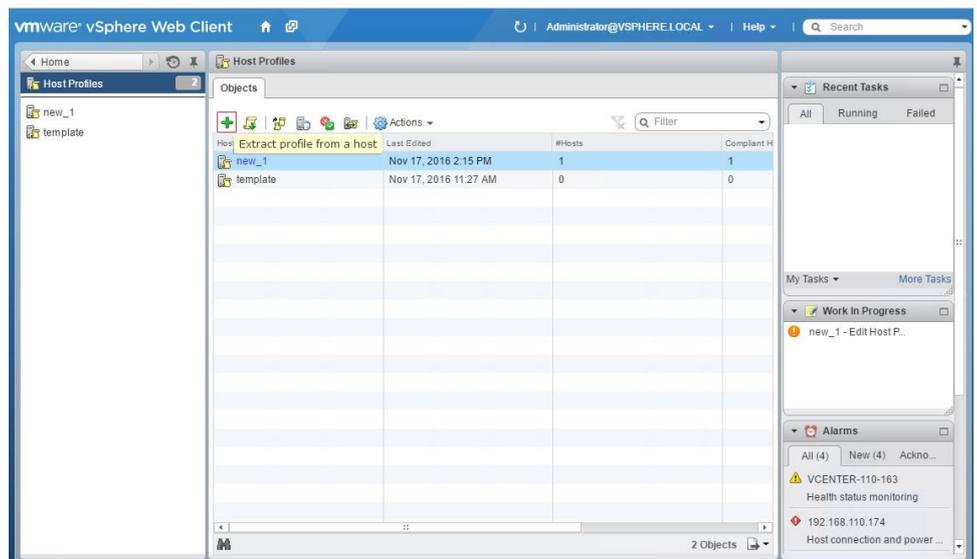
4. Select the previously configured ESXi from which to extract the profile settings and click **Next**.

5. Type the name and enter a description for the new profile and click **Next**.

6. Review the summary information for the new profile and click **Finish**.

Edit the host profile

In the vSphere Web Client, edit the host profile's settings.

Before you begin

Ensure you have

- The IP addresses for the MDMs in the cluster, or the virtual IP address for the MDM cluster.

- GUID for each ESXi's SDCs

About this task

Edit the host profile's settings to include the IP addresses for the MDMs. This allows the stateless ESXi to serve as an SDC. You can optionally configure other SDC options.

Procedure

1. In the vSphere Web Client, navigate to the Host Profiles view and select the host profile name.

2. Click **Actions** > **Edit Settings....**
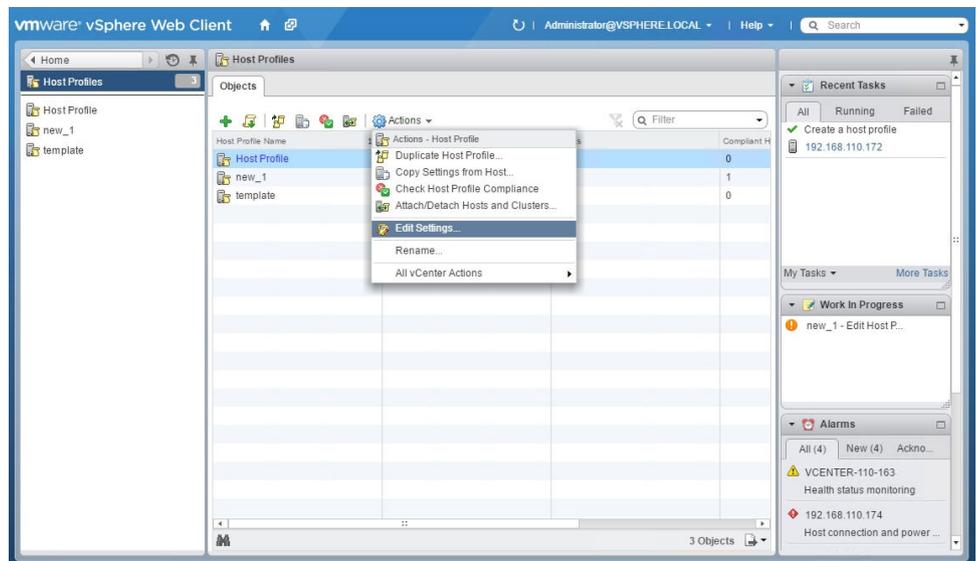
3. In the **Name and Description** screen, select the host profile you wish to edit and click **Next**.

4. In the **Edit Host Profile** screen, expand the **General System Settings** folder.

5. Expand **Kernel Module Configuration**.

6. In the list of modules, locate the **scini** module, and expand it.

7. Expand the **Kernel Module Parameter** folder.

8. In the list of kernel parameters, identify the setting that updates the MDM IP addresses.

In the right pane, the parameter name is displayed as **IoctlMdmIPStr**.
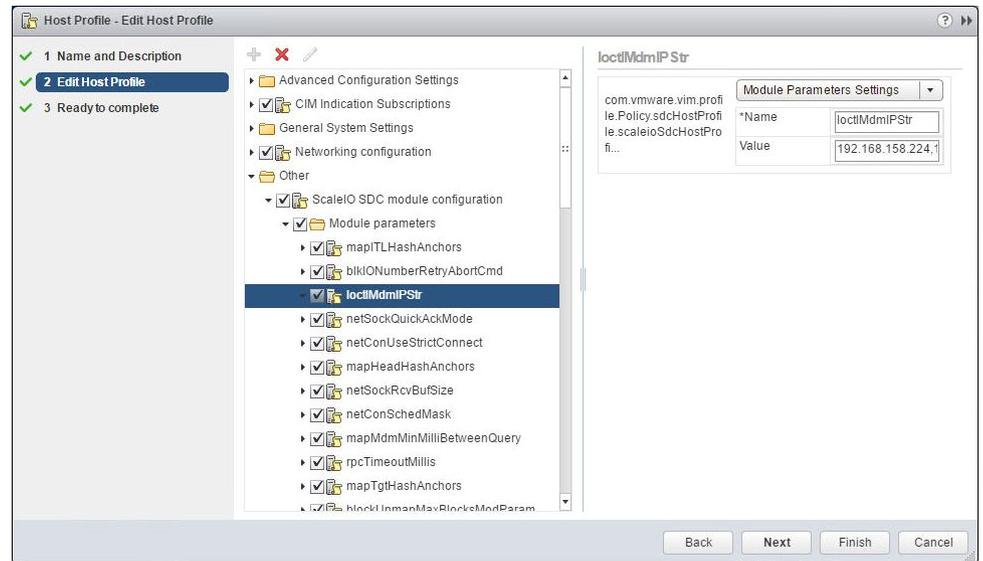
9. In the **Value** field below the setting name, enter the MDM IP addresses, and click **Next**.

   Use commas to separate the IP address of each MDM, or use a virtual IP address for the MDM cluster.

10. Locate the parameter **IoctlIniGuidStr**. From the drop-down menu, select **com.vmware.vim.profile.PolicyOption.kernelModule...**

11. Paste the string **IoctlIniGuidStr** into the **parameterName** field.

12. Review the summary information for the edited profile and click **Finish**.
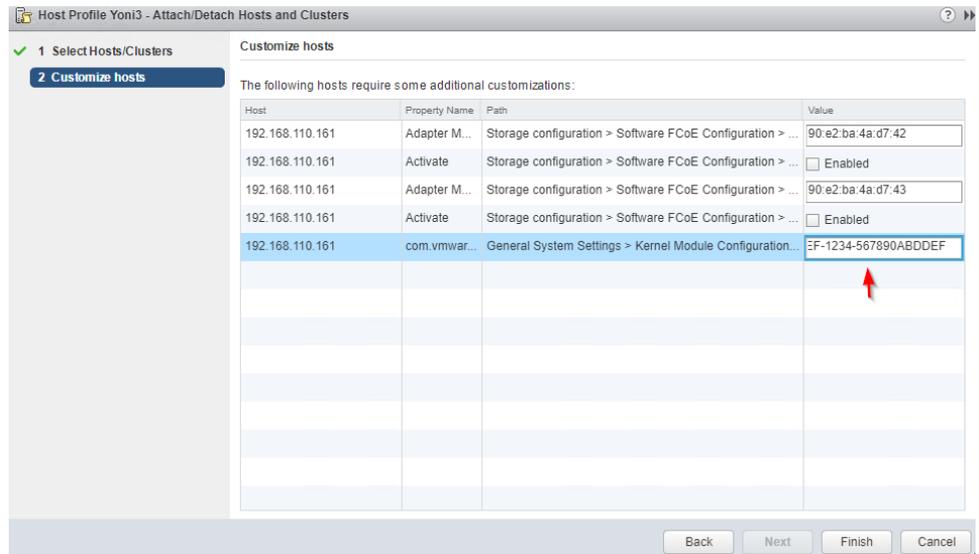
Attach the ESXi hosts to the host profile

Attach the ESXis to the host profile.

Procedure

1. In the vSphere Web Client, navigate to the Host Profiles view.

2. Select the created host profile.

3. Select **Actions** > **Attach/Detach Hosts and Clusters**.

4. In the **Select Hosts/Clusters** screen, select the ESXis you wish to attach to the host profile and click **Next**.
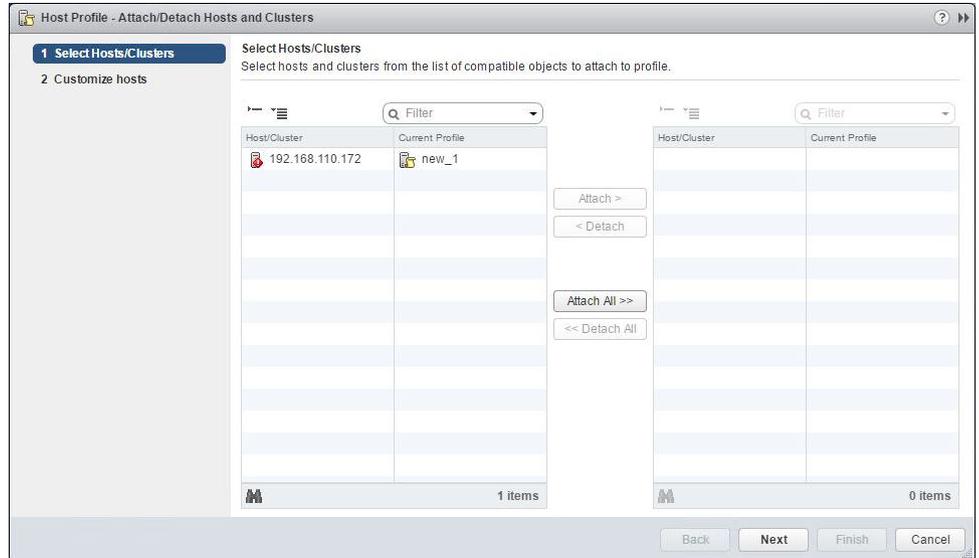
5. In the **Customize hosts** screen, enter the host GUID.

6. Reboot all ESXis that were attached to the profile.

7. If you need to attach more ESXi host to the host profile set, repeat steps 1 on page 13 through 6 on page 14, using a unique GUID for each ESXi host.

Verify that the ESXi servers hosting SDCs are connected

Use the VxFlex OS GUI to verify that the ESXi servers are connected to the system.

Before you begin

Ensure that you have:

• The management IP address or hostname of the MDM.

• The username and password to log in to the VxFlex OS GUI.

Procedure

1. Open the VxFlex OS GUI.

2. Log in using the MDM IP address or hostname and the VxFlex OS username and password.

3. In the **Frontend** > **SDCs** view, verify that all of the ESXi servers hosting SDCs are connected.