Actifio Sky On-Premises Deployment Guide

Updated April 10, 2023

Actifio GO

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1 Requirements for Installing an Actifio Sky Appliance on VMware

The following sections provide the requirements for installing an Actifio Sky Appliance on a VMware server:

- vSphere Server Requirements on page 1
- Actifio Sky Appliance Memory Requirements on page 3
- Actifio Sky Appliance Storage Requirements on page 4
- Actifio Sky Appliance Networking Requirements on page 5

vSphere Server Requirements

An Actifio Sky Appliance must be installed on a vSphere server configured specifically for a Sky Appliance.

Ensure the vSphere host has **sufficient memory and CPUs/Cores reserved** to accommodate your Actifio Sky model. See Actifio Sky Appliance Memory Requirements on page 3 for details.

Do not share the Actifio Sky Appliance's resources with other VMs. See the *A VMware vCenter Administrator's Guide to Actifio GO* section on Permissions.

Sky Appliances on Licensed/Unlicensed vSphere Host

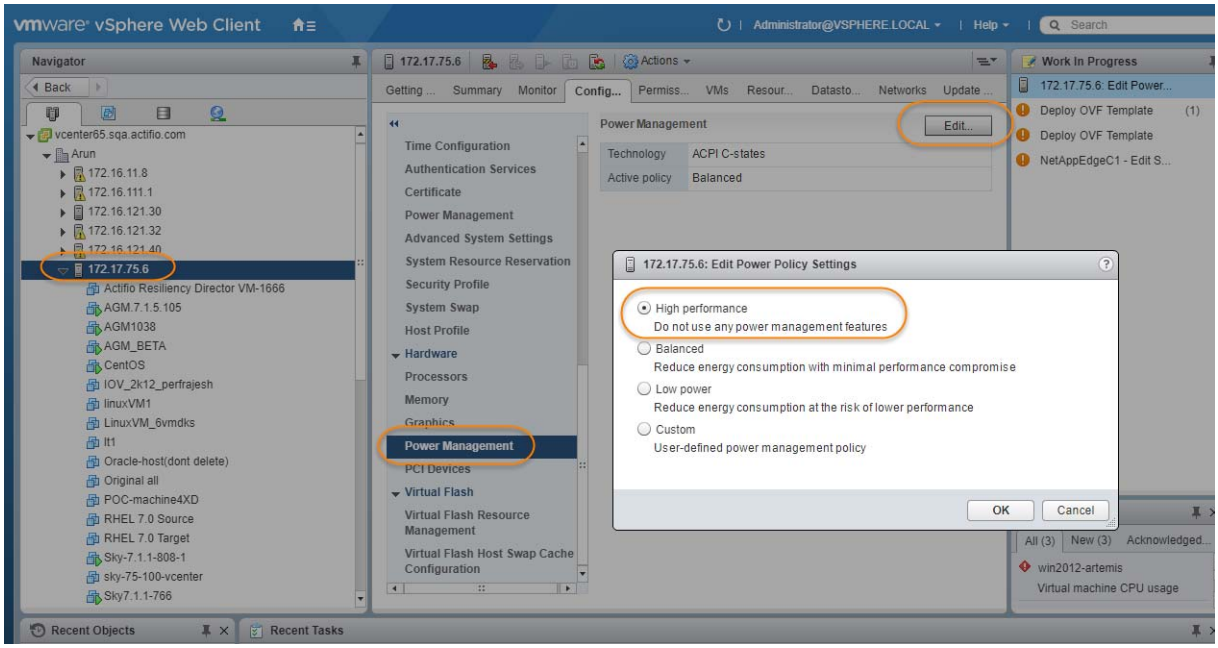
If an appliance is installed on an unlicensed (free) vSphere host, the Policy Templates for that Sky Appliance **CANNOT** capture other VMs and applications installed on that vSphere host.

If an appliance is installed on an unlicensed (free) vSphere host, the Policy Templates for that Sky Appliance **CAN** capture and access VMs and applications on licensed vSphere hosts and applications on physical servers.

If an appliance is installed on a licensed vSphere host, the Policy Templates for that Sky Appliance **CAN** capture VMs and applications on the vSphere host on which the Sky Appliance is installed. Policy Templates for that Sky Appliance can also capture VMs and applications on other licensed vSphere hosts and applications on physical servers.

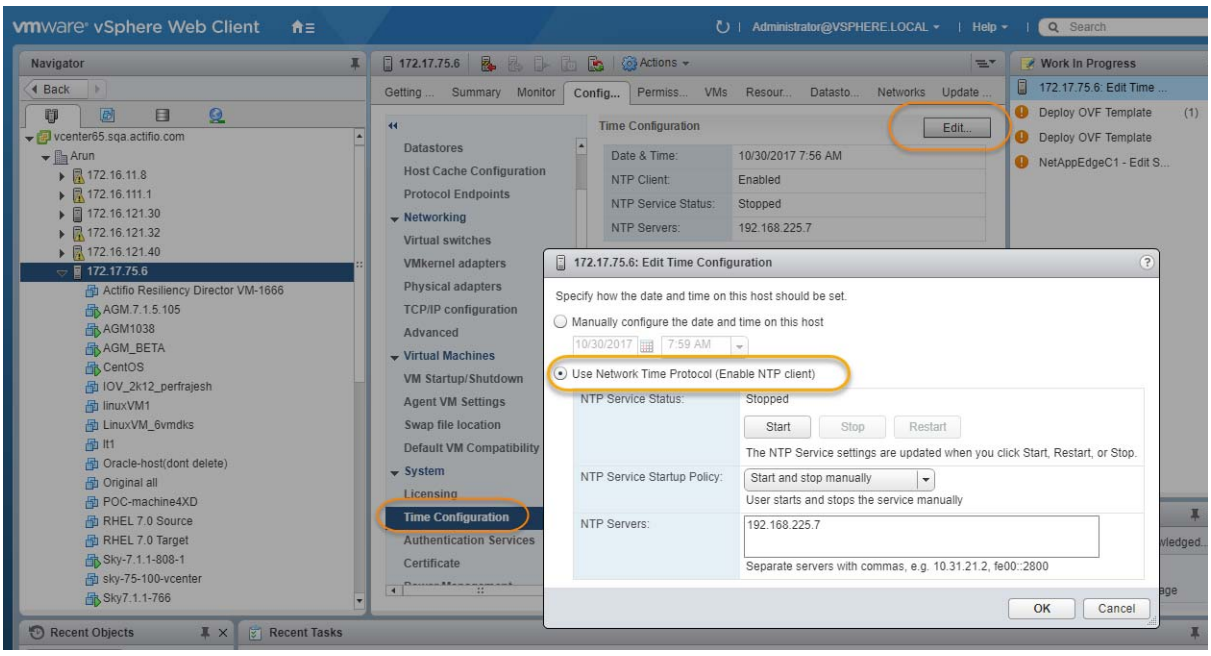
vSphere Host Power Management Off

Power management can interfere with the operation of a Sky Appliance. Ensure that power management for the ESX host is set to **High Performance**.



vSphere NTP

Do not use VMware Tools periodic time synchronization for the Sky Appliance's VM. Use NTP instead.



Actifio Sky Appliance Memory Requirements

This table allows you to compare the requirements and capabilities of Sky models.

Requirement	Model		
	60TB	120TB	200TB
CPUs required.[a]	4	6	8
CPUs required for encryption at rest. [a]	6	8	10
Minimum Reserved Memory	16GiB	32GiB	48GiB
Minimum Disk Space for Primary Pool [b]	200GiB		
Minimum Disk Space for Snapshot Pool	10GiB		
Required Disk Space for Dedup Pool	100GiB		
Maximum VDisks	10,000		

a. Minimum 2 GHz per CPU. The CPUs **must be reserved** and the balloon driver must be turned off. Any paging or swapping will cause significant performance impact and in some cases result in the appliance deadlocking.

b. See Actifio Sky Appliance Storage Requirements on page 4. Must be Thick Provision Eager Zeroed.

Actifio Sky Appliance Storage Requirements

The Sky Appliance uses three storage pools: Primary Pool, Snapshot Pool, and the Dedup Pool. Each pool **MUST:**

- Reside on a separate RAID-6 array that supports at least 100 IOPS per disk.
- Use 7200 RPM disks, 10,000 RPM disks are preferred.
- Have a performance profile of 35 random reads per second per TB with 64KB read size or 10 random writes per second per TB with 64 KB write size.

> ***Note:*** *Run the IOPerf tool prior to Sky Appliance installation to ensure adequate performance. ActifioNOW contains documentation on how to run IOP.*

- Use **Thick Provision Eager Zero** disks.

> ***Note:*** *Using thin provisioned disks can result in data loss.*

To size a Sky Appliance, you must consider the amount of data to be captured, its type, change rate, growth, and how long it will be retained. These variables and others are considered in the VDP solution sizing tool.

The sizing tool will recommend how to allocate space for at least three **Thick Provisioned Eager Zero** disks:

- **Primary Pool:** One 200 GiB disk used by the Actifio Sky Appliance.
- **Snapshot Pool:** Accommodates the full copies (snapshots) to be retained, plus enough space for future growth. A minimum of 10 GiB is required. You can add additional disks in vSphere to accommodate growth. The Snapshot Pool requires its own SCSI controller set to VMware Paravirtual. See Adding SCSI Controllers on page 16 for details.
- **Dedup Pool:** A minimum of 100 GiB is required. You can add additional disks in vSphere to accommodate growth.

> ***Note:*** *Do not resize disks for Snapshot Pools. If additional storage is needed, add disks.*

When creating disks, ensure that the **Mode** is set to **Independent** and **Persistent**.

Actifio Sky Appliance Networking Requirements

Sky Appliances require the following network settings:

- **Static IPs**: You must provide static IPs for all NICs on Sky Appliances.
- **VMXNET3**: Sky Appliance models 30, 50, 120, and 200 must use the VMXNET3 Ethernet adapter. These adapters enable 10GB performance.
- **Adding NICs**: By default, the Sky Appliance comes with a single NIC. To add additional NICs, see Adding and Configuring Additional Network Interfaces on page 25.

Actifio Sky Network Protocol support

Actifio Sky supports storage presentation (as part of backup/recovery and mount operations) over iSCSI or NFS. The configuration requirements for each of these protocols is detailed below

- **NFS**: As long as you have a network connection from both the Sky Appliance and the vSphere host that the VM resides on, all backups and mounts using NFS will proceed normally. You can use NFS over your network without configuring iSCSI.
- **iSCSI**: The Sky Appliance uses iSCSI to mount data. Ensure that iSCSI is turned on for the Sky Appliance's vSphere host, and for the servers that host the data the Sky Appliance will capture and manage.

  When capturing an entire vSphere VM, iSCSI does not need to be configured on the vSphere host that hosts the VM to be captured. Once the VM has been captured, to present the VM to another vSphere host, including the vSphere host from which it was captured, the vSphere host must have iSCSI configured.

  When capturing individual applications on a VM, rather than capturing the entire VM, iSCSI must be configured on the VM's vSphere host.

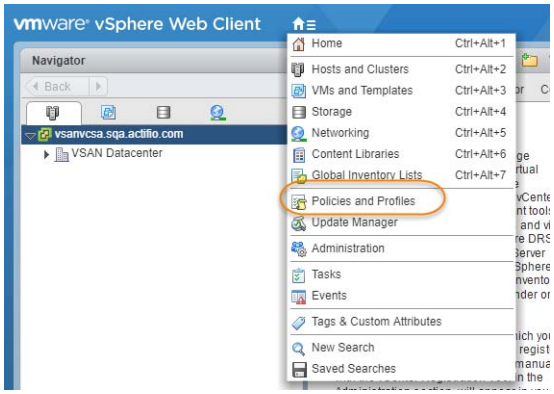
  The Snapshot pool and the Dedup pool must each have their own SCSI controller set to VMware Paravirtual.

2 Actifio Appliance VMware vSAN Requirements

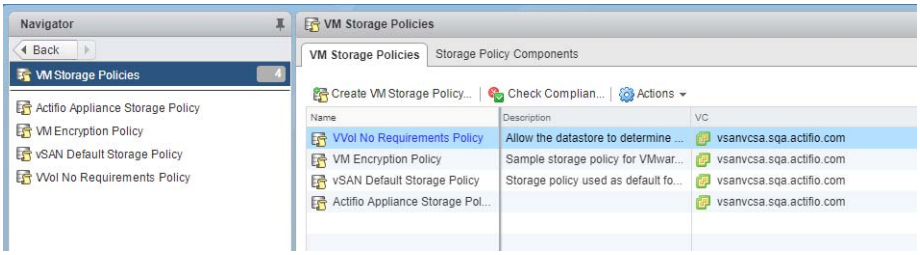
If the Actifio Sky Appliance will use VMware's vSAN storage, then you must consider the VMware vSAN storage policy used when you deploy the Sky Appliance OVA. The best practice is to use the vSAN Default Storage Policy.

VMware provides detailed step-by-step instructions on how to create and modify VMware vSAN storage polices.

1. From a vSAN data center's top bar drop down menu, select Policies and Profiles:



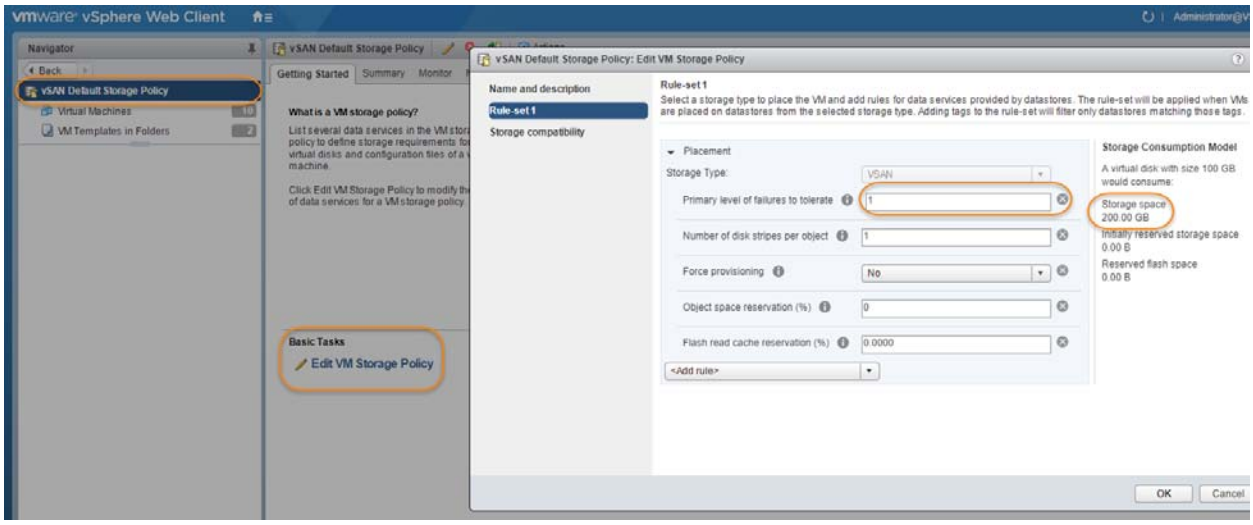
2. From VM Storage Policies, either create a new policy or select and edit an existing policy:



3. The vSAN policy sets the rules for fault tolerance (Primary level of failures to tolerate). You must consider how the fault tolerance settings will impact storage.

   A policy with a Primary level of failures to tolerate set to 1 or more will allow the Sky Appliance fault tolerant operations across the ESX cluster. Setting the value of Primary level of failures to tolerate to a value of "n" will increase the storage requirements "n" times. For example, if a policy has 100 GB of storage and a level of 1, then it will require 200 GB of storage.

   From the policy editor, set Primary level of failures to tolerate to the required level. Pay attention to how your setting impacts storage.



4. Make other settings as needed.
5. Click **OK** and the policy is complete.

3 Deploying the Actifio Sky Appliance OVA

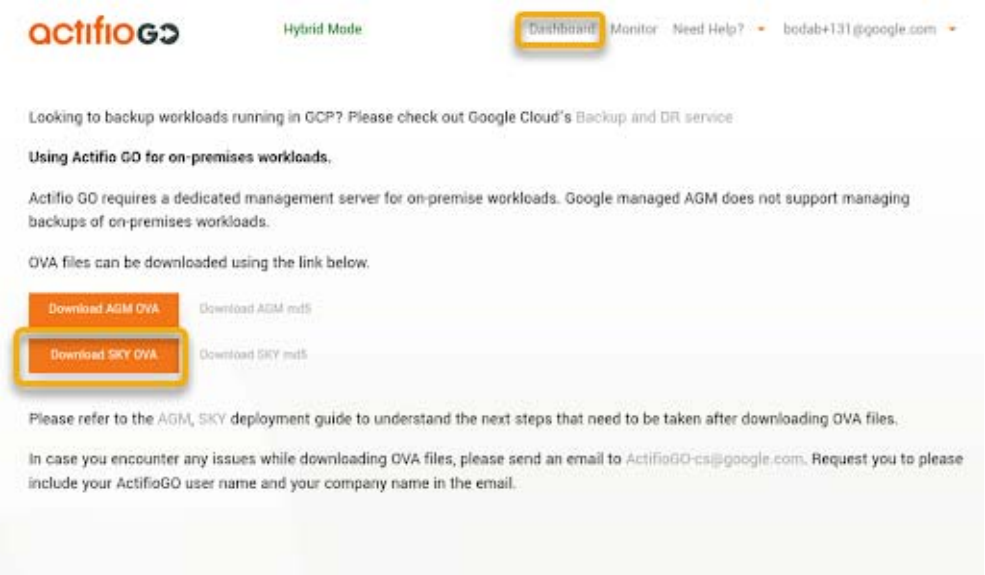
This chapter provides instructions for deploying and configuring the Sky Appliance Open Virtual Appliance (OVA) using the best practices detailed in Chapter 1, Requirements for Installing an Actifio Sky Appliance on VMware.

Deploying the Sky Appliance OVA on page 10
Configuring CPUs and Memory on page 12
Adding SCSI Controllers on page 16
Adding Disks on page 17
Adding Network Interfaces on page 18
Turning the Balloon Driver Off on page 19

Note: *At this point the VM must be powered down. Later on, you will power on the VM.*

Downloading the OVA

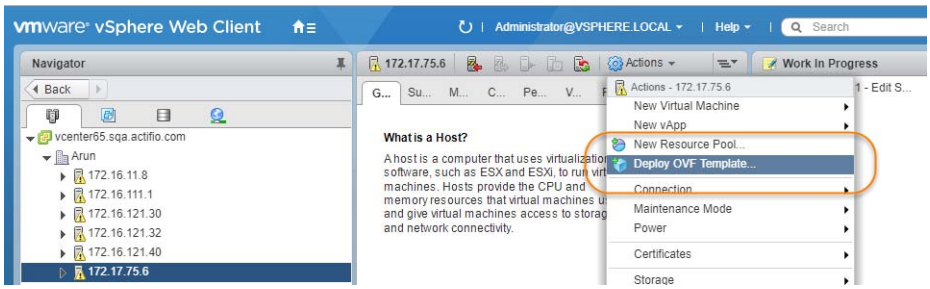
Before you can install a Sky appliance, you must download the OVA file from the portal. To download the OVA, open the dashboard and click **Download Sky OVA**.



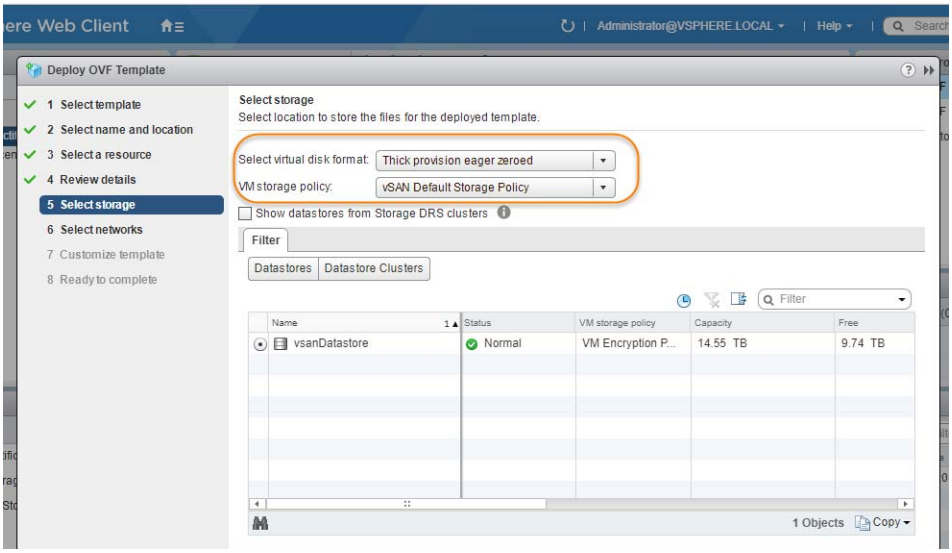
Deploying the Sky Appliance OVA

Once you have obtained a copy of the Sky Appliance OVA:

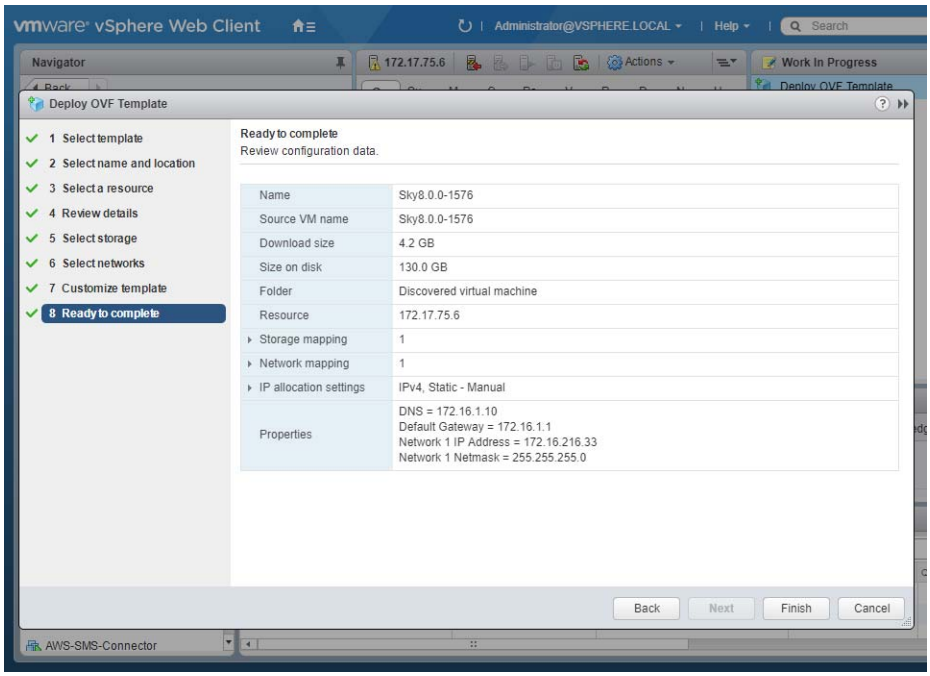
1. From the vSphere web client, select the host for the Sky Appliance VM.
2. From the vSphere web client's Actions drop-down menu, select **Deploy OVF Template**.



3. Browse to the OVA file.
4. Complete the deployment like any other OVF template including:
   - Enter a name for the Sky Appliance.
   - Select the cluster/host to store the Sky Appliance.



5. When selecting storage: Select *Thick provisioned eager zero* and ensure that the storage selected has enough room to accommodate the 130 GB OS Volume.
6. If the Sky Appliance uses VMware vSAN (recommended), then select the vSAN policy created for the appliance's fault tolerance requirements. See Actifio Appliance VMware vSAN Requirements on page 7 for details.
7. Select the network for the management interface. For appliances that require multiple networks, you will add those networks after the Sky Appliance is completely installed.
8. For network settings, enter a static IP, Gateway, DNS, and Netmask. DO NOT use DHCP.
9. Click **Next** and review your settings:



You can use the Back button to go back and make changes.

10. Click **Finish** and your Sky Appliance VM will be deployed.

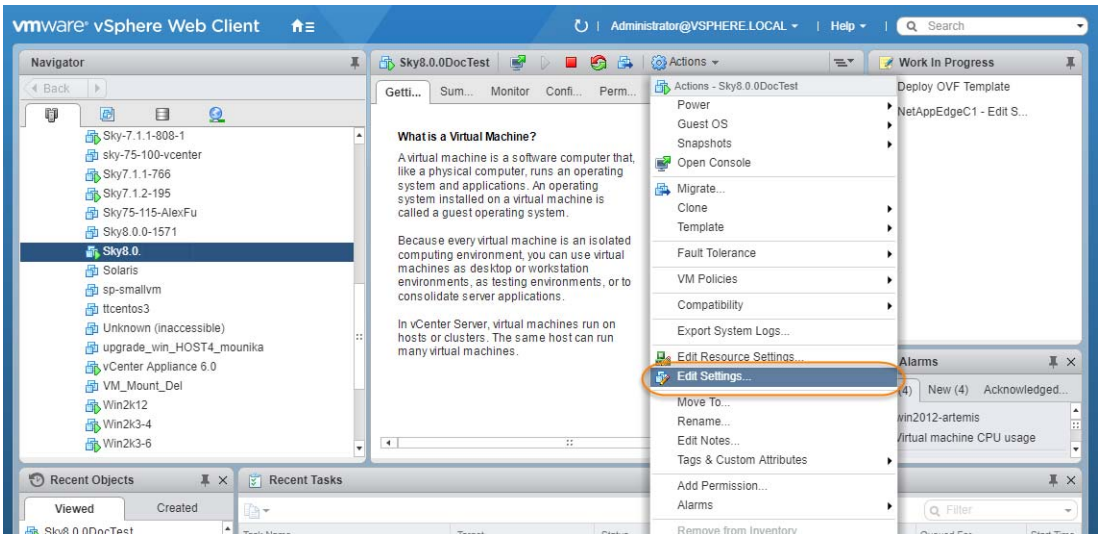
Configuring CPUs and Memory

Once the VM has been deployed, reserve and configure its CPUs and memory according to your license requirements. See Actifio Sky Appliance Memory Requirements on page 3 for details.

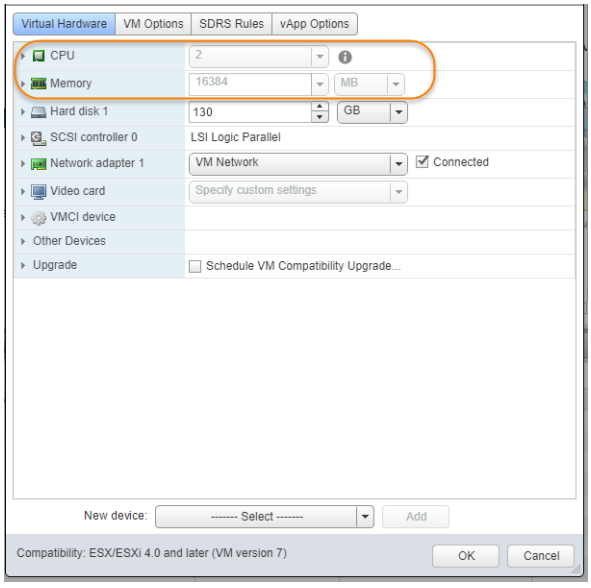
- Configuring Memory Reservation
- Configuring CPU Reservation
- Configuring CPU Cores Per Socket

Configuring Memory Reservation

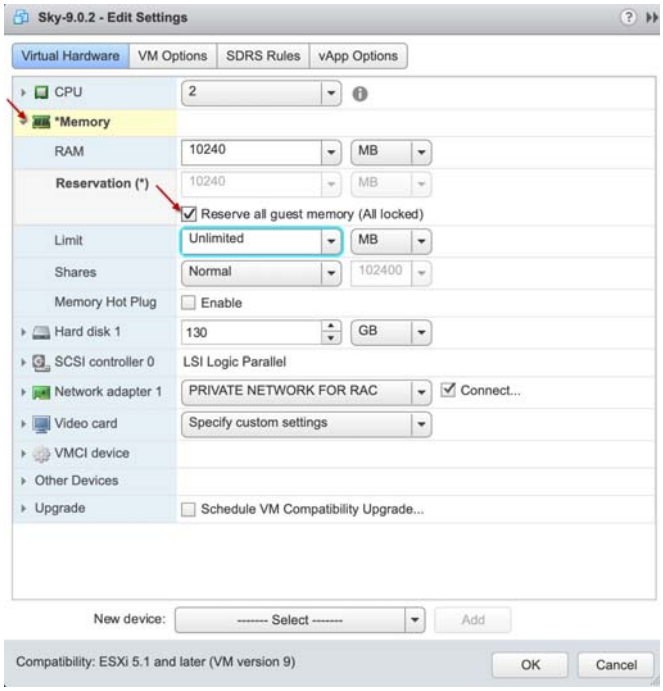
1. Select the Actifio Sky VM.



2. From the **Actions** drop down menu, select **Edit Settings**. The Edit Settings dialog box is open to the Virtual Hardware tab:



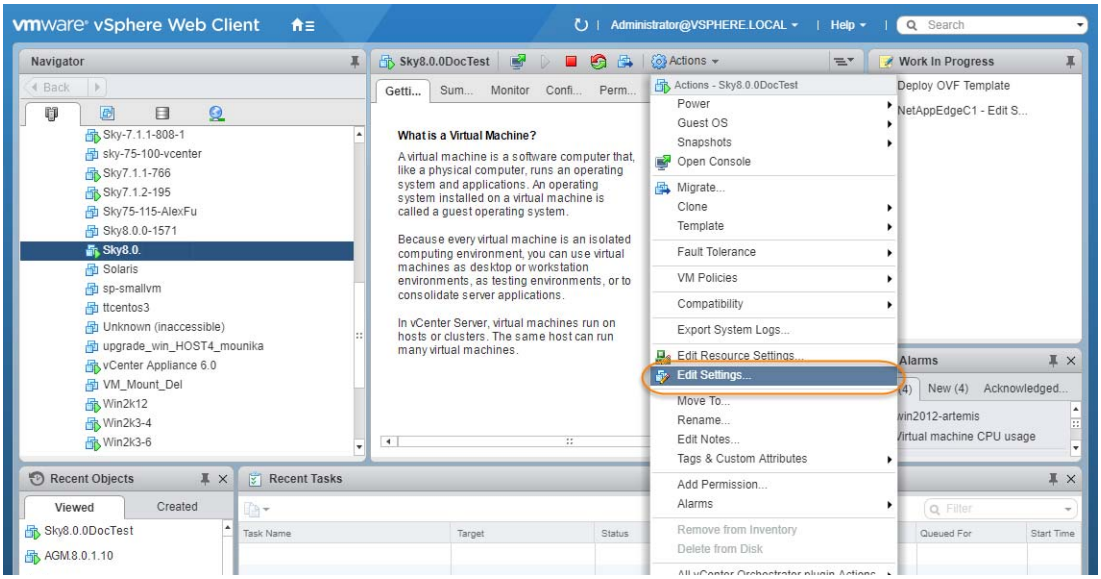
3. Expand **Memory** and check **Reserve all guest memory (All locked)**.



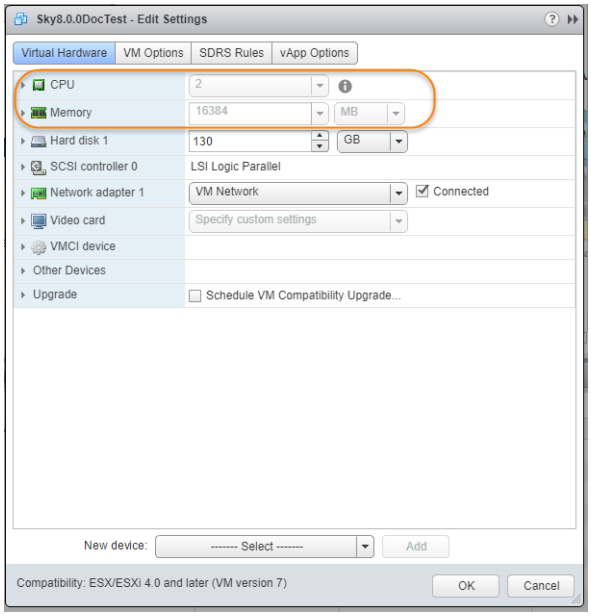
4. Select **OK**.
5. Review the Hardware Summary to ensure you have properly reserved memory.

Configuring CPU Reservation

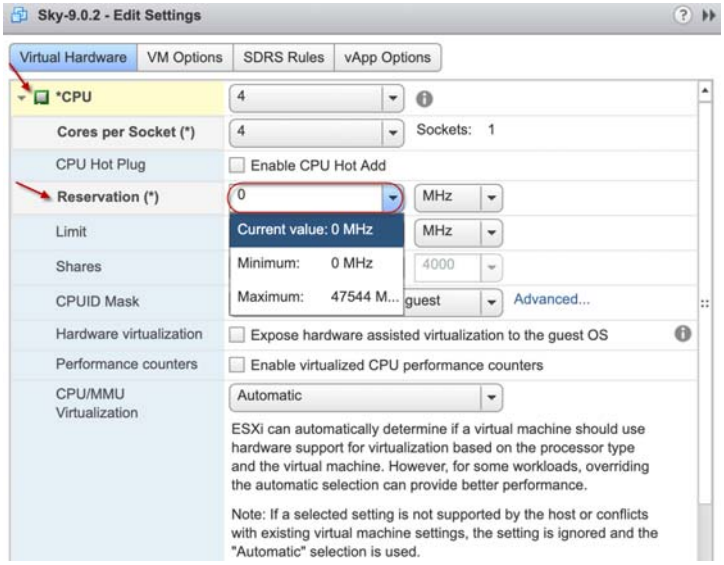
1. Select the Actifio Sky VM.



2. From the **Actions** drop down menu, select **Edit Settings**. The Edit Settings dialog box is open to the Virtual Hardware tab:



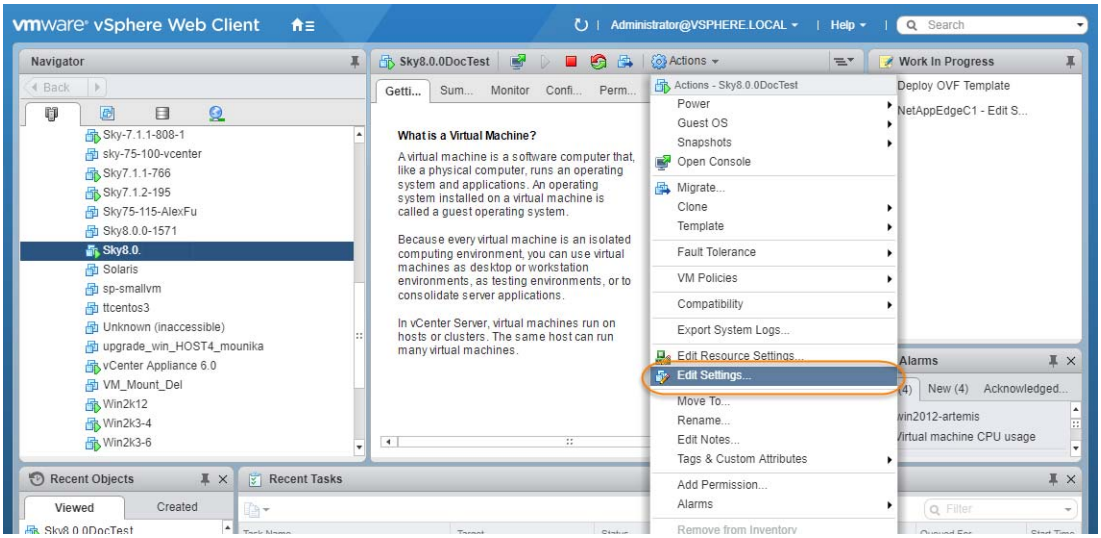
3. Expand **CPU**, specify the CPU's reservation value and units.



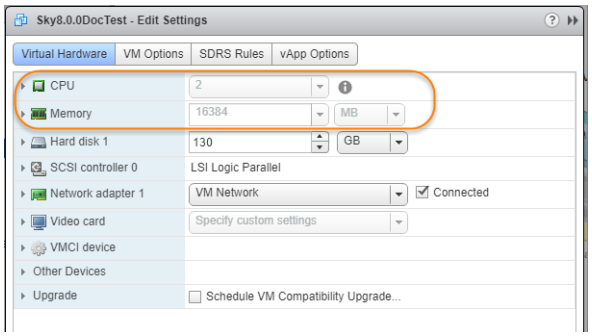
4. Select **OK**.
5. Review the Hardware Summary to ensure you have properly reserved CPU.

Configuring CPU Cores Per Socket

1. Select the Actifio Sky VM.



2. From the **Actions** drop down menu, select **Edit Settings**. The Edit Settings dialog box is open to the Virtual Hardware tab:



3. Expand **CPU**, click **Cores per Socket** and select the number of cores from the drop down list.

4. Select **OK**.
5. Review the Hardware Summary to ensure you have properly reserved cores.

Adding SCSI Controllers

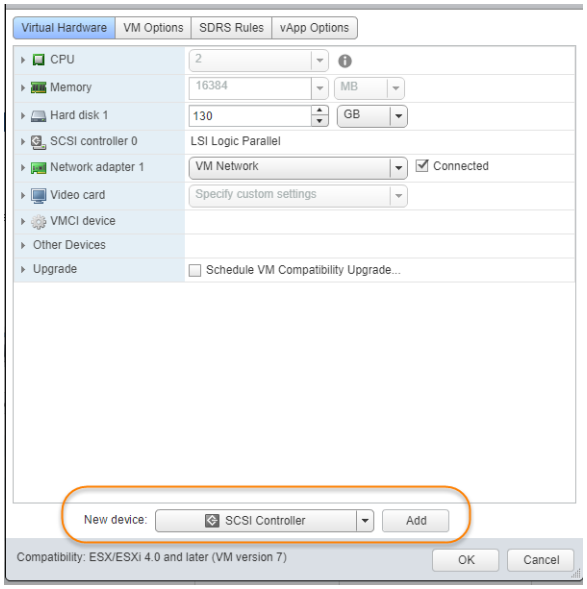
The Sky Appliance VM requires two disks, each with its own SCSI controller:

- The VM's operating system and the Primary pool disk can both use the 0:0 controller.
- The Snapshot Pool uses the 1:0 controller. Disks assigned to the Snapshot Pool will use 1:x. The controller for the Snapshot Pool must be set to VMware Paravirtual.

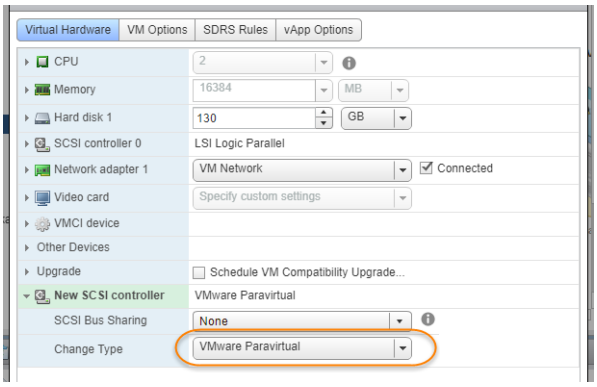
A controller can accommodate up to 16 disks. If you find it necessary to create more than 15 disks for a pool, you will need to define a new controller.

To add SCSI controllers as VMware Paravirtual:

1. Select the Sky Appliance VM.
2. From the Actions drop-down menu, select **Edit Settings.** The Edit Settings dialog box is open to the **Virtual Hardware** tab.
3. From the New Device drop down-menu at the bottom of the dialog box, select **SCSI controller**.



4. Click **Add** and the options for the SCSI controller are displayed.
5. Expand the options under the New SCSI Controller. Select **VMware Paravirtual** and then click **OK**.



6. Add another SCSI Controller as needed.
7. Click **OK** to close the Edit Settings dialog box.

Once you have defined the controllers, you can add disks and assign them to their respective controllers. See Adding Disks on page 17.

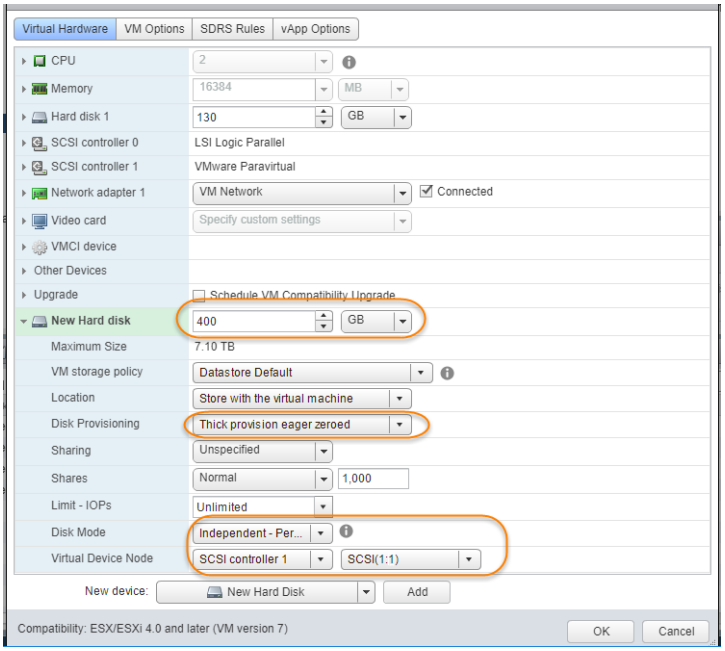
Adding Disks

Once the SCSI controllers are created and are configured, configure the VM's disks as follows.

Note: *The disks defined here will be placed into storage pools later.*

---

1. On the **Virtual Hardware** tab, select **Add**:



2. In the Add Hardware dialog, select **Hard Disk**.

Note: *Disks **MUST BE THICK PROVISIONED EAGER ZEROED**. Thin provisioned disks may cause capture operations to fail and the loss of data.*

---

3. Your Sky Appliance requires at least three **Thick Provision Eager Zeroed** disks.

   To size your Sky Appliance, you considered the amount of data to be captured, its type, change rate, growth and how long it would be retained. This same information is required to allocate space for the Sky Appliance's disks.

   - One 200 GiB disk for the Primary Pool. This disk is used by the Sky Appliance.
   - One disk for the Snapshot Pool. Allocate enough space to accommodate the full copies (snapshots) to be retained, plus enough space for growth. A minimum of 10 GiB is required. You can add additional disks in vSphere to accommodate growth.
   - One 100 GiB disk for the Dedup Pool. This disk is used by the Sky Appliance.

Note: *The pool names for these disks are used in* Configuring an Actifio Sky Appliance.

---

4. For the disks that will be assigned to the Snapshot Pool from the Virtual Device Node drop down menu, select the SCSI controller 1:x.
5. Under Mode, check **Independent** and accept the default of **Persistent**.
6. Click **OK** and the disk is configured. Once you have finished configuring all of the disks, you can power up the VM.

Note: *Do not resize disks for pools. If additional storage is needed, add disks.*

Adding Network Interfaces

Once the Sky Appliance is up and running, you can add additional network interfaces. For environments that require multiple NICs (for example, one NIC for data storage and another NIC for management), you must manually add network adapters to the Sky Appliance VM and then configure the additional adapters through the System Management user interface. See Adding and Configuring Additional Network Interfaces on page 25 for details.

For Sky Appliance network requirements, see Actifio Sky Appliance Networking Requirements on page 5.

Worker Thread Errors

Worker Thread errors such as:

```
2016-05-26 13:21:39.138 INFO Worker_Thread_Job_0593710 SC6164: Error: 1732: Worker thread
failed: write failed for "\\?\C:\Windows\act\Staging_584181\SPARK CRM04\F_2016-03-
01T211433.vhd": The storage device is unresponsive [0x8003020a]
```

Indicate either:

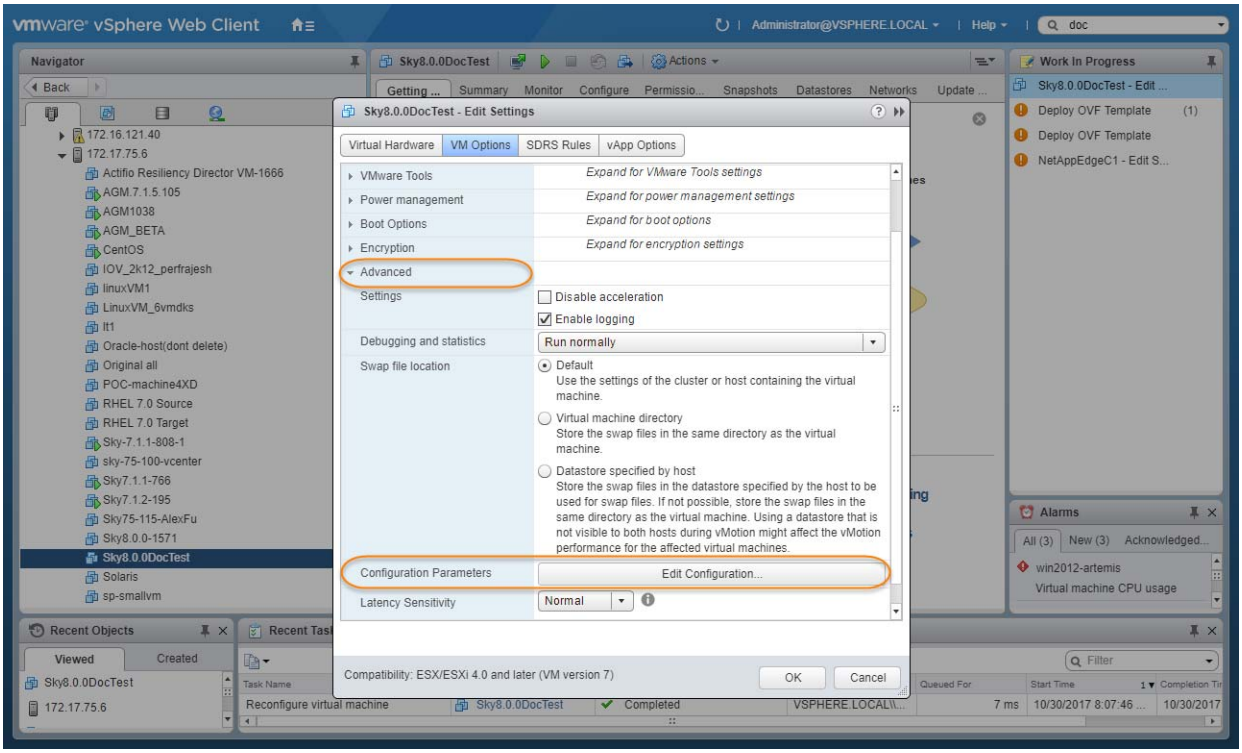
- Memory for the Sky Appliance has been incorrectly allocated.
- The bandwidth for the network on which the Sky Appliance resides is consumed by other devices.

Turning the Balloon Driver Off

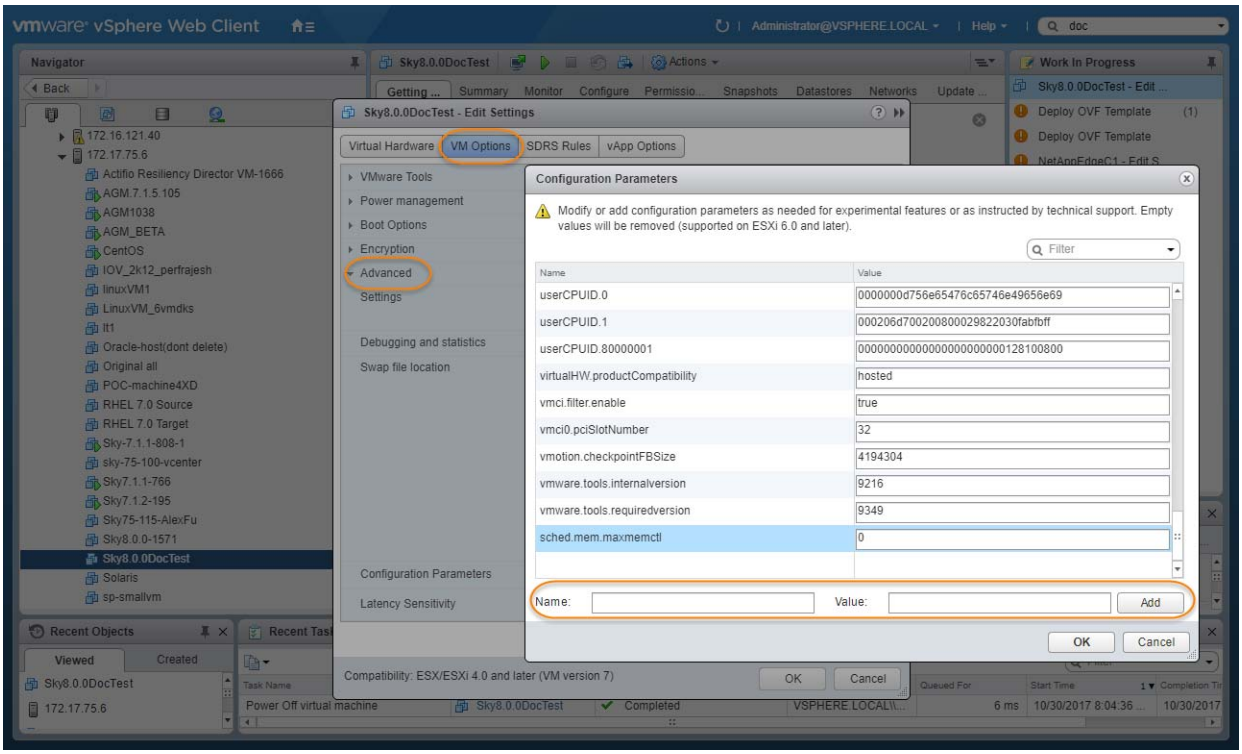
Once the VM has been configured, before you can configure the Sky Appliance, you must power down the Sky Appliance VM and turn off the Ballooning Driver. The balloon driver must be turned off because any paging or swapping will cause significant performance impact, and in some cases result in the Sky Appliance deadlocking.

To turn off the ballooning driver:

1. Log into the vSphere host as a user with administrative rights.
2. Shut down the Sky Appliance.
3. From the **Actions** drop-down menu, select **Edit Settings**.
4. Click the **VM Options** tab.
5. On the left-hand side of the VM Options tab, click **Advanced**.
6. Click **Edit Configuration**.



7. In the space provided for Name, enter **sched.mem.maxmemctl**.
8. In the space provided for Value, enter **0**.
9. Click **Add**. Ballooning is turned off.

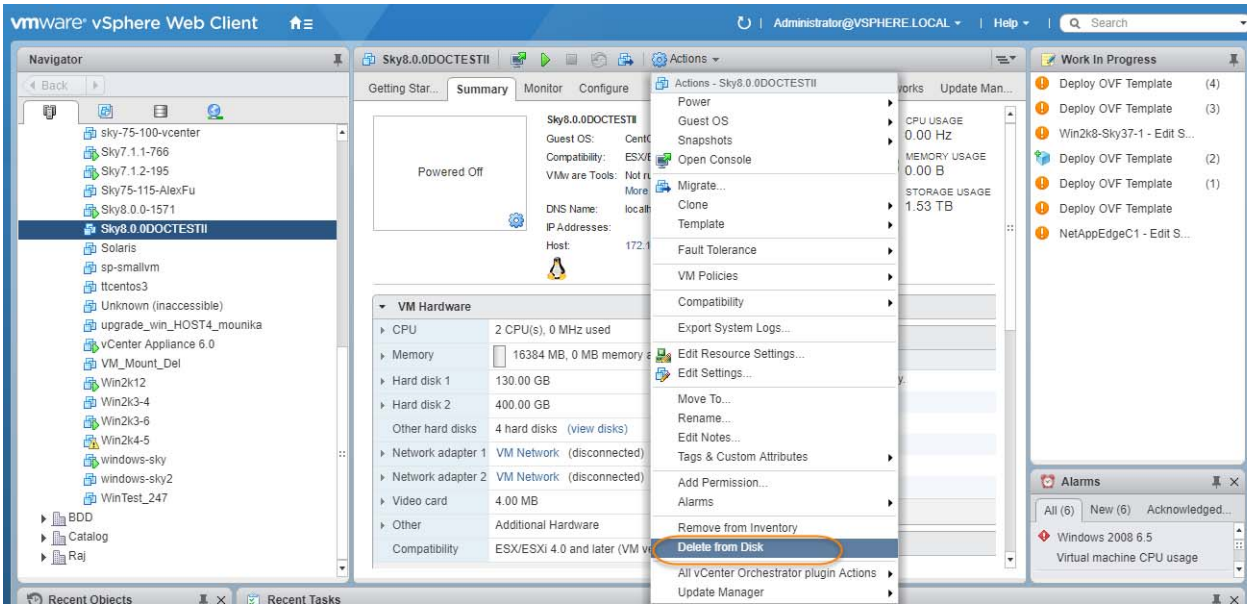


10. Click **OK** and exit out of the Edit Settings dialog boxes.
11. Power up the Sky Appliance VM and continue on to Chapter 4, Configuring an Actifio Sky Appliance.

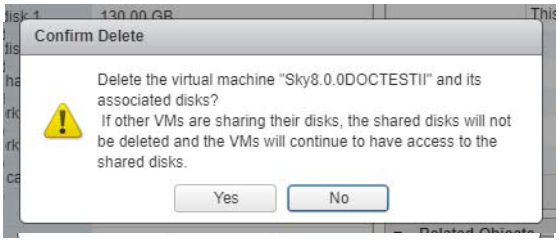
Deleting an Actifio Sky Appliance VM

To delete an Actifio Sky Appliance VM:

1. From AGM, power down the Sky Appliance VM.
2. From the vSphere Web Client's left-hand navigation frame, select the Sky Appliance VM to be deleted.



3. From the VMware Web Client's Action drop down menu, select **Delete from Disk**. This option is only available if the VM is powered down.
4. When you click Delete from Disk, a confirmation message is displayed. Ensure that the VM name displayed in the confirmation message is the name of the Sky Appliance VM you want to delete.



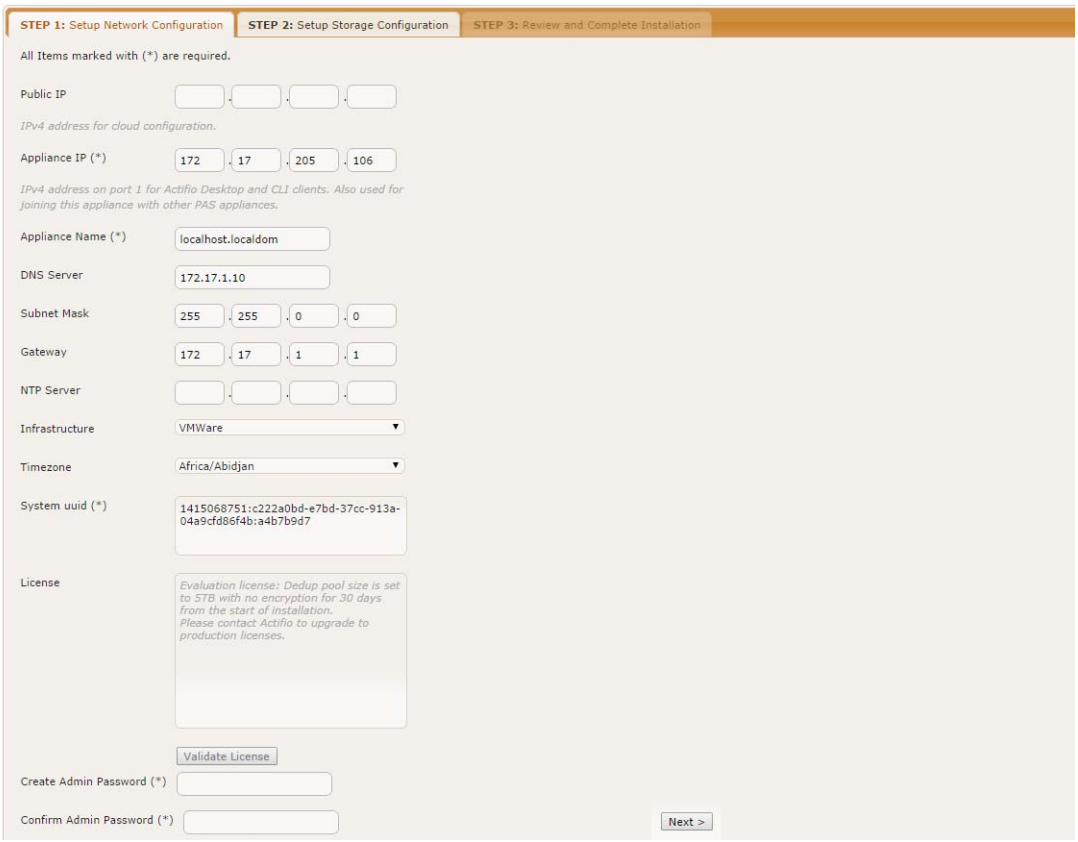
5. If the name in the confirmation message matches the name of the Sky Appliance VM that you want to delete, then click **Yes** and the Sky Appliance VM and its disks will be deleted.

4 Configuring an Actifio Sky Appliance

After the VM is configured and powered up, it is ready to be configured as an Actifio Sky Appliance.

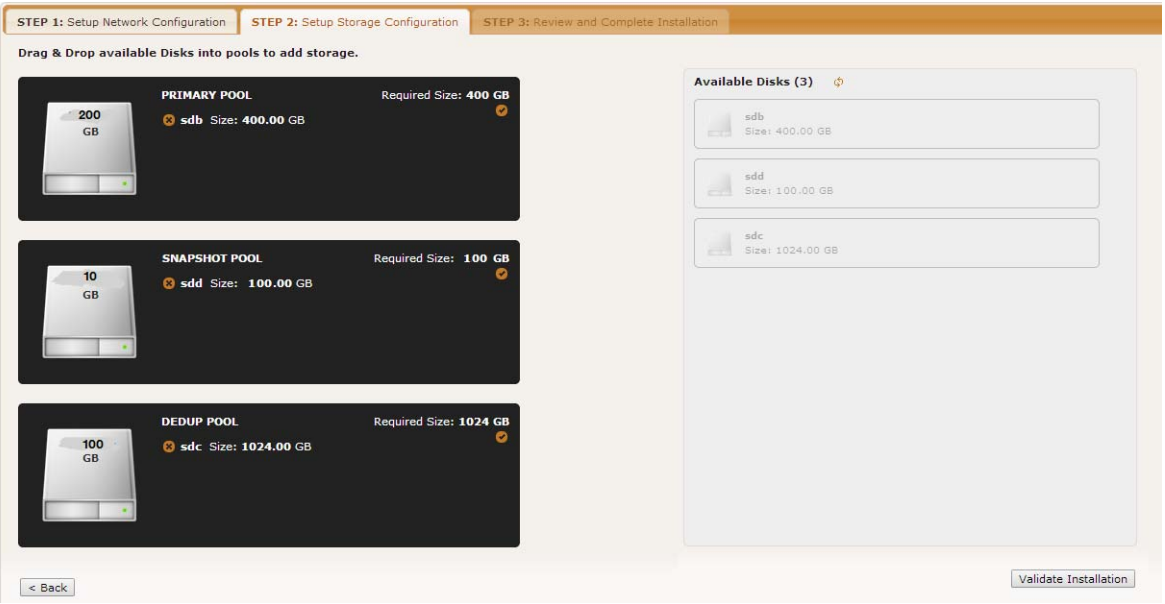
Note: *For the following procedure you will need the IP address of the VM. The VM's IP is on the VM's vSphere Summary page.*

1. Open a browser and in the address space, enter the IP of the newly configured Sky Appliance VM: http://<VM IP address>/.
2. The installer opens the first of three tabs:

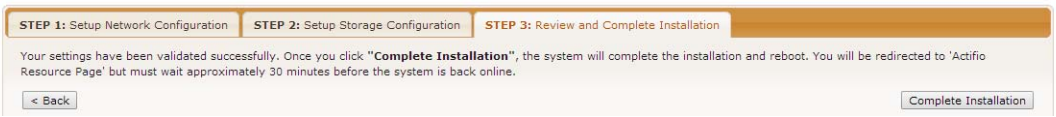


3. If your Sky Appliance will sit behind a firewall, enter the Public IP Address in the spaces provided.
4. Ensure that the auto-discovered Sky Appliance IP address is correct.
5. In the space provided, enter a name for the Sky Appliance.

6. Ensure that the auto discovered network IP addresses are correct.
7. From the Infrastructure drop down menu, select **VMware**.
8. Set the time zone as needed.
9. Capture the system UUID and include it in an email license key request for each install to Actifio Support. Actifio will use the UUID to generate the Sky Appliance license key.
10. In the space provided, paste the license key you obtained from the Actifio representative.
11. Click **Validate License** to ensure the validity of the license entered.
12. If you are using a Sky model encryption license, a Pass phrase field is displayed. Enter a pass phrase, record the pass phrase and keep it in a secure location.
13. In the spaces provided create a password for the first Admin user of the Sky Appliance.
14. Click **Next**, and the Step 2 tab contents are displayed:



15. Select and drag the Available Disks to the pools for which they were created.
16. Click **Validate Installation**. The Sky Appliance installer validates the settings, and if no issues are encountered, advances to the third tab. Any issues will appear in a yellow field at the top of the page 2.
17. The third tab provides the opportunity to review choices and go back to make changes as needed.



18. Once choices are verified, click **Complete Installation** and the Sky Appliance will reboot. The reboot may take several minutes. The user interface will become responsive before the appliance is ready for use. Do not attempt any operations until the Dedup light on the Dashboard shows green.

A Adding and Configuring Additional Network Interfaces

Adding additional network interfaces to an Actifio Sky Appliance requires:

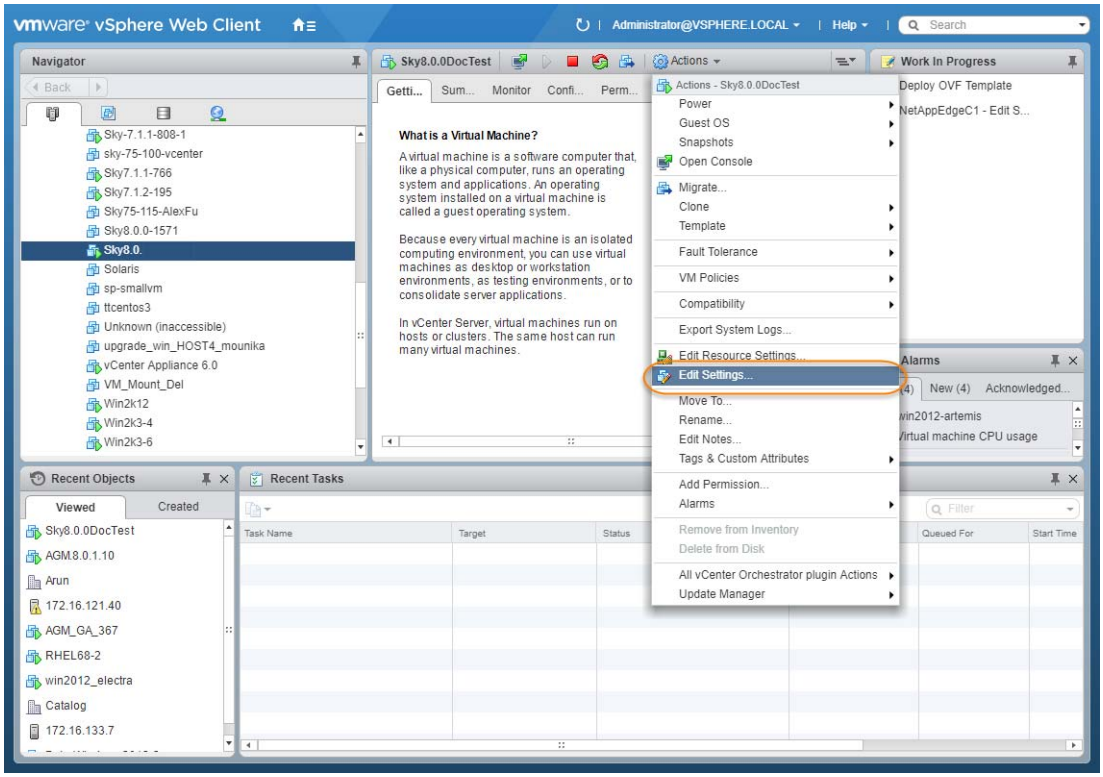
Adding a New Network Adapter

Configuring a Sky Appliance VM Network Adapter

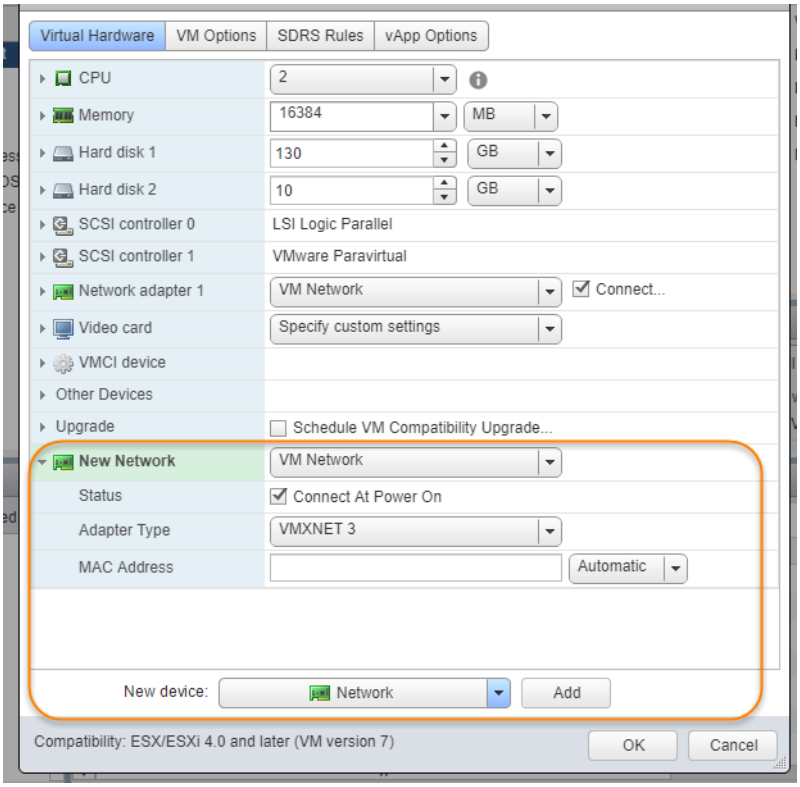
Adding a New Network Adapter

To add a new network adapter to a Sky Appliance VM:

1. In vSphere, select the Sky Appliance VM.



2. From the **Actions** drop-down menu, select **Edit Settings.** The Edit Settings dialog box is open to the Virtual Hardware tab.
3. From the **New Device** drop-down menu at the bottom of the page, select **Network**.



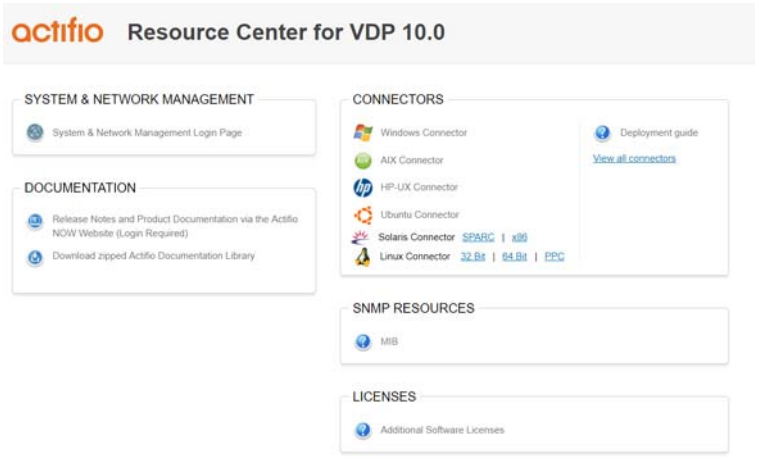
4. Click **Add**.
5. Expand the options under the New Network and ensure it is using the **VMXNET3** option.
6. Click **OK** on the Edit Settings dialog box and the new network adapter is added.
7. Once the network adapter is added, use the System Management user interface to configure the network. You can reach the System Management user interface from the Actifio Resource Center (at the IP address of the Sky Appliance).

Configuring a Sky Appliance VM Network Adapter

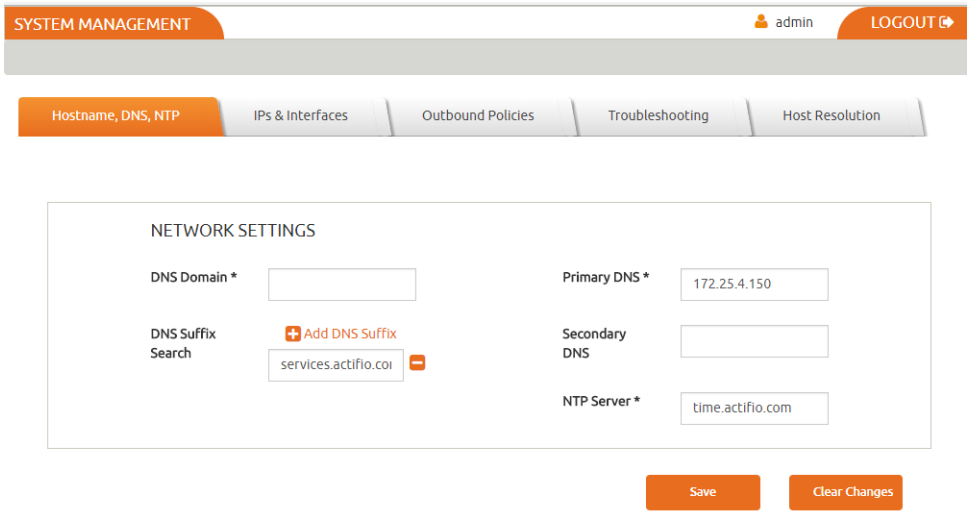
The System Management user interface is used to configure Sky Appliance network adapters. You access the System Management user interface from the appliance's Actifio Resource Center.

To display the Sky Appliance's resource page:

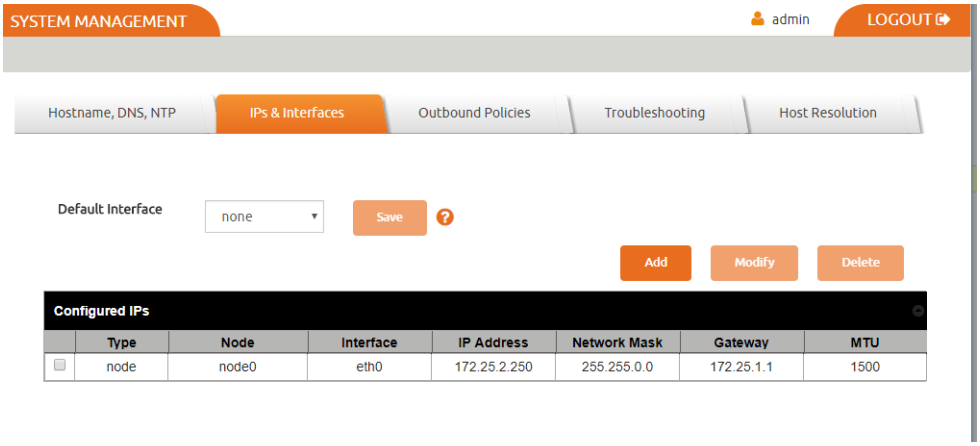
1. Open a browser to the Sky Appliance's Resource Center HTTP://<appliance IP address>/.



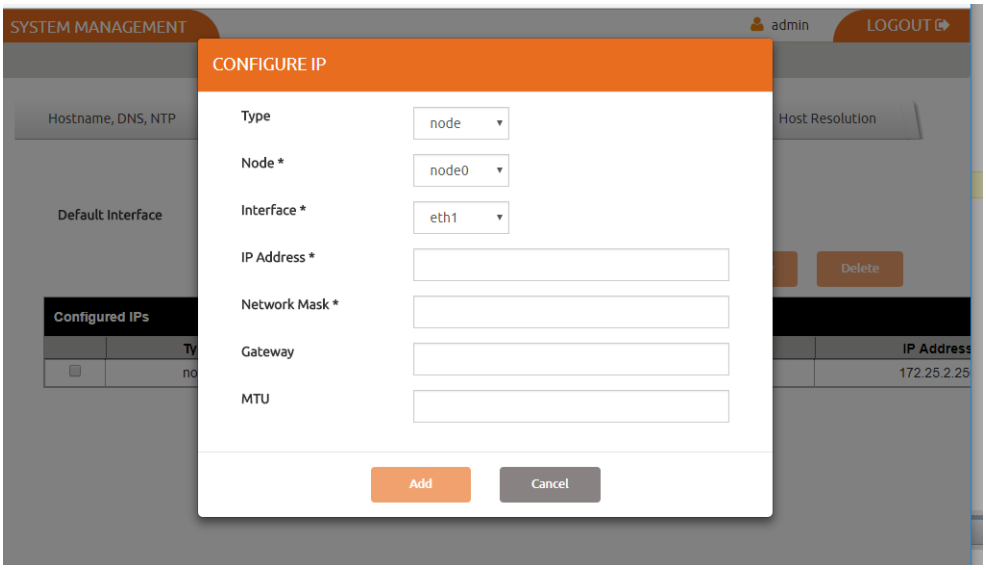
2. Click System & Network Management Login Page.
3. Log in using the Sky Appliance's administrator credentials, and the System Management interface is displayed.



4. Ensure that the DNS and NTP settings are correct.
5. Click the IPs and Interfaces tab, and the IP and Interfaces settings are displayed:



6. Click **Add** and the Configure IP dialog box is displayed:



7. Ensure Type is set to **Node**.
8. Ensure Node is set to **Node0**.
9. Select the interface you created on the Actifio Sky Appliance VM. In this example it is eth1.
10. In the spaces provided enter:
    - A static IP address
    - A network mask
    - A Gateway
    - MTU (Maximum Transmission Unit) can be used to tune the performance characteristics of traffic on an interface. There are many dependencies to consider when adjusting the MTU, as all network devices and servers involved in passing network traffic must support the specified MTU, and there must be space reserved for protocol overhead. If you are not sure what value to use, leave this at the default value of 1500.
11. Click **Add** and the interface is configured.