Installing an Actifio Sky Appliance on a VMware Server

CAUTION: This release includes a change of operating system for the VDP database, from the deprecated CentOS 7 to Rocky 8. Before upgrading any Sky appliance, be sure to back up the appliance. (334849955)



Actifio VDP 10.0

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Contents

Chapter 1 - Requirements for Installing an Actifio Sky Appliance on VMware	1
vSphere Server Requirements	1
Sky Appliances on Licensed/Unlicensed vSphere Host	1
vSphere Host Power Management Off	1
vSphere NTP	2
Requirements for Sky Appliances That WILL Use Dedup Policies	3
Requirements for Sky Appliances That WILL NOT Use Dedup Policies	4
Actifio Sky Appliance Storage Requirements	5
Actifio Sky Appliance Networking Requirements	6
Chapter 2 - Actifio Appliance VMware vSAN Requirements	7
Chapter 3 - Deploying the Actifio Sky Appliance OVA	9
Deploying the Sky Appliance OVA	9
Configuring CPUs, Cores, and Memory	
Configuring Memory Reservation	13
Configuring CPU Reservation	14
Configuring Core Reservation	16
Adding SCSI Controllers	
Adding Disks	20
Adding Network Interfaces	21
Worker Thread Errors	21
Turning the Balloon Driver Off	
Deleting an Actifio Sky Appliance VM	24
Chapter 4 - Configuring an Actifio Sky Appliance	
Appendix A - Adding and Configuring Additional Network Interfaces	
Adding a New Network Adapter	
Configuring a Sky Appliance VM Network Adapter	
Appendix B - Adding an SSD to an Actifio Sky Appliance	
Adding an SSD to a Sky Appliance	34

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
- Requirements for Sky Appliances That WILL Use Dedup Policies on page 3
- Requirements for Sky Appliances That WILL NOT Use Dedup Policies on page 4
- Actifio Sky Appliance Storage Requirements on page 5
- Actifio Sky Appliance Networking Requirements on page 6

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 Requirements for Sky Appliances That WILL Use Dedup Policies on page 3 and Requirements for Sky Appliances That WILL NOT Use Dedup Policies on page 4 for details.

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

Sky Appliances on Licensed/Unlicensed vSphere Host

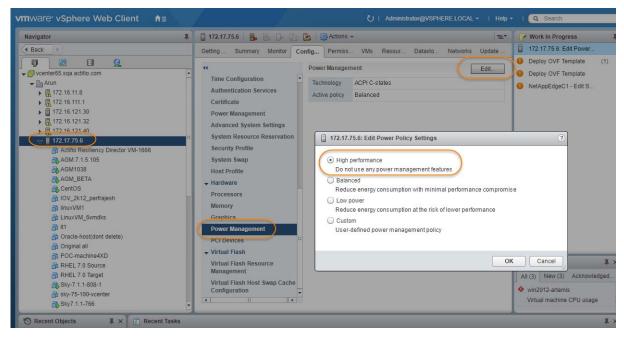
If an appliance is installed on an unlicensed (free) vSphere host, the Policy Templates for that Sky Appliance **CANNOT** capture other VMs and applications installed on that vSphere host.

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.

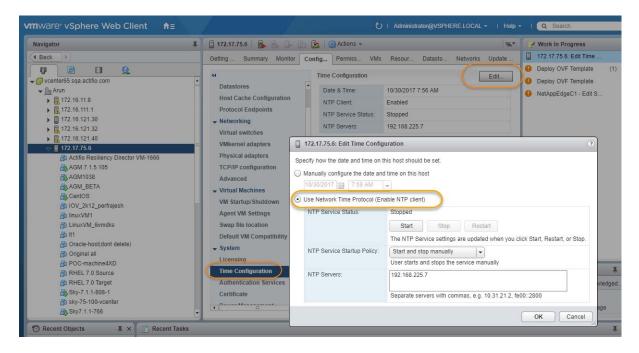
vSphere Host Power Management Off

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.



Requirements for Sky Appliances That WILL Use Dedup Policies

The following table allows you to compare the requirements and capabilities of Sky model that will protect data in both the Snapshot and Dedup Pools.

Requirement				Model			
	1TB	5TB	10TB	ЗОТВ	50ТВ	128TB	
Cores required. ^{a b}	1	2	4	8 ^c	12 ^c	12 ^c	
Cores required for encryption at rest. ^{a b}	2	4	6	10 ^c	15 ^c	15 ^c	
Minimum Reserved Memory	6GB	10GB	16GB	48GB	72GB	150GB	
Minimum Disk Space for Primary Pool. ^d	200GB						
Minimum Disk Space for Snapshot Pool. ^d	10GB						
Minimum Disk Space for Dedup Pool. ^d	100GB						
SSD Minimums ^e	Optional: 11GB	Optional: 53GB	Optional: 103GB	Required: 308GB	Required: 512GB	Required: 1TB	
Maximum VDisks		1000	'	3000	5000	5000	

a. Minimum 2 GHz per core. Required cores can be spread across multiple CPUs, with multiple CPUs providing slightly better performance. The cores and CPU **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. Sockets have a multiplying effect on the number of cores. Depending on how your VMware license is configured, select a combination of sockets and cores to achieve the required number of cores.
- c. Requires vSphere Host and vCenter 5.1 or later.
- d. See Actifio Sky Appliance Storage Requirements on page 5. Must be Thick Provision Eager Zeroed.
- e. See Adding an SSD to an Actifio Sky Appliance on page 33 for details on adding SSDs.

Requirements for Sky Appliances That WILL NOT Use Dedup Policies

This table allows you to compare the requirements and capabilities of Sky model for VDP appliances that will protect data in Snapshot Pools only.

Requirement	Model					
	60ТВ	120TB	200ТВ			
Cores required. ^{a b}	4	6	8			
Cores required for encryption at rest. ^{a b}	6	8	10			
Minimum Reserved Memory	16GB	32GB	48GB			
Minimum Disk Space for Primary Pool ^c		200GB				
Minimum Disk Space for Snapshot Pool		10GB				
Required Disk Space for Dedup Pool if appliance WILL NOT use dedup policies.		100GB				
Maximum VDisks		10,000				

- a. Minimum 2 GHz per core. Required cores can be spread across multiple CPUs, with multiple CPUs providing slightly better performance. The cores and CPU **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. Sockets have a multiplying effect on the number of cores. Depending on how your VMware license is configured, select a combination of sockets and cores to achieve the required number of cores.
- c. See Actifio Sky Appliance Storage Requirements on page 5. 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. The appliance uses the Dedup Pool even if it does not support Dedup policies. 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 GB 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 GB 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 17 for details.
- **Dedup Pool:** Accommodates the deduplicated data to be retained, plus enough space for future growth. A minimum of 1TB is required. You can add additional disks in vSphere to accommodate growth. The Dedup Pool requires its own SCSI controller set to VMware Paravirtual. See Adding SCSI Controllers on page 17 for details.

For Sky Appliance models that are not configured for deduplication, you must still add a Dedup Pool disk of 100GB. Such configurations however do not require a separate SCSI controller.

Note: Do not resize disks for Snapshot and Dedup 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 29.

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.

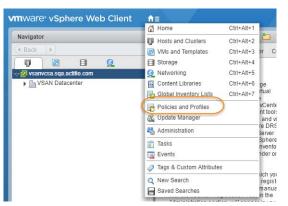
The Snapshot pool and the Dedup pool must each have their own SCSI controller set to VMware Paravirtual.

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.

vmware vSphere Web Clie	ent A					U Administrator@V
Navigator	¥	🛃 vSAN Default Storage Policy 🥜 🔮	vSAN Default Storage Polic	y: Edit VM Storage Policy		
VSAN Detault Storage Policy		Getting Started Summary Monitor I What is a VM storage policy?	Name and description Rule-set 1	Rule-set 1 Select a storage type to place the VM and a are placed on datastores from the selected	dd rules for data services provided by datas I storage type. Adding tags to the rule-set w	stores. The rule-set will be applied when VMs ill filter only datastores matching those tags.
Wittemplates in Folders		List several data sensors in the WH Bios policy to define storage requirements for unual divise and configuration files of a machine. Cick: Edit VM Storage Policy to modify the of data sensions for a WH storage policy.	Storage compatibility	Placement Storage Type: Primary level of failures to tolerate Number of disk stripes per object Force provisioning Cobject space reservation (%) Flash read cache reservation (%) Flash read cache reservation (%) Solution	3	Storage Consumption Model A virtual dost with size 100 GB, would consume: Storage space Model Model Storage space Model Model Storage space Model Model Storage space Model Model Storage space Model Model Storage space Model Model Storage space Model Model Storage space Model Model Storage space Model
						OK Cancel

- 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 Requirements for Installing an Actifio Sky Appliance on VMware on page 1.

Deploying the Sky Appliance OVA on page 9 Configuring CPUs, Cores, and Memory on page 12 Adding SCSI Controllers on page 17 Adding Disks on page 19 Adding Network Interfaces on page 20 Turning the Balloon Driver Off on page 21

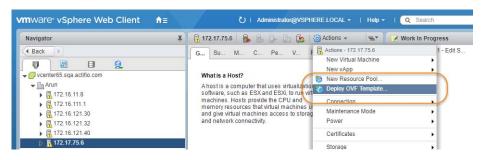
Note: At this point the VM must be powered down. Later on, you will power on the VM.

Deploying the Sky Appliance OVA

Once you have obtained a copy of the Sky Appliance OVA from your Actifio representative:

Note: Sky models 30 and 50 require vCenter 5.1 or later.

- 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:
 - o Enter a name for the Sky Appliance.
 - o Select the cluster/host to store the Sky Appliance.

beploy OVF Template					
 1 Select template 2 Select name and location 3 Select a resource 	Select storage Select location to store t	he files for the deployed template.			
4 Review details					
5 Select storage	VM storage policy:	vSAN Default Storage Policy	· ·		
6 Select networks	Show datastores from	m Storage DRS clusters 🚯			
	Filter				
7 Customize template	Datastores Datasto	re Clusters			
8 Ready to complete					lter -
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8 Ready to complete			VM storage policy	Capacity	Free
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8 Heady to complete			VM storage policy	Capacity	Free
8 Ready to complete			VM storage policy	Capacity	Free

5. When selecting storage: Select *Thick provisioned eager zero* and ensure that the storage selected has enough room to accommodate the 130GB 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 Actific 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:

Navigator	¥ (172.17.75.6 🛛 💑 🛃 🕞 🛅 🐚 🕒	🔂 Actions 👻 😑	Work In Progress
A Back				Penlov OVF Template
Deploy OVF Template				(?) }
1 Select template2 Select name and location	Ready to complete Review configuration data	a.		
✓ 3 Select a resource	Name	Sky8.0.0-1576		
✓ 4 Review details	Source VM name	Sky8.0.0-1576		
✓ 5 Select storage	Download size	4.2 GB		
✓ 6 Select networks	Size on disk	130.0 GB		
✓ 7 Customize template	Folder	Discovered virtual machine		
8 Ready to complete	Resource	172.17.75.6		
	 Storage mapping 	1		
	 Network mapping 	4		
	 IP allocation settings 	IPv4, Static - Manual		
	Properties	DNS = 172.16.1.10 Default Gateway = 172.16.1.1 Network 1 IP Address = 172.16.216.33 Network 1 Netmask = 255.255.255.0		
			Back Next	Finish Cancel
	-			
AWS-SMS-Connector	×			

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, Cores, and Memory

Once the VM has been deployed, reserve and configure its CPUs, cores, and memory according to your license requirements. See Requirements for Sky Appliances That WILL NOT Use Dedup Policies on page 4 for details.

- Configuring Memory Reservation
- Configuring CPU Reservation
- Configuring Core Reservation

Configuring Memory Reservation

1. Select the Actifio Sky VM.

Image: Sky-7.11-808-1 Image: Sky-7.11-808-1 Image: Sky-7.11-808-1 Image: Sky-7.11-808-1 Image: Sky-7.11-766 Image: Sky-7.11-808-1 Image: Sky-7.12-195 Image: Sky-7.11-808-1 Image: Sky-7.11-808-1 Image: Sky-7.11-808-1 Image: Sky-7.12-195 Image: Sky-7.11-808-1 Image: Sky-7.12-195 Image: Sky-7.11-808-1 Image: Sky-7.11-808-1 Image: Sky-7.11-808-1 </th <th>Deploy OVF Template NetAppEdgeC1 - Edit S</th> <th></th> <th></th> <th></th>	Deploy OVF Template NetAppEdgeC1 - Edit S			
^m any virtual machines. ^m any	> > > >	Guest OS Snapshots Open Console Migrate Clone Template Fault Tolerance VM Policies Compatibility	What is a Virtual Machine? A virtual machine is a software computer that, like a physical computer, runs an operating system installed on a virtual machine is called a guest operating system. Because every virtual machine is an isolated computing environment, you can use virtual machines a desktop or vorkstation environments, as testing environments, or to consolidate server applications. In vCenter Server, virtual machines run on	Image: Constraint of the
B Win2k3-4 Rename vin2012-artemis	(4) New (4) Acknowledg	Cetit Settings Move To Rename Edit Notes		급), vCenter Appliance 6.0 급): VM_Mount_Del 급): Win2k12 급); Win2k3-4

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

Virtual Hardware VM Options	SDRS Rules vApp Options
🕨 🖬 CPU	2 0
Memory	16384 v MB v
Hard disk 1	130 GB V
▶ I SCSI controller 0	LSI Logic Parallel
Metwork adapter 1	VM Network
Video card	Specify custom settings
VMCI device	
 Other Devices 	
▶ Upgrade	Schedule VM Compatibility Upgrade
New device:	Select Add
Compatibility: ESX/ESXi 4.0 and	later (VM version 7) OK Cancel

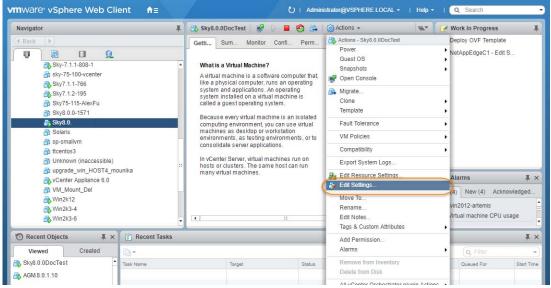
3. Expand Memory and check Reserve all guest memory (All locked).

Virtual Hardware VM	Options	SDRS Rules	vApp	Options			
CPU	2		-	0			
Memory	_						
RAM	1024	40	-	MB	-		
Reservation (*)	102	\$0	+	MB	-		
	R	eserve all guest	memo	ry (All lock	ed)		
Limit	Unli	mited	-	MB	-		
Shares	Norr	mal	-	102400	-		
Memory Hot Plug	Er	nable					
Hard disk 1	130		*	GB	-		
SCSI controller 0	LSIL	ogic Parallel					
Network adapter 1	PRI	VATE NETWOR	K FOR	RAC	-	Connect	
Video card	Spe	Specify custom settings					
WMCI device	_				-		
Other Devices							
Upgrade	So So	chedule VM Com	npatibil	ity Upgrad	e		
New device	:	Select			•	Add	

- 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:

Vitual Hardware VM Options SDRS Rules vApp Options Image: CPU 2 • Image: CPU Image: CPU Image: Memory 16384 • MB • Image: CPU 130 Image: CPU Image: CPU Image: CPU Image: CPU 130 Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU Image: CPU	Sky8.0.0DocTest - Edit Setti	ngs	? H
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WMCI device Other Devices Upgrade Schedule VM Compatibility Upgrade	Network adapter 1	VM Network	
Other Devices Upgrade Schedule VM Compatibility Upgrade	Video card	Specify custom settings	
Upgrade CSchedule VM Compatibility Upgrade	VMCI device		
	 Other Devices 		
New device: Select Y Add	Upgrade	Schedule VM Compatibility Upgrade	
New device: Select Y Add			
Compatibility: ESX/ESXi 4.0 and later (VM version 7) OK Cancel			

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

Sky-9.0.2 - Edi	t Settings						?	1
irtual Hardware	VM Options	SDRS Rules	vApp Opt	ions				
CPU		4 🔹 🕑						ľ
Cores per Socket (*)		4	-	Sockets	: 1			1
CPU Hot Plu	g	Enable CPU	U Hot Add					1
* Reservation	n (*)	0	-	MHz	-			
Limit		Current value	: 0 MHz	MHz	-			1
Shares		Minimum:	0 MHz	4000	-			1
CPUID Mask		Maximum:	47544 M	guest	-	Advanced		
Hardware vir	Hardware virtualization					0		
Performance	counters	Enable virtu	ualized CPU	performan	ce co	unters		1
CPU/MMU Virtualization		Automatic			-			1
Virtualization		ESXi can automatically determine if a virtual machine should use hardware support for virtualization based on the processor type and the virtual machine. However, for some workloads, overriding the automatic selection can provide better performance. Note: If a selected setting is not supported by the host or conflicts with existing virtual machine settings, the setting is ignored and the						

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

Configuring Core Reservation

1. Select the Actifio Sky VM.

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Back B	Getti Sum Monitor Confi What is a Virtual Machine? Avtrual machine is a software compu- like a physical computer, runs an operating system and applications. An operating system installed on a virtual machine called a guest operating system. Because every virtual machine is an is computing environment, you can use machines as desktop or workstation environments, as testing environment consolidate server applications.	Perm Actions - Sky8.0.0DocTest Power Guest OS Snapshots Gis Gis Gia	Deploy OVF Template NetAppEdgeC1 - Edit S
Unknown (inaccessible) upgrade_win_HOST4_mounika vCenter Appliance 6.0 Win_KNount_Del Win2k12 Win2k13-4 Win2k3-6 Recent Objects Vewed Created	 In vCenter Server, virtual machines run hosts or clusters. The same host can many virtual machines. 		Alarms

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

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Virtual Hardware VM Options	SDRS Rules vApp Options	
r 🗖 CPU	2 • 0	
Memory	16384 💌 MB 💌	
Hard disk 1	130 A GB V	
▶ I SCSI controller 0	LSI Logic Parallel	
Metwork adapter 1	VM Network	
Video card	Specify custom settings	
► i VMCI device		
 Other Devices 		
▶ Upgrade	Schedule VM Compatibility Upgrade	
New device:	Select Add	
Compatibility: ESX/ESXi 4.0 and	later (VM version 7) OK Ca	ancel

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

Virtual Hardware	VM Options	SDRS Rules	vApp Op	tion	IS				
- 🔲 •СРИ 🖌		4		•	Ð				ŀ
Cores per S	iocket (*)	4	*) s	Sockets:	1			1
CPU Hot Plu	ıg	Enable CPU	Hot Add	-					
Reservation		0	-		MHz	-			1
Limit		Unlimited	*	0	MHz	-			1
Shares		Normal	-		4000	*			
CPUID Mask	¢	Expose the NX	/XD flag to	gue	est	-	Advanced		
Hardware vi	tualization	Expose hard	ware assist	ed	virtualiz	ation	to the guest OS	0	
Performance	counters	Enable virtua	alized CPU	per	forman	ce co	unters		
CPU/MMU Virtualization		Automatic				-			
VILUAIZAUV		hardware support and the virtual n the automatic se Note: If a select	ort for virtua nachine. He election car ed setting i	liza owe n pri s no	ation bas ever, for rovide be ot suppo	sed o some etter	al machine should use n the processor type e workloads, overriding performance. by the host or conflicts etting is ignored and the		

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

Adding SCSI Controllers

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

- 1. The VM's operating system and the Primary pool disk can both use the 0:0 controller.
- 2. The Snapshot Pool uses the 1:0 controller. Disks assigned to the Snapshot Pool will use 1:x
- 3. The Dedup Pool uses the 2:0 controller. Disks assigned to the Dedup Pool will use 2:x.

The controllers for the Snapshot Pool and Dedup Pool must be set to VMware Paravirtual.

Note: Sky Appliance models that are not using deduplication do not require a separate SCSI controller for the Dedup Pool disk(s).

A controller can accommodate up to 16 disks. If you find it necessary to create more than 15 disks for a Snapshot or Dedup 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.

Virtual Hardware	VM Options	SDRS Rules	vApp Options
🕨 🔲 CPU		2	• 0
Memory		16384	v MB v
Hard disk 1		130	GB V
SCSI control	ler 0	LSI Logic Parall	el
🕨 📻 Network ada	pter 1	VM Network	Connected
Video card		Specify custom	settings 🗸
VMCI device			
Other Devices			
 Upgrade 		Schedule VN	Compatibility Upgrade
	levice:	SCSI Col	
compatibility: ESX/	ESXi 4.0 and I	ater (VM version	7) OK Cance

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

CPU	2	• 0
Memory	16384	▼ MB ▼
Hard disk 1	130	
G SCSI controller 0	LSI Logic Paral	
Network adapter 1	VM Network	Connected
Video card	Specify custor	m settings
WMCI device		
Other Devices		
Upgrade	-	M Compatibility Upgrade
New SCSI controller	VMware Paravi	
SCSI Bus Sharing	None	· 0
Change Type	VMware Parav	virtual 🚽
New device:	SCSI Co	ontroller 🖌 Add
ompatibility: ESX/ESXi 4.0 ar		

- 7. Add another SCSI Controller as needed.
- 8. 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 19.

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:

Virtual Hardware VM Options	SDRS Rules VApp Options
▶ □ CPU	2 • •
Memory	16384 V MB V
+ 🚐 Hard disk 1	130 GB V
▶ SCSI controller 0	LSI Logic Parallel
SCSI controller 1	VMware Paravirtual
Network adapter 1	VM Network 🖉 Connected
Video card	Specify custom settings
 WMCI device 	
 Other Devices 	
▶ Upgrade	Schedule VM Compatibility Upgrade
👻 🛄 New Hard disk	400 GB V
Maximum Size	7.10 TB
VM storage policy	Datastore Default
Location	Store with the virtual machine
Disk Provisioning	Thick provision eager zeroed 🔹
Sharing	Unspecified -
Shares	Normal - 1,000
Limit - IOPs	Unlimited •
Disk Mode	Independent - Per 🔹 🛈
Virtual Device Node	SCSI controller 1 V SCSI(1:1) V
New device:	Add
Compatibility: ESX/ESXi 4.0 and	later (VM version 7) OK Cancel

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, your Actifio representative 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.

- o One 400GB disk for the Primary Pool. This disk is used by the Sky Appliance.
- o 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 GB is required. You can add additional disks in vSphere to accommodate growth.
- o One disk for the Dedup Pool. Allocate enough space to accommodate the deduplicated data to be retained, plus enough space for growth. A minimum of ITB is required. You can add additional disks in vSphere to accommodate growth.

For Sky Appliance models that are not configured for deduplication, you must still add a Dedup Pool disk of 100GB. Such configurations however do not require a separate SCSI controller.

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

- 4. For the disks that will be assigned to the Snapshot Pool and Dedup Pool, from the Virtual Device Node drop down menu, select the SCSI controller you created to which this disk will be assigned.
 - o Disks for the Snapshot Pool use 1:x
 - o Disks for the Dedup Pool use 2: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 Snapshot and Dedup 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 29 for details.

For Sky Appliance network requirements, see Actifio Sky Appliance Networking Requirements on page 6.

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:

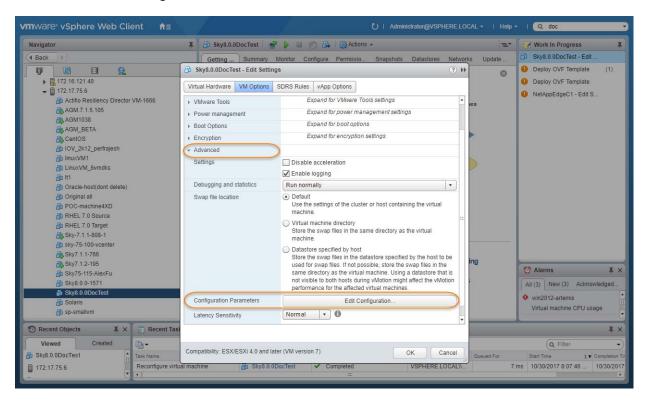
- Memory for the Sky Appliance has been incorrectly allocated.
- The bandwidth for the network on which the Sky Appliance resides is consumed by other devices.

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.

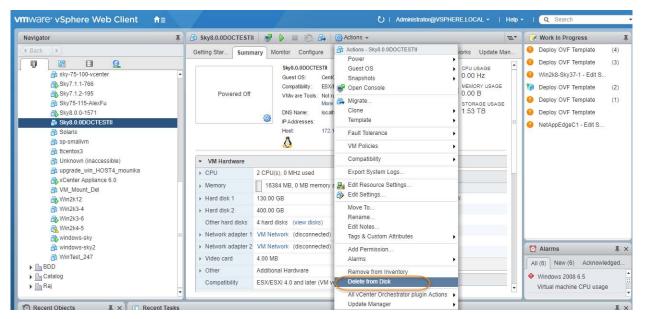
Navigator	I 🗗 Sky8.0.0DocTest	🕑 🕨 🔟 🙆 🚑 🚳 Actions 🗸		E Work In Progress
A Back			Datastores Networks Update	Sky8.0.0DocTest - Edit
	Sky8.0.0DocTest - Edit Set	tings	(?)»	Deploy OVF Template (1)
 ▶ 172.16.121.40 ₩ 172.17.75.6 	Virtual Hardware VM Options	SDRS Rules vApp Options		Deploy OVF Template NetAppEdgeC1 - Edit S
Actifio Resiliency Director VM-1666	 VMware Tools 	Configuration Parameters		*
AGM.7.1.5.105 AGM1038 AGM_BETA	Power management Boot Options	Modify or add configuration parameters as values will be removed (supported on ESXi		instructed by technical support. Empty
CentOS	Encryption			Q Filter
IOV_2k12_perfrajesh	Advanced	Name	Value	
InuxVM1 InuxVM 6vmdks	Settings	userCPUID.0	0000000d756e65476c6	\$746e49656e69
A Itt		userCPUID.1	000206d700200800029	9822030fabfbff
Oracle-host(dont delete)	Debugging and statistics	userCPUID.80000001	000000000000000000000000000000000000000	00000128100800
🔠 Original all	Swap file location	virtualHW.productCompatibility	hosted	
POC-machine4XD		vmci.filter.enable	true	
RHEL 7.0 Target			32	
Sky-7.1.1-808-1		vmci0.pciSlotNumber		
a sky-75-100-vcenter		vmotion.checkpointFBSize	4194304	
Sky7.1.1-766		vmware.tools.internalversion	9216	
Sky7.1.2-195		vmware.tools.requiredversion	9349	
B Sky8.0.0-1571		sched.mem.maxmemctl	0	
a Sky8.0.0DocTest				_
P Solaris	Configuration Parameters			
🗗 sp-smallvm	Latency Sensitivity	Name:	Value:	Add
🕤 Recent Objects 🛛 📱 🗙 🛐 Rece	nt Tasi			OK Cancel
Viewed Created				
Sky8.0.0DocTest	Compatibility: ESX/ESXi 4.0 and	l later (VM version 7)	OK Cancel Queued For	Start Time 1 T Completic
172.17.75.6 Power Off	f virtual machine 👘 Sky8.0	0.0DocTest Completed	VSPHERE LOCAL	6 ms 10/30/2017 8:04:36 10/30/2

- 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.

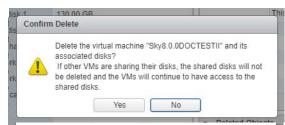
Deleting an Actifio Sky Appliance VM

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.

- 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:

STEP 1: Setup Network Cont	figuration STEP 2: Setup Storage Configuration STEP 3: Review and Complete Installation
All Items marked with (*) an	e required.
Public IP	
IPv4 address for cloud config	uration.
Appliance IP (*)	172 . 17 . 205 . 106
IPv4 address on port 1 for Ad joining this appliance with ot	ctifio Desktop and CLI clients. Also used for her PAS appliances.
Appliance Name (*)	localhost.localdom
DNS Server	172.17.1.10
Subnet Mask	255 . 255 . 0 . 0
Gateway	172 17 1 1
NTP Server	
Infrastructure	VMWare •
Timezone	Africa/Abidjan 🔻
System uuid (*)	1415068751:c222a0bd-e7bd-37cc-913a- O4a9cfd86f4b:a4b7b9d7
License	Evaluation license: Dedup pool size is set to 5TB with no encryption for 30 days from the start of installation. Please contact Actifio to upgrade to production licenses.
Create Admin Password (*)	Validate License
Confirm Admin Password (*)	Next >

- 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. If you are installing the Sky Appliance as an evaluation, leave the License field set to the default setting and go to Step 14.

Note: The Sky 5 model is used for evaluation. If you decide to purchase a Sky Appliance, you may keep the Sky 5 appliance, or contact your Actifio representative to resize the Sky Appliance to match the new model.

If you are not installing this Sky Appliance as an evaluation, then 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:

	PRIMARY POOL	Required Size: 400 GB	Available Disks (3) 💠
GB	8 sdb Size: 400.00 GB	U.	sdb Size: 400.00 GB
			sdd Size: 100.00 GB
	SNAPSHOT POOL	Required Size: 100 GB	sdc Size: 1024.00 GB
10 GB	😵 sdd Size: 100.00 GB	0	
100	DEDUP POOL 88 sdc Size: 1024.00 GB	Required Size: 1024 GB	
GB			

< Back

- 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.

STEP 1: Setup Network Configuration	STEP 2: Setup Storage Configuration	STEP 3: Review and Complete Installation		
Your settings have been validated succe	essfully, Once you click "Complete Instal	llation", the system will complete the installati	on and reboot. You will h	be redirected to 'Actifio
Resource Page' but must wait approxim	ately 30 minutes before the system is back			

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 an Sky Appliance VM:

1. In vSphere, select the Sky Appliance VM.

lika a physical computer, runs an operati system and applications. An operating system installed on a virtual machine is called a guest operating system. Because every virtual machine is an isol computing environment, you can use virt machines as desitop or workstation environment, as testing environments, consolidate server applications.	Power Guest OS Snapshots Pomer Console Power Open Console Clone Template Fault Tolerance VM Policies Compatibility	Deploy OVF Template NetAppEdgeC1 - Edit S	
hosts or clusters. The same host can run many virtual machines.	Export system Logs Edit Resource Settinos Context Contex	Alarms 4 New (4) Acknowledged win2012-artemis /irtual machine CPU usage	
	Add Permission	*	
Target Si	Delete from Disk	Q Filter Queued For Start Tim	
	All vCenter Orchestrator plugin Actions Update Manager	,	
	What is a Virtual Machine? A virtual machine is a software computer like a physical computer, runs an operating system and applications. An operating system installed on a virtual machine is called a guest operating system. Because every virtual machine is an isola computing environment, you can use virtu machines as deskop or workstation environments, as testing environments, or consolidate server applications. In vCenter Server, virtual machines run or hosts or clusters. The same host can run many virtual machines.	What is a Virual Machine? Guest OS Airfual machine is a software computer that, like a physical computer, runs an operating system and applications. An operating system installed on a virual machine is an isolated computing environment, sa testing environments, as testing environment, sa testing environments, as testing environtrents, as testing environments, as testing environments, a	

- 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**.

	Virtual Hardware VM Options	SDRS Rules vApp Options
	▶ 🔲 CPU	2 • •
l	Memory	16384 v MB v
s	▶ → Hard disk 1	130 A GB V
e	▶ → Hard disk 2	10 A GB V
6	▶ Ⅰ SCSI controller 0	LSI Logic Parallel
L	▶ Ⅰ SCSI controller 1	VMware Paravirtual
	Network adapter 1	VM Network
	Video card	Specify custom settings
	VMCI device	
L	 Other Devices 	
L	▶ Upgrade	Schedule VM Compatibility Upgrade
1	- 🛒 New Network	VM Network
	Status	Connect At Power On
d	Adapter Type	VMXNET 3
L	MAC Address	Automatic 💌
	New device:	Metwork
	Compatibility: ESX/ESXi 4.0 and	ater (VM version 7) OK Cancel

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>/.

SYSTEM & NETWORK MANAGEMENT	CONNECTORS	
System & Network Management Login Page	🝠 Windows Connector	Oeployment guide
	AIX Connector	View all connectors
DOCUMENTATION	HP-UX Connector	
Release Notes and Product Documentation via the Actifio	🛟 Ubuntu Connector	
NOW Website (Login Required)	Solaris Connector SPARC x86	
Download zipped Actifio Documentation Library	A Linux Connector <u>32 Bit</u> <u>64 Bit</u> <u>PPC</u>	
	SNMP RESOURCES	
	() МІВ	
	LICENCEC	
	Additional Software Licenses	

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

ostname, DNS, NTP	IPs & Interfaces Outbound	Policies Troublesh	Host Resolution
NETWORK	SETTINGS		
DNS Domain '	*	Primary DNS *	172.25.4.150
			112.23.4.130
DNS Suffix	Add DNS Suffix	Secondary	
Search	services.actifio.coi	DNS	
		NTP Server *	time.actifio.com

- 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:

EM MANAGEME					📥 admi	
Hostname, DNS, NT	P IPs & Ini	terfaces O	utbound Policies	Troubleshoo	ting Hos	t Resolution
Default Interface	none	▼ Save	0	Add	Modify	Delete
Configured IPs						0
	Node	Interface	IP Address	Network Mask	Gateway	MTU
Type			172.25.2.250	255.255.0.0	172.25.1.1	1500

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

SYSTEM MANAGEMENT			💄 admin	LOGOUT
	CONFIGURE IP			
Hostname, DNS, NTP	Туре	node 🔻	Host R	esolution
	Node *	node0 v		
Default Interface	Interface *	eth1 •		
	IP Address *			Delete
Configured IPs	Network Mask *			
ту по	Gateway			IP Address 172.25.2.25
	MTU			
			_	
		Add Cancel		

- 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 ethl.
- 10. In the spaces provided enter:
 - o A static IP address
 - o A network mask
 - o 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.

B Adding an SSD to an Actifio Sky Appliance

Sky Appliances that have a dedup pool of 30 TB and greater must use an SSD.

Dedup Pool	SSD Size	Optional/Required
50TB	512GB	Required
30TB	308GB	Required
10TB	103GB	Optional
5TB	53GB	Optional
ITB	11GB	Optional

Table 1: Actifio Sky Appliance SSD Requirements

Note: If the dedup pool is built entirely from an SSD, then there is no need to add an SSD.

- 1. You need the Sky Appliance configuration to configure the SSD from AGM. To install AGM, see Installing the Actifio Global Manager on a VMware Server.
- 2. Use the hypervisor vendor's best practices to physically add an SSD to a hypervisor.
- 3. Once the SSD has been added, see Adding an SSD to a Sky Appliance on page 34.

VMware Versions

Sky Appliances are delivered with VMware Virtual Machine Compatibility Level 7. This allows Sky Appliances to work with older versions of ESX.

For a Sky Appliance to identify SSDs automatically, both of the following must be true:

- o The vSphere hosting environment must be version 5.5.0 or greater.
- o The VM Compatibility must be updated to version 10.

Adding an SSD to a Sky Appliance

Once a hypervisor has been updated with the required SSD, modify the Sky Appliance's Dedup Pool as follows:

- 1. From the AGM Dashboard, click the **Manage** tab and select **Appliances** from the drop-down menu. The Appliances page opens.
- 2. Right-click the appliance that will get the SSD. Select **Configure Appliance**.
- 3. The Appliance Configuration page opens. Under System/Configuration, select **Storage Pools**.
- 4. Select the **Dedup** tab. The Dedup Pool information page opens.

Appliance Configura			Summary	Snapshot	Primary	Dedup	OnVault
Q enter search x	Dedup Pool	act ded pool000	1.			-	
- SECURITY	▼ APPLIANCE DETAILS	dot_dod_poolooo	<u> </u>				
ORGANIZATIONS USERS ROLES SYSTEM CONFIGURATION	Appliance ID 1415002134 Appliance Name SKY8.0-226 Appliance IP	Current Stats Used 106.65 GB/12% Free 756.95 GB Capacity 863.60 GB Logical 11.33 TB					
Resources Storage Pools	172.16.122.226	Configure Alert Levels 88%					

- 5. Click the Pencil icon next to the Dedup Pool name and the Manage Dedup Pool page is displayed. If necessary, scroll down until the SSD section of the window is visible.
- 6. In the Unmanaged SSDs column, click the + sign next to the SSD you added for the Actifio Sky Appliance, and it will move to the Selected SSD(s) column.

Note: If the SSD you installed is under unmanaged MDisks and not under Unmanaged SSDs, select the SSD and click the Tag link. This tags the selected disk as an SSD; it will appear in the Selected SSD column.

Name*	act_ded_pool000			
Warning		101	18 🔩	
Extent Size	[512 MB [1]	an anna an ta	78	
Nember of	Eelect AX None			
Organization(s)	2 ALL		_	
	E PUBLIC			
t/Disk(s)	and the local sectors of the l		Selected Mdisks	
Unmanaged I	Misks [C]		Selected Marsks	
			100	
			Total Selected Star 053 5 75	
Finalise Coded Stre	in Patasia's face dealers was face		Total Selected Size: 863.6 GB	
	te Drive(s) for dedup perfor	mance acce	leration (j)	
Eligible Solid Sta Unmanaged S sdg (10).0 GB	SD(s) C	mance acce		

7. Click **Submit** and the SSD is added to the Sky Appliance.

Note: Only SSDs large enough to meet your Sky Appliance's model requirements appear in the dialog box.