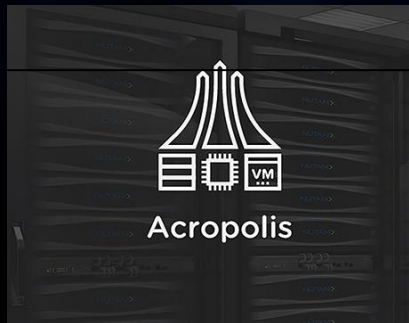


Workshop Acropolis Hyper Visor

For supporting NPP understanding – based on the Nutanix CE version



Acropolis Hyper Visor Workshop

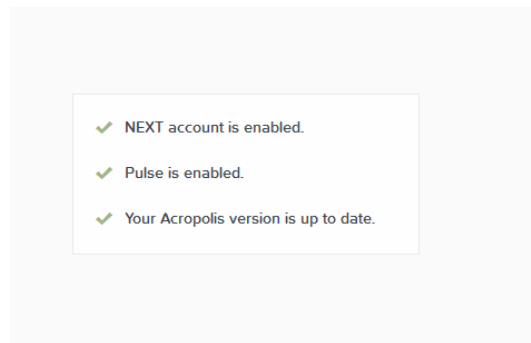
NPP supporting hands-on document

This demo guide is showing Acropolis Hyper Visor (AHV) based on the Nutanix CE version.

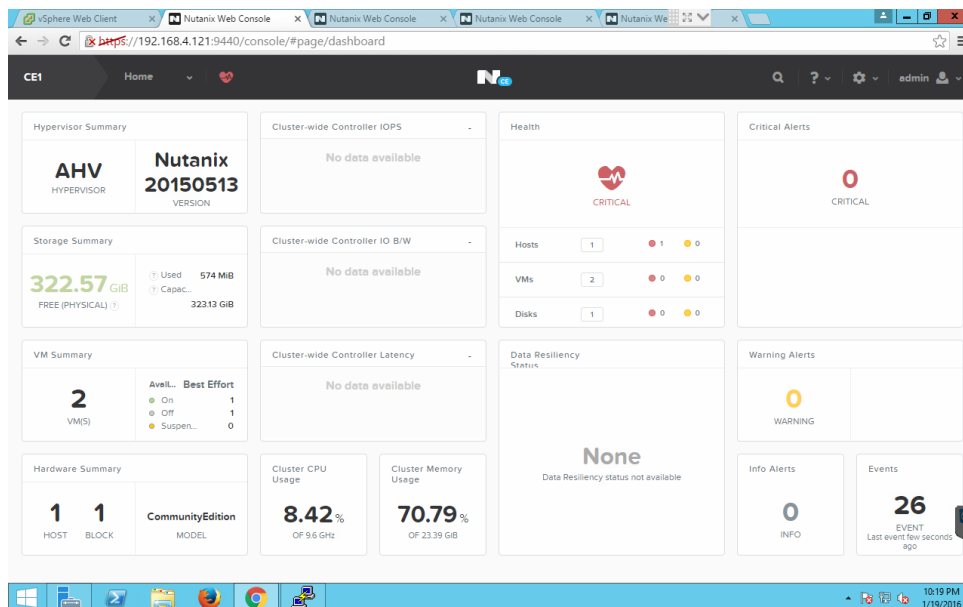
Login to the cluster by its IP Address. Use the table below.

Clustername	IP Address CVM	IP Address Hyper-Visor	VM Name	Container 1	Container 2
CE1	192.168.4.121	192.168.4.120	ub-srv-ce1	vms-ce1	DR-vms-ce2
CE2	192.168.4.126	192.168.4.125	ub-srv-ce2	vms-ce2	DR-vms-ce1
CE3	192.168.4.131	192.168.4.130	ub-srv-ce3	vms-ce3	DR-vms-ce4
CE4	192.168.4.136	192.168.4.135	ub-srv-ce4	vms-ce4	DR-vms-ce3
CE5	192.168.4.141	192.168.4.140	ub-srv-ce5	vms-ce5	DR-vms-ce6
CE6	192.168.4.146	192.168.4.145	ub-srv-ce6	vms-ce6	DR-vms-ce5

Username to be used is **admin** and the password is **nutanix/4u** .The below screen should appear after logging in.



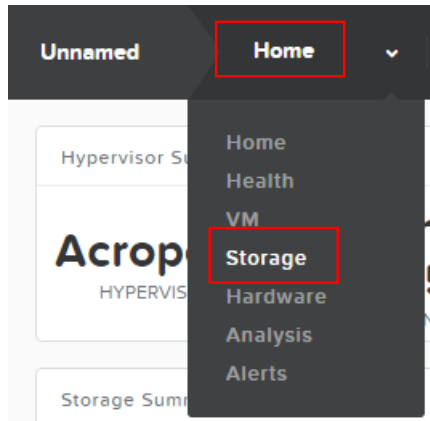
Then the HOME View should appear



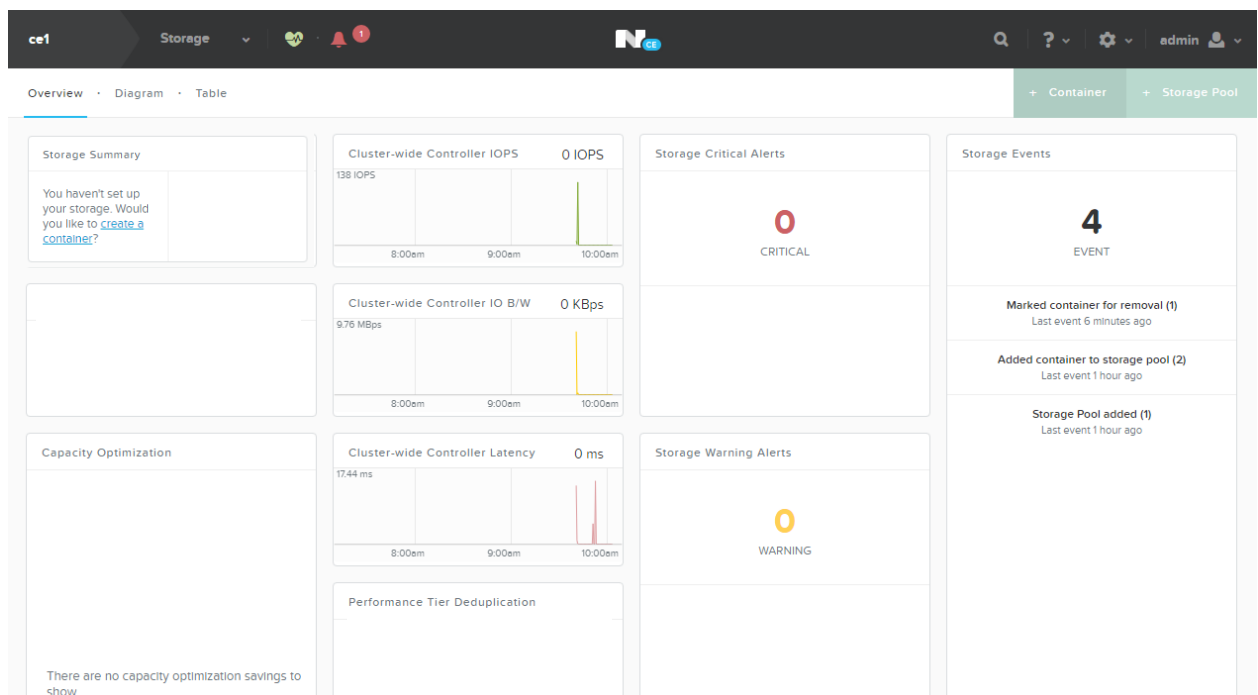
Create StoragePool

The first to be taken to put information on the Nutanix cluster is to define storage. Step 1 is to create a StoragePool. This will combine all drives (SSD and HDD) into a pool.

To start the first step, click **Home** on the top of the screen and select **Storage**.



The following example screen should appear.



Click on the right hand side of the screen on the green **+ Storage Pool** button to create one.



Give the Storage Pool a name like below.

Create Storage Pool?×

A storage pool is a group of physical disks from one or more tiers. Nutanix recommends creating a single storage pool to manage all physical disks within the cluster.

NAME

SP1|

CAPACITY

448.38 GiB

Use unallocated capacity ☒

Cancel

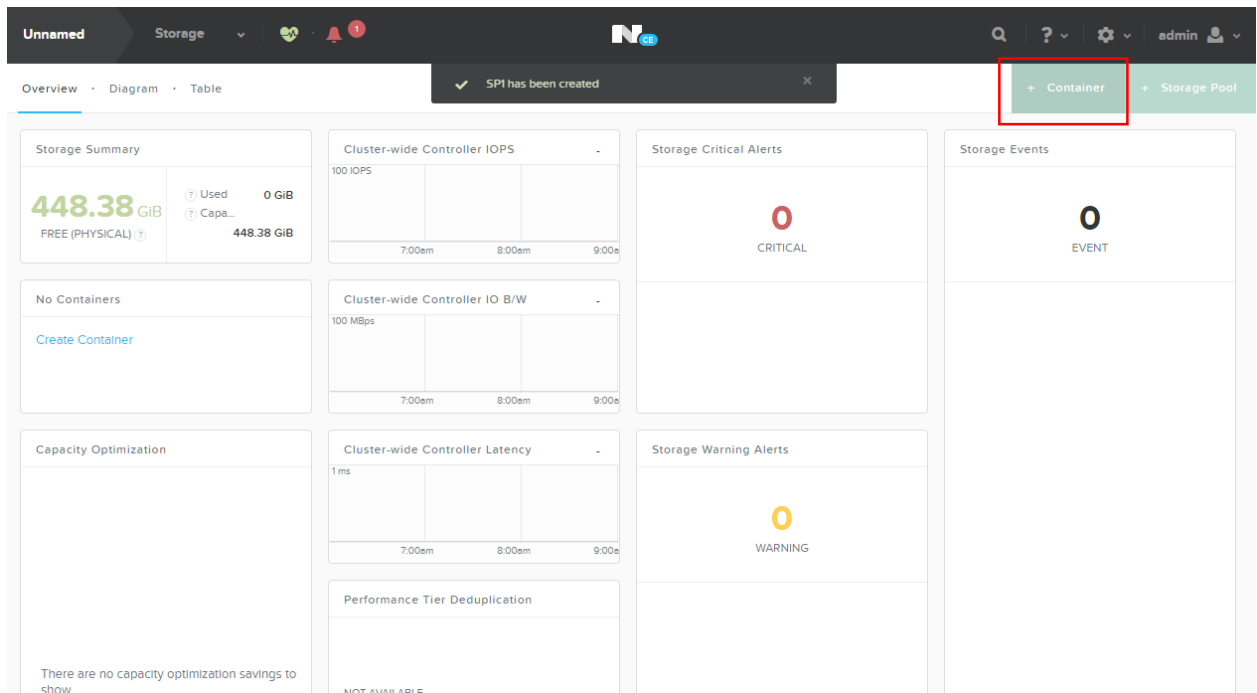
Save

On the top of the screen the below “dropdown” should be seen.

The image shows a Nutanix interface. At the top, there is a dark header bar with the Nutanix logo (a stylized 'N' with 'CE' in a blue circle). Below the header, a dark grey notification banner displays a green checkmark icon followed by the text "SP1 has been created" and a close button (an 'X' icon). Below the notification, a dropdown menu is visible, showing two options: "Controller IOPS" and "Storage Critical Alerts". The "Storage Critical Alerts" option is currently selected and highlighted.

Create Containers

As a Storage Pool has been created containers can be created. In the overview screen like below, click on **+ Container** to create a container.



Name the container according to the earlier mentioned table in the naming convention *vms-
<clustername>*. Below is a screenshot of the cluster ce1

Create Container

Enter a name for your container and select a storage pool for it. You can mount the container as an NFS datastore for all hosts, or select individual hosts.

NAME

STORAGE POOL

MAX CAPACITY
448.38 GiB
(Physical) Based on storage pool free unreserved capacity

NFS DATASTORE
No hosts can be mounted with an NFS datastore.
The cluster's hypervisor(s) are Acropolis.

Click on the **Advanced Settings** button to see other parameters that can be set on a per container bases. Just have a look at all the options you can tick.

REMARK: Keep the settings to default as the demo is running CE with limited resources during this workshop.

The screenshot shows a 'Create Container' dialog box with a dark header bar containing a question mark and a close button. Below the header, there is a section titled 'Advanced Settings'. This section contains three main configuration areas: 1. 'REPLICATION FACTOR' with a numeric input field. 2. 'ERASURE CODING' with an unchecked checkbox and an information icon. Below this checkbox is a yellow warning box that reads: 'WARNING: You are about to enable a feature that is considered as Tech Preview. Tech preview features should not be enabled in production environments.' Below the warning box is a descriptive text: 'Erasure coding enables capacity savings across solid-state drives and hard disk drives.' 3. 'RESERVED CAPACITY (GIB)' with a numeric input field. At the bottom of the dialog, there is a row of three buttons: 'Advanced Settings' (with a gear icon), 'Cancel', and 'Save'.

Create Container ? X

The cluster's hypervisor(s) are Hieropods.

Advanced Settings

REPLICATION FACTOR ⓘ

☐ ERASURE CODING ⓘ

WARNING: You are about to enable a feature that is considered as Tech Preview. Tech preview features should not be enabled in production environments.

Erasure coding enables capacity savings across solid-state drives and hard disk drives.

RESERVED CAPACITY (GIB)

⚙️ Advanced Settings Cancel Save

Create Container

?

✕

RESERVED CAPACITY (GiB)

0

ADVERTISED CAPACITY (GiB)

Total GiB

☐ PERF TIER (RAM/SSD) DEDUPLICATION (FINGERPRINT ON WRITE) ⓘ

This enables performance improvements by intelligently deduplicating data in the premium (RAM/SSD) tiers.

☐ CAPACITY TIER (HDD) DEDUPLICATION (ON-DISK) ⓘ

⚙️ Advanced Settings

Cancel

Save

Create Container

?

✕

On-Disk Deduplication works in conjunction with "Fingerprint on Write" and enables capacity savings across all tiers - RAM, SSD, & Hard Disk - in addition to performance improvements.

☐ COMPRESSION

Inline compression is enabled if the delay is set to 0 minutes.
Offline compression is enabled if there's a delay.

FILESYSTEM WHITELISTS

Enter comma separated entries

Use this format for entries: `nnn.nnn.nnn.nnn/xxx.xxx.xxx.xxx`. Also, note that setting a container whitelist will override any global whitelists for this container.

⚙️ Advanced Settings

Cancel

Save

Also create a second container for the replication part of this workshop according to the same table as mentioned earlier, for the replication partner. Naming convention should be: *DR-vms-
<clustername partner>*. The below screenshot is using the ce2 cluster as its replication partner.

Create Container ? X

Enter a name for your container and select a storage pool for it. You can mount the container as an NFS datastore for all hosts, or select individual hosts.

NAME

DR-vms-ce2

STORAGE POOL

SP1 +

MAX CAPACITY

448.38 GiB

(Physical) Based on storage pool free unreserved capacity

NFS DATASTORE

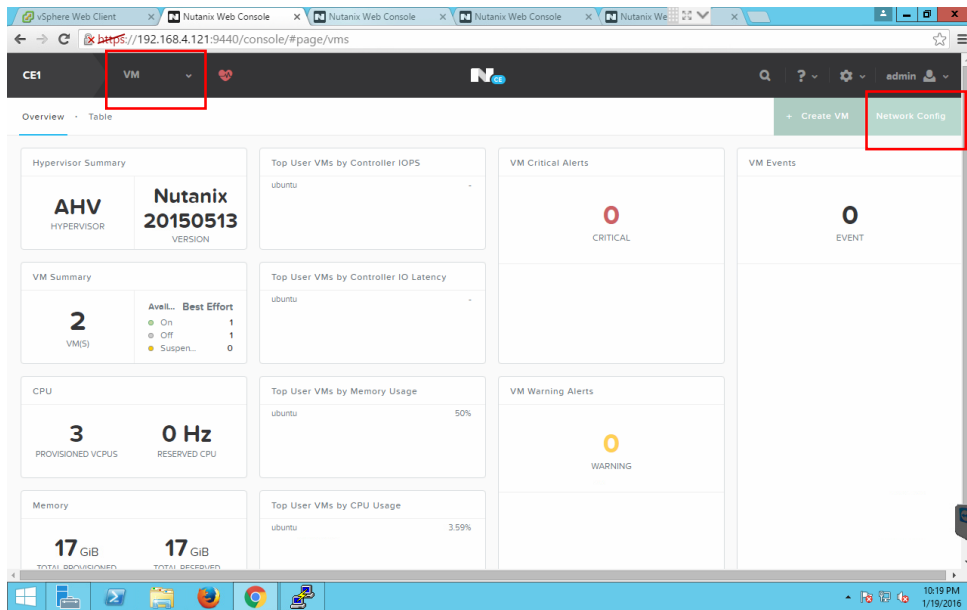
No hosts can be mounted with an NFS datastore.
The cluster's hypervisor(s) are Acropolis.

Advanced Settings Cancel Save

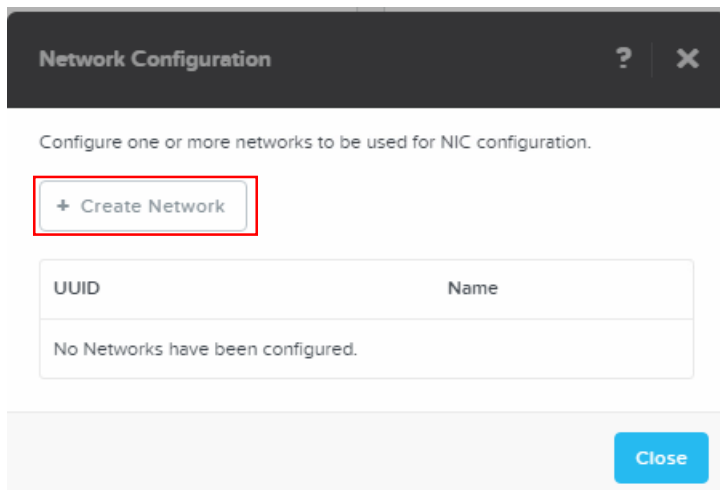
THIS CONCLUDES STORAGE RELATED SECTION OF THIS DOCUMENT

Creating a Virtual Network

Change the View to VM and click **“Network Config”** on the right side of the screen. We need networking, so we need to create virtual networks first.



In the screen below hit the **+ Create Network** button to create a new virtual network.



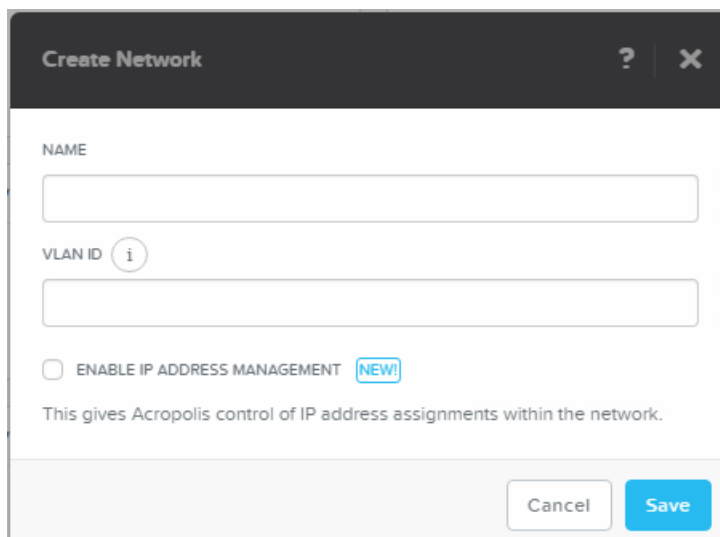
The 'Network Configuration' dialog box has a dark header with a title bar containing a question mark and a close button. Below the header, a subtitle reads 'Configure one or more networks to be used for NIC configuration.' A red rectangular box highlights the '+ Create Network' button. Below this is a table with two columns: 'UUID' and 'Name'. The table is currently empty, displaying the text 'No Networks have been configured.' at the bottom. A 'Close' button is located in the bottom right corner of the dialog.

UUID	Name
No Networks have been configured.	

Fill the needed fields (use the below value as an example):

Name: vlan0

VLAN ID: 0



The 'Create Network' dialog box features a dark header with a title bar containing a question mark and a close button. The main area contains a 'NAME' label above an empty text input field. Below this is a 'VLAN ID' label with an information icon (i) to its right, followed by another empty text input field. A checkbox labeled 'ENABLE IP ADDRESS MANAGEMENT' is present, with a 'NEW!' tag next to it. Below the checkbox, a note states 'This gives Acropolis control of IP address assignments within the network.' At the bottom right, there are 'Cancel' and 'Save' buttons.

Check the **ENABLE IP ADDRESS MANAGEMENT** checkbox to see what else can be configured in the virtual network. Use again as an example the values in the screenshot

Create Network ? X

NAME
vlan0

VLAN ID ⓘ
0

☒ **ENABLE IP ADDRESS MANAGEMENT** NEW!

This gives Acropolis control of IP address assignments within the network.

NETWORK IP ADDRESS / PREFIX LENGTH
192.168.2.0/24

GATEWAY IP ADDRESS
192.168.2.254

☒ **CONFIGURE DOMAIN SETTINGS**

Cancel Save

Create Network ? X

☒ **CONFIGURE DOMAIN SETTINGS**

DOMAIN NAME SERVERS (COMMA SEPARATED)
192.168.2.254,8.8.8.8,8.8.4.4

DOMAIN SEARCH (COMMA SEPARATED)
example.ahv

DOMAIN NAME
example.ahv

TFTP SERVER NAME

BOOT FILE NAME

Cancel Save

Create Network ? X

DOMAIN NAME
example.ahv

TFTP SERVER NAME

BOOT FILE NAME

IP ADDRESS POOLS ⓘ
+ Create Pool

None defined.

☐ OVERRIDE DHCP SERVER ⓘ

Cancel Submit

To create a DHCP-Pool in the virtual network, click the **+ Create Pool** button and use the below values again as an example

Add IP Pool ? X

START ADDRESS
192.168.2.100

END ADDRESS
192.168.2.200

Cancel Submit

When done, click the Submit button

Create Network

TFTP SERVER NAME

BOOT FILE NAME

IP ADDRESS POOLS

+ Create Pool

Start Address	End Address	
192.168.2.100	192.168.2.200	<div><div></div><div></div><div></div></div>

☐ OVERRIDE DHCP SERVER

Cancel

Submit

The screen should now look like the above screenshot. Now click the Submit again to get the virtual network created in the AHV environment.

NCE

✓ Received operation to create Network vlan0

VMs by Controller IOPS

VM Critical Alerts

Network Configuration

Configure one or more networks to be used for NIC configuration.

+ Create Network

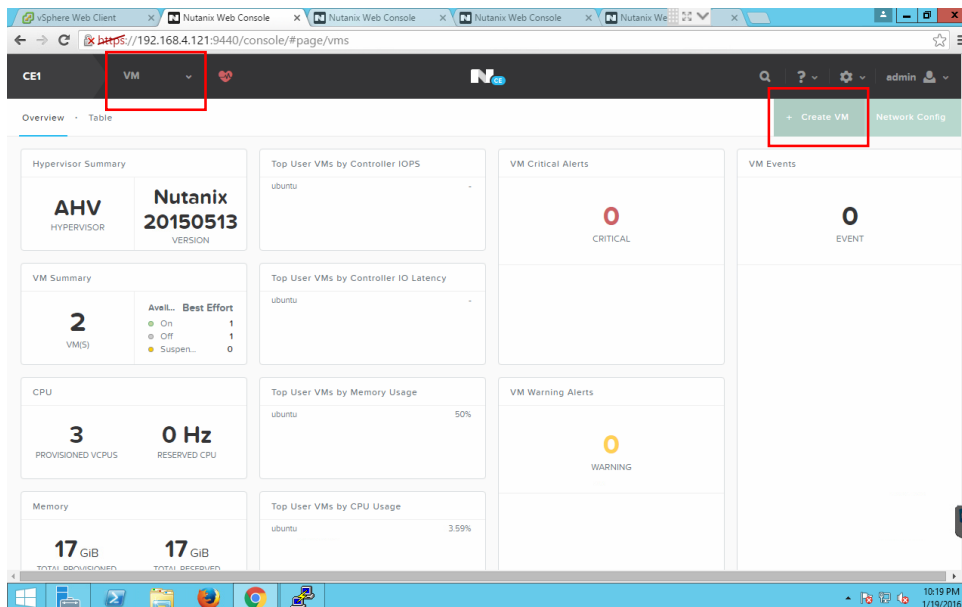
UUID	Name	
a6a3393f-0b30-4f99-ac99-8efcad8b1424	vlan0	<div><div></div><div></div><div></div></div>

Close

From the top a screen should drop down to tell that the network has been created, and the **Network Configuration** screen should show the just created network with its UUID and name. If you want to change anything just click the Pencil Icon right to the name of the virtual network. Repeat as many as needed.

Creating a VM in AHV.

Back in the VM View, Click the **+ Create VM** button on the right side of the screen.



The below screen will pop up. Use the values in the screenshot for your VM you going to create. For the name please use the following naming convention:

ub-srv-<name of the cluster> example for cluster ce1 **ub-srv-ce1** as shown below

The 'Create VM' dialog box is shown with the following fields and values: 'NAME' is 'ub-srv-ce1'; 'COMPUTE' section has '1' for 'vCPU(s)' and '1' for 'Cores per vCPU'; 'MEMORY' is '1' 'GiB'. A red box highlights the 'NAME', 'COMPUTE', and 'MEMORY' sections. At the bottom, there is a '+ New Disk' button and a table with columns 'Type', 'Address', and 'Parameters'. 'Cancel' and 'Save' buttons are at the bottom right.

Define a disk so we can write data to the VM. Hot the **+ New Disk** button to create as many disk one at a time as we need for the VM.

Add Disk ? X

TYPE
DISK

OPERATION
ALLOCATE ON CONTAINER

BUS TYPE
SCSI

CONTAINER

- ✓ default-container-2514697786982551308
vms-ce1

SIZE (GiB)

Cancel Add

Change the container to the one we've created earlier. If you haven't created it, Cancel this action and go to the Storage View and create a container quickly. Name it vms-<clustername>. As an example on cluster 1, called CE1, you create a container called vms-**ce1**, and return to the VM creation and disk creation screen like above.

Create a 10GB disk in the right container. Create a 10GB disk

Add Disk?✕

TYPE

DISK

OPERATION

ALLOCATE ON CONTAINER

BUS TYPE

SCSI

CONTAINER

vms-ce1

SIZE (GiB)

10

Cancel

Add

Now let's change the CD to something useful instead of an empty one. Click the pencil button just right to the CDROM

Create VM

1

Cores per vCPU

MEMORY

1

GIB

DISKS

+ New Disk

Type	Address	Parameters
CDROM		EMPTY=true; BUS=ide
DISK		SIZE=10GiB; CONTAINER=vms-ce...

NICS

+ New NIC

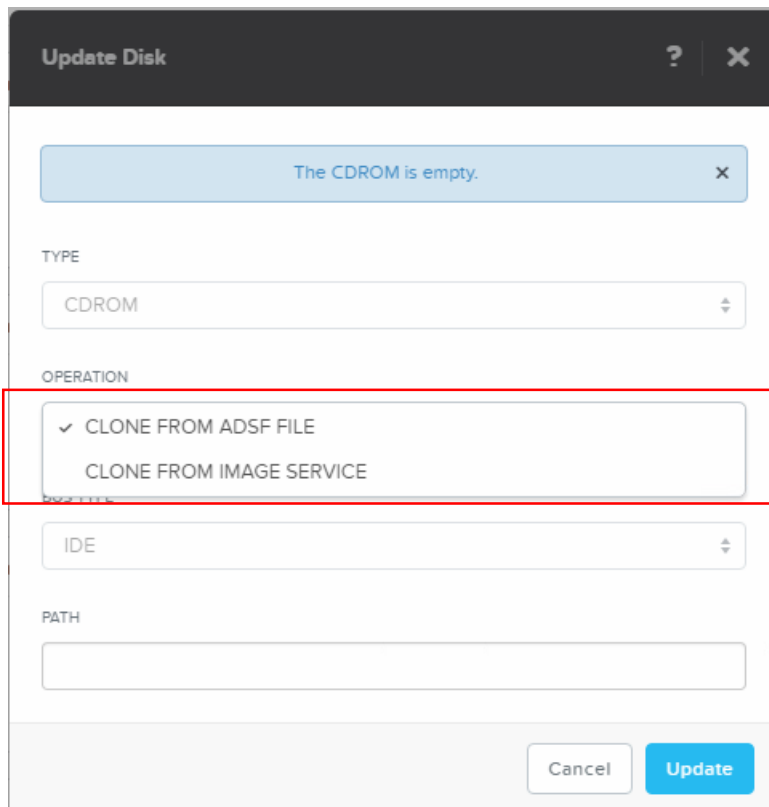
None defined.

Cancel

Save

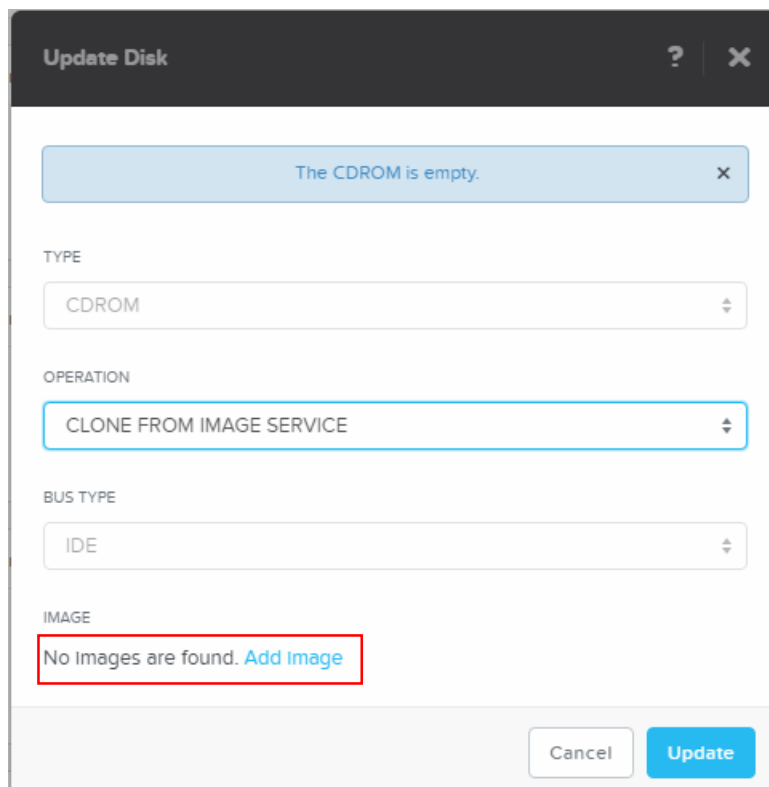
A new screen will appear

Change the OPERATION into **CLONE FROM IMAGE SERVICE**



The screenshot shows the 'Update Disk' dialog box. At the top, there's a title bar with a question mark and a close button. Below it, a message box says 'The CDROM is empty.' with a close button. The 'TYPE' dropdown is set to 'CDROM'. The 'OPERATION' dropdown is open, showing two options: 'CLONE FROM ADSF FILE' (which has a checkmark) and 'CLONE FROM IMAGE SERVICE'. A red rectangular box highlights the 'CLONE FROM IMAGE SERVICE' option. Below the 'OPERATION' dropdown, the 'BUS TYPE' dropdown is set to 'IDE'. The 'PATH' field is empty. At the bottom, there are 'Cancel' and 'Update' buttons.

As there is no ISO image yet in the cluster we need to upload one. Click the **Add Image** text



The screenshot shows the 'Update Disk' dialog box. The 'TYPE' dropdown is still 'CDROM'. The 'OPERATION' dropdown is now set to 'CLONE FROM IMAGE SERVICE'. The 'BUS TYPE' dropdown is still 'IDE'. The 'IMAGE' section shows the text 'No Images are found. Add image', where 'Add image' is a blue link. A red rectangular box highlights the 'Add image' text. At the bottom, there are 'Cancel' and 'Update' buttons.

A new screen will appear. Click the **+ Upload Image** button.

Image Configuration

?

×

Manage the images to be used for creating virtual disks.

+ Upload Image

Name	Annotation	Type	State
No images have been created.			

Close

Give the too be uploaded ISO a name which is easy to understand what the image is all about. As an example use the below parameters and change the **IMAGE TYPE** to ISO like below. Also make sure you use the right container and select the **Upload from file** radio button and click on Choose File to search the right ISO too be uploaded.

Create Image

?

×

NAME

Ubuntu Server 14.04.3

ANNOTATION

IMAGE TYPE

ISO

CONTAINER

vms-ce1

IMAGE SOURCE

☐ From URL

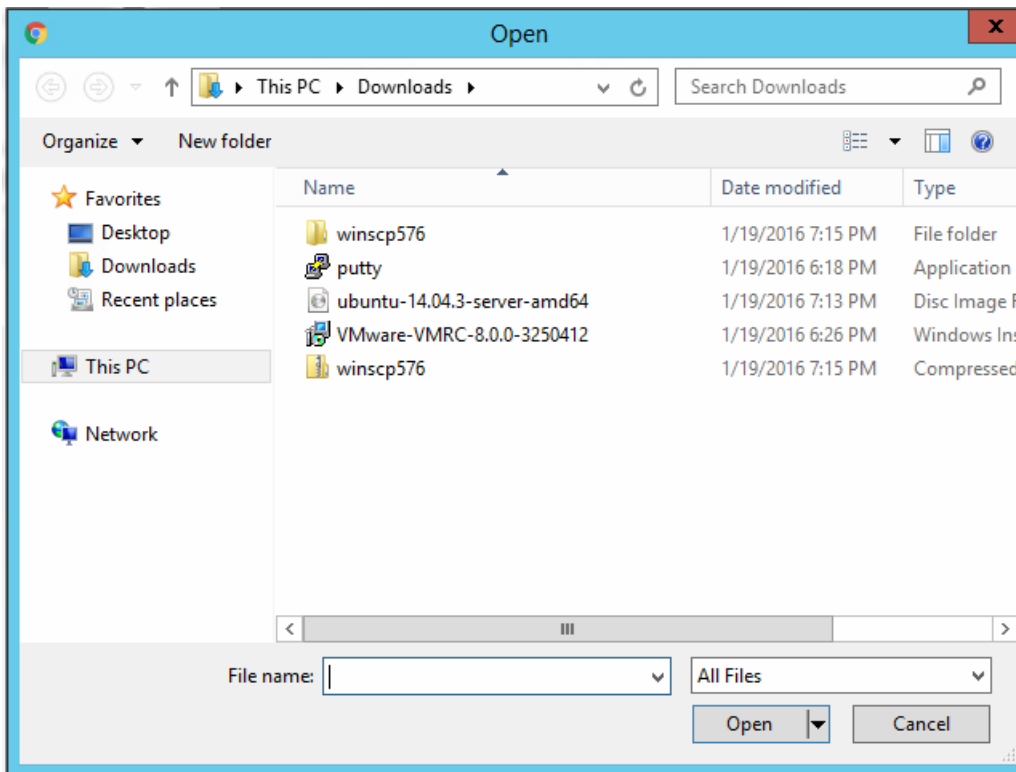
☒ Upload a file

Choose File

No file chosen

Cancel

Save

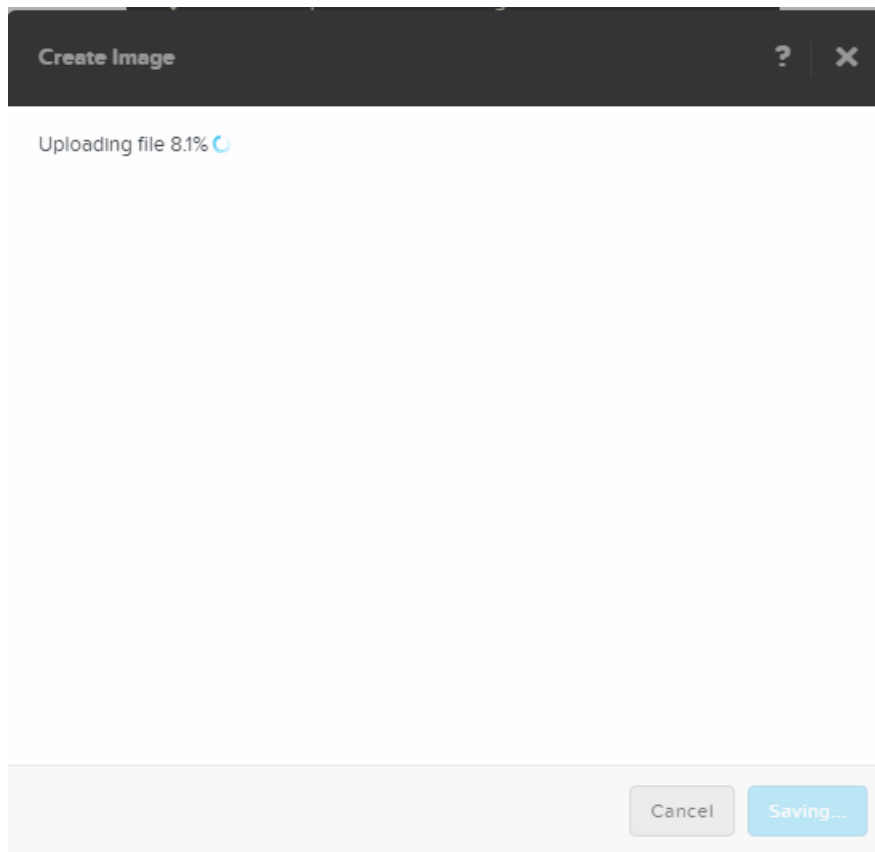


Search for the ISO file and click the **Open** button.

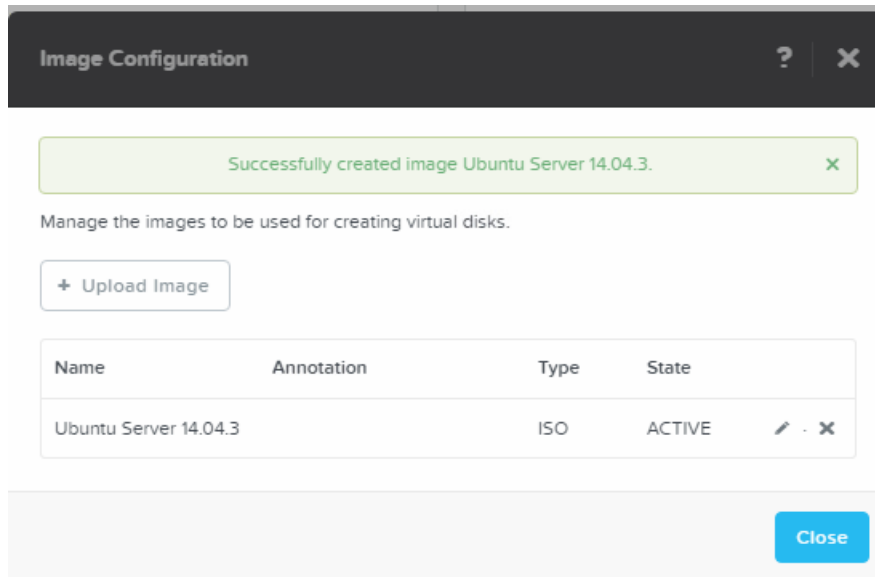
The screenshot shows the "Create Image" dialog box with the following fields and options:

- NAME:** Ubuntu Server 14.04.3
- ANNOTATION:** (empty)
- IMAGE TYPE:** ISO
- CONTAINER:** vms-ce1
- IMAGE SOURCE:**
 - ☐ From URL
 - ☒ Upload a file
- File list:** Choose File ubuntu-14.04.3...rver-amd64.iso
- Buttons:** Cancel, Save (highlighted with a red box)

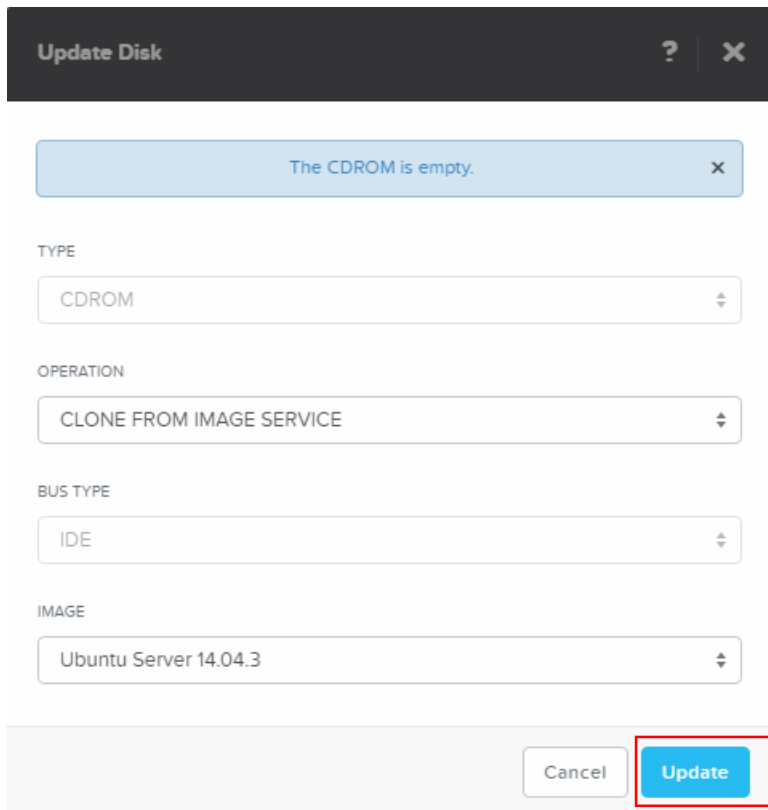
Click the **Save** button to upload the ISO file into the cluster. The below screen will appear to show the progress of the upload.



And will end with the below screenshot.



Click the **Close** button to return to the CDROM setting of the VM.



The CDROM is empty. x

TYPE

CDROM

OPERATION

CLONE FROM IMAGE SERVICE

BUS TYPE

IDE

IMAGE

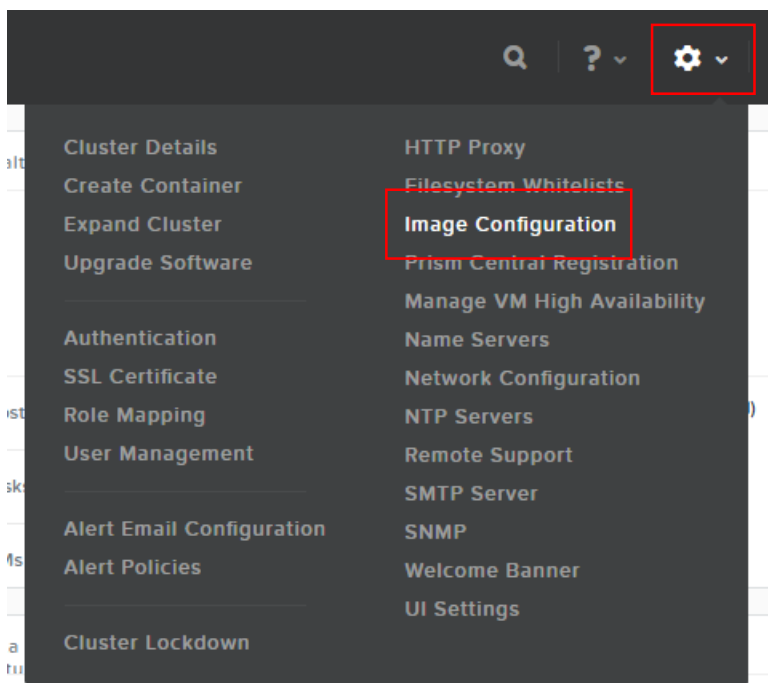
Ubuntu Server 14.04.3

Cancel Update

This is a screenshot of the 'Update Disk' dialog box in a virtual machine management interface. The dialog has a dark header bar with a question mark and a close button. Below the header, there is a light blue message box stating 'The CDROM is empty.' with a close button. The main area contains four dropdown menus: 'TYPE' (set to 'CDROM'), 'OPERATION' (set to 'CLONE FROM IMAGE SERVICE'), 'BUS TYPE' (set to 'IDE'), and 'IMAGE' (set to 'Ubuntu Server 14.04.3'). At the bottom right, there are two buttons: 'Cancel' and 'Update'. The 'Update' button is highlighted with a red rectangle.

Click the **Update** button to return to the VM definition.

If you want to change uploaded ISO images after creation of the VM, click on the gear-icon in the top right hand corner and select **Image Configuration**.



Create VM

1 Cores per vCPU

MEMORY

1 GIB

DISKS

+ New Disk

Type	Address	Parameters
CDROM		EMPTY=false; BUS=ide
DISK		SIZE=10GIB; CONTAINER=vms-ce...

NICS

+ New NIC

None defined.

Cancel Save

As this is an example we are going to use the earlier created virtual network. Click **+ New NIC** to add a network connection to one of the created virtual networks

Create NIC

VLAN ID

vlan.0

VLAN DETAILS

UUID: a6a3393f-0b30-4f99-ac99-8efcad8b1424

NETWORK ADDRESS / PREFIX

192.168.2.0/24

IP ADDRESS

Cancel Add

Click the **Add** button to have the network connection added to the VM.

Create VM

MEMORY

1

GIB

DISKS

+ New Disk

Type	Address	Parameters
CDROM		EMPTY=false; BUS=ide
DISK		SIZE=10GiB; CONTAINER=vms-ce...

NICS

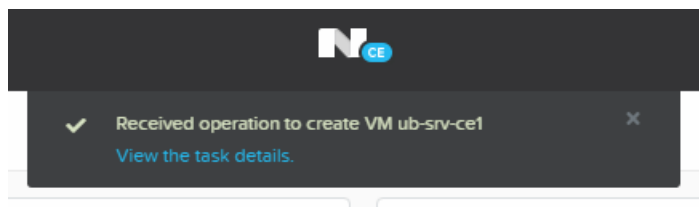
+ New NIC

VLAN ID	MAC	Requested IP
vlan.0		

Cancel

Save

Now click the **Save** button to have the VM be created. The below screen should be seen from the top coming down slowly. This will show you that a VM ub-srv-ce1 has be created.



In the tableview we were in we should no see our just created VM.

The screenshot shows the Nutanix Web Console interface. At the top, there's a navigation bar with 'CE1' and 'VM' tabs. Below it, a table lists VMs. The first VM, 'ub-srv-ce1', is selected. To the right of the table, there's a 'Summary' section with a 'Performance Summary' graph showing 'Cluster-wide CPU Usage' at 11.34% of 9.6 GHz. Below the graph, there's a 'Launch Console' button and a 'Power On' button, which is highlighted with a red box.

VM NAME	HOST	IP ADDRESSES	CORES	MEMORY CAPACITY	CPU USAGE	CONTROLLER READ IOPS	CONTROLLER WRITE IOPS	CONTROLLER IO BANDWIDTH	CONTROLLER AVG IO LATENCY	BACKUP...
ub-srv-ce1			1	1 GiB	-	0	0	0 KBps	0 ms	Yes

Summary

VM SUMMARY

- Total VMs: 2
- VM State:
 - Powered On: 1
 - Powered Off: 1
 - Suspended: 0
- Total Provisioned vCPU: 3

Performance Summary

Cluster-wide CPU Usage

11.34% of 9.6 GHz

Launch Console Power on Take Snapshot Migrate Pause Clone Update Delete

Now let's start the VM. Hit the **Power On** button halfway of the page after having the VM selected!.

The screenshot shows the Nutanix Web Console interface. At the top, there's a navigation bar with 'CE1' and 'VM' tabs. Below it, a table lists VMs. The first VM, 'ub-srv-ce1', is selected. To the right of the table, there's a 'Summary' section with a 'Performance Summary' graph showing 'Cluster-wide CPU Usage' at 11.34% of 9.6 GHz. Below the graph, there's a 'Launch Console' button and a 'Power On' button, which is highlighted with a red box.

VM NAME	HOST	IP ADDRESSES	CORES	MEMORY CAPACITY	CPU USAGE	CONTROLLER READ IOPS	CONTROLLER WRITE IOPS	CONTROLLER IO BANDWIDTH	CONTROLLER AVG IO LATENCY	BACKUP...
ub-srv-ce1			1	1 GiB	-	0	0	0 KBps	0 ms	Yes

Summary

VM SUMMARY

- Total VMs: 2
- VM State:
 - Powered On: 1
 - Powered Off: 1
 - Suspended: 0
- Total Provisioned vCPU: 3

Performance Summary

Cluster-wide CPU Usage

11.34% of 9.6 GHz

Launch Console Power on Take Snapshot Migrate Pause Clone Update Delete

The screenshot shows the Nutanix Web Console interface. At the top, there's a navigation bar with 'CE1' and 'VM' tabs. Below it, a table lists VMs. The first VM, 'ub-srv-ce1', is selected. To the right of the table, there's a 'Summary' section with a 'Performance Summary' graph showing 'Cluster-wide CPU Usage' at 11.34% of 9.6 GHz. Below the graph, there's a 'Launch Console' button and a 'Power On' button, which is highlighted with a red box.

VM NAME	HOST	IP ADDRESSES	CORES	MEMORY CAPACITY	CPU USAGE	CONTROLLER READ IOPS	CONTROLLER WRITE IOPS	CONTROLLER IO BANDWIDTH	CONTROLLER AVG IO LATENCY	BACKUP...
ub-srv-ce1			1	1 GiB	-	0	0	0 KBps	0 ms	Yes

Summary

VM SUMMARY

- Total VMs: 2
- VM State:
 - Powered On: 1
 - Powered Off: 1
 - Suspended: 0
- Total Provisioned vCPU: 3

Performance Summary

Cluster-wide CPU Usage

11.34% of 9.6 GHz

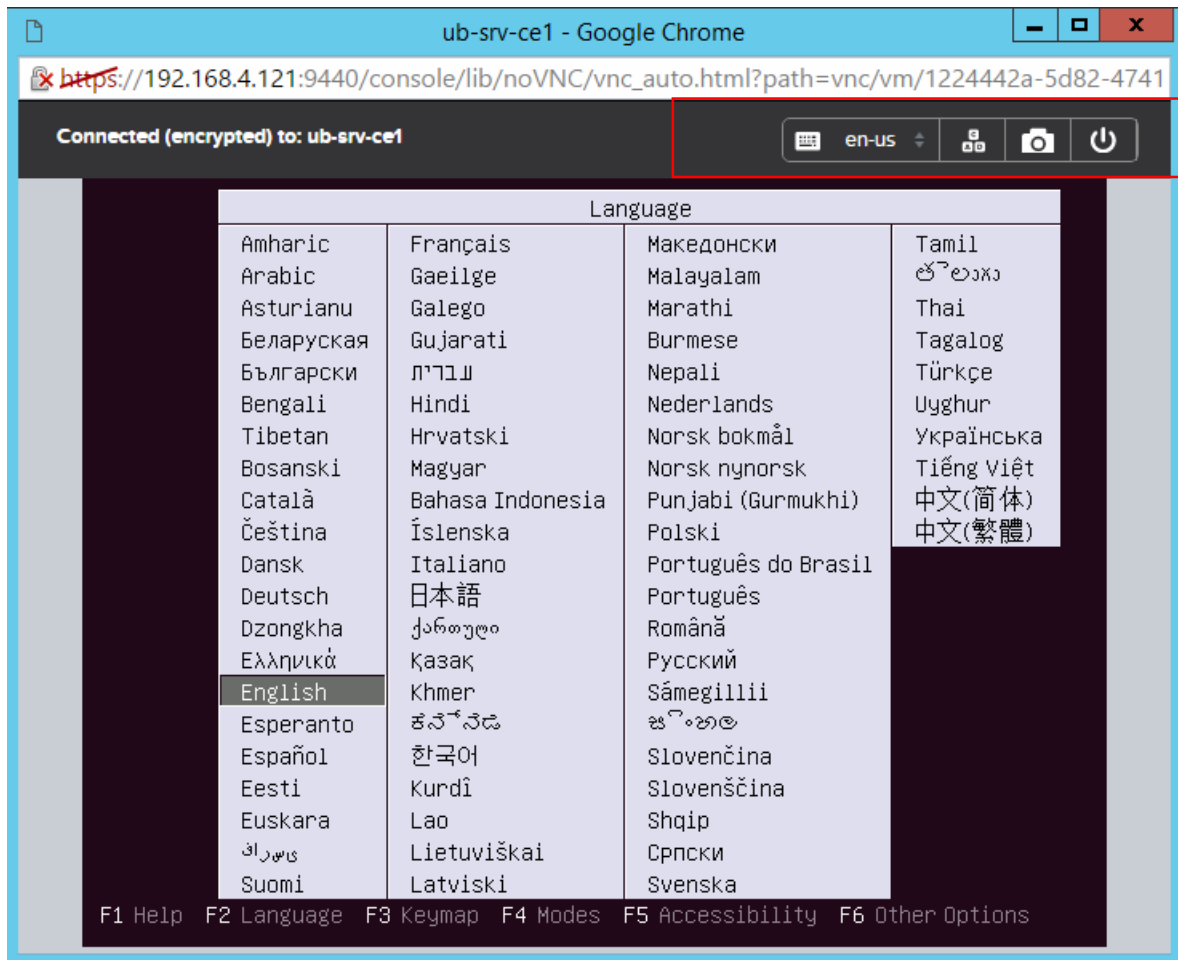
Launch Console Power on Take Snapshot Migrate Pause Clone Update Delete

After having the machine given the Power On status, a host will appear in the table view. Not sooner!

Now hit the **Launch Console** button to the left side of the **Power On** button to see the console of the VM.

Launch Console

A VNC screen will open to show the console of the VM.



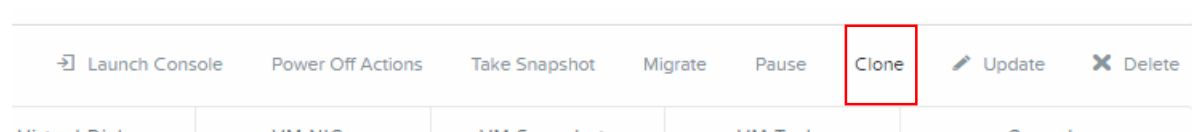
If you want, test all button on the right-hand side of the VNC console to see what they do.



THIS CONCLUDES THE CREATE VIRTUAL NETWORK AND VM SECTION OF THIS DOCUMENT

VM Cloning

Let's clone a VM using the PRISM interface. Click the **Clone** button in the PRISM interface.



Use the below settings for the clone use for the name the original name and add **-clone** to it. Look at all options you can change!

A screenshot of the 'Clone VM' dialog box. The dialog has a title bar with a question mark and a close button. The main content area has a heading 'Enter a name for the VM and set up the appropriate configuration.' followed by several sections: 'NAME' with a text input field containing 'ub-srv-ce1-clone'; 'COMPUTE' with a 'vCPU(s)' input field containing '2'; 'MEMORY' with a 'GIB' input field containing '2'; and 'DISKS' with a '+ New Disk' button and a table of existing disks. The table has columns 'Type', 'Address', and 'Parameters'. It lists a 'CDROM' at 'ide.0' and a 'DISK' at 'scsi.0'. At the bottom are 'Cancel' and 'Save' buttons.

Type	Address	Parameters
CDROM	ide.0	SIZE=0.56GiB; CONTAINER=vms-...
DISK	scsi.0	SIZE=10GiB; CONTAINER=vms-ce...

After you have clicked the **Save** button the VM clone should appear in the PRISM UI like below.

A screenshot of the PRISM VM list table. The table has a header row with columns: VM NAME, HOST, IP ADDRESSES, CORES, MEMORY CAPACITY, CPU USAGE, CONTROLLER READ IOPS, CONTROLLER WRITE IOPS, CONTROLLER IO BANDWIDTH, CONTROLLER AVG IO LATENCY, and BACKUP... The table contains two rows. The first row is for 'ub-srv-ce1' and the second row is for 'ub-srv-ce1-clone'. The 'ub-srv-ce1-clone' row is highlighted with a red rectangular box. Below the table are tabs for 'VM Performance', 'Virtual Disks', 'VM NICs', 'VM Snapshots', 'VM Tasks', and 'Console'.

VM NAME	HOST	IP ADDRESSES	CORES	MEMORY CAPACITY	CPU USAGE	CONTROLLER READ IOPS	CONTROLLER WRITE IOPS	CONTROLLER IO BANDWIDTH	CONTROLLER AVG IO LATENCY	BACKUP...
ub-srv-ce1	NTNX-f312ae31-A		1	1 GiB	100%	0	0	0 KBps	0 ms	Yes
ub-srv-ce1-clone			2	2 GiB	-	-	-	-	-	Yes

Look at all the options you can monitor after you've clicked on one of the VM's. Information should be there for the first created and powered-on VM.

THIS CONCLUDES THE VM CLONING SECTION OF THIS DOCUMENT

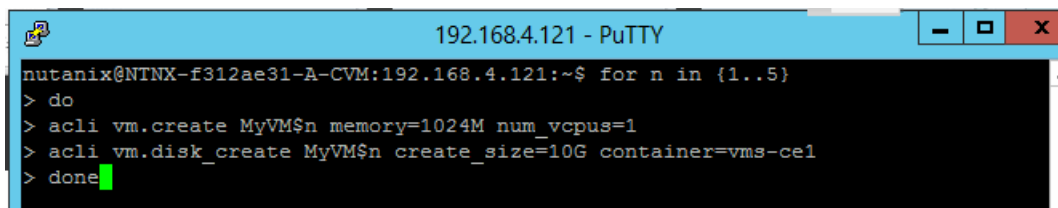
AHV Scripting

AHV is very powerful from a scripting interface the so called acli. The following section is providing some basic scripts/commands that can be used in the acli interface.

VM Creation - Basics

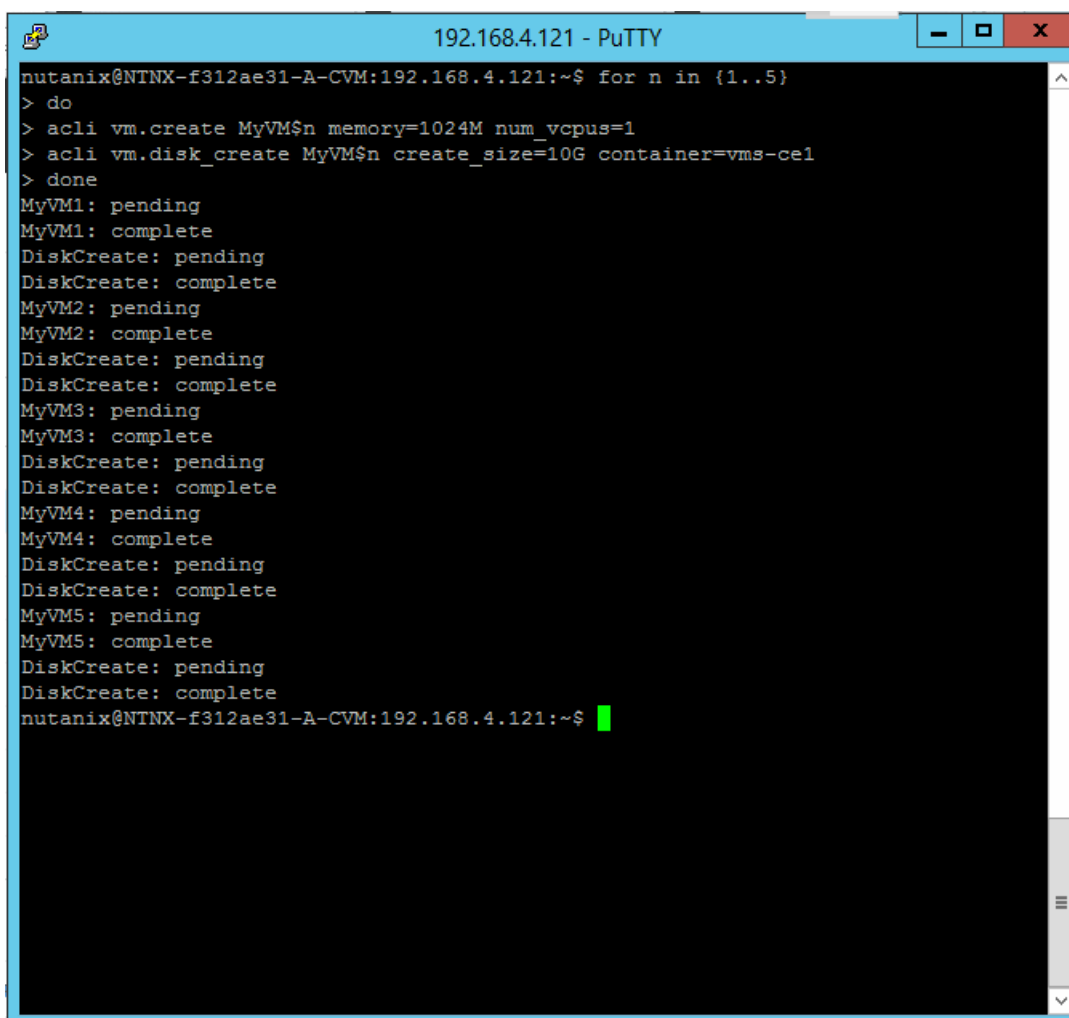
Connect to the CVM using the IP address of your cluster. Use **nutanix** and the **nutanix/4u** as username and password combination.

After the connection is successful type the following command to create a VM with 1G of RAM, 1vCPU and a 10GB disk. For demo purposes the CDROM and the NIC are not used but can be added if wanted. For a full reference to all acli command's look in the Application Mobile Fabric guide on the support site.



```
192.168.4.121 - PuTTY
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ for n in {1..5}
> do
> acli vm.create MyVM$n memory=1024M num_vcpus=1
> acli vm.disk_create MyVM$n create_size=10G container=vms-ce1
> done
```

This command should lead in having 5 VM's named MyVM1 to MyVM5 all with the earlier mentioned parameters. The below screen shows all lines returned by the cluster.



```
192.168.4.121 - PuTTY
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ for n in {1..5}
> do
> acli vm.create MyVM$n memory=1024M num_vcpus=1
> acli vm.disk_create MyVM$n create_size=10G container=vms-ce1
> done
MyVM1: pending
MyVM1: complete
DiskCreate: pending
DiskCreate: complete
MyVM2: pending
MyVM2: complete
DiskCreate: pending
DiskCreate: complete
MyVM3: pending
MyVM3: complete
DiskCreate: pending
DiskCreate: complete
MyVM4: pending
MyVM4: complete
DiskCreate: pending
DiskCreate: complete
MyVM5: pending
MyVM5: complete
DiskCreate: pending
DiskCreate: complete
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$
```

PRISM will show all just 5 newly EXTRA created VM's

▲ VM NAME	HOST	IP ADDRESSES	CORES	MEMORY CAPACITY	CPU USAGE	CONTROLLER READ IOPS	CONTROLLER WRITE IOPS	CONTROLLER IO BANDWIDTH	CONTROLLER AVG IO LATENCY	BACKUP...
● MyVM1	NTNX-f312ae31-A		1	1 GiB	0%	0	0	0 KBps	0.38 ms	Yes
● MyVM2	NTNX-f312ae31-A		1	1 GiB	0%	0	0	0 KBps	5.44 ms	Yes
● MyVM3	NTNX-f312ae31-A		1	1 GiB	0%	0	0	0 KBps	0.45 ms	Yes

VM Cloning

Before we can clone machines, we need to get some resources freed-up. So power down the earlier created clone using the UI named `ub-srv-ce1` by using the **acli vm.off** command

```
192.168.4.121 - PuTTY
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ acli vm.off ub-srv-ce1-clone
ub-srv-ce1-clone: pending
ub-srv-ce1-clone: complete
```

The PRISM should show a gray coloured icon in front of the VM like below.

<input checked="" type="radio"/>	ub-srv-ce1	NTNX-f312ae31-A
<input type="radio"/>	ub-srv-ce1-clone	

Now let's delete that VM by using the **acli vm.delete** command and reply **yes** to the asked question if you are sure.

```
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ acli vm.delete ub-srv-ce1-clone
Delete 1 VMs? (yes/no) yes
ub-srv-ce1-clone: pending
ub-srv-ce1-clone: complete
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$
```

Also delete all earlier created MyVM1 till 5 using the `acli vm.delete MyVM[1-4]` command like below and reply with yes as well.

```
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ acli vm.delete MyVM[1-4]
Delete 4 VMs? (yes/no) yes
MyVM1: pending
MyVM2: pending
MyVM3: pending
MyVM4: pending
MyVM4: complete
MyVM2: complete
MyVM3: complete
MyVM1: complete
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$
```

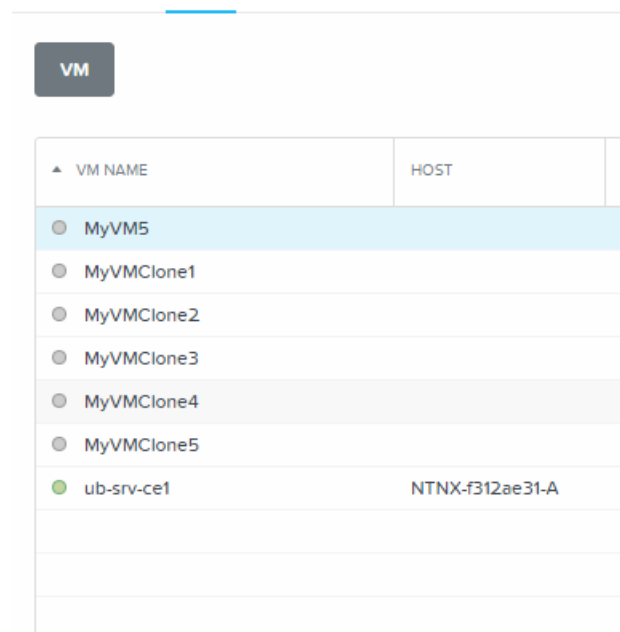
In the PRISM UI the VM's should be gone except for two.

VM NAME
<input type="radio"/> MyVM5
<input checked="" type="radio"/> ub-srv-ce1

No let's clone the MyVM5 into 5 new machines called MyVMClone1 to MyVMClone5 by using the **acli vm.clone** command as shown below.

```
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ acli vm.clone MyVMClone[1..5] clone_from_vm=MyVM5
MyVMClone1: pending
MyVMClone2: pending
MyVMClone3: pending
MyVMClone4: pending
MyVMClone5: pending
MyVMClone1: complete
MyVMClone2: complete
MyVMClone3: complete
MyVMClone4: complete
MyVMClone5: complete
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$
```

PRISM should show



The screenshot shows the PRISM interface for VM management. At the top, there is a 'VM' tab. Below it is a table with columns 'VM NAME', 'HOST', and 'If'. The table lists several VMs: MyVM5, MyVMClone1, MyVMClone2, MyVMClone3, MyVMClone4, MyVMClone5, and ub-srv-ce1. The VMs MyVM5 through MyVMClone5 are shown with a grey ball icon, indicating they are in a pending state. The VM ub-srv-ce1 is shown with a green ball icon, indicating it is powered on. The host for all VMs is NTNX-f312ae31-A.

VM NAME	HOST	If
MyVM5		
MyVMClone1		
MyVMClone2		
MyVMClone3		
MyVMClone4		
MyVMClone5		
ub-srv-ce1	NTNX-f312ae31-A	

Let's power on the first three just created VM's by using **acli vm.on MyVMClone[1-3]** command like below.

```
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ acli vm.on MyVM[1-3]
MyVM1: pending
MyVM2: pending
MyVM3: pending
MyVM2: complete
MyVM1: complete
MyVM3: complete
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$
```

PRISM should show the VM's with a green ball in front of the VM.

Now let's delete all earlier created VM by using the **acli vm.delete** command using wildcards like below and answer the question asked with **yes**.

```
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ acli vm.delete MyVM*
Delete 6 VMs? (yes/no) yes
MyVM5: pending
MyVMClone1: pending
MyVMClone2: pending
MyVMClone3: pending
MyVMClone4: pending
MyVMClone5: pending
MyVM5: complete
MyVMClone2: complete
MyVMClone3: complete
MyVMClone1: complete
MyVMClone5: complete
MyVMClone4: complete
```

Only one VM should exist in the cluster.

VM
VM NAME
ub-srv-ce1

THIS CONCLUDES THE AHV BASIC Scripting SECTION OF THIS DOCUMENT

Replication – A-Synchronous

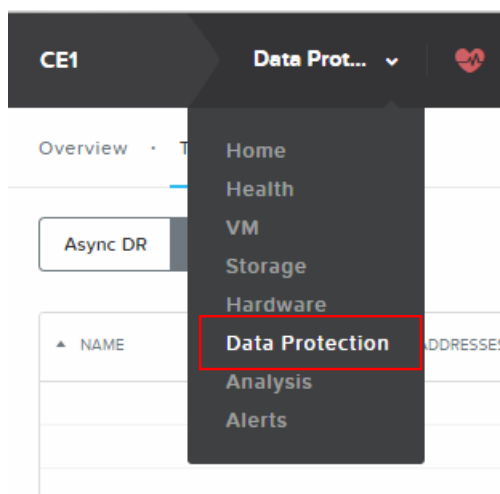
For this section you will be working with another cluster to start A-Synchronous replication using two CE installations. Use the below table to get the information needed.

Clustername	IP Address CVM	IP Address Hyper-Visor	VM Name	Container 1	Container 2
CE1	192.168.4.121	192.168.4.120	ub-srv-ce1	vms-ce1	DR-vms-ce2
CE2	192.168.4.126	192.168.4.125	ub-srv-ce2	vms-ce2	DR-vms-ce1
CE3	192.168.4.131	192.168.4.130	ub-srv-ce3	vms-ce3	DR-vms-ce4
CE4	192.168.4.136	192.168.4.135	ub-srv-ce4	vms-ce4	DR-vms-ce3
CE5	192.168.4.141	192.168.4.140	ub-srv-ce5	vms-ce5	DR-vms-ce6
CE6	192.168.4.146	192.168.4.145	ub-srv-ce6	vms-ce6	DR-vms-ce5

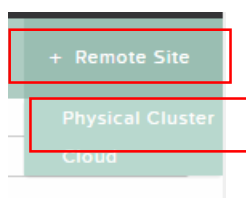
We start by creating a Remote Site and then a Protection Domain.

Remote Site creation

To get A-Async running we firstly need to define a remote site. Click on **Data Protection** in the main screen bar.



On the right-hand side click on the **+ Remote Site** and then on **Physical Cluster** as the sync partner is a “physical cluster”.



REMARK: The screenshots further on in this document use CE1 as the source and the CE2 cluster as the remote side for example reasons!

In the Remote Site screen type the information of the partner cluster. Give the remote site a name which makes the remote site understandable where and what it is. Also provide the IP address of the partner cluster and click Add Site.

REMARK: In real live production environments use the External IP address of the cluster. In our demo environment we use the IP address of the CVM as we only have one node in the Nutanix Cluster.

REMARK: As we are working in pairs the other partner cluster will have your cluster as the remote site defined so we don't need to do anything on that cluster as mentioned in orange just below the NAME field in the screen. In production time you **MUST** do this. Otherwise the replication will fail!

Remote Site

1. Details - 2. Settings

Remote Site Detail

NAME

CE2

Ensure 'CE2' has also configured 'CE1' as a remote site.

☐ Enable Proxy ☐ Use SSH Tunnel !

CAPABILITIES

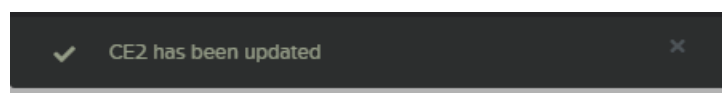
☐ Backup ☒ Disaster Recovery

ADDRESSES

192.168.4.126 Port +

Cancel Add Site

The below dropped down screen should be seen.



The screen, after clicking on the **Save** button should show a green text stating that the Remote site has been created successfully. Scroll down and leave all setting default till you see **NETWORK MAPPING** and **VSTORE NAME MAPPING** as we need to tell the cluster how to map these two.

Remote Site

?

×

1. Details

2. Settings

Remote site created successfully

×

General Settings

BANDWIDTH THROTTLING

☐ Enable bandwidth throttling

DEFAULT BANDWIDTH LIMIT

Enter the maximum bandwidth in megabytes per second (up to 2 decimal places).

No policy found

+ Add Policy

COMPRESS ON WIRE

Cancel

Save

Remote Site

?

×

1. Details

2. Settings

General Settings

BANDWIDTH THROTTLING

☐ Enable bandwidth throttling

DEFAULT BANDWIDTH LIMIT

Enter the maximum bandwidth in megabytes per second (up to 2 decimal places).

No policy found

+ Add Policy

COMPRESS ON WIRE

☒ Yes

☐ No

Cancel

Save

Remote Site

?

×

COMPRESS ON WIRE

☒ Yes

☐ No

Mappings

NETWORK MAPPING

Source Cluster

Destination Cluster

Source Cluster

Destination Cluster

+

Enter unique source and destination name mappings.

VSTORE NAME MAPPING

Source VStore

Destination VStore

vms-ce1

vms-ce2

+

Enter unique source and destination name mappings.

Cancel

Save

For network mapping we need to tell the cluster how to map the networks on both cluster to each other. This has to be done if the networks on both cluster are not named the same. In our environment we use AHV-vlan0 and both.

Remote Site

?

×

COMPRESS ON WIRE

☒ Yes

☐ No

Mappings

NETWORK MAPPING

Source Cluster

Destination Cluster

AHV: vlan0

AHV: vlan0

+

Enter unique source and destination name mappings.

VSTORE NAME MAPPING

Source VStore

Destination VStore

vms-ce1

vms-ce2

+

Enter unique source and destination name mappings.

Cancel

Save

For the **VSTORE NAME MAPPING** we need to tell the mapping between **Source VStore** and **Destination VStore**. In our environments we need to change these to the below screenshot. Again use your parameters according to the table earlier. As example in the screenshot vms-ce2 on ce2 is mapped to DR-vms-ce2 on the ce1 cluster.

Remote Site

COMPRESS ON WIRE

☒ Yes

☐ No

Mappings

NETWORK MAPPING

Source Cluster

Destination Cluster

Source Cluster

Destination Cluster

+

Enter unique source and destination name mappings.

VSTORE NAME MAPPING

Source VStore

Destination VStore

vms-ce2

DR-vms-ce2

+

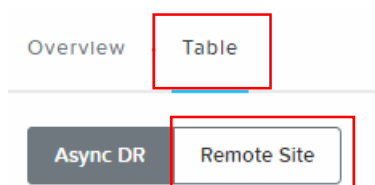
Enter unique source and destination name mappings.

Cancel Save

REMARK: The OS on which the CVM is running is **CASE SENSITIVE**. Make sure you use the right upper and lower characters as mentioned in the clusters.

TIP: Open both clusters in a browser and select and copy the name of the cluster so you don't make any mistakes.

After creation of the Remote Site the below screenshot should be shown where you see the settings which you have created earlier. If you don't see this, click on the Table view and then on Remote Site.



After selecting the Remote Site you just created you should be able to use the **Test Connection** button. If you've created the remote site correctly, you should see a **green checkmark** left to the button like below screenshot.

Async DR

Remote Site

1 Remote Site

search in table

NAME	REMOTE ADDRESSES	VSTORE MAPPINGS	CAPABILITIES	COMPRESS ON WIRE	USE SSH TUNNEL	B/W LIMIT (TX)	B/W USED (TX)	B/W USED (RX)
CE2	192.168.4.126	vms-ce1:DR-vms-ce1	Disaster Recovery	On	No	-	0 KBps	0 KBps

Summary > CE2

Test Connection

Update

Delete

Test Connection

Creating a Protection Domain

When clicking on the **Async DR** button there should not be shown anything.

Overview

Table

Async DR

Remote Site

On the right hand-side of the screen click on the **+ Protection Domain** and the on **Async DR**.

+ Protection Domain

Async DR

A new screen appears in which a name is asked for. Give the Protection Domain a useful name like CE1-CE2 and click the **Create** button.

Protection Domain (Async DR)

?

×

Name

- Virtual Machines

- Schedule

A protection domain is a grouping of Virtual Machines for disaster recovery purposes. Enter a name (using alpha numeric characters only) for the protection domain you would like to create. You will then be guided into assigning Virtual Machines to it, and scheduling it.

NAME

CEI-CE2

Cancel

Create

The next phase will be to assign VM's to the Protection Domain. Select the **ub-srv-cex** VM which you created earlier and click on the **Protect Selected VMs** button.

Name - **Virtual Machines** - Schedule

Unprotected VMs (1)

Filter by:

<input type="checkbox"/>	VM	HOST
<input checked="" type="checkbox"/>	ub-srv-ce1	NTNX-f312ae31-A
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Pick a Consistency Group ?

- ☒ Use VM Name
- ☐ Use an existing CG
- ☐ Create a new CG

Protect Selected VMs (1)



Protected VMs (None)

Filter by:

<input type="checkbox"/>	VM	CG
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		



Unprotect Selected VMs

Next

This should end up in a screen like below. Click the **Next** button.

The screenshot shows the 'Protection Domain (Async DR)' window. At the top, it says 'Name - Virtual Machines - Schedule'. A green message bar indicates 'Successfully protected 1 VM(s)'. Below this, there are two panels: 'Unprotected VMs (None)' and 'Protected VMs (1)'. The 'Protected VMs' panel shows a table with one entry: 'ub-srv-ce1' under the 'VM' column and 'ub-srv-ce1' under the 'CG' column. At the bottom right, there is a blue 'Next' button.

Now we need to tell the cluster according to which schedule it has to make snapshots and should they be replicated to another remote site. Click the **New Schedule** button.

A button labeled 'New Schedule' is shown, highlighted with a red border.

Try to create a repeatable time smaller than 60 minutes like below.

The screenshot shows the 'Configure your local schedule' section. It has a radio button selected for 'Repeat every' followed by a text input field containing '59' and the unit 'minute(s)'. A help icon (?) is next to the unit.

This should return an error as soon as you click on another parameter in the top of the schedule.

A red error message bar is displayed at the bottom of the screen, stating: 'Please enter a value greater than or equal to 60 minutes.' There is a close button (X) on the right side of the bar.

REMARK: The lowest number which can be set in the minutes is 60 minutes!

Protection Domain (Async DR) ? X

Name - Virtual Machines - **Schedule**

Configure your local schedule

☐ Repeat every minute(s) ?

☒ Repeat every hour(s) ?

☐ Repeat every day(s) ?

☐ Repeat weekly

☐ S ☐ M ☐ T ☐ W ☐ T ☐ F ☐ S

☐ Repeat monthly

Day of month: ?

Start on at

☐ End on at

☐ Create application consistent snapshot

Retention policy

☒ Local keep the last snapshots

Up to 1 snapshot will be retained for this schedule and retention policy (1 snapshot for each interval).

Remote Sites

☒ CE2 keep the last snapshots

Cancel Create Schedule

Set the parameters according to above screenshot and click the **Create Schedule** button.

This should result in a screen just like below.

Protection Domain (Async DR)

?

×

Name · Virtual Machines · **Schedule**

You currently have 1 schedule . Next snapshot is scheduled on 01/20/16, 01:11:00am

New Schedule

TYPE	REPEAT ON	START DATE	END DATE	APP CONSISTENT SNAPSHOT	RETENTION POLICY	
Hourly	Every 1 hour	01/19/16, 11:11:00pm	-	No	Local: 1, CE2: 1	<div><div></div><div></div><div></div></div>

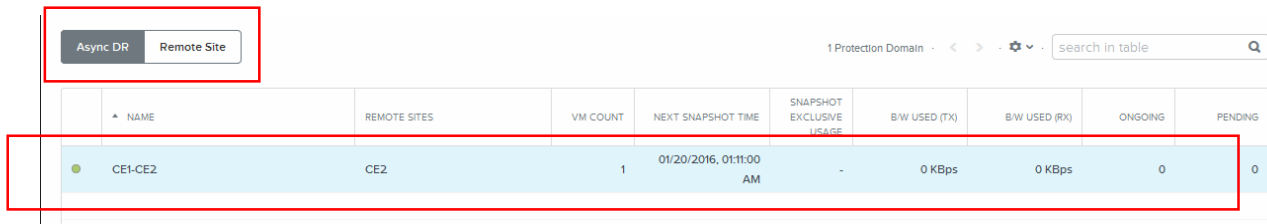
Previous

Close

Click the **Close** button to close the creation of the Protection Domain.

Test the Replication

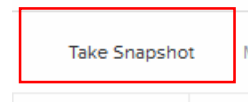
To test all simple click on the **Async DR** button and select the protection domain we've just created.



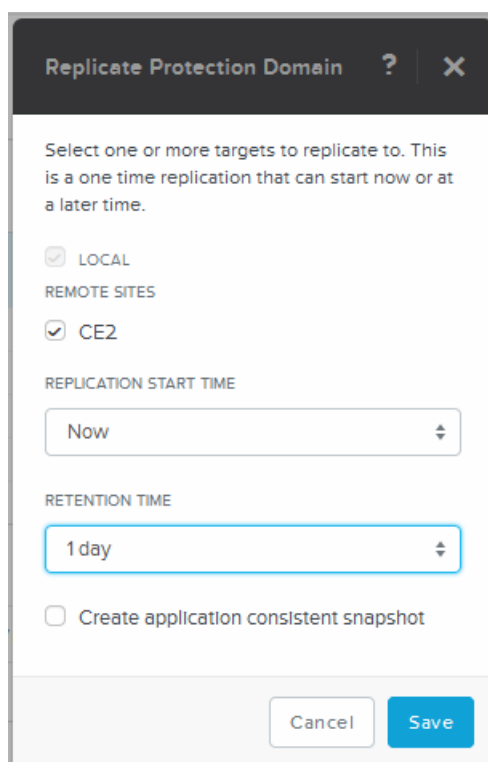
The screenshot shows the 'Async DR' tab selected. Below it is a table with the following data:

	NAME	REMOTE SITES	VM COUNT	NEXT SNAPSHOT TIME	SNAPSHOT EXCLUSIVE USAGE	B/W USED (TX)	B/W USED (RX)	ONGOING	PENDING
	CE1-CE2	CE2	1	01/20/2016, 01:11:00 AM	-	0 KBps	0 KBps	0	0

The **Take Snapshot** button should now be available. Click this button.



Now let's create a snapshot of the VM in the selected protection domain and set the settings to the below screenshot. This will result in a snapshot be create, replicated to the remote site, scheduled now and with a retention of 1 day. Don't forget to select the **REMOTE SITES** otherwise ther will only be a local snapshot created. Click on **Save** when done.

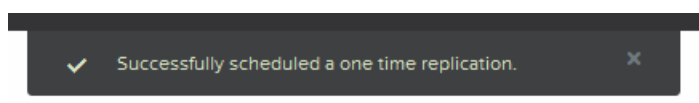


The 'Replicate Protection Domain' dialog box is shown with the following settings:

- Select one or more targets to replicate to. This is a one time replication that can start now or at a later time.
- ☒ LOCAL
- REMOTE SITES
 - ☒ CE2
- REPLICATION START TIME: Now
- RETENTION TIME: 1 day
- ☐ Create application consistent snapshot

Buttons: Cancel, Save

That click should provide a dropped down screen stating that the schedule has been created.



Select the protection domain again and then look at the Replications tab. There should be a line stating what it is doing.

Replications	VMs	Schedules	Local Snapsh...	Remote Snap...	Metrics	Alerts	Events
Total Ongoing (1)							
DIRECTION	PROTECTION DOMAIN	REMOTE SITE	SNAPSHOT	START TIME	TIME REMAINING	DATA COMPLETED	
Outgoing	CE1-CE2	CE2	102	01/20, 12:16:20am	35s	75.76 MiB	

If the replication has worked and is completed, there will be in the same tab of **Replications** at mention of this lower in that subscreen. Example is below.

Last Successful (1)					
DIRECTION	REMOTE SITE	SNAPSHOT ID	START TIME	END TIME	
Outgoing	CE2	102	01/20, 12:16:20am	01/20, 12:16:41am	

Take a look at all tabs which are available.

VMs tab

Replications	VMs	Schedules	Local Snapsh...	Remote Snap...	Metrics	Alerts	Events
1 VM · < > · ⚙ · search in table 🔍							
VM NAME	CONSISTENCY GROUP	POWER STATE ON RECOVERY					
ub-srv-ce1	ub-srv-ce1	power state at time of snapshot	Unprotect				

Schedules tab

Replications	VMs	Schedules	Local Snapsh...	Remote Snap...	Metrics	Alerts	Events
1 Schedule · < > · ⚙ · search in table 🔍							
TYPE	REPEAT ON	START DATE	END DATE	RETENTION POLICY			
Hourly	Every 1 hour	01/19/16, 11:11:00pm	-	Local: 1, CE2: 1			✎ ✕

Local Snapshots tab

Replications	VMs	Schedules	Local Snapsh...	Remote Snap...	Metrics	Alerts	Events
<input type="checkbox"/> Include Expired · 1 Snapshot · < > · ⚙ · search in table 🔍							
<input type="checkbox"/>	ID	CREATE TIME	RECLAIMABLE SPACE ⓘ	CHANGED BYTES ⓘ	EXPIRY TIME		
<input type="checkbox"/>	102	01/20/2016, 12:16:20 AM	Processing	0 GiB	01/21/2016, 12:16:20 AM	Details · Restore · ✕	

Remote Snapshots tab

Replications	VMs	Schedules	Local Snapsh...	Remote Snap...	Metrics	Alerts	Events
<input type="checkbox"/> Include Expired · 1 Snapshot · < > · ⚙ · search in table <input type="text"/>							
<input type="checkbox"/>	ID	CREATE TIME	LOCATION	CHANGED BYTES ¹	EXPIRY TIME		
<input type="checkbox"/>	102	01/20/2016, 12:16:20 AM	CE2	0 GiB	01/21/2016, 12:16:20 AM	Details · Retrieve	✕

Alerts and Events tab.

If it didn't work, use the Alerts tab to see what is wrong.

Replications	VMs	Schedules	Local Snapsh...	Remote Snap...	Metrics	Alerts	Events
<input type="checkbox"/> Unresolved ✕ · 1 Alert · < > · ⚙							
<input type="checkbox"/>	SEVERITY	ISSUE	TIMESTAMP	ENTITIES	DOCUMENTATION		
<input type="checkbox"/>	● Info	The replication for protection domain CE1-CE2 to remote site CE2 was a full replication.	01-20-16, 12:16:21am	Protection domain, Remote site	Cause Resolution	✎	

Replications	VMs	Schedules	Local Snapsh...	Remote Snap...	Metrics	Alerts	Events
<input type="checkbox"/> Include Acknowledged · 1 Event · < > · ⚙							
<input type="checkbox"/>	MESSAGE	ENTITIES	MODIFIED BY	TIMESTAMP			
<input type="checkbox"/>	Replication completed for Protection Domain 'CE1-CE2' to remote 'CE2' using snapshot '(2514697786982551308, 1453229242800600, 102)' and at time '1453245401831865'.	Protection domain, Remote site		01-20-16, 12:16:41am			

On the left hand-side of the bottom half of the screen you will find Summary information of the protection domain.

[Summary](#) > CE1-CE2

PROTECTION DOMAIN DETAILS	
Name	CE1-CE2
Mode	● Active
Next Snapshot Time	01/20/16, 01:11:00am
VM Count	1
File Count	0
Remote Site(s)	CE2

THIS CONCLUDES THE REPLICATION – A-ASYNCHRONOUS SECTION OF THIS DOCUMENT