



Workshop Acropolis Hyper Visor

For supporting NPP understanding – based on the Nutanix CE version
Using the demos.dell.com environments



Acropolis

NUTANIX

Acropolis Hyper Visor Workshop – demos.dell.com environment

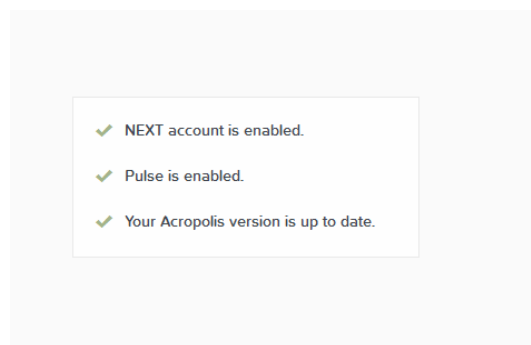
NPP supporting hands-on document

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

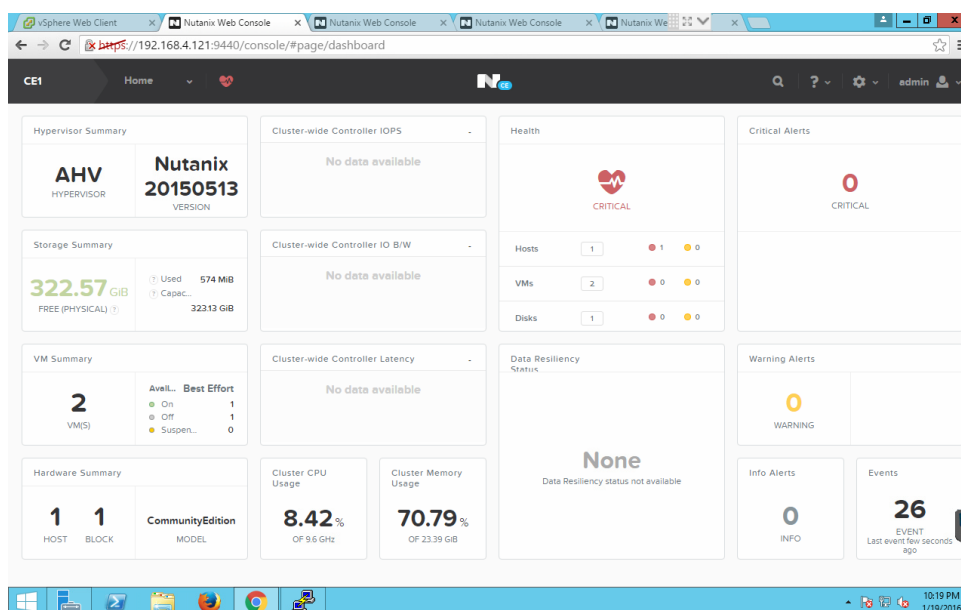
Login to the cluster by its IP Address. Use the table below.

Clustername	IP Address CVM	IP Address Hyper-Visor	VM Name	Container 1
	172.20.0.111	172.20.0.11	ub-srv-ce1	vms-ce1

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



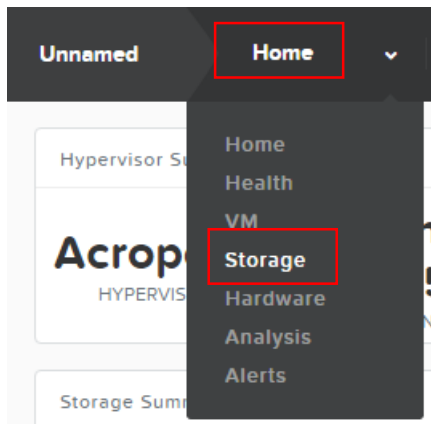
Then the HOME View should appear



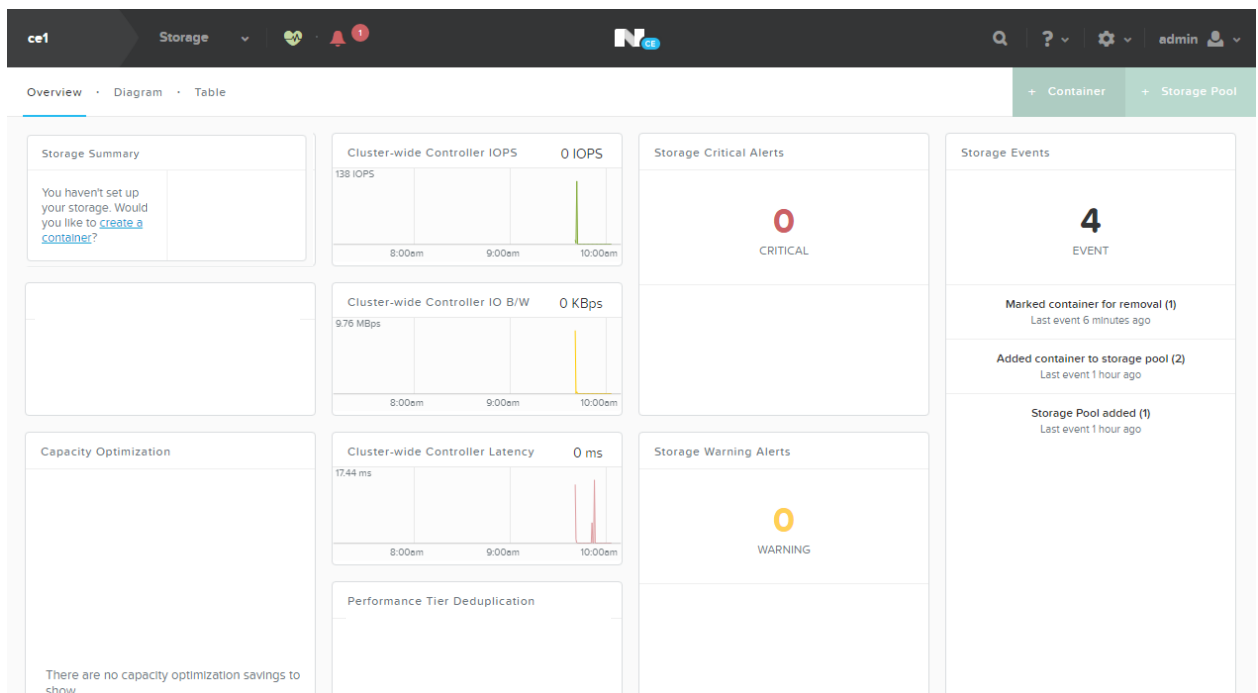
Create StoragePool

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 screenshot shows the top of the Nutanix interface with the Nutanix logo. Below the logo, a dark grey notification bar displays a green checkmark and the text "SP1 has been created". Below this bar, a dropdown menu is visible, showing "Controller IOPS" and "Storage Critical Alerts".

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.

The screenshot shows the 'Storage' overview page. At the top, there's a navigation bar with 'Storage' and a '+ Container' button highlighted with a red box. Below the navigation bar, there's a status bar showing 'SPI has been created'. The main content area is divided into several sections: 'Storage Summary' showing 448.38 GiB used and 0 GiB free; 'Cluster-wide Controller IOPS' and 'Cluster-wide Controller IO B/W' charts; 'Storage Critical Alerts' showing 0 critical alerts; 'Storage Events' showing 0 events; 'Capacity Optimization' showing no savings; 'Cluster-wide Controller Latency' chart; 'Storage Warning Alerts' showing 0 warnings; and 'Performance Tier Deduplication' showing 'NOT AVAILABLE'.

Name the container according to the earlier mentioned table in the naming convention vms-ce1.

The 'Create Container' dialog box is shown. It has a title bar with 'Create Container', a question mark, and a close button. The main content area contains the following fields and sections:

- NAME:** A text input field containing 'vms-ce1'.
- STORAGE POOL:** A dropdown menu showing 'SP1' and a '+' button to add more options.
- MAX CAPACITY:** A section showing '448.38 GiB' and a note '(Physical) Based on storage pool free unreserved capacity'.
- NFS DATASTORE:** A section showing 'No hosts can be mounted with an NFS datastore.' and 'The cluster's hypervisor(s) are Acropolis.'
- Buttons:** At the bottom, there are three buttons: 'Advanced Settings' (highlighted with a red box), 'Cancel', and 'Save'.

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.

Create Container

?

✕

The cluster's hypervisor is Hyper-V.

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

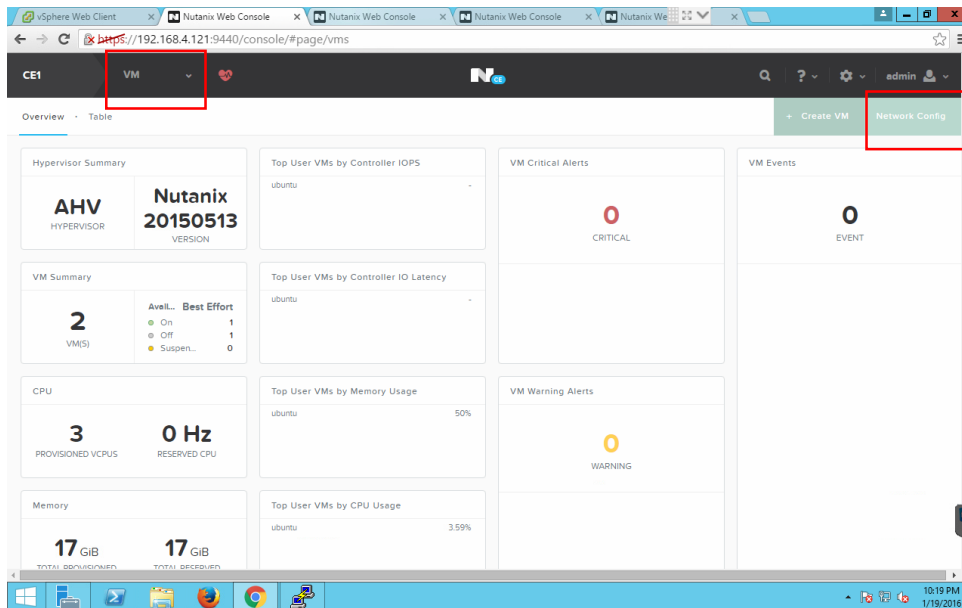
Cancel

Save

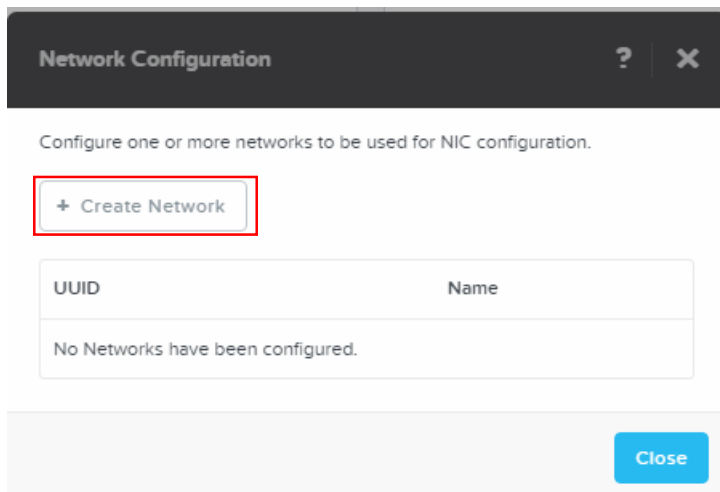
THIS CONCLUDES STORAGE RELATED SECTION OF THIS DOCUMENT

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.



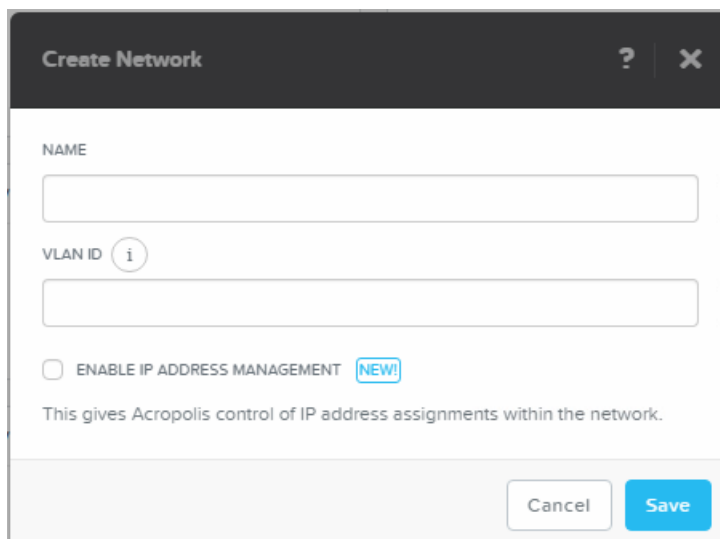
The 'Network Configuration' dialog box has a dark header with a question mark and a close button. Below the header, it says 'Configure one or more networks to be used for NIC configuration.' A red rectangle highlights the '+ Create Network' button. Below this is a table with two columns: 'UUID' and 'Name'. The table is currently empty, with the text 'No Networks have been configured.' at the bottom. At the bottom right of the dialog is a blue 'Close' button.

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 has a dark header with a question mark and a close button. It contains two input fields: 'NAME' and 'VLAN ID'. The 'VLAN ID' field has an information icon (i) to its right. Below these fields is a checkbox labeled 'ENABLE IP ADDRESS MANAGEMENT' with a 'NEW!' tag next to it. A note below the checkbox states: 'This gives Acropolis control of IP address assignments within the network.' At the bottom right are 'Cancel' and 'Save' buttons.

NAME

VLAN ID ⓘ

☐ ENABLE IP ADDRESS MANAGEMENT **NEW!**

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

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

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

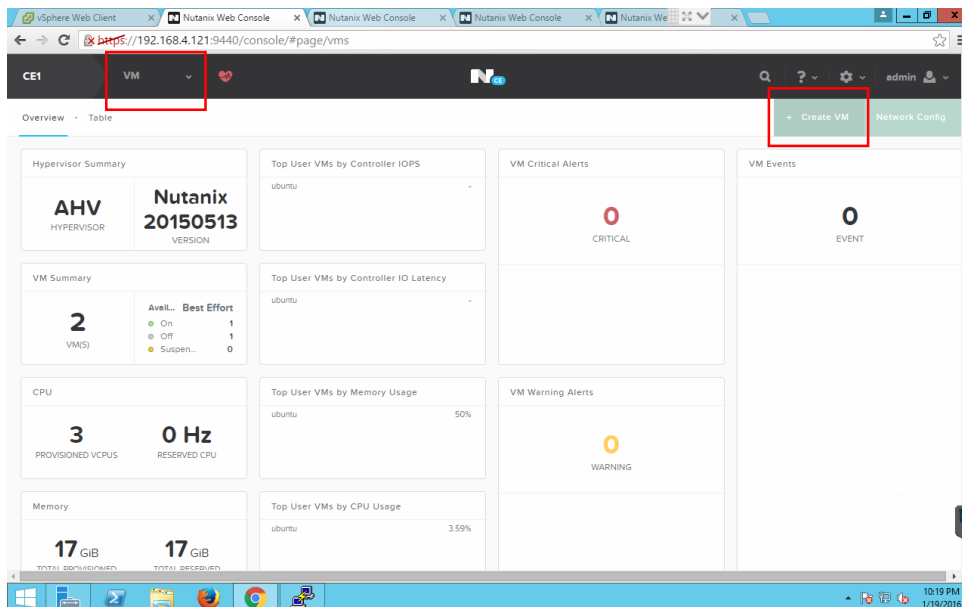
UUID	Name	
a6a3393f-0b30-4f99-ac99-8efcad8b1424	vlan0	<div><div></div><div></div><div></div></div>

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

Create VM

Enter a name for the VM and set up the appropriate configuration.

NAME

ub-srv-ce1

COMPUTE

1 vCPU(s)

1 Cores per vCPU

MEMORY

1 GiB

DISKS

+ New Disk

Type	Address	Parameters
------	---------	------------

Cancel Save

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.

Remark:

If you haven't created it, Cancel this action and go to the Storage View and create a container quickly. Name it vms-ce1.

Create a 10GB disk

Add Disk ? X

TYPE

DISK

OPERATION

ALLOCATE ON CONTAINER

BUS TYPE

SCSI

CONTAINER

vms-ce1

SIZE (GiB)

10

Cancel Add

Create VM ? X

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 ? X

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

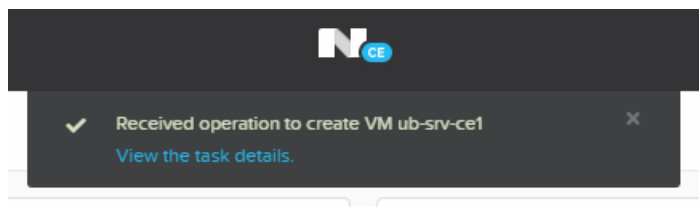
+ New NIC

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.

Overview · Table

+ Create VM Network Config

VM

☐ Include Controller VMs · 1 VM (filtered from 2)

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

All VM Tasks

10:30 PM 1/19/2016

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

Launch Console Power on Take Snapshot Migrate Pause Clone Update Delete

Virtual Disks VM NICs VM Snapshots VM Tasks Console

✓ Received operation to power on VM ub-srv-ce1
View the task details.

Overview · Table

+ Create VM Network Config

VM

☐ Include Controller VMs · 1 VM (filtered from 2)

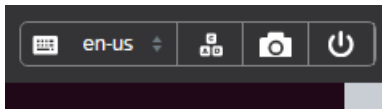
VM NAME	HOST	IP ADDRESSES	CORES	MEMORY CAPACITY	CPU USAGE	CONTROLLER READ IOPS	CONTROLLER WRITE IOPS	CONTROLLER IO BANDWIDTH	CONTROLLER AVG IO LATENCY	BACKUP...
ub-srv-ce1	NTNX-F312ae31-A		1	1 GiB	0%	0	0	0 KBps	0 ms	Yes

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

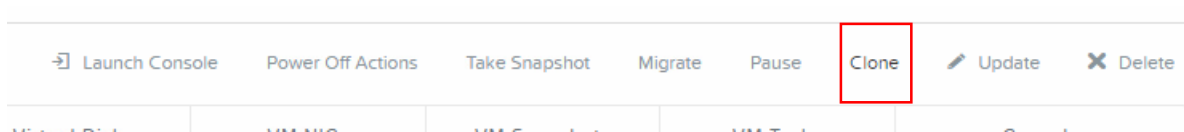
A VNC screen will open to show the console of the VM. If you want, test all buttons on the right-hand side of the VNC console to see what they do.



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 is titled 'Enter a name for the VM and set up the appropriate configuration.' It contains several sections: 'NAME' with a text input field containing 'ub-srv-ce1-clone'; 'COMPUTE' with a 'vCPU(s)' section containing a text input field with '2'; 'MEMORY' with a 'GIB' section containing a text input field with '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 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

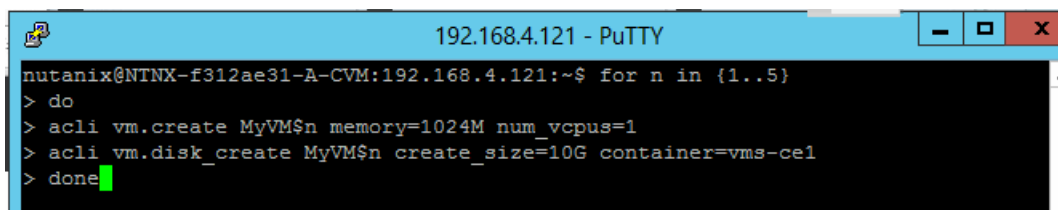
Connect to the CVM using the IP address of your cluster. Use **nutanix** and the **nutanix/4u** as username and password combination.

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.

Type the following command in the CVM SSH session:

```
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=vmx-ce1  
done
```

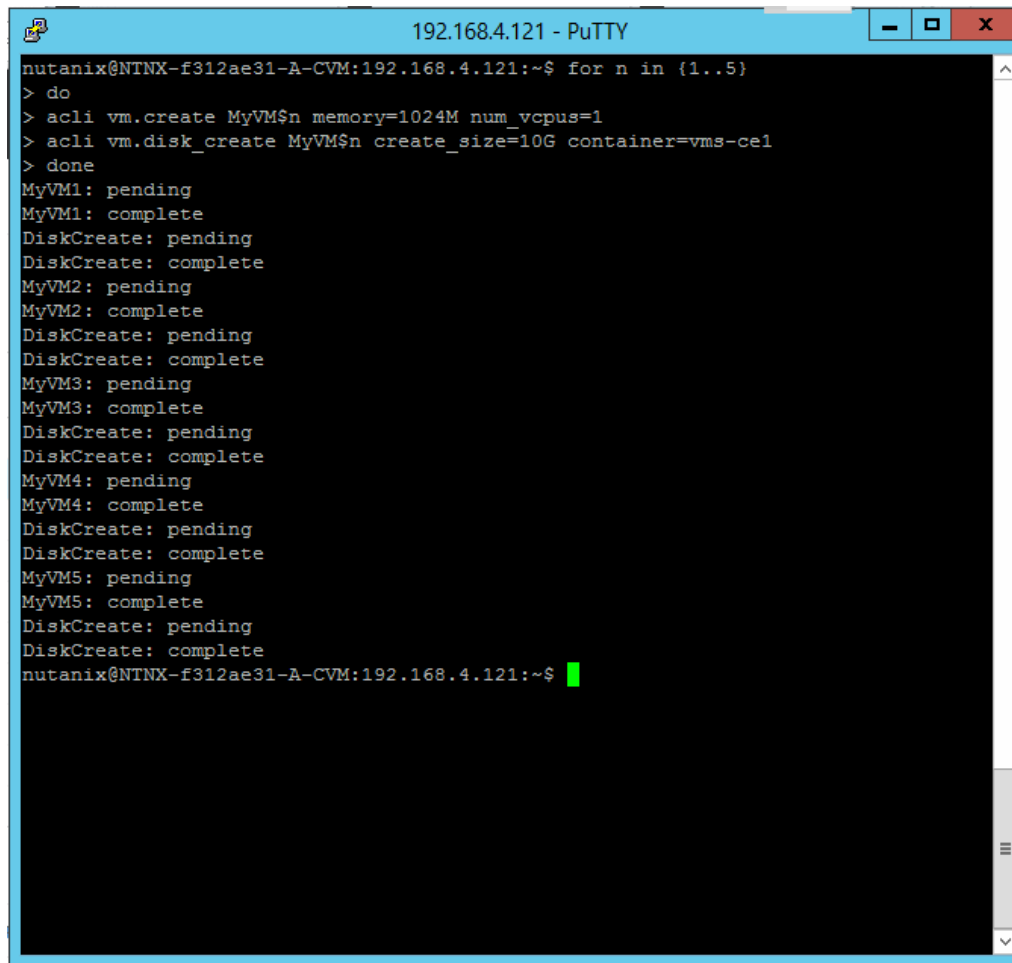
Below is the command in the putty session



The screenshot shows a PuTTY terminal window titled "192.168.4.121 - PuTTY". The terminal displays the following commands and their execution:

```
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:~$
```

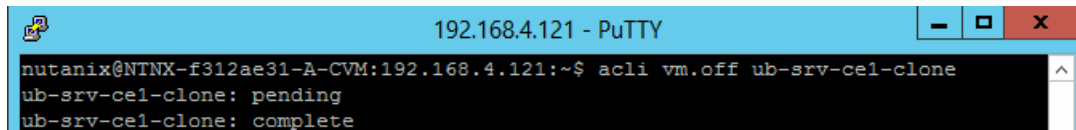
PRISM will show all just 5 newly EXTRA created VM's

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:

`acli vm.off ub-srv-ce1-clone`



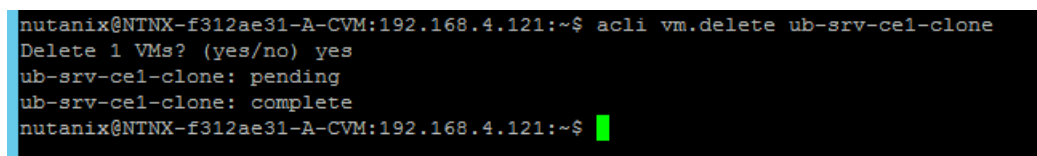
```
192.168.4.121 - PuTTY
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ acli vm.off ub-srv-ce1-clone
ub-srv-ce1-clone: pending
ub-srv-ce1-clone: complete
```

The PRISM should show a gray colored 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	

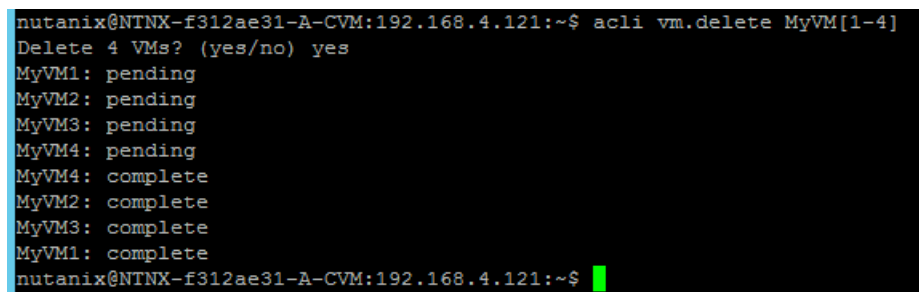
Now let's delete that VM by using the **`acli vm.delete`** command and reply **yes** to the asked question if you are sure.

`acli vm.delete ub-srv-ce1-clone`



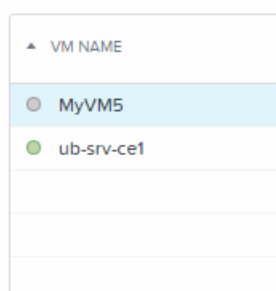
```
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$ acli vm.delete ub-srv-ce1-clone
Delete 1 VMs? (yes/no) yes
ub-srv-ce1-clone: pending
ub-srv-ce1-clone: complete
nutanix@NTNX-f312ae31-A-CVM:192.168.4.121:~$
```

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.

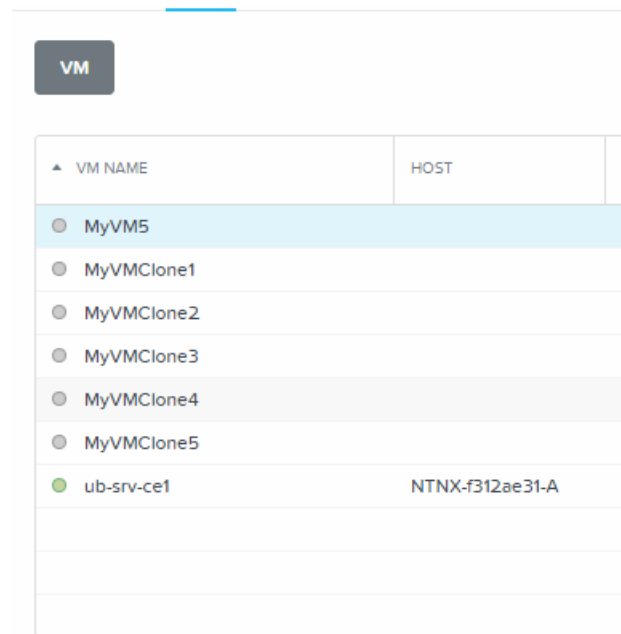


VM NAME
<input type="radio"/> MyVM5
<input checked="" type="radio"/> ub-srv-ce1

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

```
for n in {1..5}
do
acli vm.clone MyVMClone$n
done
```

PRISM should show



The screenshot shows the PRISM VM management interface. At the top, there is a 'VM' tab. Below it is a table with columns 'VM NAME', 'HOST', and 'IP'. The table contains the following entries:

VM NAME	HOST	IP
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 MyVM**** 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