Getting Started

Welcome to the Nutanix AOS on AHV Bootcamp! This workbook accompanies an instructor-led session that introduces Nutanix Core technologies and many everyday management tasks.

You will explore Prism Element (PE) and become familiar with its features and navigation. You will use PE to perform basic cluster administration tasks, including storage and networking. You will also walk through basic VM deployment and management tasks with Prism and AHV. The instructor explains the exercises and answers any additional questions that you may have.

At the end of the bootcamp, attendees should understand the core concepts and technologies that comprise the Nutanix Enterprise Cloud stack and be well prepared for a hosted or onsite proof-of-concept (POC) engagement.

What's New

(Last updated 8-10-22)

Labs are updated for the following software versions:

- AOS 6.5 LTS

Agenda

- Introductions
- Nutanix Presentation
- Technology Overview
- Storage Configuration
- Networking Configuration
- Deploying Workloads
- Managing Workloads
- Data Protection
- (Optional) Image Configuration

Introductions

- Name
- Familiarity with Nutanix

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Technology Overview →

Technology Overview

Overview

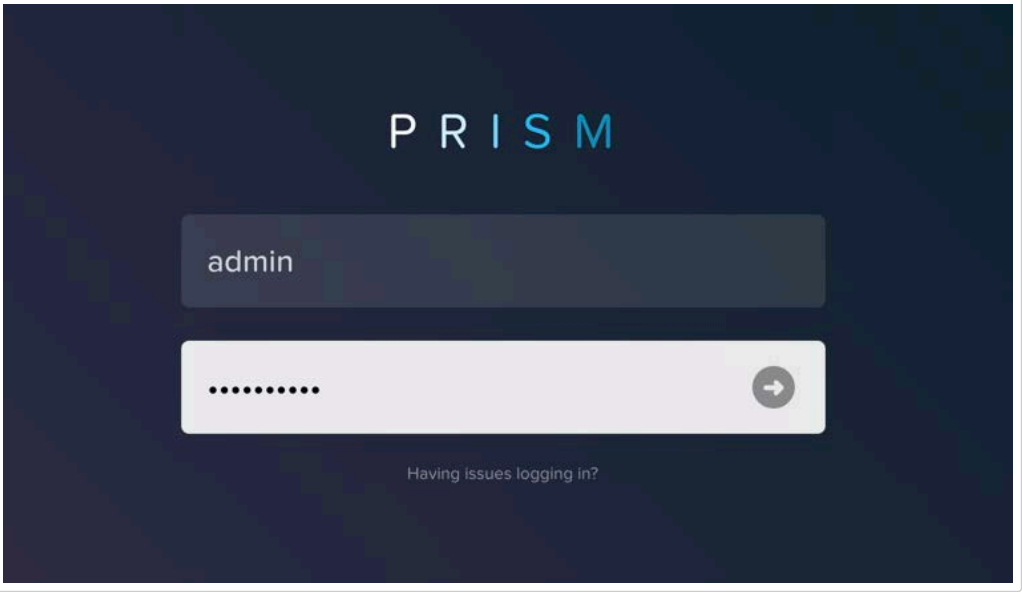
In this section, we will introduce the Prism Element (PE) graphical user interface (GUI), familiarize you with its layout, and navigation.

Prism Element

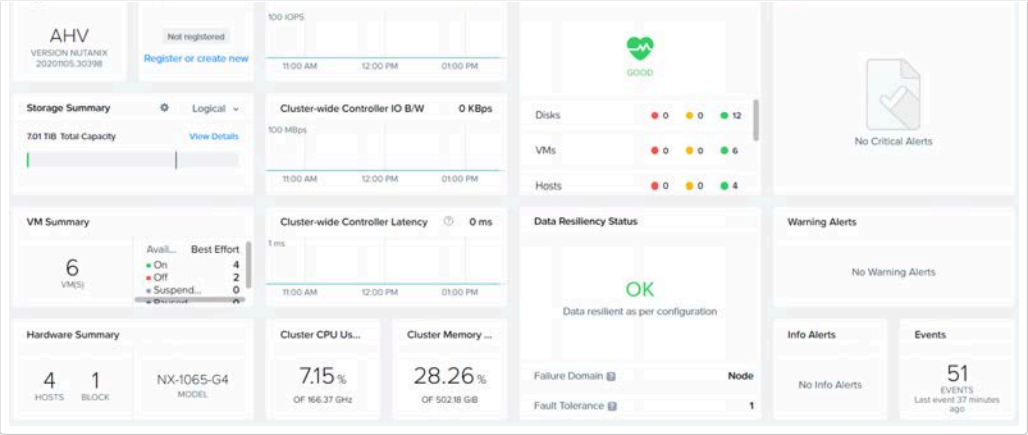
The Prism service provides the GUI for managing Nutanix clusters, and runs on every Controller VM (CVM), ensuring there isn't a single point of failure. This local Prism Element service can be accessed via the IP of any individual CVM, or via the virtual IP (VIP) for the cluster, which will redirect to the current Prism leader.

From the Firefox web browser (preferred), log into the Nutanix Prism GUI using the Cluster IP.

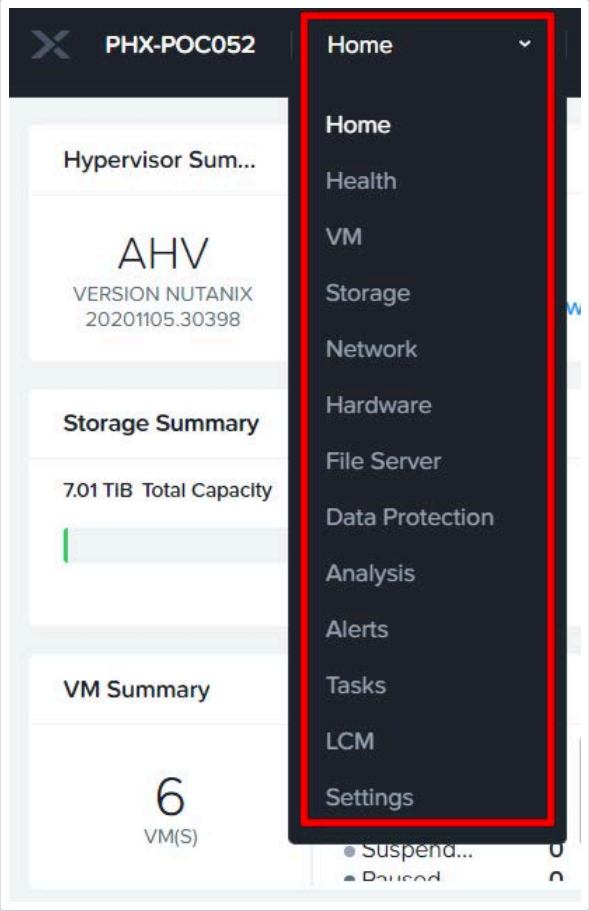
1. Enter `NUTANIX-CLUSTER-IP` into a new browser tab.
2. Log in using the following credentials:
   - **Username** - admin
   - **Password** - `HPOC-PASSWORD`



3. After you log in to PE, familiarize yourself with the GUI. Explore the information on the Home screen, as well as the other screens.
4. Review the Home screen, and identify the following items:
   - Hypervisor
   - Version
   - Hardware Model
   - Health
   - VM Summary
   - Warning Alerts
   - Data Resiliency Status



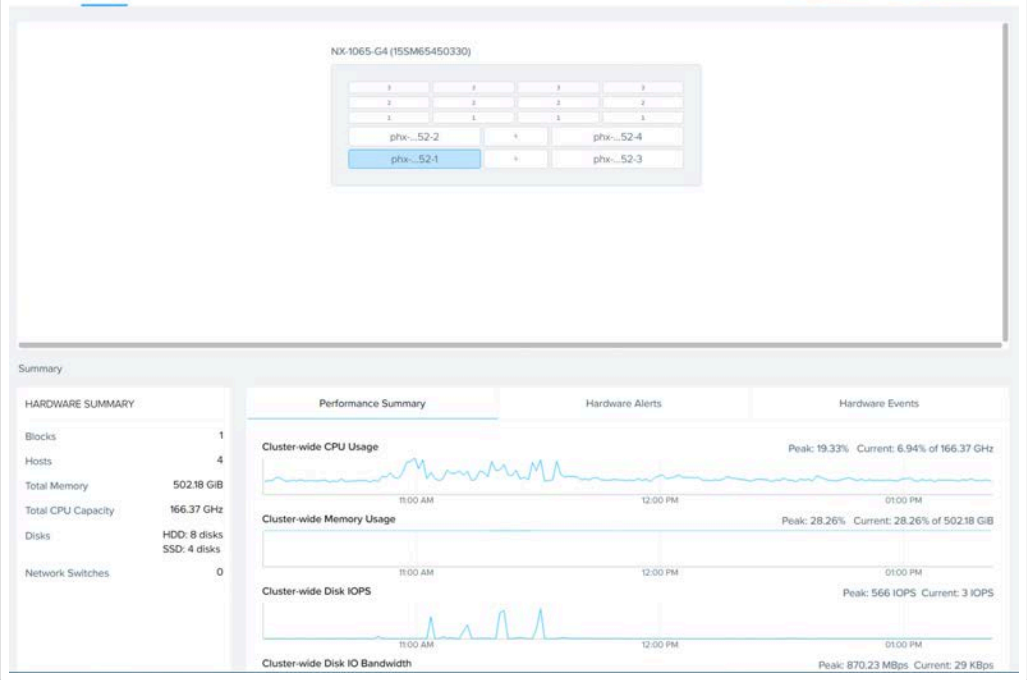
5. Review the GUI navigation options under the main drop-down menu. The label of this menu changes based on the dashboard that is currently being displayed. For example, from the Home dashboard it will be labeled *Home*, from the Health dashboard it will be labeled *Health*, etc.



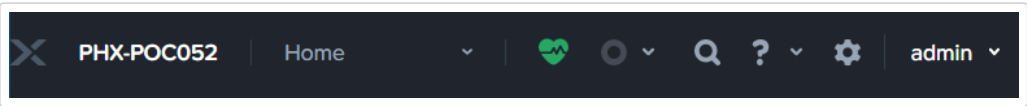
6. Examine the cluster hardware. From the main drop-down, click **Hardware**, and then **Diagram**.

7. Review the hardware summary information:

   - Blocks
   - Hosts
   - Memory
   - CPU
   - Disks



8. Review the other selections from the main drop-down, and do a quick walk through:
   - VM
   - Health
   - Network
   - Data Protection
   - Storage
   - Alerts
9. Review other selections on the top navigation bar:
   - Health
   - Alarms
   - Tasks
   - Search
   - Help
   - Configuration
   - User - Displays currently logged in user (ex. admin)

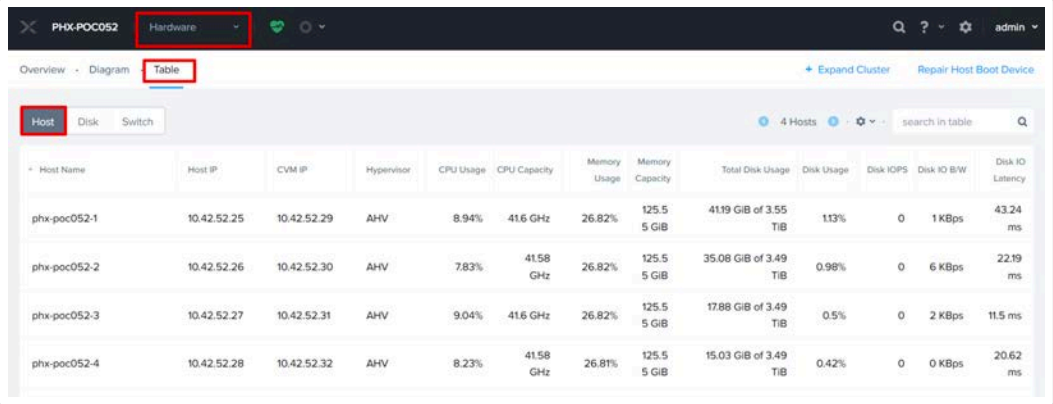


Prism Element GUI Review

Q: Where would you locate the version of AOS you are running?

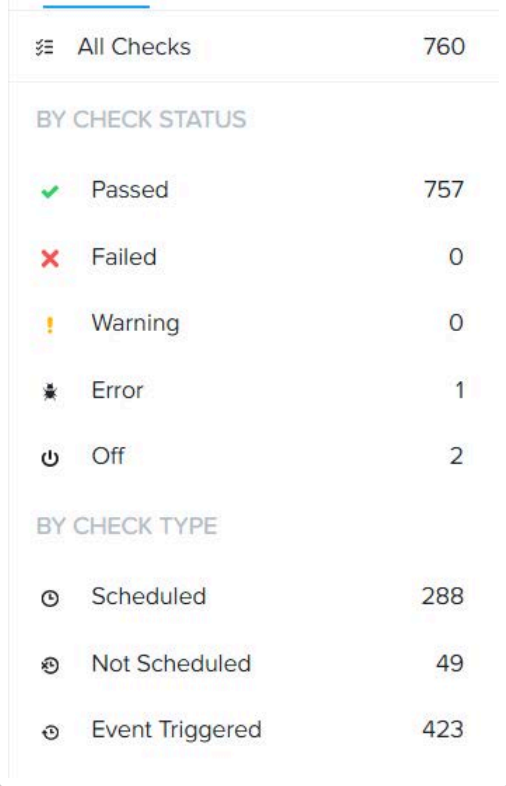
A: You can do this by clicking on the *User* drop-down, and then clicking **About Nutanix**.

Q: How would you view a summary of the number of hosts (nodes), the resource capacity, and current utilization?



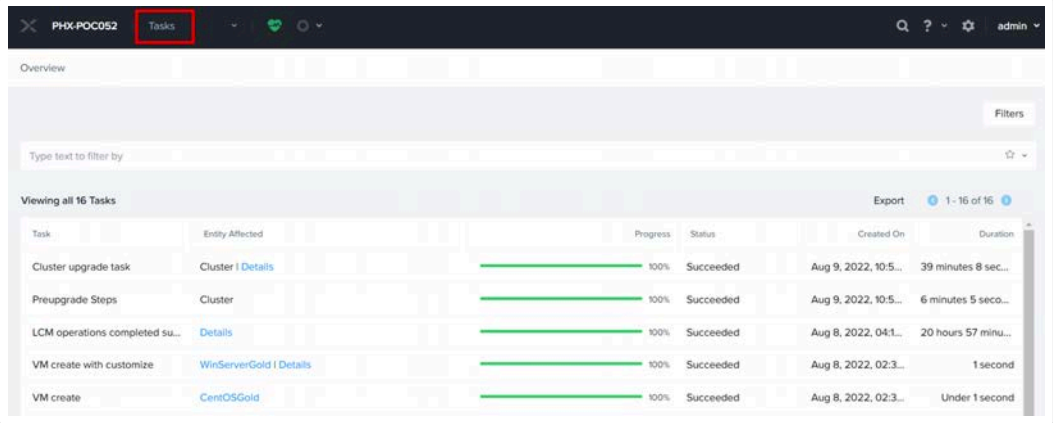
A: From the main drop-down, click **Hardware** > **Table** > **Host**.

Q: How would you see the health of your cluster?



A: From the main drop-down, click **Health**, which will default to *Summary* on the right-hand pane.

Q: What page would show you the latest activity, including being able to monitor the progress of any task, and keep track of what has been done in the past using time stamps? Can you figure out two different ways to get there?



A: From the main drop-down, click **Tasks**. Alternatively, click the circle .

Takeaways

- Prism Element is thoughtfully laid-out GUI.
- Critical information is displayed front and center.

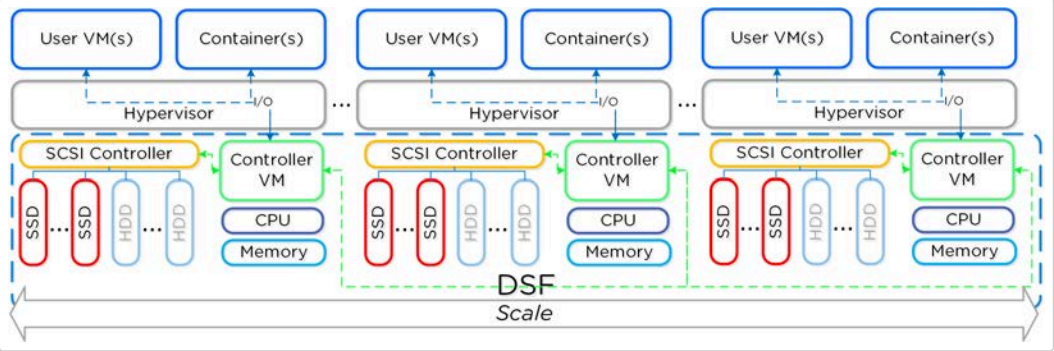
Storage Configuration

Overview

In this section, we will use Prism to perform a basic container setup.

Distributed Storage Fabric (DSF)

The Nutanix Distributed Storage Fabric (DSF) presents storage to the hypervisor in a way that looks identical as if it were presented from any centralized storage array. However, Nutanix uses Controller VMs (CVMs) combined with the local storage within each node to provide shared storage for the cluster that is both redundant and resilient. The combination of computing and distributed local storage resources is now commonly referred to as Hyper-converged Infrastructure (HCI).



As a pioneer in the HCI space, Nutanix DSF is a mature solution capable of delivering the performance and resiliency needed to support **many different workloads**, including enterprise databases, virtual desktops, Remote Office - Branch Office (ROBO), Big Data, and more.

The two main storage constructs within the DSF are the *Storage Pool* and *Storage Containers*.

The *Storage Pool* is the aggregation of all of the physical disks within a given Nutanix cluster. The cluster manages data distribution, so other storage pools (like LUNs in a traditional storage environment) are not required. As new nodes are added to a cluster, disks are automatically added to the pool, and the cluster will begin **re-distributing data to the new disks** as a background task.

The *Storage Containers* are software-defined, logical constructs that allow you to configure storage policy for groups of VMs or vDisks. In the next exercise, you will walk through the process for creating and configuring Nutanix storage within Prism.

> **Note**
>
> To learn more about additional DSF constructs such as vDisks, extents, and extent groups, refer to **this section** of the Nutanix Bible.

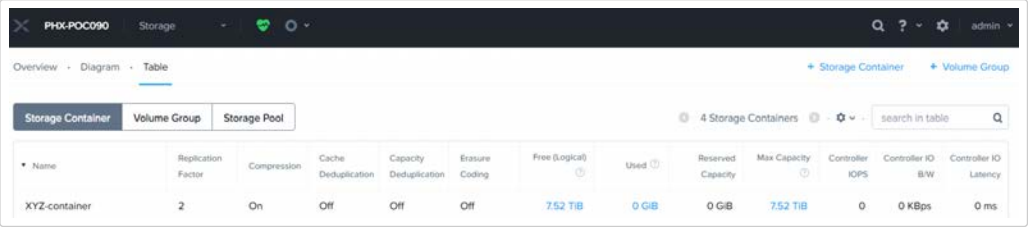
Prism Element Storage Configuration Items

Configure Storage Containers

Let's use PE to perform a basic container setup.

1. From the main drop-down, choose **Storage**. Select **Table** > **+ Storage Container**.

- Name - `Initials`-Container
- Select ⚙ **Advanced Settings**
- **Advertised Capacity** - `500 GiB`
- Select **Compression**
- **Delay (In Minutes)** - `0`

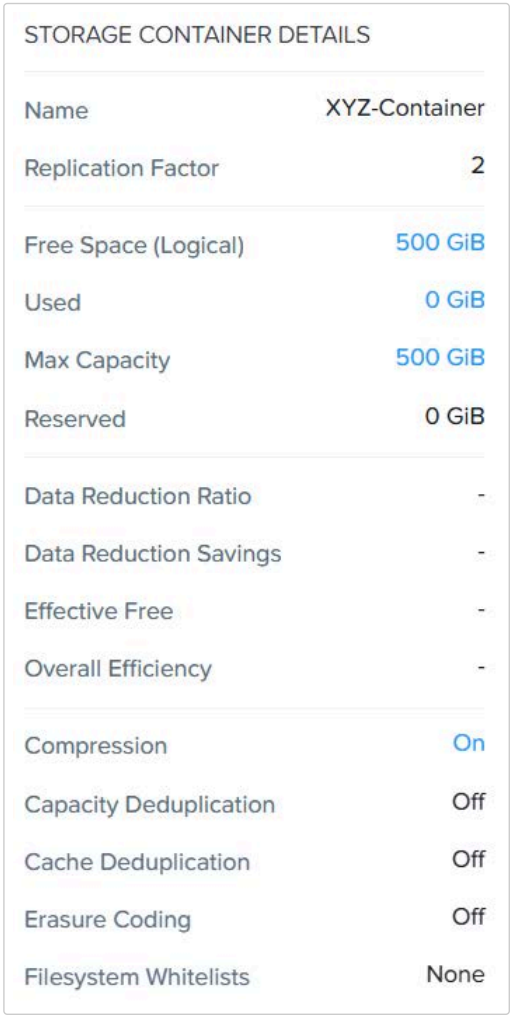


The storage container is now instantly available across all nodes within the cluster.

You can create multiple containers with different policies, all sharing capacity from the **Storage Pool**. For example, you may want to enable **deduplication** for a storage container used for full clone persistent virtual desktops. However, deduplication wouldn't make sense for workloads such as databases. Similarly, you may want to create a storage container with **erasure coding** enabled for archival data, such as backups or security footage.

3. Explore the configuration basics further by updating your Container configuration. How would you ensure capacity availability for critical VMs on a cluster running mixed workloads?

4. Try selecting different storage containers on the cluster and reviewing the *Storage Container Details* below.



Reduction Ratio is the data efficiency when accounting for compression, deduplication, and erasure coding. The *Overall Efficiency* number tracks data reduction and native data avoidance, specific savings from thin provisioning and cloning.

Replication Factor (RF)

The Nutanix platform currently uses replication factor (RF), and checksum to ensure data redundancy and availability in the case of a node or disk failure or corruption. RF sets the number of data copies to maintain (2 or 3). A replication factor of 3 adds an extra layer of data protection at the cost of storage an additional data copy.

Interested in learning about how RF writes and reads work? Check out the **video** below.

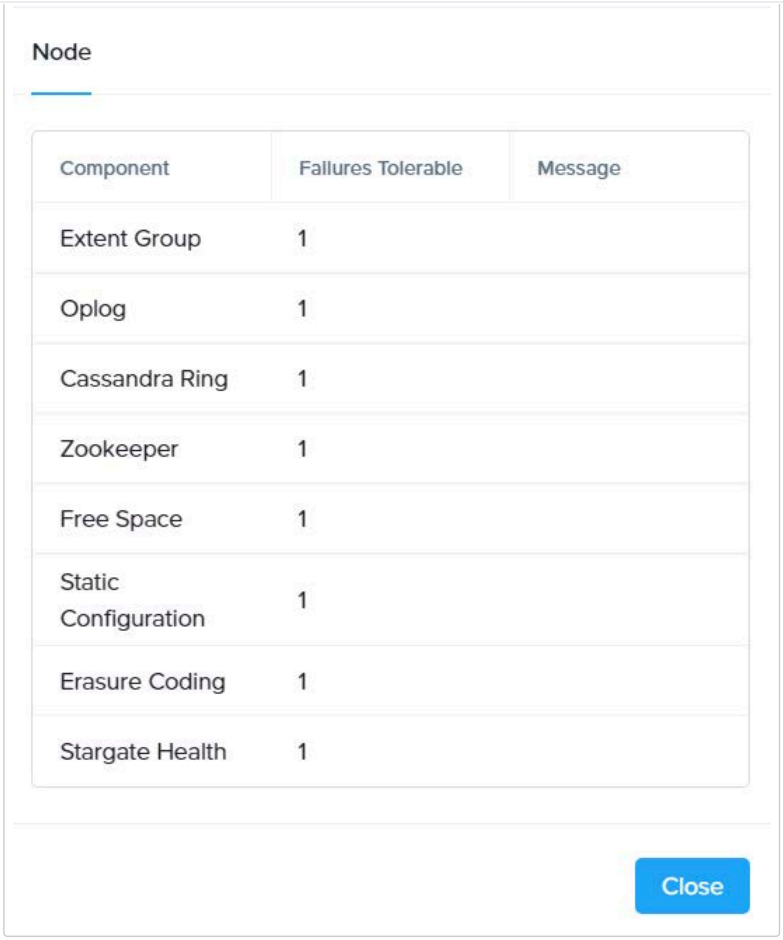
RF policies are applied on a per-container basis.

Nutanix clusters can also enforce **availability domain policies** at the Block or Rack level.

Block Awareness ensures that secondary copies of data are not written to a node within the same physical enclosure as the primary copy. Block Awareness allows for the loss of a multi-node block without experiencing data unavailability. The same concept can be applied using a Nutanix cluster spanning multiple racks.

The basic requirement for rack/block fault tolerance is to have a minimum of 3 blocks in the cluster (for RF2) as we need to store three copies of metadata. Rack and block awareness can be supported with erasure coding enabled.

1. Within the *Home* screen, click **OK** within the *Data Resiliency Status* box.



Data Resiliency Status indicates how many failures can be tolerated without impacting the cluster. Each service listed has a specific function in the cluster. For example, Zookeeper nodes maintain configuration data (service states, IPs, host information, etc.) for the cluster.

2. The RF of a cluster in PE can be configured by clicking **Redundancy State** in the ⚙ menu. An RF2 cluster can be upgraded to support RF3 (which requires a minimum of 5 nodes), or downgraded to RF1 with the following caveat:

> **Warning**
>
> Enabling RF1 does not guarantee data availability. Nutanix recommends enabling RF1 when your primary cluster use case is running applications that do not require storage resiliency.

Takeaways

- The Distributed Storage Fabric provides RF2 or RF3 shared storage to the cluster.
- Storage Containers allow you to define storage policy for VMs, including RF level, compression, deduplication, and erasure coding.

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← Technology Overview

Network Configuration →

Network Configuration

Overview

In this section, you will learn how to set up a network. The networks you create in the steps below provide VMs with connectivity by assigning the appropriate networks to the VM's respective virtual network interface cards (NICs).

AHV Networking Background

Nutanix's Acropolis Hypervisor (AHV) leverages Open vSwitch (OVS) for all VM networking. OVS is an open-source software switch designed to work in a multi-server virtualization environment. Each AHV server maintains an OVS instance, and all OVS instances combine to form a single logical switch.

Each node is typically uplinked to a physical switch to multiple virtual LANs (VLANs), exposed as virtual networks.

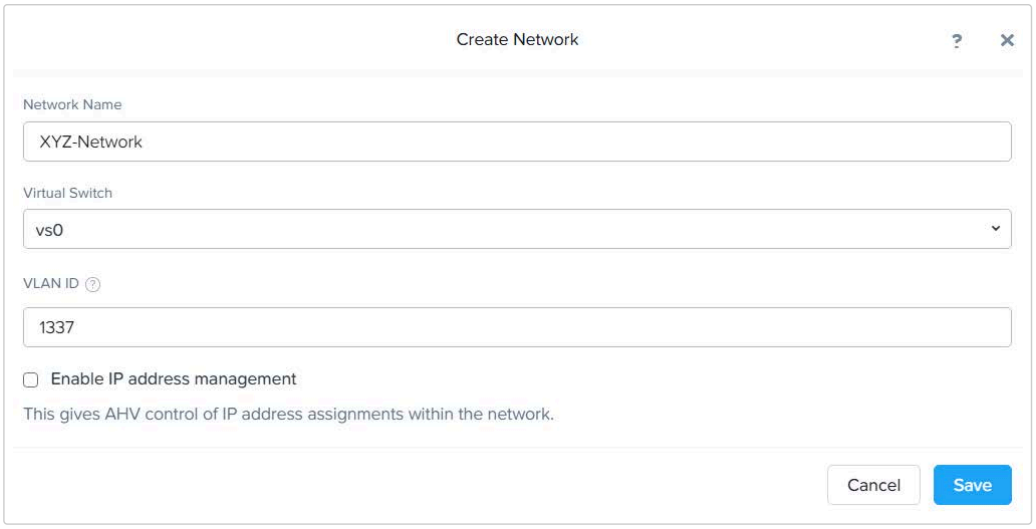
VM networking is configured through Prism (or optionally CLI/REST), making network management in AHV very simple.

With AHV, you can also set up a DHCP server to automatically provide IP addresses for VMs on that network using the IP address management (IPAM) service. IPAM can potentially make network management more straightforward, as you wouldn't have to set up a separate DHCP server for the network.

Additional details about AHV networking can be found here.

Virtual Networks

- Similar to a VMware distributed port group.
- Each virtual NIC belongs to precisely one virtual network.
- Each virtual network is a common point of configuration for a group of vNICs.
- Physical switch port must be configured to trunk VLAN.

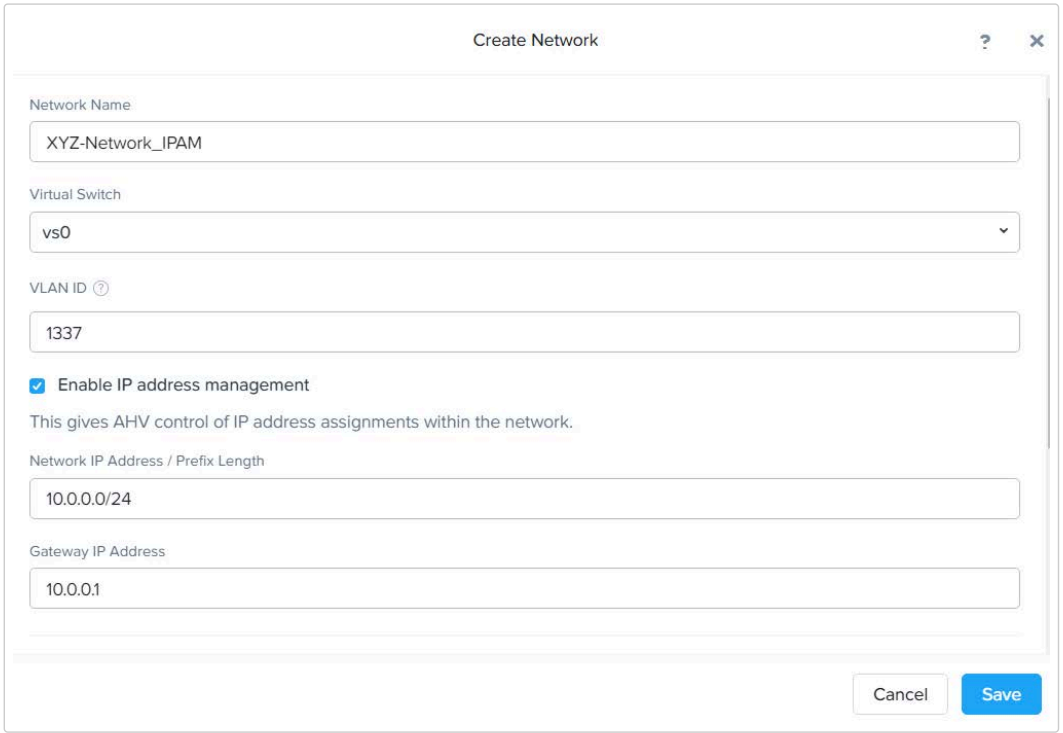


Virtual NICs of VMs

- Each vNIC belongs to exactly one virtual network.
- For IPAM-enabled networks, vNICs get life-long static IP assignments.
- User may configure pools to allocate IPs, either automatically or by specifying the IP manually.

IP Address Management (IPAM)

- Integrated DHCP Server.
- AHV intercepts DHCP requests from guests on IPAM networks, and injects responses.
- Virtualization admin manages a range of IP addresses.
- Supports DHCP options, with UI support for DNS and TFTP configuration.



Configure Network

In the following exercise, you will create networks using invalid VLANs, meaning no VM traffic will be transmitted outside an individual host. This behavior is expected for demonstration/education purposes only.

Create Subnet without IPAM

Connect to Prism Element and create a network for user VM interfaces. Use any VLAN other than 0, and do not enable IP address management.

1. From the main drop-down, choose **VM**.
2. Select **Network Config**, and then click **+ Create Subnet**.
3. Fill out the following fields and click **Save**:

- **Subnet Name** - `Initials` -Network
- **VLAN ID** - A value (< 4096) other than your *Primary* or *Secondary* network VLANs
- Do not select *Enable IP Address Management*

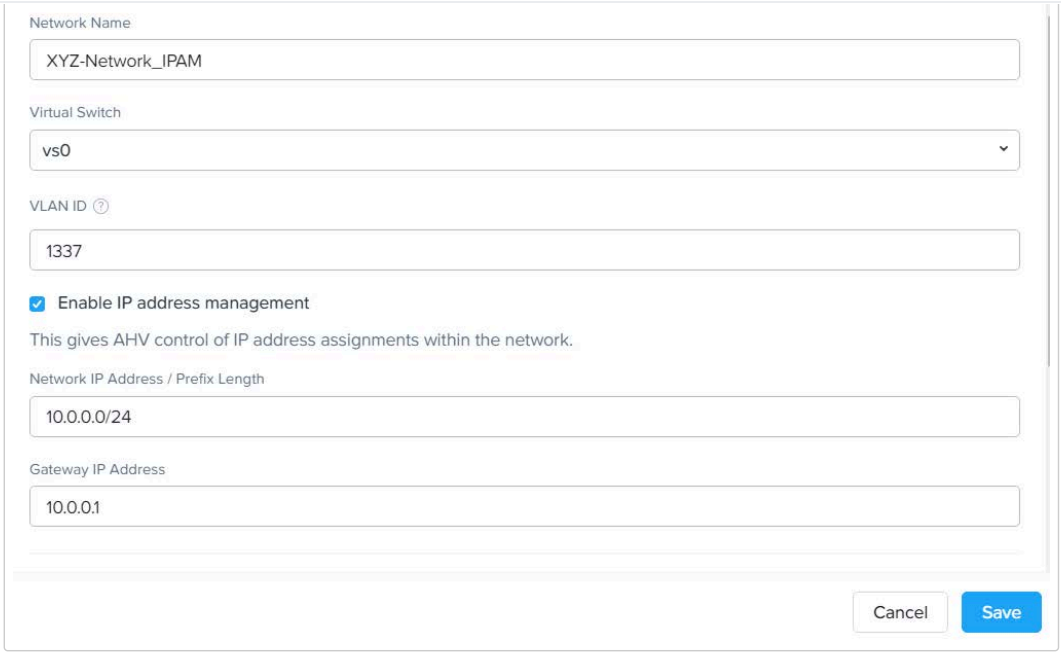
The configured virtual network will now be available across all nodes within the cluster, conveying the benefit of not having to configure the same settings on each host within the cluster. When creating VMs in IPAM managed networks, the IP can optionally be manually specified during vNIC creation.

Create Subnet with IPAM

Let's create another network, but this time we will enable IPAM.

1. Fill out the following fields and click **Save**:

- **Subnet Name** - `Initials` -Network_IPAM
- **VLAN ID** - A value (< 4096) other than your *Primary** or *Secondary* network VLANs
- Select **Enable IP Address Management**
- **Network IP Address / Prefix Length** - `10.0.0.0/24`
- **Gateway** - `10.0.0.1`
- Do not select *Configure Domain Settings*
- **Create Pool** - `10.0.0.100-10.0.0.150`
- Do not select *Override DHCP Server*



> **Note**
>
> It is possible to create multiple pool ranges for a network.

The configured virtual network will now be available across all nodes within the cluster. VMs with vNICs on this network will receive a DHCP address from the range specified. This IP assignment lasts for the life of the VM, avoiding the need to depend on DHCP reservations or static IPs for many workloads.

Takeaways

- It's effortless to set up a network in the cluster to establish VM connectivity.
- IPAM is very simple to set up within a network, and it can significantly simplify IP management within the cluster.

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← Storage Configuration

Deploying Workloads →

Deploying Workloads

Overview

In addition to storage, VM creation, management, and monitoring can all be performed for Nutanix AHV directly through Prism. Prism also offers native support for VM CRUD (create, read, update, delete) operations for Nutanix clusters running ESXi.

In the following exercise, we'll create VMs from source media and existing disk images.

Creating a Windows VM

You will now create a Windows Server VM from a Windows installation ISO image.

AHV provides an Image Service feature to build a store of imported ISO or disk image files. The Image Service supports raw, vhd, vhdx, vmdk, vdi, iso, and qcow2 disk formats.

> **Note**
>
> You can explore the available images and upload additional images under ⚙ > **Image Configuration** in Prism Element.

To provide high-performance IO to VMs, AHV requires installing paravirtualized drivers into the guest (similar to VMware Tools). For Windows guests specifically, these drivers must be loaded during installation for the VM's disk to be accessible by the Windows installer.

Nutanix validates and distributes these drivers via the **Nutanix Portal**. The ISO image containing the drivers has already been uploaded to the Image Service.

1. From the main drop-down, choose **VM**. Select **Table** > **+ Create VM**.

2. Fill out the following fields and click **Save**:

   Leave other settings at their default values.

   - **Name** - `Initials` -Windows
   - **vCPU(s)** - `2`
   - **Memory** - `4` GiB

   Within the *Disks* section, select ✎ next to CD-ROM.

   - **Operation** - Clone from Image Service
   - **Image** - Windows2019.ISO
   - Select **Update**

   This will mount the Windows Server ISO from the Image Service for boot/installation.

   Select **+ Add New Disk**

   - **Type** - DISK
   - **Operation** - Allocate on Storage Container
   - **Storage Container** - `Initials` -Container
   - **Size (GiB)** - 30 GiB
   - Select **Add**

Select **+ Add New Disk**

- **Type** - CD-ROM
- **Operation** - Clone from Image Service
- **Image** - Nutanix-VirtIO-1.1.6.iso
- Select **Add**

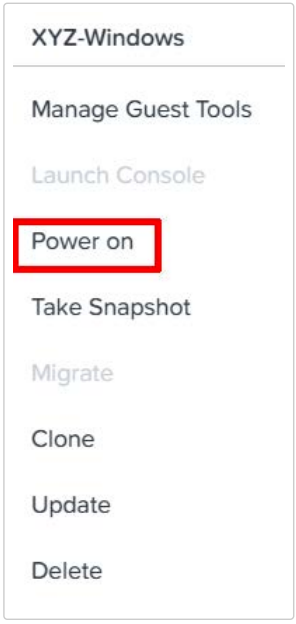
Select **+ Add New NIC**

- **VLAN Name** - `Initials` -Network
- Select **Add**

This will add a single virtual NIC to the VM on the selected Virtual Network.

3. Click **Save** to create the VM.

4. Right-click on your VM and then select **Power On**.



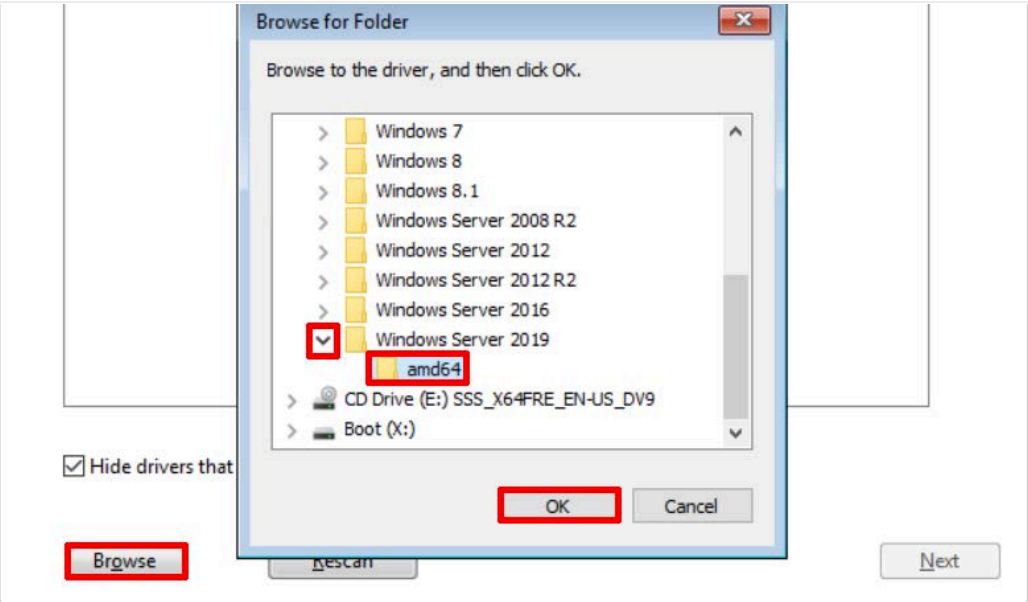
5. After a few moments, right-click on your VM and select **Launch Console** from the list of actions to access the HTML5 console, allowing you to interact with the VM.

6. Progress through the standard install questions until you reach the Windows install location.

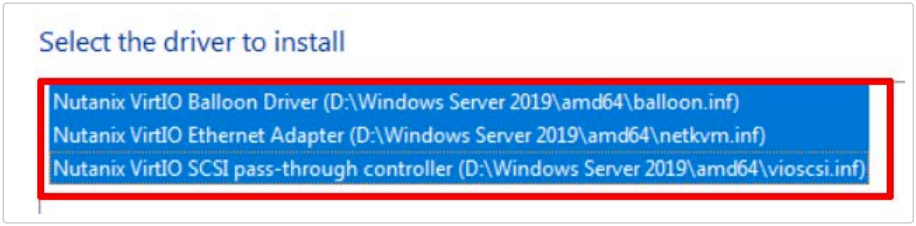
7. Choose **I don't have a license key**, **Windows Server 2019 Datacenter (Desktop Experience)**, and **Custom** installation when presented with the choice.

8. Click **Load Driver**, and navigate to the CD where the Nutanix VirtIO ISO is mounted.

9. Select the directory that corresponds to the Windows 2019.



10. Select the three Nutanix drivers displayed. Press and hold the **Ctrl** key to select all three drivers: Balloon, Ethernet adapter, and SCSI passthrough controller.



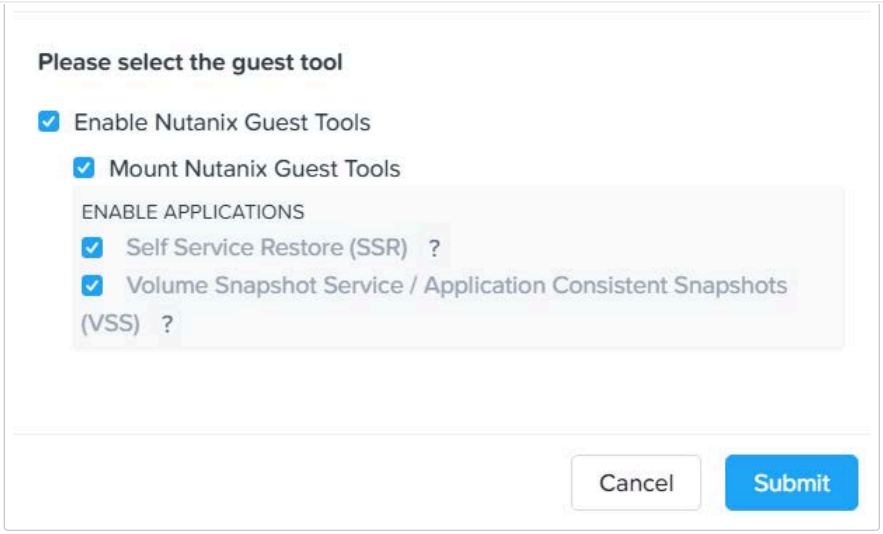
11. Click **Next**.

After the drivers are loaded, the disk created in step 2 appears as an installation target.

12. Select that disk, and continue with the normal install process.

13. Following Windows installation, install the Nutanix Guest Tools (NGT) by right-clicking and choosing **Manage Guest Tools** > **Enable Nutanix Guest Tools** > **Mount Nutanix Guest Tools** > **Submit**. Select the link to unmount one of the CD-ROM drives when prompted.

This will use the virtual CD-ROM device to mount the NGT installation ISO to the VM. NGT includes VirtIO drivers and services to support *Self-Service File Restore (SSR)* and *Application Consistent (VSS) snapshots*.



Creating a Linux VM

You will now create a CentOS VM from an existing, pre-installed disk image in the Image Service. It is common in many environments to have template-style images of pre-installed operating systems. Similar to the previous exercise, the disk image has already been uploaded to the Image Service.

1. From the main drop-down, choose **VM** > **Table**, and then click **+ Create VM**.

2. Fill out the following fields and click **Save**:

   - **Name** - `Initials` -Linux
   - **vCPU(s)** - `1`
   - **Memory** - `2` GiB Select **+ Add New Disk**
   - **Type** - DISK
   - **Operation** - Clone from Image Service
   - **Image** - CentOS7.qcow2
   - Select **Add** Select **Add New NIC**
   - **VLAN Name** - `Initials` -Network
   - Select **Add** This will add a single virtual NIC to the VM on the selected Virtual Network.

3. Click **Save** to create the VM.

4. (Optional) Complete the installation within the VM console.

Takeaways

- In this lab, you saw how simple it is to deploy either a Windows and Linux VM.
- The Image Configuration tool allows you to catalog available images used in VM deployments as needed and cover broad format support that includes raw, vhd, vhdx, vmdk, vdi, iso, and qcow2.

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Managing Workloads →

Managing Workloads

Overview

Now that you have a couple of VMs deployed, let's have some fun and explore some of the VM management tasks with AHV: power actions, searching, cloning, and migrating.

Workload Management

Power Actions and Console Access

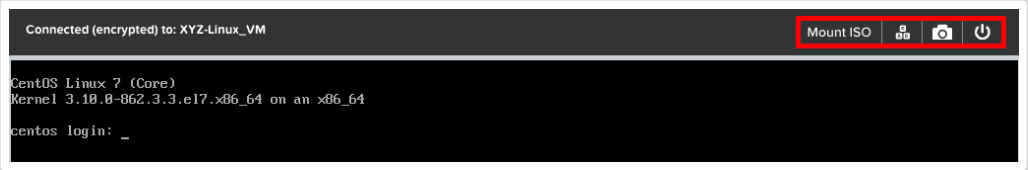
Explore VM power actions and console access.

1. Choose **VM** > **Table** from the main drop-down and use the search bar to locate the Linux VM you created in the previous exercise. (ex. `Initials` -Linux)

   Note that the Power State column for that VM shows a red dot, indicating that the VM is powered off.

2. Right-click on the VM and choose **Power On**. Wait a few moments, and then right-click on the VM and select **Launch Console**.

   The console window provides 4 actions: Mount ISO, Send CTRLALTDEL, Take screenshot, and Power.



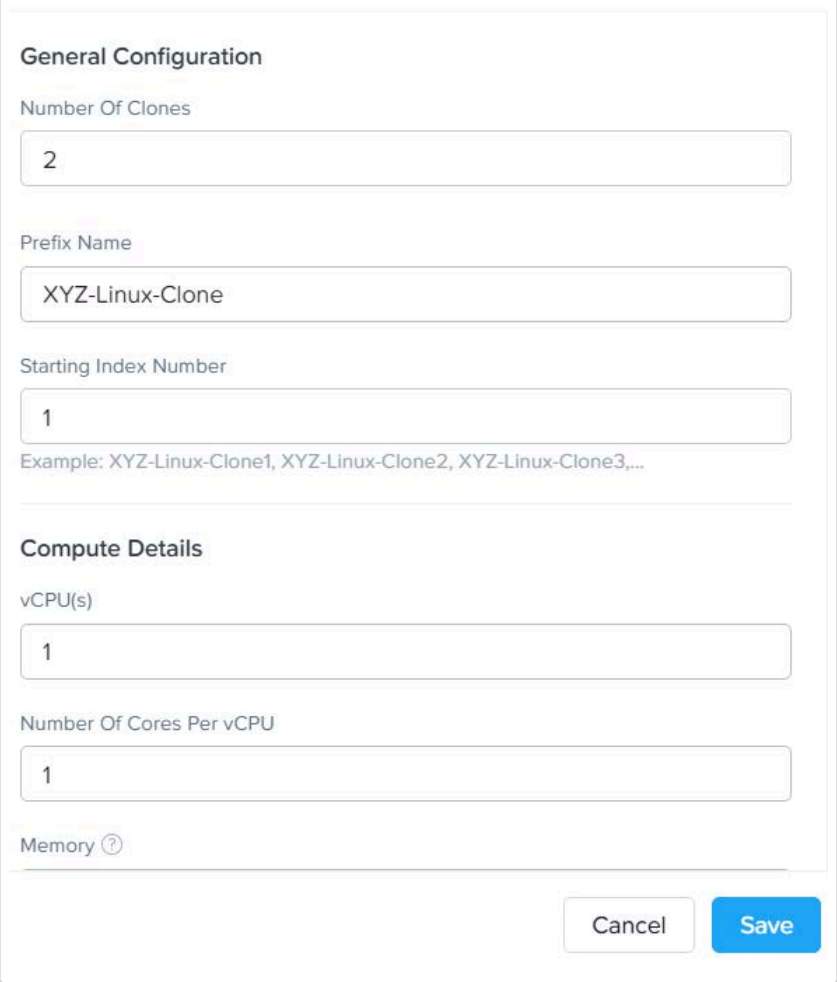
Cloning VMs

1. Right-click on your `Initials` -Linux VM, and choose **Clone**.

2. Fill out the following fields, and then click **Save**:

   Leave other settings at their default values.

   - **Number of Clones** - `2`
   - **Prefix Name** - `Initials` -Linux-Clone
   - **Starting Index Number** - `1`



Both Nutanix snapshots and clones use a **redirect-on-write** algorithm to quickly and efficiently create copies of VMs as a metadata operation.

Migrating a VM Between Hosts

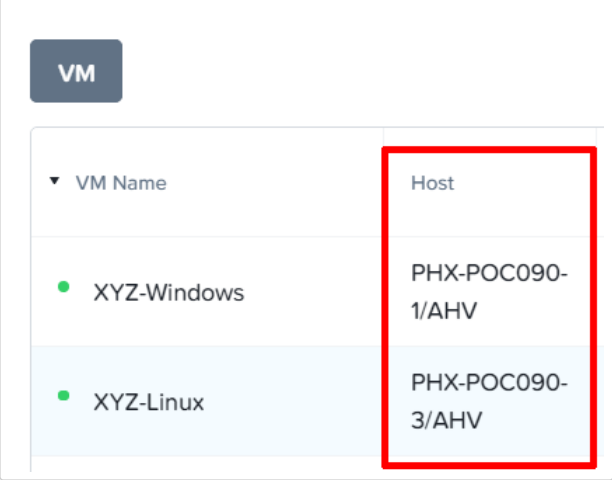
VM live migration is a critical feature for any virtualized environment, allowing VMs to move seamlessly across hosts within a cluster to enable infrastructure maintenance or performance balancing.

1. Right-click on your `Initials` -Linux_VM, and choose **Migrate**.

   You can either choose one of the other hosts in the cluster as a migration target for the VM or accept the default and let AHV automatically select a location.

2. Click **Migrate** to finalize the action.

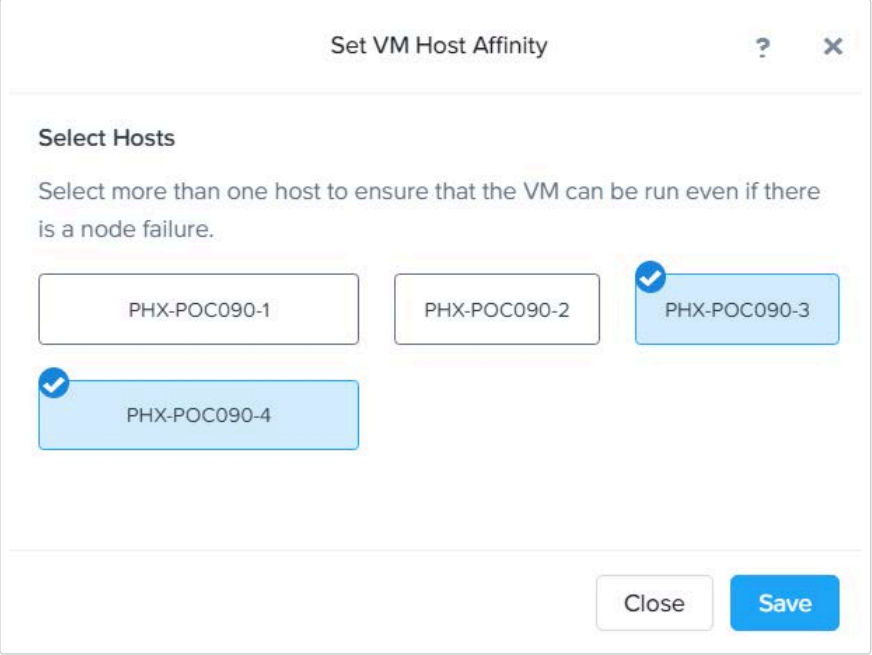
   When the task completes, verify that your VM host location has changed from the host recorded above to the new location you selected.



Configuring Affinity Policies

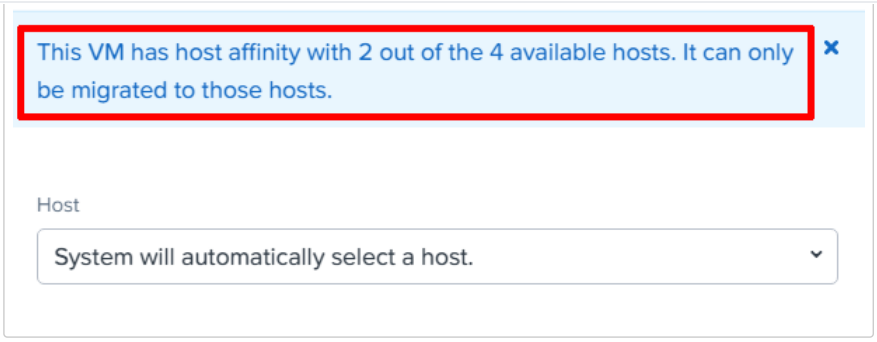
VM-to-Host affinity rules are commonly used to configure VMs to only run on specific hosts. Affinity is typically done either for performance or licensing reasons. AHV can also create VM-to-VM anti-affinity rules, commonly used for highly available applications, or when you need to ensure multiple instances of an application do not run on the same node.

1. Select one of your `Initials` -Linux clones from the previous exercises, right-click and choose **Update + Set Affinity**.
2. Select any two hosts to which the VM can have an affinity, and click **Save** > **Save**.



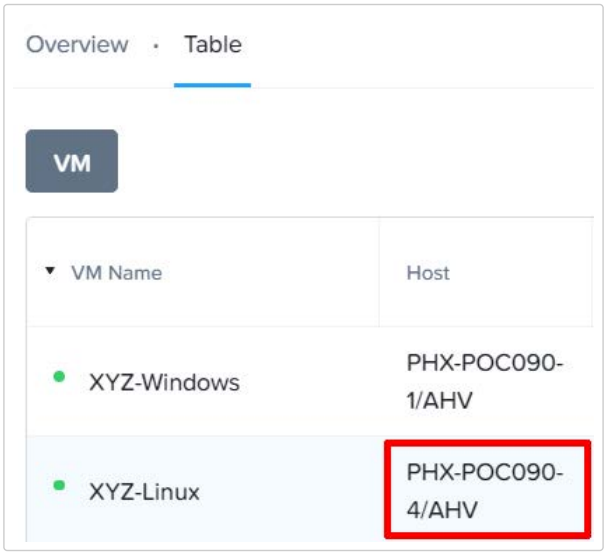
> **Note**
>
> We select more than one host, so the VM has a place to migrate to in the event of a node failure.

3. Power on the VM and verify it is running on one of the specified affinity hosts you selected within the affinity policy.
4. Right-click on the VM, and then click **Migrate**.



5. Click **Migrate**.

You should see that the VM has moved to the other host you selected within the affinity policy.



High Availability & Dynamic Scheduling

High availability is enabled by default for AHV and will restart VMs in a best-effort manner in the event of a host failure. Additional configuration can set resource reservations to ensure there is available capacity during an HA event.

With the Acropolis Dynamic Scheduler (ADS) service, AHV performs both intelligent initial placement of VMs, and also dynamically migrates VMs to other hosts within the cluster to optimize workload performance. ADS runs by default, and without additional configuration.

A benefit of a Nutanix AHV solution is making VM placement decisions not based solely on CPU/memory congestion avoidance but also on storage performance.

See here for additional details about the *Acropolis Dynamic Scheduler*.

Takeaways

In this lab, you experienced how AHV provides a complete set of tools and actions that can be performed to manage VMs in the cluster.

← Deploying Workloads

Data Protection →

Data Protection

Overview

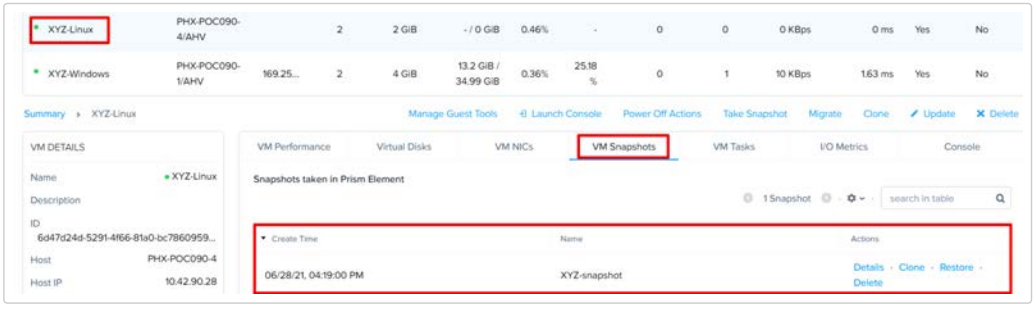
Nutanix provides the ability to perform VM/vDisk-level storage snapshots. Protection Domains (PDs) are the construct for grouping VMs and applying snapshot and replication policies.

In this section, you will use Prism to create and restore from VM snapshots and create a Protection Domain for your VMs.

Data Protection

VM Snapshots

1. Right-click on `Initials` -Linux-Clone1, and choose **Take Snapshot**.
2. Within the *Name* field, enter `Initials` -Snapshot, and then click **Submit**.
3. Select the **VM Snapshots** tab below the table to view the available snapshots for the selected VM.



4. Under the *Actions* column, click **Details** to see all of the VM's properties at the time of the snapshot. You can see the snapshot contains the VM's state, in addition to just its data.

   Now it's time to break your VM!

5. Right-click your VM, and choose **Update**. Remove the disk by clicking the ✕ icon, and then click **Save**.
6. Attempt to power on the VM, and launch its console window.

   The VM no longer has any disks from which to boot, so the 2048 game is displayed.

7. Right-click your VM, and choose **Power Off Actions** > **Power off** > **Submit**.
8. Select your snapshot under **VM Snapshots** and click **Restore** > **Yes** to revert the VM to a functioning state.

   Alternatively, you can click **Clone** instead of **Restore** to create a new VM from the snapshot.

9. Verify that the VM boots successfully.

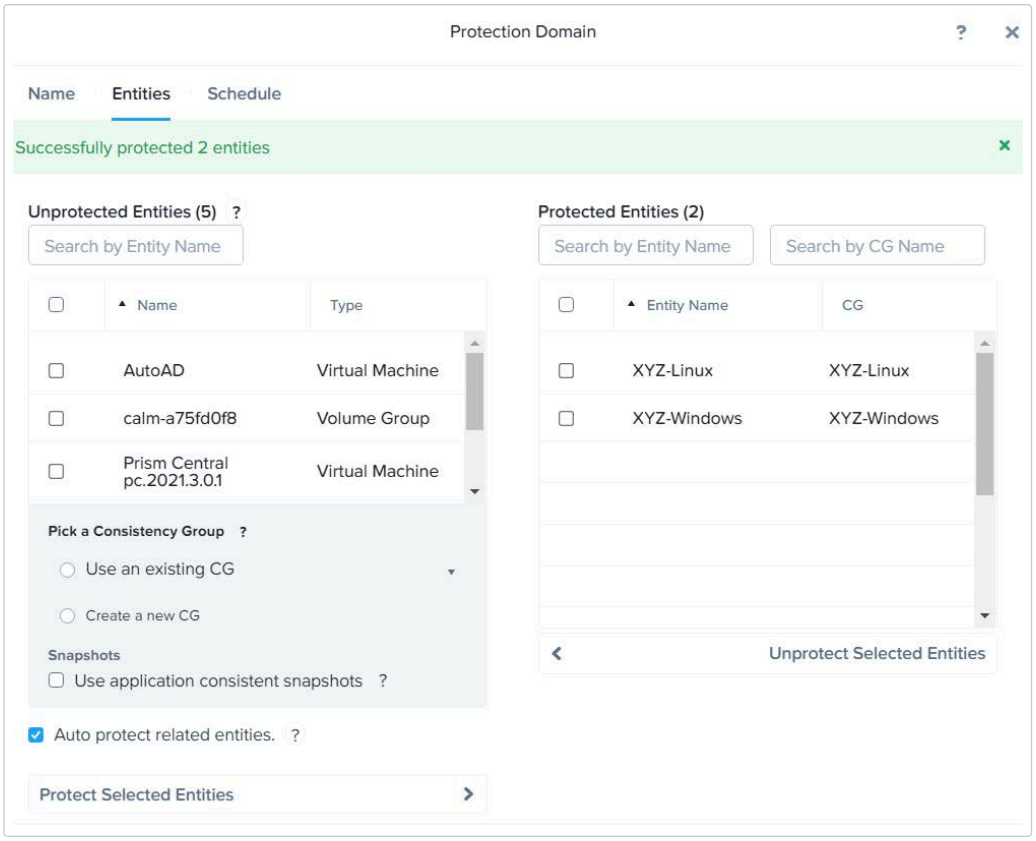
As previously mentioned, Nutanix snapshots in AHV use a redirect-on-write approach that does not suffer from the performance degradation of chained snapshots found in other hypervisors.

Protection Domains

2. Within the *Name* field, enter `Initials` -PD, and then click **Create**.

3. Filter or scroll to select the VMs you've created during this bootcamp.

4. Click **Protect Selected Entities**, and verify the VMs appear under *Protected Entities* (right column).



Consistency groups allow you to group multiple VMs to have their snapshots simultaneously (ex. multiple VMs belonging to the same application).

> **Note**
>
> Nutanix snapshots can perform application consistent snapshots for supported operating systems with NGT installed. Each VM using application consistent snapshots will be part of its consistency group.

5. Click **Next**.

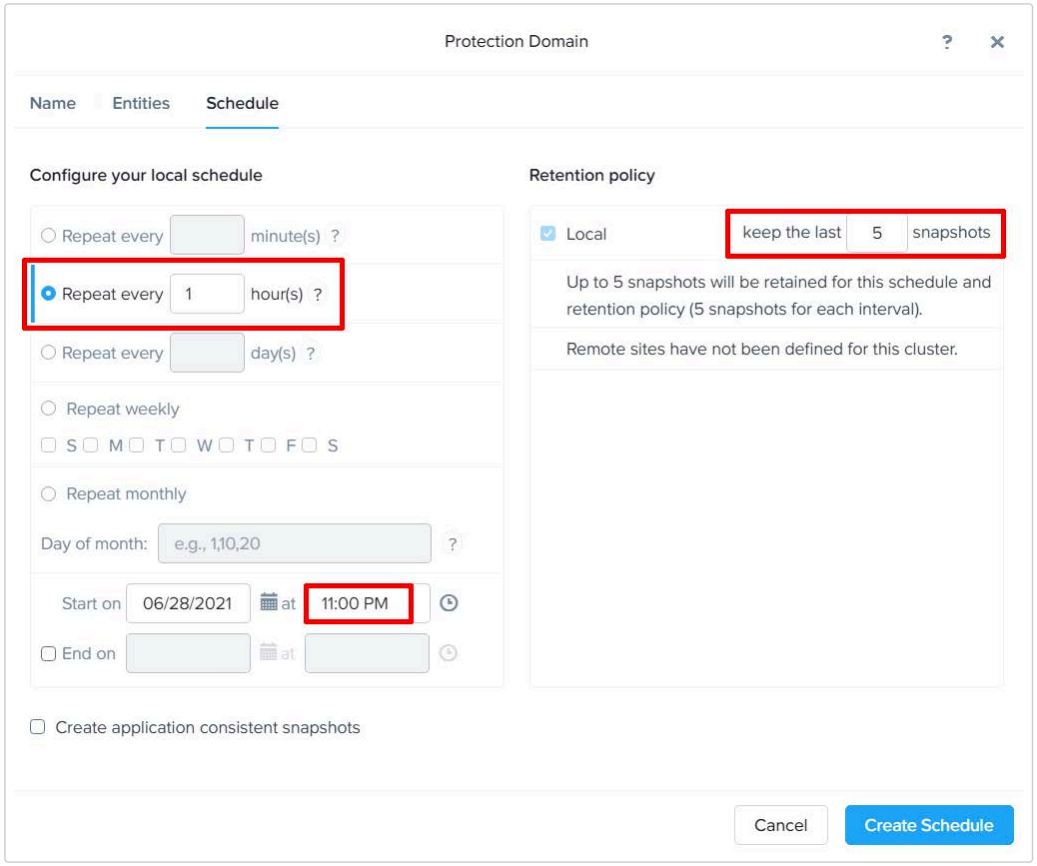
6. Click **New Schedule** to define Recovery Point Objective (RPO) and retention.

7. Select **Repeat every 1 hour(s)**.

> **Note**
>
> AHV supports NearSync snapshots, with RPOs as low as 1 minute. Multiple schedules can be applied to the same PD, allowing you to take and retain X number of hourly, daily, monthly snapshots.

8. Within the *Retention policy* section, enter 5 (i.e., keep the last five snapshots).

> **Note**



9. Set the *Start on* time to **11:00 PM**.
10. Click **Create Schedule**.
11. Click **Close** to exit.

Additional information can be found here.

That's it! You've successfully configured native data protection.

Takeaways

- Nutanix offers data protection solutions for virtual datacenters via different strategies, including one-to-one or one-to-many replication.
- Nutanix provides data protection functions at the VM, file, and volume group level, so VMs and data remain safe.
- VM-level snapshot and replication policies can be managed through Prism for any supported hypervisor.

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← Managing Workloads

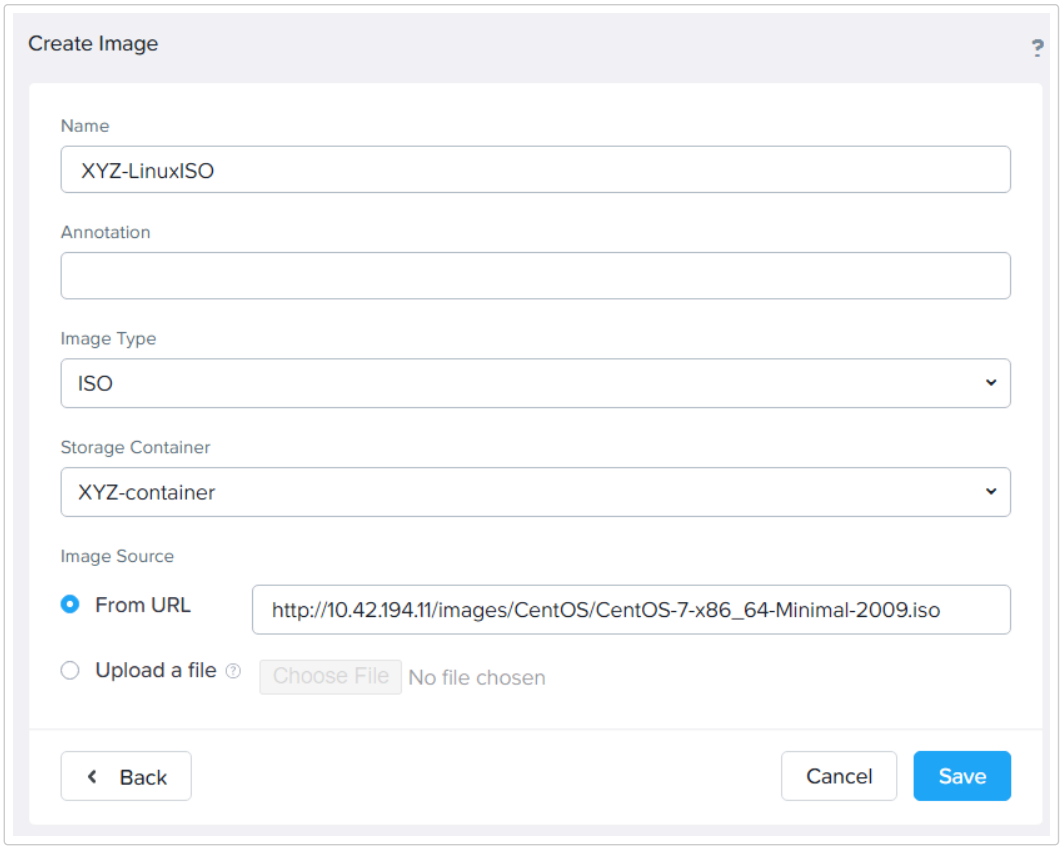
Image Configuration

Nutanix's Image Service is where you can store ISOs, as well as other disk images.

While we already staged some disk images ahead of this bootcamp it's now time for you to upload an ISO.

1. From the drop-down menu, choose **Settings**, and then **Image Configuration** from the left-hand menu.
2. Click **+ Upload Image**.
3. Fill out the following fields and click **Save**:

- **Name** - `Initials` -LinuxISO
- **Image Type** - ISO
- **Storage Container** - `Initials` -container
- **Image Source** - Select **From URL**, and then enter `http://10.42.194.11/hol/os/CentOS-7-x86_64-Minimal-2009.iso` in the field.



Takeaways

- Image management in Prism Central allows you to upload images that can deploy workloads in any of the clusters registered to that Prism Central instance.
- An image can also be uploaded directly from a cluster's Prism Element.
- This tool can also convert VM disk images to formats that AHV can understand.
- The image service supports raw, vhd, vhdx, vmdk, vdi, iso, and qcow2 disk formats.

Glossary

Nutanix Core

AOS

AOS stands for Acropolis Operating System, and it is the OS running on the Controller VMs (CVMs).

Pulse

Pulse provides diagnostic system data to Nutanix customer support teams so that they can deliver proactive, context-aware support for Nutanix solutions.

Prism Element

Prism Element is the native management plane for Nutanix. Because its design is based on consumer product interfaces, it is more intuitive and easier to use than many enterprise application interfaces.

Prism Central

Prism Central is the multi-cloud control and management interface for Nutanix. Prism Central can manage multiple Nutanix clusters and serves as an aggregation point for monitoring and analytics.

Node

An industry-standard x86 server with server-attached SSD and optional HDD (All-Flash & Hybrid Options).

Block

2U rackmount chassis contains 1, 2, or 4 nodes with shared power and fans and no shared backplane.

Storage Pool

A storage pool is a group of physical storage devices, including PCIe SSD, SSD, and HDD devices for the cluster.

Storage Container

A container is a subset of available storage used to implement storage policies.

Anatomy of a Read I/O

Performance and Availability

- Data is read locally
- Remote access only if data is not locally present

Anatomy of a Write I/O

- Data is written locally
- Replicated on other nodes for high availability
- Replicas are spread across the cluster for high performance

Nutanix Flow

Application Security Policy

Use an application security policy to secure an application by specifying allowed traffic sources and destinations.

Isolation Environment Policy

Use an isolation environment policy when you want to block all traffic, regardless of direction, between two groups of VMs identified by their category. VMs within a group can communicate with each other.

Quarantine Policy

Use a quarantine policy when you want to isolate a compromised or infected VM and optionally wish to subject it to forensics. You cannot modify this policy, and the two modes to quarantine a VM are Strict or Forensic.

Strict: Use this value when you want to block all inbound and outbound traffic.

Forensic: Use this value when you want to block all inbound and outbound traffic except the traffic to and from categories that contain forensic tools.

AppTier

Add values for the tiers in your application (ex. web, application_logic, and database) to this category and use the values to divide the application into tiers when configuring a security policy.

AppType

Associate the VMs in your application with the appropriate built-in application type such as Exchange and Apache_Spark. You can also update the category to add values for applications not listed in this category.

Environment

Add values for environments that you want to isolate from each other and then associate VMs with the values.

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Environment Details →

Environment Details

Nutanix Bootcamps are intended to be run within the Nutanix Hosted POC environment. Your cluster will be provisioned with all necessary images, networks, and VMs required to complete the exercises.

Credentials

> **Note**
>
> The `HPOC-PASSWORD` is unique to each cluster and will be provided by the leader of the Bootcamp.

Credential	Username	Password
Prism Element	admin	`HPOC-PASSWORD`
Prism Central	admin	`HPOC-PASSWORD`
Controller VM	nutanix	`HPOC-PASSWORD`
Prism Central VM	nutanix	`HPOC-PASSWORD`

Each cluster has a dedicated domain controller VM (AutoAD), responsible for providing AD services for the NTNXLAB.LOCAL domain. The domain is populated with the following users and groups:

Group	Username(s)	Password
Administrators	Administrator	nutanix/4u
SSP Admins	adminuser01-adminuser25	nutanix/4u
SSP Developers	devuser01-devuser25	nutanix/4u
SSP Consumers	consumer01-consumer25	nutanix/4u
SSP Operators	operator01-operator25	nutanix/4u
SSP Custom	custom01-custom25	nutanix/4u
Bootcamp Users	user01-user25	nutanix/4u

Access Instructions

The Nutanix Hosted POC environment can be accessed in several ways.

Lab Access User Credentials

PHX Based Clusters:

Username: PHX-POCxxx-User01 through PHX-POCxxx-User20 **Password:** `HPOC-PASSWORD`

Frame VDI

Log in here

Parallels VDI

- PHX Based Clusters
- BLR Based Clusters

Nutanix Employees - Use your **NUTANIXDC** credentials **Non-Employees** - Use **Lab Access User** credentials

Employee Pulse Secure VPN

Download the client

- PHX Based Clusters
- BLR Based Clusters

Nutanix Employees - Use your **NUTANIXDC** credentials **Non-Employees** - Use **Lab Access User** credentials

Install the client

In Pulse Secure Client, **Add** a connection:

PHX:

- **Type** - Policy Secure (UAC) or Connection Server
- **Name** - X-Labs - PHX
- **Server URL** - xlv-uswest1.nutanix.com

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Network Configuration

The following tables detail the network IP Address assignments for multi-node and single-node environments.

Multi-Node Reservations

IP Range	Service	Comments
10.x.x.7	Hyper-V Failover IP	
10.x.x.8 - 10.x.x.14	Files	
10.x.x.15	File Analytics	
10.x.x.16 - 10.x.x.21	Objects	
10.x.x.22		
10.x.x.23	Beam	
10.x.x.25 - 10.x.x.28	Hosts	
10.x.x.29 - 10.x.x.32	CVMs	
10.x.x.33 - 10.x.x.36	IPMI	
10.x.x.37	Cluster IP	
10.x.x.38	Data Services IP	
10.x.x.39	Prism Central	
10.x.x.40	VCSA	vCenter
10.x.x.41	AutoAD	Windows Domain Controller
10.x.x.42	PrismOpsLabUtilityServer	Used for Prism Ops Labs
10.x.x.44	Era	
10.x.x.45	Citrix DDC	
10.x.x.50 - 10.x.x.125	Primary Network IPAM	VLAN 0
10.x.x.126 - 10.x.x.254	Secondary Network IPAM	Secondary VLAN

Single Node Reservations

Partition 1	Partition 2	Partition 3	Partition 4	Service	Comments
10.38.x.1	10.38.x.65	10.38.x.129	10.38.x.193	Gateway	
10.38.x.5	10.38.x.69	10.38.x.133	10.38.x.197	AHV Host	
10.38.x.6	10.38.x.70	10.38.x.134	10.38.x.198	CVM	
10.38.x.7	10.38.x.71	10.38.x.135	10.38.x.199	Cluster IP	

10.38.x.8	10.38.x.72	10.38.x.136	10.38.x.200	Data Services	
10.38.x.9	10.38.x.73	10.38.x.137	10.38.x.201	Prism Central	
10.38.x.11	10.38.x.75	10.38.x.139	10.38.x.203	AUTOAD	Windows Domain Controller
10.38.x.12	10.38.x.76	10.38.x.140	10.38.x.204	Utility Server	Prism Ops Lab
10.38.x.14	10.38.x.78	10.38.x.142	10.38.x.206	Era	
10.38.x.15	10.38.x.79	10.38.x.143	10.38.x.207	Citrix DDC	
10.38.x.32 - 10.38.x.37	10.38.x.96 - 10.38.x.101	10.38.x.160 - 10.38.x.165	10.38.x.224 - 10.38.x.229	Objects	
10.38.x.38 - 10.38.x.58	10.38.x.102 - 10.38.x.122	10.38.x.166 - 10.38.x.186	10.38.x.230 - 10.38.x.250	Primary Network IPAM	6 IPs free for static assignment

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← Environment Details

Active Directory User and Groups →

Active Directory User and Groups

Each cluster has a dedicated domain controller VM - AUTOAD - responsible for providing Active Directory services for the *ntnxlab.local* domain. The domain is pre-populated with the following users and groups:

Group	Username(s)	Password
Administrators	Administrator	nutanix/4u
SSP Admins	adminuser01 -adminuser25	nutanix/4u
SSP Developers	devuser01 - devuser25	nutanix/4u
SSP Consumers	consumer01 - consumer-25	nutanix/4u
SSP Operators	operator01 - operator-25	nutanix/4u
SSP Custom	custom01 - custom25	nutanix/4u
Bootcamp Users	user01 - user25	nutanix/4u

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← Network Configuration

Getting Help →

Getting Help

The Cluster

The cluster (ex. RX, password not working, Foundation failed, cluster in a degraded state, etc.).

#rx-and-hpoc

The Lab Content

The lab content (ex. instructions incorrect or unclear, typos, feedback, etc.) or staging (ex. images or blueprints are missing).

#technology-bootcamps:

Products, VDIs and Pulse Access

Frame, Parallels VDI, or Pulse VPN access.

#x-labs

Feedback

Feedback and suggestions can also be submitted to **bootcamps@nutanix.com**.

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← Active Directory User and Groups