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EXAM BLUEPRINT GUIDE

# Nutanix Certified Professional-Multicloud Infrastructure (NCP-MCI) 5.20 Exam

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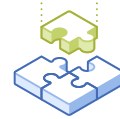
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**Disclaimer:**

The Nutanix Certified Professional - Multicloud Infrastructure (NCP-MCI) 5.20 Exam Blueprint Guide provides an over-view of the objectives that must be mastered to achieve the NCP-MCI credential. Nutanix does not offer any guarantees that this guide will ensure a candidate's success in achieving the NCP-MCI Certification. All information in this guide is subject to change at any time at the sole discretion of Nutanix.

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# 1. The Exam

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## 1.1 PURPOSE OF EXAM

The Nutanix Certified Professional - Multicloud Infrastructure (NCP-MCI) 5.20 exam tests candidates on their skills and abilities deploying, administering and troubleshooting Nutanix AOS 5.20 in the Enterprise Cloud. Successful candidates demonstrate mastery of these skills and abilities.

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## 1.2 NUMBER OF QUESTIONS

The NCP-MCI 5.20 exam consists of 75 multiple choice and multiple response questions.

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## 1.3 PRICING

The cost for the NCP-MCI 5.20 exam is \$199 USD.

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## 1.4 PASSING SCORE

The passing score for this exam is 3000, using a scaled scoring method. The scale is from 1000-6000. Scaled scores are calculated using a mathematical formula that considers a variety of factors, including the number and type of exam questions included in a specific version of the exam. Because this combination may vary in different versions of the same examination, scaled scores provide a fair score for everyone based on the version of the exam taken.

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## 1.5 HOW OBJECTIVES RELATE TO QUESTIONS ON THE EXAM

Objectives summarize what the test is designed to measure. Objectives are developed by Exam Developers and Subject Matter Experts based on identified tasks that relate to the job of deploying and administering a Nutanix AOS 5.20 cluster. Once the initial development process is complete, these objectives are verified using an external group of individuals in the actual job role. Finally, a number of questions is determined for each objective, which relates directly to the criticality of the task in the job role.

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## 1.6 LANGUAGES

The exam is available in English, Japanese and Simplified Chinese.

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## 1.7 TIME LIMIT

The time limit for the exam is 120 minutes.

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## 1.8 SCHEDULING AND TAKING THE EXAM

This exam is delivered via remote proctoring in your home or office, or at a designated testing center. Occasionally, testing at Nutanix events may also be offered. At the start of the registration process, you will be asked to choose remote or in person testing. After registering for the exam, you will receive further information specific to the testing method you chose. Regardless of whether you test remotely or in person, you must provide valid identification and will be provided with a monitored and secure exam experience.

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## 1.9 CERTIFICATION TRACKS

The NCP-MCI 5.20 exam is a core component of the Nutanix Multicloud Infrastructure track. The certification requires a passing score on the exam. While it is not required that you attend a course, Nutanix provides training that covers the objectives on the exam.

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## 1.10 RETAKE POLICY

If a candidate fails an exam on the first attempt, he or she is allowed two additional attempts. There is a seven-day waiting period between attempts. Like the first attempt, these are paid for individually and Nutanix recommends that you allow sufficient time between attempts to be properly prepared and to maximize your chances for success.

Please note: After three attempts, you will be unable to take the exam for 60 days, after which you can e-mail [university.nutanix.com](mailto:university.nutanix.com) and request that your attempts are reset. Nutanix recommends you utilize the time to thoroughly review this guide and the related references and/or take the recommended training for this exam.

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## 1.11 EXAM SECURITY

Nutanix reserves the right to refuse certifying a candidate who violates exam security policies. This includes copying and redistribution of exam material, using any type of study material during the exam itself, attempting to photograph exam items and taking an exam using a false identity. Your identity is captured as part of the exam registration process and must be validated before you will be allowed to take the exam

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## 1.12 RECERTIFICATION

Once you have achieved the NCP-MCI 5 certification, it will remain valid until Nutanix releases the next major version of the certification (i.e. NCP-MCI 6). At that time, you have one year to upgrade your certification to the new release before it expires. Nutanix provides a delta training covering features that are part of the AOS release that coincides with the new version of the certification.

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## 1.13 BENEFITS OF CERTIFICATION

- Digital badge from Credly that you can share on social media
- Points on Nutanix Xtribe that you can redeem for prizes (not available for Nutanix employees)
- Access to the Certification store at <http://store.nutanix.com> for shirts, mugs, and more
- Opportunity to participate as a SME to develop future exams
- Discount on attending Nutanix .NEXT



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## 2. Intended Audience

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### 2.1 INTENDED AUDIENCE

A candidate for the NCP-MCI 5.20 certification has approximately three to six months experience working with an AOS implementation. They are typically infrastructure personnel who are capable of deploying and administering Nutanix AOS 5.20 nodes, blocks and clusters and can use Prism Element to monitor, manage, troubleshoot and administer AHV hosts and virtual machines. The successful candidate will most likely have additional general systems administration experience (typically 1-2 years).



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# 3. Objectives covered in the NCP-MCI 5.20 Exam

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## 3.1 INTRODUCTION

It is recommended that candidates have the knowledge and skills necessary to deploy, administer and troubleshoot a Nutanix AOS environment before attempting the NCP-MCI 5.20 exam. It is also recommended that the candidate complete the recommended course prior to taking the exam.

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## 3.2 OBJECTIVES

Prior to taking this exam, candidates should understand each of the following objectives. Each objective is listed below; along with related tools the candidate should have experience with, and related documentation that contains information relevant to the objective. Please note that some documentation requires access via the Support Portal. Information on creating an account for use with the Support Portal can be found [here](#).

All objectives may also be referenced in other product documentation not specifically highlighted below. The candidate should be familiar with all relevant product documentation or have the equivalent skills.

### Section 1 - UNDERSTAND NUTANIX ENTERPRISE CLOUD CONCEPTS

Objective 1.1 - Describe and differentiate features present in Acropolis, Prism (Element and Central), and AHV

Knowledge:

- Recall Acropolis features, limits, and benefits
- Recall backup process for Prism Central
- Recall AHV features, limits, and benefits
- Identify when to use Prism Central
- Recall Prism Element features, limits, and benefits
- Recall Prism Central features, limits, benefits, and dependencies



## References

- [What's New | AOS 5.20](#)
- [Features and Updates | AOS 5.20](#)
- [Guest OS Compatibility Matrix](#)
- [Nutanix Key Technical Terms](#)
- [Controlling Cluster Access](#)
- [Prism Central VMs Summary View](#)
- [eBook - Enterprise Cloud for Dummies](#)
- [Video - Nutanix - How it Works \(Detailed\)](#)
- [Whitepaper - The Definitive Guide to Hyperconverged Infrastructure](#)
- [Compute-Only Node Configuration \(AHV Only\)](#)
- [Erasure Coding](#)
- [Recommendations for Time Synchronization](#)
- [Controller Virtual Machine \(CVM\) Overview in ESXi](#)

## Section 2 - MANAGE A NUTANIX CLUSTER

### Objective 2.1 - Manage node operations in a Nutanix cluster

#### Knowledge:

- Recall prerequisites and limits
- Identify steps for node removal
- Recall steps before adding a node to a new cluster
- Recall how long it will take to remove a node

#### References:

- [Prism 5.20 Web Console - Cluster Management](#)
- [Prism 5.20 Central Administration](#)
- [Destroying a Cluster](#)
- [Node Removal](#)
- [Expanding a Cluster](#)
- [VMware vSphere Cluster settings with Nutanix](#)
- [How to Setup Nutanix using ESXi](#)
- [Walk Through Clusters Operations Scenarios | Initial Setup](#)

Objective 2.2 – Given a scenario, deploy ROBO sites

Knowledge:

- Determine compatible hardware
- Determine witness VM deployment requirements and limits
- Determine Foundation requirements for ROBO site
- Determine software at scale requirements
- Determine ROBO cluster limitations
  - One-node and two-node deployments

References:

- [Prism 5.20 Web Console - Hardware Management](#)
- [Witness VM 5.20 Release Notes](#)
- [Witness Option for Data Protection and Recovery](#)
- [Recovery Procedures \(Witness VM Installed\)](#)
- [Foundation Central Overview and Limitations](#)
- [Field Installation Guide](#)
- [ROBO Deployment and Operations](#)
- [One-Node and Two-Node Clusters](#)
- [Single-node Clusters](#)
- [Two-node Clusters](#)

## SECTION 3 – SECURE A NUTANIX CLUSTER

Objective 3.1 – Given a scenario, configure RBAC

Knowledge:

- Gather requirements to create custom roles
- Determine project requirements
- Configure authentication sources
- Determine RBAC limits
- Determine role mapping

References:

- [Controlling User Access \(RBAC\)](#)
- [Configuring Role Mapping](#)
- [Build-in Role Management](#)

- [Assigning a Role](#)
- [Assigning Role Permissions](#)
- [Custom Role Management](#)
- [Installing an SSL Certificate](#)
- [Configuring Authentication](#)
- [Data-at-Rest Encryption](#)
- [Security Management](#)
- [User Management](#)
- [Tech Note - Information Security with Nutanix](#)
- [Whitepaper - Building Secure Platforms and Services with Nutanix Enterprise Cloud](#)

#### Objective 3.2 - Install SSL certificates

##### Knowledge:

- Recall how to generate a CSR and key
- Recall where to apply SSL certificates
- Recall how to chain certificates
- Recall how to renew certificates
- Submit to CA
- Identify required certificate attributes
- Identify correct certificate format

##### References:

- [Installing an SSL Certificate](#)
- [Replacing a Certificate](#)
- [Controlling Cluster Access](#)
- [Security Management](#)

#### Objective 3.3 - Explain authentication and password management

##### Knowledge:

- Explain security concepts like two-factor authentication, key management, cluster lockdown
- Identify when and how to change passwords
- Identify how to configure LDAP
- Identify supported identity providers
- Identify authentication mapping to user accounts

References:

- [Configuring Authentication](#)
- [Authentication Best Practices](#)
- [Controlling Cluster Access](#)
- [Accessing the Controller VM Using the Admin User Account](#)
- [Setup Admin Session Timeout](#)
- [Adding a SAML-based Identity Provider](#)
- [Configuring Role Mapping](#)

Objective 3.4 – Explain Data-at-Rest Encryption (DARE) functionality

Knowledge:

- Identify when to use DARE software
- Identify DARE requirements, limits, and constraints
- Recall supported key management systems
- Locate where encryption can be applied

References:

- [Data-at-Rest Encryption](#)
- [Data-at-Rest Encryption \(SEDs\)](#)
- [Data-at-Rest Encryption \(Software Only\)](#)
- [Switching from SED-EKM to Software-LKM](#)
- [Security Management](#)

## SECTION 4 – CONFIGURE AND MANAGE NETWORKING

Objective 4.1 – Given a scenario, configure networking

Knowledge:

- Determine when to create an additional OVS bridge in an AHV environment
- Remove 1gb network adapters from BRO
- Create and maintain basic networking (adding VLANS)
- Explain the need to separate 1GbE and 10GbE interfaces
- Explain network segmentation
- Identify the default AHV network configuration
- Summarize internal vSwitch requirements and limits
- Determine when to use VLAN tags and native VLAN
- Determine suitable networking hardware

References:

- [Network Management](#)
- [Host Network Management](#)
- [Best Practices Guide - AHV Networking](#)
- [Best Practices Guide - AHV](#)
- [How to Change AHV VM NIC mode \(Access, Trunked\)](#)
- [Isolating the Backplane Traffic Logically on an Existing Cluster](#)
- [Layer 2 Network Management](#)
- [Video Series - Nutanix University Tech TopX Networking Series with Jason Burns](#)

Objective 4.2 - Describe AHV networking components and configuration settings

Knowledge:

- Identify AHV networking components
- Identify purpose of network function VM
- Identify when to use service chain
- Recall requirements for network visualization

References:

- [Networking Components](#)
- [AHV Networking Recommendations](#)
- [Best Practices Guide - AHV Networking](#)
- [Host Network Management](#)
- [Virtual Switch Limitations](#)
- [How to Add or Remove NICs from Bridges on AHV Clusters](#)
- [Network Visualization](#)

Objective 4.3 - Describe AHV Managed vs Unmanaged networks

Knowledge:

- Explain IP Address Management (IPAM)
- Recall where VXLAN and Open Flow are used
- Identify when to use IPAM
- Recall IPAM requirements and limitations

References:

- [IP Address Management](#)
- [Configuring a Virtual Network for Guest VM Interfaces](#)
- [Network Virtualization with VMware NSX \(VXLAN Use Cases\)](#)

- [Best Practices Guide - AHV Networking](#)
- [Nutanix Bible - Book of AHV - How It Works](#)
- [How to Upgrade to Virtual Switches from Network Bridges](#)

Objective 4.4 - Describe AHV Bond modes

Knowledge:

- Recall when to change from defaults
- Identify characteristics of each bond type
- Identify supported bond types
- Recall bond modes limits

References:

- [Network Management](#)
- [Host Network Management](#)
- [Best Practices Guide - AHV Networking](#)

## SECTION 5 - CREATE AND MANAGE VIRTUAL MACHINES (VMs)

Objective 5.1 - Identify tools and methods for migrating a VM

Knowledge:

- Determine existing environment
- Identify source and destination Hypervisors
- Identify source operating systems
- Identify network connectivity
- Recall available tools, along with requirements, benefits, and limits
- Identify when to use an application tool vs an infrastructure tool

References:

- [Managing a VM](#)
- [Environments and Migration Plan Management](#)
- [Move - Supported Source and Destination Hypervisors](#)
- [UEFI Support for VM](#)
- [Move - Firewall Port Requirements](#)
- [Azure to AHV Migration](#)
- [ESXi to AHV and ESXi to Nutanix Clusters on AWS](#)
- [Hyper-V to AHV and Hyper-V to Nutanix Clusters on AWS](#)
- [Migration Considerations](#)
- [Nutanix Cross Hypervisor Disaster Recovery](#)

## Objective 5.2 – Create and Deploy VMs

### Knowledge:

- Describe creation/deployment process
- Identify resource requirements
- Identify correct VLAN
- Complete VM creation page

### References:

- [Creating a VM \(AHV\)](#)
- [Windows VM Provisioning](#)
- [Windows Defender Credential Guard Support in AHV](#)
- [Acropolis Dynamic Scheduling in AHV](#)
- [Nutanix Guest Tools](#)
- [Configuring Images](#)
- [Managing a VM](#)
- [Nutanix Image Management](#)
- [How to Install Community Edition Episode 2](#)

## Objective 5.3 – Given a scenario, modify a VM configuration

### Knowledge:

- Update memory and CPU
- Update storage
- Update network
- Update GPU

### References:

- [Managing a VM](#)
- [Nutanix Image Management](#)
- [Nutanix VirtIO for Windows](#)
- [Virtual Machine Management](#)
- [How to Inject Storage VirtIO Driver](#)
- [Migrating a vDisk to Another Container](#)
- [Restrictions for Multiple vGPU Support](#)
- [GPU and vGPU Support](#)
- [AHV VMs with Multiple vGPU Profiles](#)

Objective 5.4 – Given a scenario, configure Affinity Rules

Knowledge:

- Determine application requirements including licensing
- Determine cluster resources
- Determine availability and hardware requirements

References:

- [Managing a VM](#)
- [Virtual Machine Management](#)
- [Affinity Policies for AHV](#)
- [Configuring VM-VM Anti-Affinity Policy](#)

Objective 5.5 – Explain Live Migration

Knowledge:

- Recall network requirements
- Recall CPU compatibility requirements
- Recall impacts of application workloads
- Recall live migration prerequisites and limits

References:

- [Managing a VM](#)
- [Virtual Machine Management](#)
- [AHV Networking Recommendations](#)
- [Virtual Machine Memory and CPU Hot-Plug Configurations](#)
- [CPU Compatibility Matrix for Live Migration](#)
- [Live Migration of VMs with Virtual GPUs](#)
- [Live vDisk Migration Across Storage Containers](#)
- [Live migrate AHV VMs with vGPU](#)

## SECTION 6 – MONITOR CLUSTER HEALTH AND ALERTS

Objective 6.1 – Given a scenario, analyze the performance and health of a Nutanix cluster and VMs

Knowledge:

- Differentiate metric and entity charts



- Determine when to export
- Determine methods of adding charts to analysis page
- Given a collection of charts, assess chart data
- Interpret NCC Health Checks
- Create a log bundle from Health dashboard
- Determine limitations of Health dashboard
- Run NCC checks
- Change frequency of NCC checks
- Determine whether a check should be run
- Anonymize log bundles

References:

- [Health Monitoring](#)
- [Alert and Event Monitoring](#)
- [Understanding Displayed Statistics](#)
- [Configuring a Warning Threshold for Resilient Capacity](#)
- [Alert/Health Checks - Detailed Descriptions](#)
- [Prism Web Console - Health Dashboard](#)
- [Running NCC Checks by Using Web Console](#)
- [Collecting Logs by Using Web Console](#)

Objective 6.2 - Configure Cluster Monitoring

Knowledge:

- Send logs to a SYSLOG server
- Configure PULSE
- Configure email notifications
- Configure SNMP
- Traps, MIBs

References:

- [Configuring Syslog Monitoring](#)
- [Sending Logs to a Remote Syslog Server](#)
- [Configuring Pulse](#)
- [Configuring an SMTP Server](#)
- [Configuring Alert Emails](#)
- [Configuring SNMP](#)
- [Get Started with Monitoring for non-Nutanix Virtual Infrastructure](#)

## SECTION 7 - UNDERSTAND THE NUTANIX DISTRIBUTED STORAGE FABRIC

Objective 7.1 – Recognize components of storage constructs and the data path of snapshots, clones, etc.

Knowledge:

- Identify components of Distributed Storage Fabric
- Identify how snapshots and clones impact storage consumption and performance
- Identify when shadow clones would be enabled
- Identify limits of local snapshots

References:

- [Distributed Storage Fabric Components](#)
- [Nutanix Clones and Snapshots](#)
- [Recycle Bin](#)
- [Blockstore Support with SPDK](#)
- [Nutanix Cluster Entity Maximum System Values](#)
- [Snapshots](#)
- [eBook – Software-Defined Storage for Dummies](#)
- [Tech Note – Data Efficiency](#)

Objective 7.2 – Identify methods for creating a Storage Container and how to configure Deduplication, Compression, and Erasure Coding on Nutanix Containers

Knowledge:

- Determine when to use each data reduction technology
- Determine performance impact
- Determine when to have more than one container
- Determine recovery requirements

References:

- [Distributed Storage Fabric Components](#)
- [Creating a Storage Container](#)
- [Capacity Reservation Best Practices](#)
- [Configuring a Warning Threshold for Resilient Capacity](#)
- [ESXi Datastores in Nutanix AOS](#)

## SECTION 8 - DESCRIBE ACROPOLIS STORAGE SERVICES

### Objective 8.1 - Define and configure Nutanix Volumes

#### Knowledge:

- Identify data workload requirements
- Identify compatibility requirements
- Identify components of an iSCSI connection
- Identify supported client operating systems
- Identify supported hardware configurations
- Identify supported MPIO configurations
- Identify networking and security requirements

#### References:

- [Volumes - Supported Client Operating Systems](#)
- [Volumes - Requirements and Supported Clients](#)
- [Example Use Cases Supported by Volumes](#)
- [Discovering the Volumes Target from a Windows Client](#)
- [Obtaining the Windows Client iSCSI Initiator Name](#)
- [Adding an iSCSI Data Services IP Address \(Cluster Details\)](#)
- [Volumes Security Requirements for Network Segmentation](#)
- [Best Practices Guide - Nutanix Volumes](#)

### Objective 8.2 - Define Nutanix Files use cases

#### Knowledge:

- Recall Nutanix Files limits and requirements
- Recall home vs general shares
- Recall supported protocols and authentication methods
- Identify supported client operating systems

#### References:

- [Files Overview](#)
- [Files Prerequisites](#)
- [Files Port Requirements](#)
- [Files - Share and Export Management](#)
- [Files Authorization](#)
- [White Paper - Reimagine File Services with Nutanix Files](#)
- [Tech Note - Nutanix Files](#)

## SECTION 9 - UNDERSTAND DATA RESILIENCY

Objective 9.1 - Given a scenario, configure VM High Availability

Knowledge:

- Determine when to enable HA reservations
- Differentiate best effort vs reserved HA
- Determine when to disable HA
- Determine HA limitations
  - Pass through hardware, affinity rules

References:

- [Failure and Recovery Scenarios](#)
- [VM High Availability in Acropolis](#)
- [Best Practices Guide - Data Protection and Disaster Recovery](#)
- [Whitepaper - The Definitive Guide to Data Protection and Disaster Recovery](#)
- [Video - Tech TopX - Redundancy Factor vs. Replication Factor](#)
- [Tech Note - Infrastructure Resiliency](#)
- [Tech Note - Data Protection and Disaster Recovery](#)

Objective 9.2 - Given a scenario, differentiate failover processes, including disk failure, CVM failure, and node failure related to Replication Factor

Knowledge:

- Outline expected failure of each component
- Assess user impact of a failure
- Outline recovery procedure for a given failure
- Understand replication factor and its impact

References:

- [Failure and Recovery Scenarios](#)
- [VM High Availability in Acropolis](#)
- [Best Practices Guide - Data Protection and Disaster Recovery](#)
- [Controller VM Failure](#)
- [Video - Tech TopX - Redundancy Factor vs. Replication Factor](#)
- [Nutanix Bible - Book of AOS - Distributed Storage Fabric](#)

### Objective 9.3 – Describe Data Path Redundancy

#### Knowledge:

- Recall components of VM data path
- Recall networking requirements
- Recall component failure behavior

#### References:

- [Failure and Recovery Scenarios](#)
- [VM High Availability in Acropolis](#)
- [Best Practices Guide – Data Protection and Disaster Recovery](#)
- [Whitepaper – The Definitive Guide to Data Protection and Disaster Recovery](#)
- [Nutanix Bible – Book of AOS – Distributed Storage Fabric](#)

## SECTION 10 – IMPLEMENT DATA PROTECTION

### Objective 10.1 – Given a scenario, configure Protection Domains

#### Knowledge:

- Configure Protection domain to meet specified RPO and RTO
- Configure consistency group
- Configure application-consistent recovery
- Perform failover tests
- Determine when to use crash-consistent recovery

#### References:

- [Data Protection](#)
- [Data Protection with Async DR and NearSync Replication](#)
- [Data Protection and Recovery Terminology](#)
- [Nutanix Cross Hypervisor Disaster Recovery](#)
- [Failover and Failback Operations for Asynchronous and NearSync Replication](#)
- [Failing from One Site to Another](#)
- [Configuring a Remote Site in AWS](#)
- [Best Practices Guide – Data Protection and Disaster Recovery](#)
- [Whitepaper – The Definitive Guide to Data Protection and Disaster Recovery](#)
- [Tech Note – Data Protection for AHV-Based VMs](#)

## Objective 10.2 – Describe Leap Availability Zones

### Knowledge:

- Recall Leap limits and requirements
- Recall applicable availability zones
- Recall networking requirements

### References:

- [General Requirements of Leap](#)
- [General Limitations of Leap](#)
- [Recommendations for Leap](#)
- [Leap Availability Zones](#)
- [Pairing Availability Zones](#)

## SECTION 11 – UNDERSTAND PRISM CENTRAL

Objective 11.1 – Describe and differentiate Prism Element and Prism Central. Identify methods for viewing information about VMs, clusters, hosts, disks, and Storage Containers, as well as creating and monitoring performance graphs, alerts, and statistics

### Knowledge:

- Identify Prism Central requirements
- Deploy a Prism Central VM
- Register/Unregister a Nutanix Cluster with Prism Central
- Use Prism Central to configure and monitor a cluster
- Create Graphs (Performance, entity)

### References:

- [Prism Central Prerequisites and Requirements](#)
- [Prism Central Upgrade and Installation](#)
- [Register \(Unregister\) Cluster with Prism Central](#)
- [Prism Central – Virtual Infrastructure \(Cluster\) Administration](#)
- [Prism Central – Application Monitoring](#)
- [Prism Central – Entity Exploring](#)
- [Prism Central – Performance Monitoring](#)
- [Chart Management](#)
- [Prism Operation Tiers](#)
- [Prism Central Registration of Nutanix Cluster](#)

## SECTION 12 – CONDUCT LIFECYCLE OPERATIONS

Objective 12.1 – Given a scenario, recognize processes to start, stop, and expand a cluster. Additionally, demonstrate how to start and shutdown a node within a cluster and how to eject a node from a cluster

Knowledge:

- Determine cluster maintenance process
- Perform physical node upgrades
- Determine cluster resiliency status

References:

- [Cluster Management – AOS Advanced Administration Guide](#)
- [Starting a Cluster](#)
- [Starting a Node in a Cluster \(AHV\)](#)
- [Stopping a Cluster](#)
- [Shutting Down an AHV Cluster](#)
- [Expanding a Cluster](#)
- [Putting a Node into Maintenance Mode](#)
- [Exit a Node from the Maintenance Mode](#)
- [Increasing the Cluster Fault Tolerance Level](#)
- [Maintain Infrastructure with Zero Downtime](#)
- [Nutanix AOS Cluster Expansion](#)

Objective 12.2 – Perform upgrades on a Nutanix cluster

Knowledge:

- Recall methods for upgrading AOS and AHV
- Recall how to navigate to one-click upgrade
- Recall how to upload supporting files for AOS upgrade
- Recall when LCM framework gets updated
- Recall dark site requirements and limits
- Recall how to verify valid upgrade paths
- Locate compatibility matrices
- Recall support limits for release families

References:

- [Acropolis Upgrade Resources](#)
- [Upgrade Recommendations and Requirements](#)
- [Prism One Click Upgrade](#)
- [Upgrading AOS](#)
- [Upgrading AHV](#)
- [Recommended Upgrade Order](#)
- [Upgrading AOS by Uploading Binary and Metadata Files](#)
- [Performing Updates with the Life Cycle Manager](#)
- [Tech TopX: Upgrading AOS on Prism Central](#)

Objective 12.3 - Install, upgrade, and reclaim licenses

Knowledge:

- Recall licensing process
- Identify when to reclaim licenses
- Identify when to upgrade a license
- Recall license edition features and limits
- Recall dark site licensing constraints

References:

- [Manage Prism Central Licenses](#)
- [Reclaiming Licenses](#)
- [Upgrading, Extending, or Downgrading Licenses or Add-Ons](#)
- [Displaying License Features and Details](#)





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# 4. Course Recommendations

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## 4.1 COURSE RECOMMENDATION

Nutanix offers courses that provide training on the objectives tested for in the exam. More information on these courses, including delivery methods and pricing, can be found at [nutanix.com/training](https://nutanix.com/training).

### **Nutanix® Enterprise Cloud Administration**

The four-day, Nutanix Enterprise Cloud Administration hands-on training course explores the deployment, administration and troubleshooting of a Nutanix Enterprise Cloud environment. The course covers the following objectives:

- Nutanix Enterprise Cloud Concepts
- Managing a Nutanix Cluster
- Securing a Nutanix Cluster
- Networking
- Nutanix Enterprise Cloud Concepts
- Managing a Nutanix Cluster
- Securing a Nutanix Cluster
- Networking

The material provided in the course covers a majority of the objectives (approximately 80%) that appear on the NCP-MCI 5.20 exam and is recommended for individuals who want to gain a good understanding of these objectives. Please note that additional exposure to a Nutanix environment is highly recommended.

### **NCP-MCI Exam Prep**

This course helps prepare you for the Nutanix Certified Professional - Multicloud Infrastructure (NCP-MCI) exam. We will refresh the knowledge covered by the Enterprise Cloud Administration (ECA) course by going through all course topics in condensed format, and by running you through a set of test questions for each module.



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## 5. Resources

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### 5.1 NUTANIX COMMUNITY EDITION

The Nutanix Community Edition is a free product that allows you to deploy a Nutanix Enterprise Cloud. To download the software and build your own environment for exam preparation, [click here](#).

You can also take a 2-hour Hyperconverged Test Drive, which utilizes the Nutanix Community Edition, by clicking [here](#).

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### 5.2 THE NUTANIX NEXT COMMUNITY

The Nutanix Next Community is a social interaction site where professionals can connect with cloud builders from around the world, learn from IT Pros in the industry and share experiences. The community maintains an area focused on the NCP certification, which is located [here](#).



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Nutanix makes infrastructure invisible, elevating IT to focus on the applications and services that power their business. The Nutanix Enterprise Cloud OS leverages web-scale engineering and consumer-grade design to natively converge compute, virtualization, and storage into a resilient, software-defined solution with rich machine intelligence. The result is predictable performance, cloud-like infrastructure consumption, robust security, and seamless application mobility for a broad range of enterprise applications. Learn more at [www.nutanix.com](http://www.nutanix.com) or follow us on [Twitter @nutanix](https://twitter.com/nutanix).