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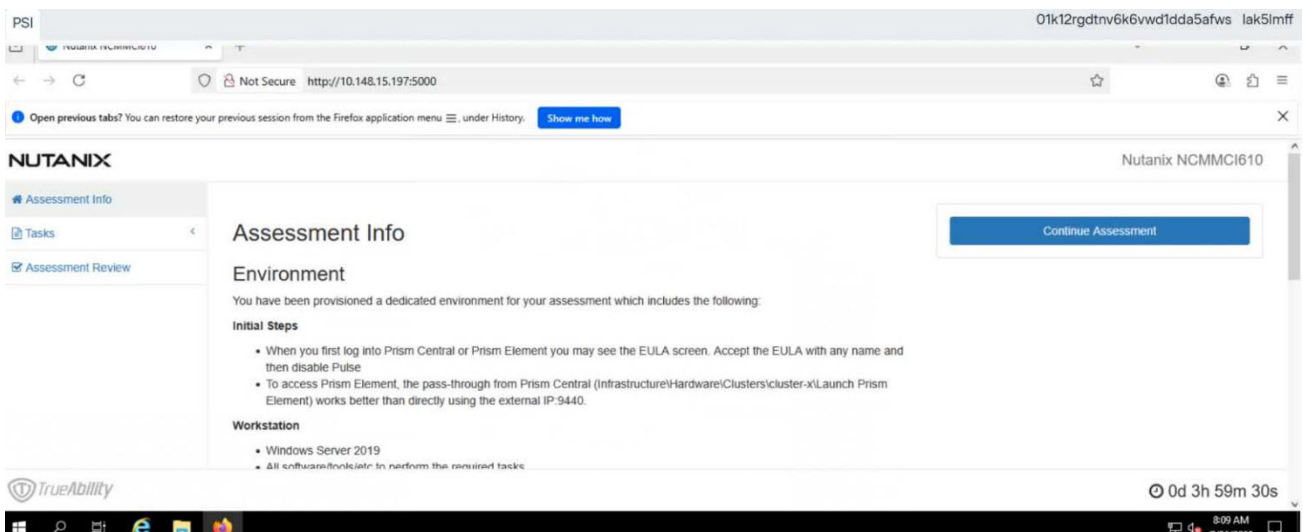
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Exam : **NCM-MCI-6.10**

Title : Nutanix Certified Master
Multicloud Infrastructure
(NCM-MCI) 6.10

Version : DEMO

1.Refer to the exhibit.



Environment

You have been provisioned a dedicated environment for your assessment which includes the following:

Initial Steps

- When you first log into Prism Central or Prism Element you may see the EULA screen. Accept the EULA with any name and then disable Pulse
- To access Prism Element, the pass-through from Prism Central (Infrastructure\Hardware\Clusters\cluster-x\Launch Prism Element) works better than directly using the external IP:9440.

Workstation

- Windows Server 2019
- All software/tools/etc to perform the required tasks
- Nutanix Documentation and whitepapers can be found in `Desktop\Files\Documentation` and `Desktop\Files\Documentation 6.10`
- *Note that the Workstation is the system you are currently logged into*
- Windows Server 2019
- All software/tools/etc to perform the required tasks
- Nutanix Documentation and whitepapers can be found in `Desktop\Files\Documentation` and `Desktop\Files\Documentation 6.10`
- *Note that the Workstation is the system you are currently logged into*

Nutanix Cluster

- There are two clusters provided, connected to one Prism Central. The connection information for the relevant cluster will be displayed to the right of the question. Please make sure you are working on the correct cluster for each item. Please ignore any licensing violations.

Important Notes

- If the text is too small and hard to read, or you cannot see all of the GUI, you can increase/decrease the zoom of the browser with `CTRL +` and `CTRL -` (the plus and minus keys)



Prism Central Web Console

- admin / yKZUJCHER7V*
- nutanix / UJ2x0!DEXGY

Cluster 1

CVM external IP : 34.53.118.63
 CVM DR IP : 172.30.0.6

- admin / 9Fw08!3QW4XJ
- nutanix / GNP*FE2504XWZ
- root / KR*6HY00z5E8

Cluster 2

CVM external IP : 34.82.155.5
 CVM DR IP : 172.30.0.4

- admin / 5*K30FA76X
- nutanix / N*3FwM1E7ZT9

Task1

A newly created Windows VM “SQL02” is experiencing poor storage performance when compared to “SQL01” running within the same cluster, on the same storage container.

The cluster is in a healthy state.

Create a new session named Monitor SQL02 with meaningful metrics. Right click on the session page and click Select All then paste this into Notepad and save it as Task 1.txt on the desktop.

Also, save the analysis as a report named “MonitorSQL02” and send the report as a PDF on a daily basis to perf_group@ACME.org. Reports should not be retained. If any new objects need to be created, use monitorvm2 in the name.

Finally, correct the issue within “SQL02”

Notes:

Do not power on the VMs.

While you will be creating a session, you will need to examine the VM configurations to determine the

issue.

Do not delete the VM to resolve the issue, any other destructive change is acceptable

Answer:

This is a classic Nutanix performance troubleshooting scenario. The issue is almost certainly that the VM was created using the wrong Disk Bus Type (IDE or SATA instead of SCSI).

Here is the step-by-step solution to complete Task 1.

Part 1: Analysis and Reporting

Create the Session

Log in to Prism Central (or Prism Element, depending on the exam environment, but Analysis is usually a PC feature).

Navigate to Operations -> Analysis.

Click New Session.

Name: Monitor SQL02

Entity: Search for and select the VM named SQL02.

Metrics: Since the issue is storage performance, search for and add these specific metrics:

Hypervisor IOPS (or Controller IOPS)

Hypervisor IO Latency (or Controller IO Latency)

Hypervisor IO Bandwidth

Click Save.

Save Session Data (Task 1.txt)

Open the "Monitor SQL02" session you just created.

(Per instructions): Right-click anywhere on the chart/data area -> Click Select All.

Copy the selected text (Ctrl+C).

Open Notepad on the provided desktop.

Paste the data.

Save the file as Task 1.txt on the Desktop.

Create and Schedule the Report

While still in the Analysis session, click the Create Report (or "Add to Report") button.

Report Name: MonitorSQL02

Report Settings:

Format: PDF

Frequency: Daily

Email Recipient: perf_group@ACME.org

Retention: 0 (or "Do not retain", as requested).

Note: If the system forces you to create a new Report object and MonitorSQL02 is rejected, use monitorvm2 as the name per the instructions.

Save/Schedule the report.

Part 2: Diagnose and Fix the Issue

The Issue:

VM SQL02 was likely created with its data disks set to IDE or SATA.

Why this causes poor performance: IDE/SATA are emulated hardware with high CPU overhead and low queue depths (single-threaded).

The Standard: SQL01 (the healthy VM) is using SCSI, which is multithreaded and optimized for virtualization.

The Fix (Steps):

Navigate to the VM list in Prism.

Select SQL02 and click Update (or Edit).

Scroll down to the Disks section.

Identify the data disk(s). You will see the Bus Type listed as IDE or SATA.

Do not delete the VM. instead, perform a disk conversion (destructive change to the disk is allowed, but we want to keep the data).

Method to Convert (Clone to SCSI):

Hover over the IDE/SATA disk to see the path/filename of the vDisk (or write it down).

Click Add New Disk.

Operation: select Clone from ADSF file.

Path: Browse to the storage container and select the file associated with the current IDE disk.

Bus Type: Select SCSI (This is the critical fix).

Index: Ensure it doesn't conflict with existing disks (usually index 1 or higher for data).

Click Add.

Once the new SCSI disk is added, find the original IDE/SATA disk and click the X to remove it.

Click Save.

Note: You do not need to power on the VM to verify. The change from IDE to SCSI allows the VM to use the Nutanix VirtIO drivers for maximum storage performance.

2.TASK2

The security team has provided some new security requirements for cluster level security on Cluster 2.

Security requirements:

Update the password for the root user on the Cluster 2 node to match the admin user password.

Note: The 192.168.x.x network is not available. To access a node use the host IP (172.30.0.x) from the CVM.

Output the cluster-wide configuration of the SCMA policy to desktop\output.txt before changes are made.

Enable the Advanced Intrusion Detection Environment (AIDE) to run on a weekly basis for the hypervisor and cvms for Cluster 2.

Enable high-strength password policies for the hypervisor and cluster.

Ensure CVMs require SSH keys for login instead of passwords. (SSH keys are located in the desktop\Files\SSH folder.)

Ensure the cluster meets these requirements. Do not reboot any cluster components.

Note: Please ensure you are modifying the correct components.

Answer:

This task focuses on Security Technical Implementation Guides (STIGs) and general hardening of the Nutanix cluster. Most of these tasks are best performed via the Nutanix Command Line Interface (ncli) on the CVM, though the SSH key requirement is often easier to handle via the Prism GUI.

Here is the step-by-step procedure to complete Task 2.

Prerequisites: Connection

Open PuTTY (or the available terminal) from the provided Windows Desktop.

SSH into the Cluster 2 CVM. (If the Virtual IP is unknown, check Prism Element for the CVM IP).

Log in using the provided credentials (usually nutanix / nutanix/4u or the admin password provided in your instructions).

Step 1: Output SCMA Policy (Do this FIRST)

Requirement: Output the cluster-wide configuration of the SCMA policy to desktop\output.txt before changes are made.

In the SSH session on the CVM, run:

Bash

```
ncli cluster get-software-config-management-policy
```

Copy the output from the terminal window.

Open Notepad on the Windows Desktop.

Paste the output.

Save the file as output.txt on the Desktop.

Step 2: Enable AIDE (Weekly)

Requirement: Enable the Advanced Intrusion Detection Environment (AIDE) to run on a weekly basis for the hypervisor and CVMs.

In the same CVM SSH session, run the following command to modify the SCMA policy:

Bash

```
ncli cluster edit-software-config-management-policy enable-aide=true schedule-interval=WEEKLY
```

(Note: This single command applies the policy to both Hypervisor and CVMs by default in most versions).

Step 3: Enable High-Strength Password Policies

Requirement: Enable high-strength password policies for the hypervisor and cluster.

Run the following command:

Bash

```
ncli cluster set-high-strength-password-policy enable=true
```

Step 4: Update Root Password for Cluster Nodes

Requirement: Update the password for the root user on the Cluster 2 node to match the admin user password.

Method A: The Automated Way (Recommended)

Use ncli to set the password for all hypervisor nodes at once without needing to SSH into them individually.

Run:

Bash

```
ncli cluster set-hypervisor-password
```

When prompted, enter the current admin password (this becomes the new root password). Method B:

The Manual Way (If NCLI fails or manual access is required)

Note: Use this if the exam specifically wants you to touch the node via the 172.x network.

From the CVM, SSH to the host using the internal IP:

Bash

```
ssh root@172.30.0.x (Replace x with the host ID, e.g., 4 or 5)
```

Run the password change command:

Bash

```
passwd
```

Enter the admin password twice.

Repeat for other nodes in Cluster 2.

Step 5: Cluster Lockdown (SSH Keys)

Requirement: Ensure CVMs require SSH keys for login instead of passwords.

It is safest to do this via the Prism Element GUI to prevent locking yourself out.

Open Prism Element for Cluster 2 in the browser.

Click the Gear Icon (Settings) -> Cluster Lockdown.

Uncheck the box "Enable Remote Login with Password".

Click New Public Key (or Add Key).

Open the folder Desktop\Files\SSH on the Windows desktop.

Open the public key file (usually ends in .pub) in Notepad and copy the contents.

Paste the key into the Prism "Key" box.

Click Save.

Note: Do not reboot the cluster. The SCMA and Password policies take effect immediately without a reboot.

3.Topic 1, Performance Based Questions

Environment

You have been provisioned a dedicated environment for your assessment which includes the following:

Workstation

- windows Server 2019
- All software/tools/etc to perform the required tasks
- Nutanix Documentation and whitepapers can be found in desktop\files\Documentation
- Note that the workstation is the system you are currently toggged into

Nutanix Cluster

- There are three clusters provided. The connection information for the relevant cluster will be displayed to the high of the question Please make sure you are working on the correct cluster for each item Please ignore any licensing violations
- Cluster A is a 3-node cluster with Prism Central 2022.6 where most questions will be performed
- Cluster B is a one-node cluster and has one syslog item and one security item to perform
- Cluster D is a one-node duster with Prism Central 5.17 and has a security policy item to perform

Important Notes

- If the text is too small and hard to read, or you cannot see an of the GUI. you can increase/decrease the zoom of the browser with CTRL +, and CTRL - (the plus and minus keys)

You will be given 3 hours to complete the scenarios for Nutanix NCMCI

Once you click the start button below, you will be provided with:

- A Windows desktop A browser page with the scenarios and credentials (Desktop\instructions) Notes for this exam delivery:

The browser can be scaled lo Improve visibility and fit all the content on the screen.

- Copy and paste hot-keys will not work Use your mouse for copy and paste.
- The Notes and Feedback tabs for each scenario are to leave notes for yourself or feedback for
- Make sure you are performing tasks on the correct components.
- Changing security or network settings on the wrong component may result in a falling grade.
- Do not change credentials on an component unless you are instructed to.
- All necessary documentation is contained in the Desktop\Files\Documentation directory

Task 1

An administrator has been asked to configure a storage for a distributed application which uses large

data sets across multiple worker VMs.

The worker VMs must run on every node. Data resilience is provided at the application level and low cost per GB is a Key Requirement.

Configure the storage on the cluster to meet these requirements. Any new object created should include the phrase Distributed_App in the name.

Answer:

To configure the storage on the cluster for the distributed application, you can follow these steps:

Log in to Prism Element of cluster A using the credentials provided.

Go to Storage > Storage Pools and click on Create Storage Pool.

Enter a name for the new storage pool, such as Distributed_App_Storage_Pool, and select the disks to include in the pool. You can choose any combination of SSDs and HDDs, but for low cost per GB, you may prefer to use more HDDs than SSDs.

Click Save to create the storage pool.

Go to Storage > Containers and click on Create Container.

Enter a name for the new container, such as Distributed_App_Container, and select the storage pool that you just created, Distributed_App_Storage_Pool, as the source.

Under Advanced Settings, enable Erasure Coding and Compression to reduce the storage footprint of the data. You can also disable Replication Factor since data resilience is provided at the application level.

These settings will help you achieve low cost per GB for the container.

Click Save to create the container.

Go to Storage > Datastores and click on Create Datastore.

Enter a name for the new datastore, such as Distributed_App_Datastore, and select NFS as the datastore type. Select the container that you just created, Distributed_App_Container, as the source.

Click Save to create the datastore.

The datastore will be automatically mounted on all nodes in the cluster. You can verify this by going to Storage > Datastores and clicking on Distributed_App_Datastore. You should see all nodes listed under Hosts.

You can now create or migrate your worker VMs to this datastore and run them on any node in the cluster. The datastore will provide low cost per GB and high performance for your distributed application.

4.Task 2

An administrator needs to configure storage for a Citrix-based Virtual Desktop infrastructure. Two VDI pools will be created

Non-persistent pool names MCS_Pool for tasks users using MCS Microsoft Windows 10 virtual Delivery Agents (VDAs)

Persistent pool named Persist_Pool with full-clone Microsoft Windows 10 VDAs for power users 20 GiB capacity must be guaranteed at the storage container level for all power user VDAs The power user container should not be able to use more than 100 GiB Storage capacity should be optimized for each desktop pool.

Configure the storage to meet these requirements. Any new object created should include the name of the pool(s) (MCS and/or Persist) that will use the object.

Do not include the pool name if the object will not be used by that pool.

Any additional licenses required by the solution will be added later.

Answer:

To configure the storage for the Citrix-based VDI, you can follow these steps:

Log in to Prism Central using the credentials provided.

Go to Storage > Storage Pools and click on Create Storage Pool.

Enter a name for the new storage pool, such as VDI_Storage_Pool, and select the disks to include in the pool. You can choose any combination of SSDs and HDDs, but for optimal performance, you may prefer to use more SSDs than HDDs.

Click Save to create the storage pool.

Go to Storage > Containers and click on Create Container.

Enter a name for the new container for the non-persistent pool, such as MCS_Pool_Container, and select the storage pool that you just created, VDI_Storage_Pool, as the source.

Under Advanced Settings, enable Deduplication and Compression to reduce the storage footprint of the non-persistent desktops. You can also enable Erasure Coding if you have enough nodes in your cluster and want to save more space. These settings will help you optimize the storage capacity for the non-persistent pool.

Click Save to create the container.

Go to Storage > Containers and click on Create Container again.

Enter a name for the new container for the persistent pool, such as Persist_Pool_Container, and select the same storage pool, VDI_Storage_Pool, as the source.

Under Advanced Settings, enable Capacity Reservation and enter 20 GiB as the reserved capacity. This will guarantee that 20 GiB of space is always available for the persistent desktops. You can also enter 100 GiB as the advertised capacity to limit the maximum space that this container can use. These settings will help you control the storage allocation for the persistent pool.

Click Save to create the container.

Go to Storage > Datastores and click on Create Datastore.

Enter a name for the new datastore for the non-persistent pool, such as MCS_Pool_Datastore, and select NFS as the datastore type. Select the container that you just created, MCS_Pool_Container, as the source.

Click Save to create the datastore.

Go to Storage > Datastores and click on Create Datastore again.

Enter a name for the new datastore for the persistent pool, such as Persist_Pool_Datastore, and select NFS as the datastore type. Select the container that you just created, Persist_Pool_Container, as the source.

Click Save to create the datastore.

The datastores will be automatically mounted on all nodes in the cluster. You can verify this by going to Storage > Datastores and clicking on each datastore. You should see all nodes listed under Hosts.

You can now use Citrix Studio to create your VDI pools using MCS or full clones on these datastores.

For more information on how to use Citrix Studio with Nutanix Acropolis, see Citrix Virtual Apps and Desktops on Nutanix or Nutanix virtualization environments.

Create Storage Container

Name:

Storage Pool:

Max Capacity: **53.26 TiB** (Physical) Based on storage pool free unreserved capacity

Advanced Settings

Replication Factor [?]:

Reserved Capacity: GiB

Advertised Capacity: GiB

Compression
Perform post-process compression of all persistent data. For inline compression, set the delay to 0.
Delay (in minutes):

Deduplication

Cache
Perform inline deduplication of read caches to optimize performance.

Capacity
Perform post-process deduplication of persistent data.

Erasure Coding [?]

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

Filesystem Whitelists

Create Storage Container

Name
ST_Persist_Pool

Storage Pool
Storage_Pool

Max Capacity
53.26 TiB (Physical) Based on storage pool free unreserved capacity

Advanced Settings

Replication Factor (?)
2

Reserved Capacity
0 GiB

Advertised Capacity
100 GiB

Compression
Perform post-process compression of all persistent data. For inline compression, set the delay to 0.
Delay (in minutes)
0

Deduplication
 Cache
Perform inline deduplication of read caches to optimize performance.
 Capacity
Perform post-process deduplication of persistent data.

Erasure Coding (?)
 Enable
Erasure coding enables capacity savings across solid-state drives and hard disk drives.

Filesystem Whitelists
Enter comma separated entries

<https://portal.nutanix.com/page/documents/solutions/details?targetId=BP-2079-Citrix-Virtual-Apps-and-Desktops:bp-nutanix-storage-configuration.html>

5.Task 3

An administrator needs to assess performance gains provided by AHV Turbo at the guest level. To perform the test the administrator created a Windows 10 VM named Turbo with the following configuration.

1 vCPU

8 GB RAM

SATA Controller

40 GB vDisk

The stress test application is multi-threaded capable, but the performance is not as expected with AHV Turbo enabled. Configure the VM to better leverage AHV Turbo.

Note: Do not power on the VM. Configure or prepare the VM for configuration as best you can without powering it on.

Answer:

To configure the VM to better leverage AHV Turbo, you can follow these steps:

Log in to Prism Element of cluster A using the credentials provided.

Go to VM > Table and select the VM named Turbo.

Click on Update and go to Hardware tab.

Increase the number of vCPUs to match the number of multiqueues that you want to enable. For example, if you want to enable 8 multiqueues, set the vCPUs to 8. This will improve the performance of multi-threaded workloads by allowing them to use multiple processors.

Change the SCSI Controller type from SATA to VirtIO. This will enable the use of VirtIO drivers, which are required for AHV Turbo.

Click Save to apply the changes.

Power off the VM if it is running and mount the Nutanix VirtIO ISO image as a CD-ROM device. You can download the ISO image from Nutanix Portal.

Power on the VM and install the latest Nutanix VirtIO drivers for Windows 10. You can follow the instructions from Nutanix Support Portal.

After installing the drivers, power off the VM and unmount the Nutanix VirtIO ISO image.

Power on the VM and log in to Windows 10.

Open a command prompt as administrator and run the following command to enable multiqueue for the VirtIO NIC:

```
ethtool -L eth0 combined 8
```

Replace eth0 with the name of your network interface and 8 with the number of multiqueues that you want to enable. You can use ipconfig /all to find out your network interface name.

Restart the VM for the changes to take effect.

You have now configured the VM to better leverage AHV Turbo. You can run your stress test application again and observe the performance gains.

<https://portal.nutanix.com/page/documents/kbs/details?targetId=kA00e00000LKPdCAO>

change vCPU to 2/4 ?

Change SATA Controller to SCSI:

```
acli vm.get Turbo
```

Output Example:

```
Turbo {
  config {
    agent_vm: False
    allow_live_migrate: True
    boot {
      boot_device_order: "kCdrom"
      boot_device_order: "kDisk"
      boot_device_order: "kNetwork"
      uefi_boot: False
    }
    cpu_passthrough: False
    disable_branding: False
    disk_list {
      addr {
        bus: "ide"
        index: 0
      }
      cdrom: True
      device_uuid: "994b7840-dc7b-463e-a9bb-1950d7138671"
      empty: True
    }
    disk_list {
      addr {
        bus: "sata"
        index: 0
      }
      container_id: 4
      container_uuid: "49b3e1a4-4201-4a3a-8abc-447c663a2a3e"
      device_uuid: "622550e4-fb91-49dd-8fc7-9e90e89a7b0e"
      naa_id: "naa.6506b8dcda1de6e9ce911de7d3a22111"
      storage_vdisk_uuid: "7e98a626-4cb3-47df-a1e2-8627cf90eae6"
      vmdisk_size: 10737418240
      vmdisk_uuid: "17e0413b-9326-4572-942f-68101f2bc716"
    }
    flash_mode: False
    hwclock_timezone: "UTC"
    machine_type: "pc"
    memory_mb: 2048
    name: "Turbo"
    nic_list {
      connected: True
      mac_addr: "50:6b:8d:b2:a5:e4"
      network_name: "network"
```

```
network_type: "kNativeNetwork"
network_uuid: "86a0d7ca-acfd-48db-b15c-5d654ff39096"
type: "kNormalNic"
uuid: "b9e3e127-966c-43f3-b33c-13608154c8bf"
vlan_mode: "kAccess"
}
num_cores_per_vcpu: 2
num_threads_per_core: 1
num_vcpus: 2
num_vnuma_nodes: 0
vga_console: True
vm_type: "kGuestVM"
}
is_rf1_vm: False
logical_timestamp: 2
state: "Off"
uuid: "9670901f-8c5b-4586-a699-41f0c9ab26c3"
}
acli vm.disk_create Turbo clone_from_vmdisk=17e0413b-9326-4572-942f-68101f2bc716 bus=scsi
remove the old disk
acli vm.disk_delete 17e0413b-9326-4572-942f-68101f2bc716 disk_addr=sata.0
```