Avid® MediaCentral | Production Management

Virtualization Best Practices with Nutanix

Important Information

Avid recommends that you read all the information in this ReadMe thoroughly before installing or using the software described in this document.

As this guide is subject to change, Avid recommends that you check the Avid Knowledge Base for updates before you begin reading this document. For the latest versions of this and other documentation related to Avid MediaCentral Production Management, see:

https://avid.secure.force.com/pkb/articles/en_US/ReadMe/MediaCentral-Production-Management-v2020-x-Documentation

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Using This Guide

This document provides guidelines for deploying Avid MediaCentral Production Management in a virtual environment using hyperconverged infrastructure and the Nutanix Acropolis Hypervisor (AHV). It provides details to help you identify your infrastructure requirements and information on how to configure virtual machines for use with Avid applications. This guide is intended for system administrators and other personnel who are familiar with general IT architecture design, virtualization technology, and using Nutanix Prism.

Information regarding virtualization best practices for Avid MediaCentral | Cloud UX, Avid MediaCentral | Asset Management, Avid MediaCentral | Newsroom Management, and Avid Media Composer can be found on the Avid Knowledge Base in separate guides dedicated to those products.

Overview

Since 2015, Avid has supported the deployment of Production Management in three-tier virtual environments with VMware ESXi. In April 2020, Avid completed the testing and qualification of Production Management on the Nutanix hyperconverged platform. This document covers the basics of the Nutanix test environment, as well as Avid's general approach and best practices when designing the infrastructure for your Production Management solution.

Additional Technical Notes

- Testing with the Nutanix HCI platform was completed using MediaCentral Production Management v2019.6.x operating under Windows Server 2016.
- Avid does not support Production Management Engines or MediaCentral | Archive Production Engines using Microsoft clustering in a Nutanix environment.

Definition of Terms

Term	Definition
Nutanix AOS	Acropolis Operating System: Nutanix Acropolis is the foundation that transforms the HCI infrastructure in to an Enterprise Cloud OS. the main components are the Distributed Storage Fabric (DSF), the Acropolis Hypervisor (AHV), Storage Services to manage SMB and NFS protocols, object and block storage and advanced virtual networking.
Nutanix AHV	Acropolis Hypervisor: Based on Linux KVM/QEMU virtualization.
Nutanix Prism	Nutanix Prism provides a single management plane to easily manage your infrastructure environment end to end. Prism combines multiple aspects of Enterprise Cloud management into a single consumer-grade product that lets IT administrators manage infrastructure and virtualization, access operational insights, troubleshoot and fix problems.
Nutanix Block	A Nutanix Block is a rack-mountable chassis containing up to four nodes.

Term	Definition
Nutanix Node	A Nutanix Node is the foundational unit for the cluster. You need a minimum of three nodes to create a cluster. Each node in the cluster runs a standard hypervisor and contains processors, memory, and local storage (SSDs and HDDs).
IPMI	The Nutanix IPMI interface is the Intelligent Platform Management Interface. Each node has an IPMI port to assign an IP address to so it can be accessed over the network. Once the IPMI interface is accessible on the network it can be accessed by a Web-console or CLI to help with any configuring, monitoring and troubleshooting server hardware.
Virtual Machine (VM)	A virtual machine or VM is the compute resource object that mimics a traditional physical workstation or server in a virtualized computer environment. It is comprised of processing cores, RAM, storage, and an operating system. The virtual machine is usually deployed using a small portion of a larger pool of the compute resources.
vCPU	A virtual CPU (vCPU) is a physical central processing unit (CPU) that plugs in to a socket on the host motherboard. With compute virtualization a vCPU is assigned to a virtual machine.
Cores	Cores are the multiple, duplicate sets of CPU components that share one common physical CPU and socket.
Physical vs Logical Cores	Physical cores are a complete set of actual hardware components within a CPU. Logical cores are the number of physical cores times the number of threads that can run on each core via hyperthreading. Example: A processor that can run two threads per core has 10 physical cores would present itself as having 20 logical cores.
Memory/RAM	RAM (Random Access Memory) is the hardware in a computing device where the operating system (OS), application programs and data in current use are kept so they can be quickly reached by the device's processor.
Nutanix CVM	The Nutanix CVM or Controller Virtual Machine is a VM that runs on each Nutanix host node. The CMV enables the pooling of compute resources from all nodes in the cluster, Acropolis data plane functions as well as the Prism Management web interface and functions.

Nutanix Infrastructure

Qualified Nutanix AOS

The minimum supported version of the Nutanix Acropolis Operating System for use with Production Management is version AOS 5.10

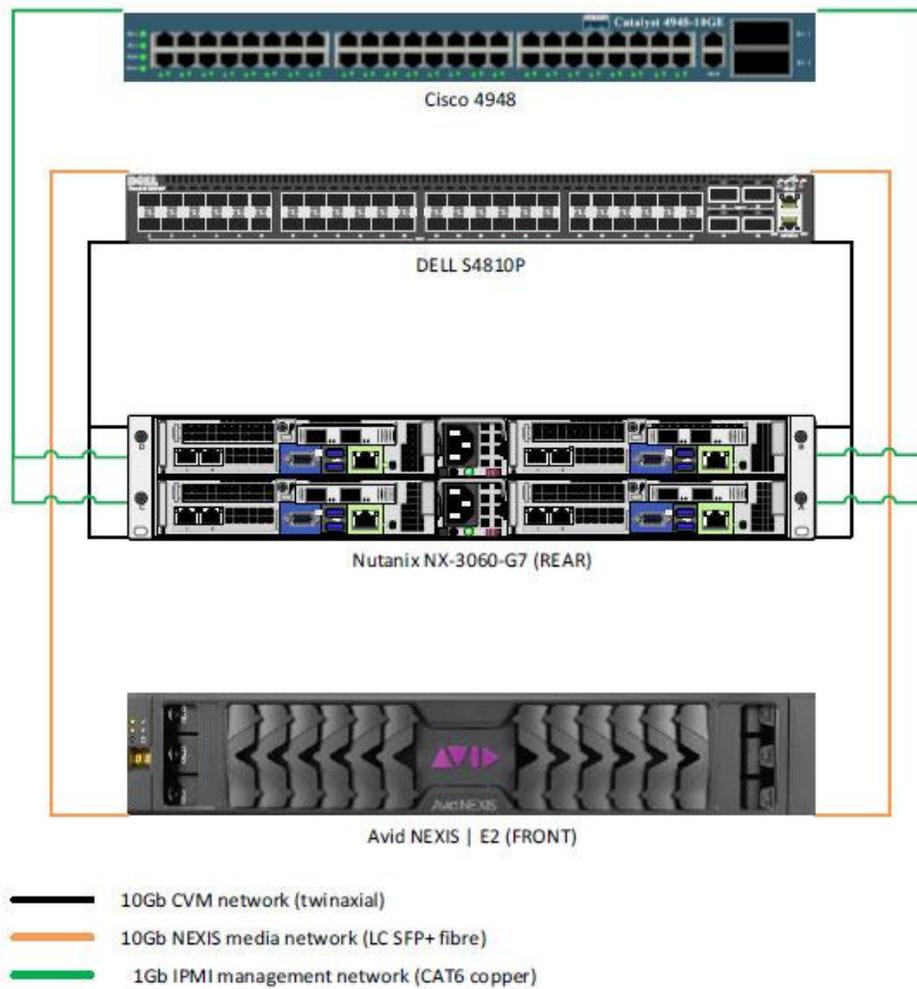## Nutanix Validation Infrastructure

The Nutanix hypervisor comes pre-installed when you purchase a Nutanix hardware appliance. Nutanix software is generally hardware agnostic. Nutanix software is qualified to run on HPE ProLiant series servers (DL/DX), Dell, Cisco Lenovo, and other third-party server vendors. Refer to the Nutanix website for the most up to date, qualified, and certified hardware platforms.

Hardware configurations are available to fit any workload by scaling the primary resources (CPU, RAM, or Storage) within each node. All nodes include flash memory to optimize storage performance, and all-flash nodes are available to deliver maximum I/O throughput with minimum latency.

The following table lists the hardware specifications used for Avid's internal test and qualification process.

Resource	Model/Description
Nutanix Block	NX-3060-G7
Number of Blocks	1 (2-RU)
Number of Nodes	4
CPU	Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz
Number of Sockets	2 physical processor sockets per node
Number of Cores	36 per node
Memory	512 GB per node
Storage	36 TB total across 4 nodes
Network	Intel X550T2 10Gb
AOS Version	5.10 and 5.11.2.1
NCC Version	3.9.4.1
LCM Version	2.3.0
Prism License	Prism Pro
Avid NEXIS Storage	Avid NEXIS	E2, NEXIS 2019.10.x
Network Switch	Dell S4810P

Infrastructure Diagram

Cisco 4948

DELL S4810P

Nutanix NX-3060-G7 (REAR)

Avid NEXIS | E2 (FRONT)

—— 10Gb CVM network (twinaxial)

—— 10Gb NEXIS media network (LC SFP+ fibre)

—— 1Gb IPMI management network (CAT6 copper)

Network Design

When designing the network for the deployment of your solution, Avid recommends that you consult with a certified network engineer who is familiar with virtualization and hyperconverged platforms.

To maximize performance Avid recommends that you create a separate vlan for the controller VM's to communicate over.

Cabling

Logical rules for cabling apply. If you need to limit single points of failure, you should design your system to "dual connect" each component.

Hostnames and IP Addresses

As part of your pre-flight planning you should gather and document all of the logistical information you will need to configure the system. Some of the first parameters you need to enter are hostnames and IP addresses.

- Reserve/assign one IP address for Nutanix Prism (system management web interface)
- Reserve/assign three IP addresses for each compute node:
  - One for the node
  - One for the IPMI
  - One for the Controller VM
- Create a hostname for each node
- Create a hostname for each Controller VM

Provisioning Resources

Calculating and Provisioning Virtual Compute Resources

Compute resources such as CPU sockets, cores, memory, and virtual disks are provisioned for each virtual machine when the VM is created or modified. The cores, memory, and disk space needed for each Avid virtual machine can depend on a number of factors. For example:

- What host operating system will the VM run?
- What services and applications will the VM be running?
- What will be the workload and impact on the VM?
  - How many clients will connect to the services running on the VM?
  - How many VM files or assets will the services running on the VM need to track?
- Will the VM's disk space requirements increase over time?
  - Is it hosting a database?
  - Does it store any log files that could consume significant space?
- Will users connect to and perform federated searches across multiple databases?

  Federated searches require increased core count for the Production Engine.
- Is the workload of the VM more compute intensive, network intensive, or both?

Physical servers often have more (unused) resources than are needed without showing any negative effects. However the opposite is often for virtual machines, where allocating more cores can negatively impact performance. Avid recommends that you be conservative when initially allocating resources to the VM, and increase the resources as needed. This means that you should first allocate fewer cores to the VM, closely monitor the VM, and increase the core count later if necessary.

System administrators should create alerts and properly monitor the resource utilization of their hosts and virtual machines, continually making adjustments as needed. Keep in mind that you still need to plan for using additional compute resources beyond what you may initially allocate. So be sure to take this into account when deciding what the hardware configuration will be for your host nodes.

Sockets and Cores

In most cases the cores assigned to a VM will not exceed the number of physical cores per physical CPU socket in the host. Therefore, you should provision your VM with all cores assigned to a single socket (CPU).

In the following example illustration, the physical host node has two CPU sockets. Each CPU socket has an Intel Gold 5220 CPU with 18 cores. Therefore, the host has a total of 36 physical cores.

CPU Model

   Intel(R) Xeon(R) Gold 5220 CPU @ 2.2...

No. of CPU Cores   36

No. of Sockets   2

As long as no single VM requires more than 18 cores, each VM can be provisioned with one CPU and their required number of cores.

Compute Details

VCPU(S)

1

Number Of Cores Per Vcpu

4

Memory Allocation

When allocating memory to a virtual machine, note the following:

- You should not over provision the total amount of physical memory in a host or resource pool to virtual machines that will be running at the same time. The hypervisor cannot manage memory in the same way it can dynamically manage over-provisioning of cores with CPU scheduling.

- Over allocating memory to a virtual machine does not have a negative impact on performance like over allocating cores. If you allocate 32GB of memory, but for the majority of time the VM does not use more than 20GB, there is not any negative performance impact.

- Applications and services might consume whatever memory is made available to them by the operating system. Therefore allocating additional memory might not increase performance or resolve what appears to be a lack of available system memory.

- The Production Management Engine and Archive Production Engine can both see increased performance with proper memory allocation. Certain attributes of the database are used to determine the memory it requires for optimal performance. For more information about Production Management database memory requirements, see "Determining Interplay Database Scalability" in the *Avid Interplay Production Best Practices Guide*.

- Starting with Production Management v3.6, the Media Indexer performance and scalability become more directly tied to the amount of available memory. For more information about allocating compute resource requirements and Media Indexer performance, see "Working with Interplay Media Indexers" in the *Avid Interplay Production Best Practices Guide*.

Provisioning Virtual Disks for VMs

Nearly all the VM's in a Production Management environment can be deployed with a single virtual disk to host both the operating system and all installed applications. However, there are two virtual machines that should be deployed with two disks — the Production Management Engine and the Archive Production Engine.

The Production Management Engine contains the Production Management database. Avid recommends that you store this database on a second virtual disk to isolate it from the operating system and applications. The size of this disk depends on two factors:

- The expected size of the Production Management database
- Plans to use this disk to create and store backup copies of the database

The same rules apply to the Archive Production Engine. However, the archive database by nature will likely continue to grow and require more disk space. Therefore, you should plan for this and start with a larger allocation of disk space to accommodate the database's initial size and for future growth.

General Compute Resource Guidelines

The following table can be used as a reference for sizing Production Management virtual machines. In some cases, Avid supports combining more than one application or service on a single virtual machine. However doing so might require you to allocate additional cores and/or memory to the VM.

The following recommendations are based on an environment with 30 or fewer client connections. If you exceed this number of connections, you might be required to add additional cores and/or memory to your virtual machines.

Application	Cores	Memory	Disk Size GB
Production Management Engine[a]	2	32	C: 80GB D: 200+GB
Archive Production Engine[a]	2	32	C: 80GB D: 500+GB
Media Indexer[b]	4	32	C: 200GB
Production Services Engine	2	12	C:80GB
Transcode Service (2 Instances)[c]	4	16	C: 80GB
Transcode Service (4 Instances)[c]	8	24	C: 80GB
STP Encode Service	4	16	C: 80GB
Copy Service	2	12	C: 80GB
Move Service	2	12	C: 80GB
Delivery Service	2	12	C: 80GB
Archive/Restore Service	2	12	C: 80GB
MediaCentral Capture with Router Control	2	12	C: 80GB
Production Management Web Services	2	12	C: 80GB
Nutanix CVM[d]	8-12	32	

a. For more information, see "Determining Interplay Database Scalability" in the Interplay Production Best Practices Guide.
b. For information on calculating memory allocation, see "Working With Interplay Media Indexers" in the latest Interplay Production Best Practices Guide.
c. Transcode performs best when 2 cores are allocated for each running instance of the service.
d. Every node in a Nutanix cluster requires a Controller VM (CVM). Please reference the Nutanix Support Portal to find the recommended CVM configuring for your infrastructure.

When calculating the size of the virtual hard disk for a virtual machine consider:

• A clean install of Windows Server 2016 takes approximately 20 GB of disk space.

• Windows updates download packages can consume a considerable amount of disk space.

• Avid software is often deployed from installer packages that are downloaded to the local machine. These packages can often consume 15-20 GB of space on the target machine. While you can often delete these packages following the installation, you must have enough space to host the packages for the initial deployment.

• Some applications generate log files that accumulate over time and should be monitored and moved or purged if necessary.

Before making any purchasing decisions, Avid recommends that you contact your Avid Sales representative to arrange a consultation to help with designing a solution that meets your specific technical requirements.

Deployment in Nutanix Prism

This section provides detailed instructions for deploying a virtual machine in Nutanix Prism.

Prior to deploying your virtual machines, Avid highly recommends that you organize and appropriately document all required pre-flight data, such as hostnames, IP addresses, passwords, or other. Avid also recommends that you pre-configure all Computer Objects, Group Policies, and Organizational Units in Active Directory.

Deploying a Windows Virtual Machine in Nutanix Prism

To deploy a Windows virtual machine:

1. Log into Nutanix Prism.

2. Choose VM from the Dashboard pull-down menu.

3. In the VM Dashboard, click the Create VM option.

4. Configure the following parameters in the Create VM window:

    General Configuration

- - Name: custom
- - Description (optional): custom
- - Timezone: custom
- - Use this VM as an agent VM: deselected

Compute Details

Compute Details

VCPU(S)

> 1

Number Of Cores Per Vcpu

> 4

- VCPU(S): 1
- Cores: depends on VM application role and workload
- Memory: depends on VM application role and workload

Disks

- There will be one CD-ROM by default.

5. Click the pencil icon to edit the default CD-ROM and for the image choose the Windows OS ISO image.

Add Disk   ?   ✕

Type

CD-ROM

Operation

Clone from Image Service

Bus Type

IDE

Image ⓘ

WinSvr2016

MCCUX_2019_9_Platform

VirtIO_1.1.4

WinSvr2016

- Type: CD ROM
- Operation: Clone from Image Service
- Bus Type: IDE
- Image: Choose the Windows ISO

6. Click Update

7. Create a second CD-ROM using the same setting but for the image choose the VirtIO ISO image this time.

8. Create one DISK for the Windows Operating System installation.

- Type: DISK to host the Windows Operating System
- Operation: Allocate on Storage Container
- Bus Type: SCSI
- Storage Container: Default
- Size: 80 GB
- Index: Next Available

After you click Add for the OS Disk and return to the Create VM window, scroll down to the Disks pane and select the CD-ROM with the Windows OS ISO as your boot device.

9. Scroll Down and click Add New NIC.

10. Complete the following parameters in the Create NIC window:
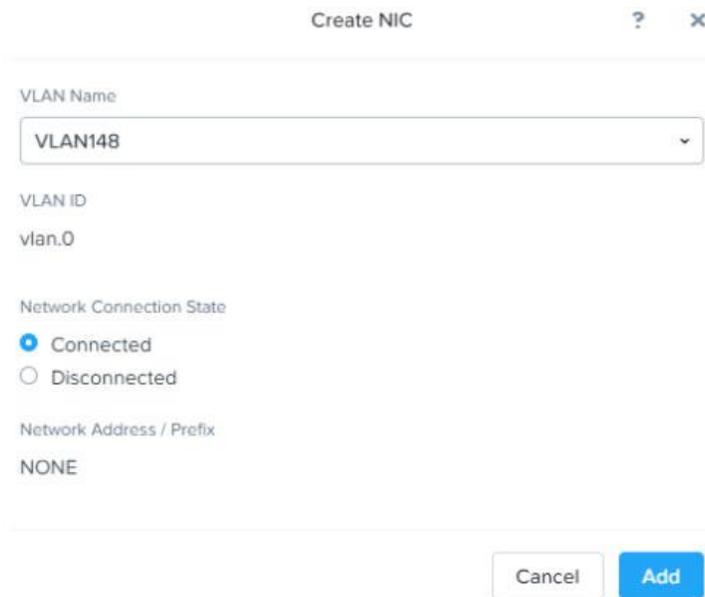
- - VLAN Name: custom
- - Network Connection State: Connected
- - Network Address/Prefix: None

11. Scroll through the Create VM window to verify that your settings are correct, and then click Save.

12. Select your new VM in the Table view of the VM Dashboard, and click Power On.

The circle icon to the left of the VM name will change from red to green when it is powered on.

13. Click the Launch Console menu.

The VM Console window should appear in a separate browser window and present you with the Windows Setup screen as the VM has booted from the Windows OS ISO image.
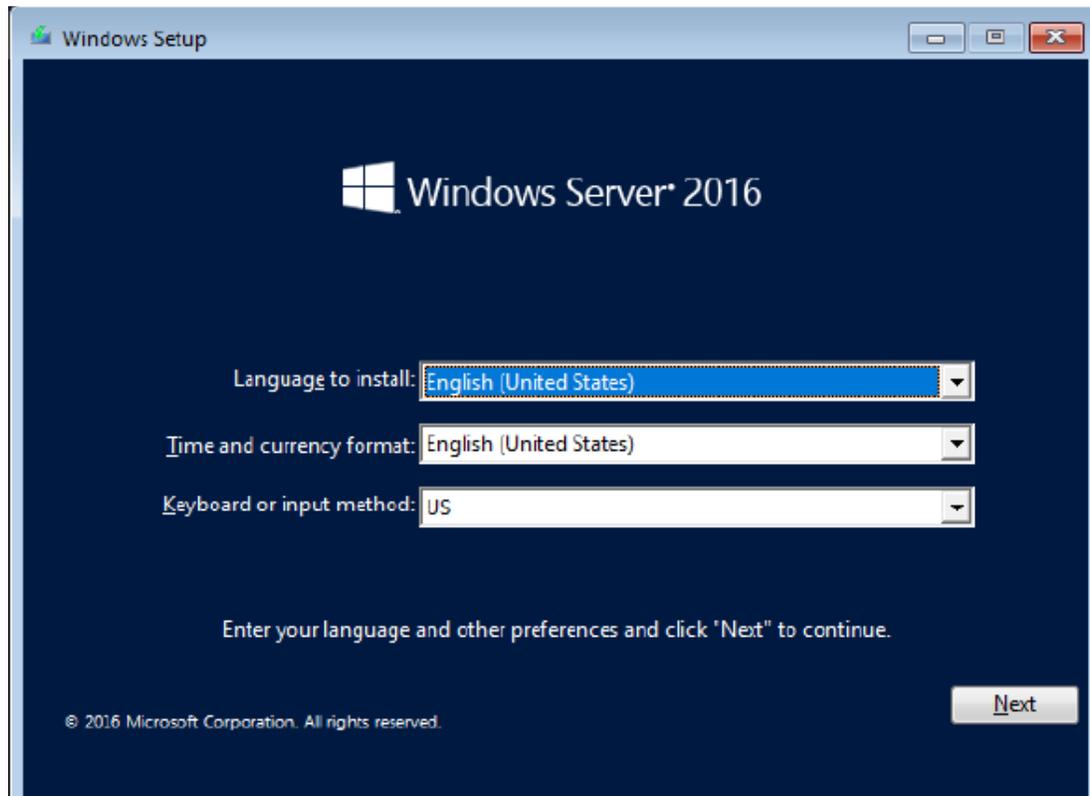

14. Proceed with the Windows OS installation process.

    a.   Enter your Windows Product Key

    b.   Choose Windows Server 2016 (Desktop Experience)

    c.   Accept the License Terms

    d.   Choose Custom Install

15. At the prompt "Where do you want to Install Windows?" prompt, there are no target disks listed. Click the Load driver option.

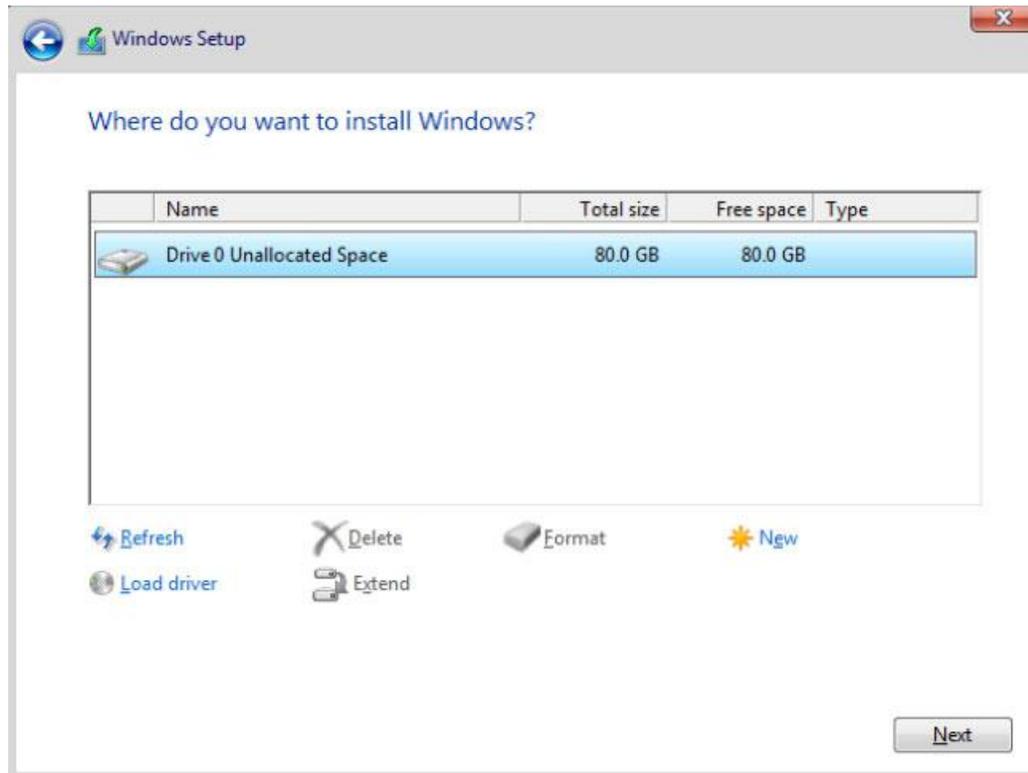16. Browse to the VirtIO drivers ISO.

17. Navigate to the Windows Server 2016\amd64 folder and click OK.
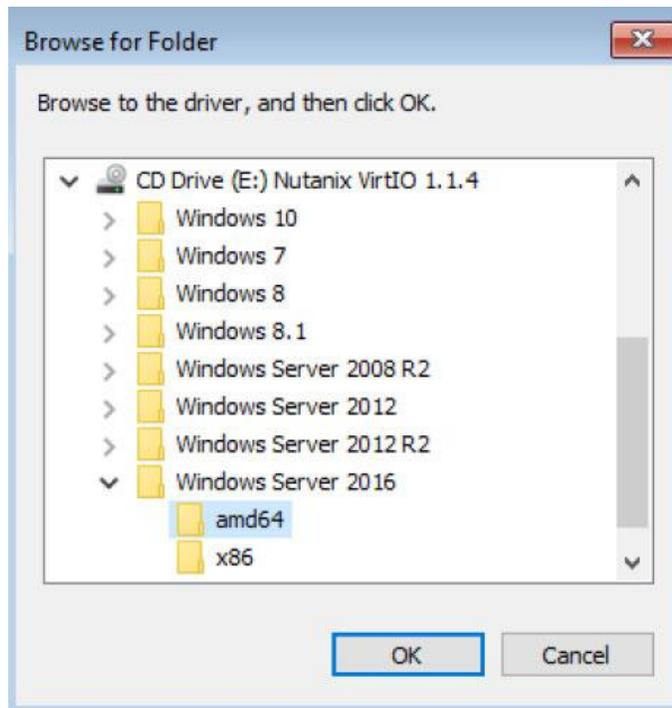
18. Use the Shift key to select all three drivers and click Next.
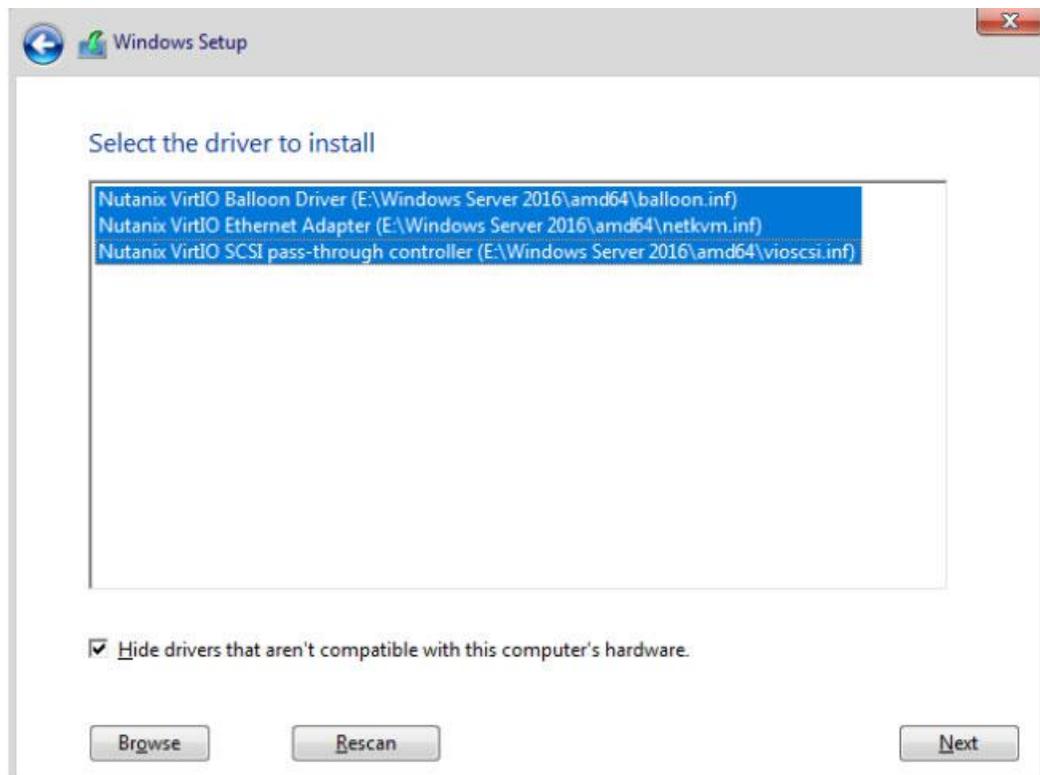
19. A progress bar processes several times and then the Windows Setup window will return where you can now select the VM disk you created to install the operating system onto.

20. Click Next and the Windows installation process will begin. The virtual machine appears to reboot a few times.

21. When the installation process completes you are presented with a window to set the local Administrator password. Take extra care in recording the password in a safe place.

22. After entering the password, you are presented with the standard Windows OS login screen.

23. Use the Control Alt Delete (CAD) icon at the top of your Console Window so you can enter your password and login into the virtual machine.

24. Use your preferred method to perform the following.

    a. Set the Computer hostname

    b. Enable Remote Desktop

    c. Set the Time zone

    d. Configured the TCP/IP and DNS Settings

25. Shut the VM down.

26. Select the VM in Prism and choose Update.

27. Navigate to the Disk section.

28. Change the Boot Device to be the DISK.

29. Eject the ISO images from both CD-ROM drives.

30. Delete one of the CD-ROM drives.

31. Install Nutanix Guest Tools

    a. Select the VM in Prism and click Manage Guest Tools.

    b. Select the option to Enable NGT.

    c. Select the option to Mount NGT.

    d. Click Submit.
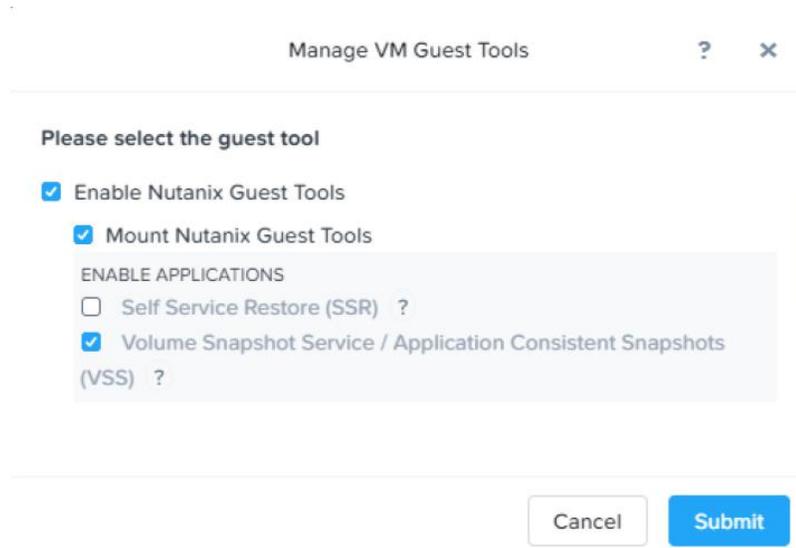
32. Remotely access the VM and navigate to the CD drive and double-click the Nutanix icon.

33. Agree to the license terms, step through the installer and restart the VM when the install is complete.

34. Confirm the Computer Object for this VM is added to the correct folder in Active Directory.

35. Join the VM to the domain.

36. Restart the virtual machine.

    With the VM now joined to the domain and Remote Desktop enabled you should be able to remotely access the machine using your preferred method (or continue to use the Nutanix console) and save the login credentials for quick access gong forward.

37. Login with the domain user that will be the standard operational login.

38. Verify Group Policies have been applied.

39. Verify Windows Updates are current. If they are not, install updates using your preferred method.

40. (Optional) Create a Snapshot to preserve a Windows OS baseline image that you can return to if anything should go wrong while installing and configuring additional software on the virtual machine. Once the configuration is complete and verify everything is working properly you should delete any snapshots that you created.

Production Management Software Deployment

After all your VM's are deployed and baselined at their operating system level you can use the standard installation guides for each Avid product to proceed with the software installation and configuration.

Revision History

Date	Description
June, 2020	Initial Release

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