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Deployment Guide Cisco Public

# Cisco Compute Hyperconverged with Nutanix for Citrix Virtual Apps and Desktops on AHV

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## About the Cisco Validated Design Program

The Cisco Validated Design (CVD) program consists of systems and solutions designed, tested, and documented to facilitate faster, more reliable, and more predictable customer deployments. For more information, go to: <u>http://www.cisco.com/go/designzone</u>.

## **Executive Summary**

Application modernization is the foundation for digital transformation, enabling organizations to integrate advanced technologies. The key technologies include AI, IoT, cloud computing, and data analytics. Once integrated, these technologies enable businesses to take advantage of digital innovations and identify growth opportunities. These applications are diverse, distributed across geographies and deployed across data centers ,edge and remote sites. For instance, new AI workloads, demand modern infrastructure to make inferences in branch offices, retail locations, or the network edge. The key challenge for IT Administrators is how to quickly deploy and manage infrastructure at scale, whether with many servers at a core data center or with many dispersed locations.

Hyperconverged Infrastructure (HCI) solves many of today's challenges because it offers built-in data redundancy and a smooth path to scaling up computing and storage resources as your needs grow.

The Cisco Compute Hyperconverged (CCHC) with Nutanix solution helps you overcome the challenge of deploying on a global scale with an integrated workflow. The solution uses Cisco Intersight<sup>®</sup> to deploy and manage physical infrastructure, and Nutanix Prism Central to manage your hyperconverged environment. Cisco and Nutanix engineers have tightly integrated our tools through APIs, establishing a joint cloud-operating model.

Whether it is at the core, edge or remote site, Cisco HCI with Nutanix provides you with a best in-class solution, enabling zero-touch accelerated deployment through automated workflows, simplified operations with an enhanced solution-support model combined with proactive, automated resiliency, secure cloud-based management and deployment through Cisco Intersight and enhanced flexibility with choice of compute and network infrastructure

This Cisco Validated Design and Deployment Guide provides prescriptive guidance for the design, setup, and configuration to deploy Cisco Compute Hyperconverged with Nutanix in Intersight Standalone mode allowing nodes to be connected to a pair of Top-of-Rack (ToR) switches and servers are centrally managed using Cisco Intersight<sup>®</sup>.

For more information on Cisco Compute for Hyperconverged with Nutanix, go to: https://www.cisco.com/go/hci

## **Solution Overview**

This chapter contains the following:

- <u>Audience</u>
- Purpose of this Document
- Solution Summary

## Audience

The intended audience for this document includes sales engineers, field consultants, professional services, IT managers, partner engineering staff, and customers deploying Cisco Compute Hyperconverged Solution with Nutanix. External references are provided wherever applicable, but readers are expected to be familiar with Cisco Compute, Nutanix, plus infrastructure concepts, network switching and connectivity, and the security policies of the customer installation.

## **Purpose of this Document**

This document describes the design, configuration, and deployment steps for Citrix Virtual Apps and Desktops Virtual Desktop Infrastructure (VDI) on Cisco Compute Hyperconverged with Nutanix in Intersight Standalone Mode (ISM).

## **Solution Summary**

The Cisco Compute Hyperconverged with Nutanix family of appliances delivers pre-configured UCS servers ready to be deployed as nodes to form Nutanix clusters in various configurations. Each server appliance contains three software layers: Cisco UCS server firmware, hypervisor (Nutanix AHV), and hyperconverged storage software (Nutanix AOS).

Physically, nodes are deployed into a cluster, with a cluster consisting of four Cisco Compute Hyperconverged All-Flash Servers capable of supporting 600 users. Nutanix clusters can be scaled out to the maximum cluster server limit documented by <u>Nutanix</u>. The environment can be scaled into multiple clusters. The minimum depends on the management mode. These servers can be interconnected and managed in two different ways:

**UCS Managed mode:** The nodes are connected to a pair of Cisco UCS<sup>®</sup> 6400 Series or Cisco UCS 6500 Series fabric interconnects and managed as a single system using UCS Manager. The minimum number of nodes in such a cluster is three. These clusters can support both general-purpose deployments and mission-critical high-performance environments.

**Intersight Standalone mode:** The nodes are connected to a pair of Top-of-Rack (ToR) switches, and servers are centrally managed using Cisco Intersight<sup>®</sup>, while Nutanix Prism Central manages the hyperconverged environment..

The present solution elaborates on the design and deployment details for deploying Cisco C-Series nodes in DC-no-FI environments for Nutanix configured in Intersight Standalone Mode (ISM).

## **Technology Overview**

This chapter contains the following:

- <u>Cisco Unified Computing System</u>
- <u>Cisco Compute Hyperconverged HCIAF240C M7 All-NVMe/All-Flash Servers</u>

The components deployed in this solution are configured using best practices from both Cisco and Nutanix to deliver an enterprise-class VDI solution deployed on Cisco Compute Hyperconverged Rack Servers. The following sections summarize the key features and capabilities available in these components.

## **Cisco Unified Computing System**

Cisco Unified Computing System (Cisco UCS) is a next-generation data center platform that integrates computing, networking, storage access, and virtualization resources into a cohesive system designed to reduce total cost of ownership and increase business agility. The system integrates a low-latency, lossless 10-100 Gigabit Ethernet unified network fabric with enterprise-class, x86-architecture servers. The system is an integrated, scalable, multi-chassis platform with a unified management domain for managing all resources.

Cisco Unified Computing System consists of the following subsystems:

Compute-The compute piece of the system incorporates servers based on the Second-Generation Intel<sup>®</sup>
 Xeon<sup>®</sup> Scalable processors. Servers are available in blade and rack form factor, managed by Cisco UCS Manager.

• Network—The integrated network fabric in the system provides a low-latency, lossless, 10/25/40/100 Gbps Ether-net fabric. Networks for LAN, SAN and management access are consolidated within the fabric. The unified fabric uses the innovative Single Connect technology to lowers costs by reducing the number of network adapters, switches, and cables. This in turn lowers the power and cooling needs of the system.

• Virtualization-The system unleashes virtualization's full potential by enhancing its scalability, performance, and operational control. Cisco security, policy enforcement, and diagnostic features are now extended into virtual environments to support evolving business needs.

#### **Cisco UCS Differentiators**

Cisco Unified Computing System is revolutionizing how servers are managed in the datacenter. The following are the unique differentiators of Cisco Unified Computing System and Cisco UCS Manager:

• Embedded Management–In Cisco UCS, the servers are managed by the embedded firmware in the Fabric Inter-connects, eliminating the need for external physical or virtual devices to manage the servers.

• Unified Fabric-In Cisco UCS, from blade server chassis or rack servers to FI, a single Ethernet cable is used for LAN, SAN, and management traffic. This converged I/O results in reduced cables, SFPs, and adapters, reducing the overall solution's capital and operational expenses.

• Auto Discovery–By simply inserting the blade server in the chassis or connecting the rack server to the fabric interconnect, discovery and inventory of compute resources occurs automatically without any management intervention. Combining unified fabric and auto-discovery enables the wire-once architecture of Cisco UCS, where the compute capability of Cisco UCS can be extended easily while keeping the existing external connectivity to LAN, SAN, and management networks.

#### **Cisco UCS Manager**

Cisco UCS Manager (UCSM) provides unified, integrated management for all software and hardware components in Cisco UCS. Using Cisco Single Connect technology, it manages, controls, and administers multiple chassis for thousands of virtual machines. Administrators use the software to manage the entire Cisco

Unified Computing System as a single logical entity through an intuitive graphical user interface (GUI), a command-line interface (CLI), or a through a robust application programming interface (API).

## **Cisco Intersight**

Cisco Intersight is a lifecycle management platform for your infrastructure, regardless of location. In your enterprise data center, at the edge, in remote and branch offices, at retail and industrial sites—all these locations present unique management challenges and typically require separate tools. Cisco Intersight Software as a Service (SaaS) unifies and simplifies your experience of the Cisco Unified Computing System and Cisco HyperFlex systems. See Figure 1.



## Cisco Compute Hyperconverged HCIAF240C M7 All-NVMe/All-Flash Servers

The Cisco Compute Hyperconverged HCIAF240C M7 All-NVMe/All-Flash Servers extends the capabilities of Cisco's Compute Hyperconverged portfolio in a 2U form factor with the addition of the 4th Gen Intel<sup>®</sup> Xeon<sup>®</sup> Scalable Processors (codenamed Sapphire Rapids), 16 DIMM slots per CPU for DDR5-4800 DIMMs with DIMM capacity points up to 256GB.

The All-NVMe/all-Flash Server supports 2x 4th Gen Intel<sup>®</sup> Xeon<sup>®</sup> Scalable Processors (codenamed Sapphire Rapids) with up to 60 cores per processor. It has memory up to 8TB with 32 x 256GB DDR5-4800 DIMMs in a 2-socket configuration. There are two servers to choose from:

- HCIAF240C-M7SN with up to 24 front facing SFF NVMe SSDs (drives are direct-attach to PCIe Gen4 x2)
- HCIAF240C-M7SX with up to 24 front facing SFF SAS/SATA SSDs

For more details, go to: HCIAF240C M7 All-NVMe/All-Flash Server specification sheet.

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Figure 2. Front View: HCIAF240C M7 All-NVMe/All-Flash Servers

## Solution Design

This chapter contains the following:

- <u>Requirements</u>
- <u>Considerations</u>

## Requirements

## **Physical Components**

Table 1 lists the required physical components and hardware.

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Component	Hardware
Network Switches	Two (2) Cisco UCS 6454 Nexus switches
Servers	Four (4) Cisco C240 M7 All NVMe servers

## **Software Components**

<u>Table 2</u> lists the software components and the versions required for a single cluster of the Citrix Virtual Apps and Desktops (CVAD) Virtual Desktop Infrastructure (VDI) on Cisco Compute Hyperconverged with Nutanix in Intersight Standalone Mode (ISM), as tested, and validated in this document.

Table 2.	Software	Components	and	Hardware
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Component	Hardware
Foundation Central	1.6
Prism Central deployed on ESXi cluster	pc.2024.1.0.1
AOS and AHV bundled	nutanix_installer_package-release-fraser-6.8.0.1
Nutanix VirtlO	1.2.3
Cisco UCS Firmware	Cisco UCS C-Series bundles, revision 4.3(3.240043)
Nutanix AHV Citrix Plug-in	2.7.7
Citrix Virtual Apps and Desktops	2203 LTSR
Citrix Provisioning Services	2203 LTSR

## **Physical Topology**

Cisco Compute Hyperconverged (CCHC) with Nutanix cluster built using Cisco HCIAF240C M7 Series rackmount servers. The two Cisco Nexus switches connect to every Cisco Compute Hyperconverged server. Upstream network connections, referred to as "northbound" network connections are made from the Nexus switches to the customer datacenter network at the time of installation.

The Day0 deployment is managed through Cisco Intersight and Nutanix Foundation Central and is enabled through Prism Central.

Figure 3. Cisco Compute Hyperconverged (CCHC) with Nutanix in Intersight standalone mode (ISM) Physical Topology



## **Logical Topology**

<u>Figure 4</u> illustrates the logical architecture of the validated solution, which is designed to run desktop and RDS server VMs supporting up to 600 users on a single Cisco Compute Hyperconverged (CCHC) 4-node cluster with Nutanix, with physical redundancy for the rack servers and a separate cluster to host core services and management components.

**Note:** Separating management components and desktops is a best practice for the large environments.





## **Considerations**

## **Design Considerations for Desktop Virtualization**

There are many reasons to consider a virtual desktop solution, such as an ever-growing and diverse base of user devices, complexity in managing of traditional desktops, security, and even Bring Your Own Device (BYOD) to work programs. The first step in designing a virtual desktop solution is understanding the user community and the tasks required to execute their role successfully. The <u>Citrix VDI Handbook</u> offers detailed information on user classification and the types of virtual desktops.

The following user classifications by the workload impact overall density and the VDI model:

- Knowledge Workers 2-10 office productivity apps with light multimedia use.
- Task Workers 1-2 office productivity apps or kiosks.
- Power Users Advanced applications, data processing, or application development.
- Graphic-Intensive Users High-end graphics capabilities, 3D rendering, CAD, and other GPU-intensive tasks.

After the user classifications have been identified and the business requirements for each user classification have been defined, it becomes essential to evaluate the types of virtual desktops that are needed based on user requirements. Below is the Citrix set of VDI models for each user:

- Hosted Apps: Delivers application interfaces to users, simplifying the management of key applications.
- Shared Desktop: Hosts multiple users on a single server-based OS, offering a cost-effective solution, but users have limited system control.
- Pooled Desktop: Provides temporary desktop OS instances to users, reducing the need for multi-user compatible applications.
- Persistent Desktop: Offers a customizable, dedicated desktop OS for each user, ideal for those needing persistent settings.

- GPU Desktop: Provides dedicated GPU resources for enhanced graphical performance.
- vGPU: Allows multiple VMs to share a single physical GPU for better graphics processing.
- Remote PC Access: Secure remote access to a user's physical office PC.
- Web and SaaS Application Access: Offers secure, flexible access to web/SaaS apps with enhanced security and governance.

**Note:** Windows 11 Pooled and Persistent Desktops (Single-session OS) and Windows Server 2022 Shared Desktops (Multi-session OS) VDAs were validated using Knowledge Worker workload for the purposes of the validation represented in this document.

#### **Understanding Applications and Data**

When the desktop user groups and sub-groups have been identified, the next task is to catalog group application and data requirements. This can be one of the most time-consuming processes in the VDI planning exercise, but it is essential for the VDI project's success. Performance will be negatively affected if the applications and data are not identified and co-located.

The inclusion of cloud applications, such as SalesForce.com, will likely complicate the process of analyzing an organization's variety of applications and data pairs. This application and data analysis is beyond the scope of this Cisco Validated Design but should not be omitted from the planning process. Various third-party tools are available to assist organizations with this crucial exercise.

#### Sizing

The following key project and solution sizing questions should be considered:

- Has a VDI pilot plan been created based on the business analysis of the desktop groups, applications, and data?
- Is there infrastructure and budget in place to run the pilot program?
- Are the required skill sets to execute the VDI project available? Can we hire or contract for them?
- Do we have end-user experience performance metrics identified for each desktop sub-group?
- · How will we measure success or failure?
- · What is the future implication of success or failure?

Below is a short, non-exhaustive list of sizing questions that should be addressed for each user sub-group:

- What is the Single-session OS version?
- How many virtual desktops will be deployed in the pilot? In production?
- How much memory per target desktop group desktop?
- · Are there any rich media, Flash, or graphics-intensive workloads?
- Are there any applications installed? What application delivery methods will be used, Installed, Streamed, Layered, Hosted, or Local?
- What is the Multi-session OS version?
- What is the virtual desktop deployment method?
- What is the hypervisor for the solution?
- What is the storage configuration in the existing environment?
- Are there sufficient IOPS available for the write-intensive VDI workload?

- Will there be storage dedicated and tuned for VDI service?
- Is there a voice component to the desktop?
- Is there a 3rd party graphics component?
- Is anti-virus a part of the image?
- Is user profile management (for example, non-roaming profile-based) part of the solution?
- What are the fault tolerance, failover, and disaster recovery plans?
- Are there additional desktop sub-group-specific questions?

## Install and Configure Nutanix cluster on Cisco Compute Hyperconverged Servers in Standalone Mode

This chapter contains the following:

- Prerequisites
- Install Nutanix on Cisco Compute Hyperconverged Servers in Intersight Standalone Mode
- <u>Configure Cisco Nexus Switches</u>

This chapter provides an introduction to the solution deployment for Nutanix on Cisco Compute Hyperconverged Servers in Intersight Standalone Mode (ISM). The Intersight Standalone Mode requires the Cisco Compute Hyperconverged Servers to be directly connected to an ethernet switches and the servers are claimed through Cisco Intersight.

For the complete step-by-step procedures for implementing and managing the deployment of the Nutanix cluster in the ISM mode, refer to the Cisco Deployment guide: <u>Cisco Compute Hyperconverged with Nutanix in Intersight Standalone Mode Design and Deployment Guide.</u>

## **Prerequisites**

Before beginning the installation of Nutanix Cluster on Cisco Compute Hyperconverged servers in Intersight Standalone Mode, you should ensure they have deployed Nutanix Prism Central and enabled Nutanix Foundation Central through the Nutanix marketplace available through Prism Central. Foundation Central can create clusters from factory-imaged nodes and reimage existing nodes registered with Foundation Central from Prism Central. This provides benefits such as creating and deploying several clusters on remote sites, such as ROBO, without requiring onsite visits

At a high level, to continue with the deployment of Nutanix on Cisco Compute Hyperconverged servers in Intersight standalone mode (ISM), ensure the following:

- Prism Central is deployed on a Nutanix Cluster
- Foundation Central 1.6 or later is enabled on Prism Central
- A local webserver is available hosting Nutanix AOS image

Note: Prism Central 2022.9 or later to support Windows 11 on AHV.

**Note:** In this solution, using the Cisco Intersight **Advantage** License Tier enables the following: Configuration of Server Profiles for Nutanix on Cisco Compute Hyperconverged Rack Servers Integration of Cisco Intersight with Foundation Central for Day 0 to Day N operations.

## Install Nutanix on Cisco Compute Hyperconverged Servers in Intersight Standalone Mode

<u>Figure 5</u> shows the high-level configuration of Cisco Compute Hyperconverged Servers in Intersight Standalone Mode (ISM) for Nutanix.

Figure 5. High-level configuration of Cisco Compute Hyperconverged servers in Intersight Standalone Mode for Nutanix



## **Solution Cabling**

The following sections detail the physical connectivity configuration of the Nutanix cluster on Cisco Compute Hyperconverged servers in standalone mode.

**Note:** This document is intended to allow the reader to configure the Citrix Virtual Apps and Desktops customer environment as a stand-alone solution

This section provides information on cabling the physical equipment in this Cisco Validated Design environment.

**Note:** This document assumes that out-of-band management ports are plugged into an existing management infrastructure at the deployment site. These interfaces will be used in various configuration steps.

**Note:** Follow the cabling directions in this section. Failure to do so will cause problems with your deployment.

Figure 6 details the cable connections used in the validation lab for Cisco Compute Hyperconverged with Nutanix ISM topology based on the Cisco Nexus 9000 Series data center switches. 100Gb links connect the Cisco Compute Hyperconverged servers to the Cisco Nexus Switches. Additional 1Gb management connections will be needed for an out-of-band network switch that sits apart from the CCHC infrastructure. Each Cisco Nexus switch is connected to the out-of-band network switch. Layer 3 network connectivity is required between the Out-of-Band (OOB) and In-Band (IB) Management Subnets.

#### Figure 6. **CCHC ISM Cabling Diagram**



## **Configure Cisco Nexus Switches**

Management Cable

Before beginning the installation, configure the following ports, settings, and policies in the Cisco Nexus 93180YC-FX interfaces.

The solution described in this document provides details for configuring a fully redundant configuration. Configuration guidelines refer to which redundant component is configured with each step, whether A or B. For example, Cisco Nexus A and Cisco Nexus B identify the pair of configured Cisco Nexus switches.

The VLAN configuration recommended for the environment includes six VLANs as listed in Table 3. The ports were configured in the trunk mode to support multiple VLANs presented to the servers,

Note: MTU 9216 is not required but recommended in case jumbo frames are ever used in the future

#### Table 3. vLANs

VLAN Name	VLAN ID	VLAN Purpose	Subnet Name	VLAN ID
Default	1	Native VLAN	Default	1
InBand-Mgmt_70	70	In-Band management interfaces	VLAN-70	70
Infra-Mgmt_71	71	Infrastructure Virtual Machines	VLAN-71	71
VDI_72	72	RDSH, VDI Persistent and Non-Persistent <sup>1</sup>	VLAN-72	72
ООВ	132	Out-Of-Band connectivity	VLAN-132	

<sup>1</sup>VDA workloads were deployed and tested individually, one at a time.

#### **Tech tip**

It is recommended to use VLAN segmentation to accommodate various VDA workloads in a hybrid deployment.

#### Procedure 1. Configure Cisco Nexus A

Step 1. Log in as "admin" user into the Cisco Nexus Switch A.

**Step 2.** Use the device CLI to configure the hostname to make it easy to identify the device, enable services used in your environment and disable unused services.

Step 3. Configure the local login and password:

```
interface Ethernet1/51
  description C240M7 Nutanix A
  switchport mode trunk
  switchport trunk allowed vlan 1-132
  spanning-tree port type edge trunk
 mtu 9216
 no shutdown
interface Ethernet1/52
 description C240M7 Nutanix A
  switchport mode trunk
  switchport trunk allowed vlan 1-132
  spanning-tree port type edge trunk
 mtu 9216
  no shutdown
interface Ethernet1/53
  description C240M7 Nutanix A
  switchport mode trunk
  switchport trunk allowed vlan 1-132
  spanning-tree port type edge trunk
```

```
mtu 9216
no shutdown
interface Ethernet1/54
description C240M7 Nutanix A
switchport mode trunk
switchport trunk allowed vlan 1-132
spanning-tree port type edge trunk
mtu 9216
no shutdown
copy running-config startup-config
```

#### Procedure 2. Configure Cisco Nexus B

Step 1. Log in as "admin" user into the Cisco Nexus Switch B.

**Step 2.** Use the device CLI to configure the hostname to make it easy to identify the device, enable services used in your environment and disable unused services.

#### Step 3. Configure the local login and password:

```
interface Ethernet1/51
  description C240M7 Nutanix B
  switchport mode trunk
  switchport trunk allowed vlan 1-132
  spanning-tree port type edge trunk
 mtu 9216
  no shutdown
interface Ethernet1/52
  description C240M7 Nutanix B
  switchport mode trunk
  switchport trunk allowed vlan 1-132
  spanning-tree port type edge trunk
 mtu 9216
 no shutdown
interface Ethernet1/53
  description C240M7 Nutanix B
  switchport mode trunk
  switchport trunk allowed vlan 1-132
  spanning-tree port type edge trunk
 mtu 9216
  no shutdown
interface Ethernet1/54
  description C240M7 Nutanix B
  switchport mode trunk
```

```
switchport trunk allowed vlan 1-132
spanning-tree port type edge trunk
mtu 9216
no shutdown
copy running-config startup-config
```

## **Post Cluster Creation Task**

This procedure describes the post-cluster creation steps.

#### **Procedure 1.** Create a VM network subnet

Step 1. Log into the Cluster VIP with admin - Nutanix/4u and change the password.

		1
	PRISM	
	Create a new password for the cluster admin.	
	password	
	reade virtual yook a large for administration trade to assess on a large data with application or and a scriptisk unling the administration of an attendication. Manufai recommends that you arcrete a user assigned with the administration for a using the administration of an attendication. The Perim Web consols Guide	
	describes authoritication and roles. Having issues logging in?	
Powered by NUTANIX.	Your password must: End Contain at least 8 character(s)	age the warp drive!

**Step 2.** Go to Cluster details, enter the iSCSI data services IP, and enable Retain Deleted VMs for 1 day. Click **Save**.

#### **Configure Subnets**

To create additional subnets used by virtual desktops follow the steps below. The subnets from the <u>Table 4</u> were created for this validated design.

#### **Procedure 1.** Create a VM network subnet

Step 1. Go to the VM tab and click Network Config link.

VDI-4NODE-AHV VM	·   😂 🌲 • • • 🗉 💿	<b>Q ?</b> 🗸 🗢 🛛 admin.~
Overview · Table		+ Create VM Network Config

Step 2. Click +Create Subnet.

Network Config	guration ?
Subnets Internal Interfaces Virtual Switch	
	+ Create Subne

**Step 3.** Enter **Subnet Name** and **VLAN ID** for your subnet. Click **Save**. Repeat for any additional VLANs you are introducing to virtual desktops.

Create Subnet	? ×
Subnet Name	
VLAN-72	
Virtual Switch	
vsO	~
VLAN ID ③	
72	
Enable IP address management	
This gives AHV control of IP address assignments within the network.	
	Cancel

## **Configure Storage Container**

To create a Storage Container to host virtual desktops, follow the steps below. A single container was created for single-session and multi-session desktops.





Create Storage Cor	ntainer	? X	Create Storage Container ?	×
ame		^	Compression	
VDI			Perform post-process compression of all persistent data. For	
torage Pool			inline compression, set the delay to 0.	
default-storage-pool-61470195232803		~	0	
lax Capacity (Physical)				
5.59 TiB Based on storage pool free unres	served capacity		Deduplication	
			Capacity	
dvanced Settings			Perform post-process deduplication of persistent data.	
Replication Factor ③				
2		~	Erasure Coding 💮	
			Enable	
Reserved Capacity (Logical)			Erasure coding enables capacity savings across solid-state drives	\$
0		GiB	anu nano ulas unvea,	
Reserved Capacity (Physical) - 0 GIB			Filesystem Allowlists	
Advertised Capacity (Logical)			Enter comma separated entries	
		¥		

#### **Tech tip**

Nutanix recommends enabling compression for Virtual Apps or Virtual Desktops as a general best practice; only enable the Elastic Deduplication Engine for full clones. Erasure coding isn't a suitable data reduction technology for desktop virtualization.

**Note:** Full clones in the table above are persistent machines including MCS full clone persistent machines. Citrix MCS are nonpersistent machines.

## Install and Configure Citrix Virtual Apps and Desktops

This chapter contains the following:

- Prerequisites
- Build the Virtual Machines and Environment for Workload Testing
- Install Citrix Virtual Apps and Desktops Delivery Controller, Citrix Licensing, and StoreFront
- Install and Configure Citrix Provisioning Server

## **Prerequisites**

Citrix recommends using Secure HTTP (HTTPS) and a digital certificate to protect communications. Citrix recommends using a digital certificate issued by a certificate authority (CA) according to your organization's security policy. In our testing, the implementation of CA was not carried out.

## **Build the Virtual Machines and Environment for Workload Testing**

#### Prerequisites

Create the necessary DHCP scopes for the environment and set the Scope Options.

#### Example of the DHCP Scopes used in this CVD Figure 7. 📜 DHCP File Action View Help 🗢 🔿 🙍 📆 💥 📴 🧟 📑 💽 📀 🖞 DHCP Contents of Scope Address Pool 🗸 ᡖ IPv4 🛃 Address Leases 📑 Server Options Reservations > Scope [10.10.71.0] VLAN71 Scope Options Scope [10.54.0.0] VLAN54 Policies Scope [10.72.0.0] VLAN72 Policies > 📝 Filters 👗 IPv6

## Software Infrastructure Configuration

This section explains how to configure this solution's software infrastructure components.

Install and configure the infrastructure virtual machines by following the process listed in Table 4.

Configuration	Microsoft Active Directory DCs Virtual Machine	Citrix Virtual Apps and Desktops Controllers Virtual Machines
Operating system	Microsoft Windows Server 2019	Microsoft Windows Server 2022
Virtual CPU amount	4	6

Table 4. Test Infrastructure Virtual Machine Configuration

Configuration	Microsoft Active Directory DCs Virtual Machine	Citrix Virtual Apps and Desktops Controllers Virtual Machines
Memory amount	8 GB	24 GB
Network	Infra-Mgmt_71	Infra-Mgmt-71
Disk-1 (OS) size	40 GB	96 GB
Disk-2 size		

Configuration	Microsoft SQL Server Virtual Machine	Citrix Provisioning Servers Virtual Machines
Operating system	Microsoft Windows Server 2019	Microsoft Windows Server 2022
Virtual CPU amount	6	6
Memory amount	24GB	96 GB
Network	Infra-Mgmt_71	VLAN_72
Disk-1 (OS) size	40 GB	40 GB
Disk-2 size	100 GB SQL Databases\Logs	200 GB Disk Store

Configuration	Citrix StoreFront Controller Virtual Machine
Operating system	Microsoft Windows Server 2022
Virtual CPU amount	4
Memory amount	8 GB
Network	Infra-Mgmt-71
Disk-1 (OS) size	96 GB
Disk-2 size	

## **Create the Golden Images**

This section guides creating the golden images for the environment.

Major steps involved in preparing the golden images: installing and optimizing the operating system, installing the application software, and installing the Virtual Delivery Agents (VDAs).

Note: For this CVD, the images contain the basics needed to run the Login VSI workload.

The single-session OS and multi-session OS master target virtual machines were configured as detailed in <u>Table 5</u>.

Configuration	Single-session OS Virtual Machine	Mutli-session OS Virtual Machine
Operating system	Microsoft Windows 11 64-bit 21H2 (19044.2006)	Microsoft Windows Server 2022 21H2 (20348.2227)
Virtual CPU amount	2	4
Memory amount	4 GB	24 GB
Network	VDI_72	VDI_72
vDisk size	64 GB	96 GB
Additional software used for testing	Microsoft Office 2021 Office Update applied	Microsoft Office 2021 Office Update applied
Additional Configuration	Configure DHCP Add to domain Activate Office CVAD Agent Install FSLogix 2210 hotfix 1	Configure DHCP Add to domain Activate Office CVAD Agent Install FSLogix 2210 hotfix 1

Table 5. Single-session OS and Multi-session OS Virtual Machines Configurations

#### **Procedure 1.** Install Windows 11 Operating System

Using the following procedure, you can create a virtual machine with the vTPM configuration enabled.

**Note:** To create a virtual machine with vTPM enabled using Prism Central, the version PC.2022.9 or later is required. The Prism Central PC.2024.1.0.1 was deployed on the cluster. For additional details, refer to the Nutanix Tech note: <u>Windows 11 on Nutanix AHV</u>.

- **Step 1.** Log in to Prism Central as an administrator.
- Step 2. Select Infrastructure in the Application Switcher.
- Step 3. Go to Compute & Storage > VMs and click Create VM.

**Step 4.** The Create VM wizard appears. Continue with wizard making appropriate selections for v**CPU(s)**, **Memory**, **Disks**, **Networks**.

Note: Create two CD-ROMs to support VirtIO installation alongside Windows 11 OS.

Step 5. At the Shield VM Security Settings, click the Attach vTPM checkbox.

Boot Configuration	
UEFI BIOS Mode	
UEFI BIOS Mode supports enhanced Shield VM se	ecurity settings.
O Legacy BIOS Mode	
Shield VM Security Settings 🧧	
Secure Boot	
Uindows® Defender Credential Guard	
Attach vTPM	

- Step 6. Click Next at the subsequent VM setting tabs and then click Save
- Step 7. Mount ISOs with VirtIO drivers and Windows 11 to CDROMs.
- **Step 8.** Power on **VM** and follow the installation wizard.
- Step 9. Provide VirtIO drivers from CDROM.

🚱 🔏 Windows Setup Select the drive	r to install	×
	Browse for Folder	
	<ul> <li>CD Drive (E:) Nutanix VirtIO 1.2.3</li> <li>Windows 10</li> <li>Windows 11</li> <li>x64</li> <li>Windows 7 (Legacy)</li> <li>Windows 8.1 (Legacy)</li> <li>Windows 8.1 (Legacy)</li> <li>Windows Server 2008 R2 (Legacy)</li> <li>Windows Server 2012 R2</li> <li>Windows Server 2012 R2</li> <li>Windows Server 2012 R2</li> </ul>	
Hide drivers that		
Browse	OK Cancel	Next

Step 10. Select drivers to be installed and click Next.

🚱 🔬 Windows Setup	
Select the driver to install Nutanix VirtlO Balloon Driver (E\Windows 11\x64\balloon.inf) Nutanix VirtlO Ethernet Adapter (E\Windows 11\x64\hetkvm.inf)	
Nutanix VirtIO SCSI pass-through controller (E\Windows 11\x64\vioscsi.inf) QEMU FWCfg Device (null driver) (E\Windows 11\x64\qemufwcfg.inf)	
Hide drivers that aren't compatible with this computer's hardware.	
Br <u>o</u> wse <u>R</u> escan	Next

Step 11. Continue with OS installation until completed

Step 12. Remove the second CD-ROM after installation.

#### **Procedure 2.** Install Windows Server 2022 Operating System

- **Step 1.** Log in to Prism Central as an administrator.
- Step 2. Select Infrastructure in the Application Switcher.
- Step 3. Go to Compute & Storage > VMs and click Create VM.

**Step 4.** The Create VM wizard appears. Continue with wizard making appropriate selections for v**CPU(s)**, **Memory**, **Disks**, **Networks**.

Note: Create two CD-ROMs to support VirtIO installation alongside Windows Server 2022 OS.

- Step 5. Click Next at the subsequent VM setting tabs and then click Save
- Step 6. Mount ISOs with VirtIO drivers and Windows Server 2022 to CDROMs.
- Step 7. Power on VM and follow the installation wizard.
- Step 8. Provide VirtIO drivers from CDROM.

Browse for Folder	
Browse to the driver, and then dick OK.	
>         Windows 7 (Legacy)           >         Windows 8 (Legacy)           >         Windows Server 2008 R2 (Legacy)           >         Windows Server 2008 R2 (Legacy)           >         Windows Server 2012 R2           >         Windows Server 2016           >         Windows Server 2016           >         Windows Server 2021           C         X64	

Step 9. Select drivers to be installed and click Next.

Microsoft Server Operating System Setup	
Select the driver to install	
Nutanix Virt1O Balloon Driver (D:\Windows Server 2022\x64\balloon.inf) Nutanix Virt1O Ethernet Adapter (D:\Windows Server 2022\x64\netkvm.inf) Nutanix Virt1O SCSI pass-through controller (D:\Windows Server 2022\x64\vioscsi.inf) QEMU FWCfg Device (null driver) (D:\Windows Server 2022\x64\qemufwcfg.inf)	
Hide drivers that aren't compatible with this computer's hardware.	
Br <u>o</u> wse <u>R</u> escan	Next

Step 10. Continue with OS installation until completed

Step 11. Remove the second CD-ROM after installation.

After OS installation is completed, install Microsoft Office and apply security updates.

The final step is to optimize the Windows OS. The Citrix Optimizer Tool includes customizable templates to enable or disable Windows system services and features using Citrix recommendations and best practices across multiple systems. Since most Windows system services are enabled by default, the optimization tool can easily disable unnecessary services and features to improve performance.

**Note:** In this CVD, the Citrix Optimizer Tool - v3.1.0.3 was used. Base images were optimized with the Default template for Windows 11 version 21H2, 22H2 (2009), or Windows Server 2022 version 21H2 (2009) from Citrix. Additionally, Windows Defender was disabled on the Windows 11 PVS golden image.

## Install Virtual Delivery Agents (VDAs)

Virtual Delivery Agents (VDAs) are installed on the server and workstation operating systems, enabling connections for desktops and apps. This procedure was used to install VDAs for both Single-session and Multi-session OS.

#### **Procedure 1.** Install Citrix Virtual Apps and Desktops Virtual Desktop Agents

Virtual Delivery Agents (VDAs) are installed on the server and workstation operating systems, enabling connections for desktops and apps. This procedure was used to install VDAs for both Single-session and Multi-session OS.

When you install the Virtual Delivery Agent, Citrix User Profile Management is silently installed on master images by default.

**Note:** Using profile management as a profile solution is optional but Microsoft FSLogix was used for this CVD and is described later.

**Step 1.** Launch the Citrix Virtual Apps and Desktops installer from the Citrix\_Virtual\_Apps\_and\_Desktops\_7\_2203\_4000 ISO.



Step 2. Click Start in the Welcome Screen.

**Step 3.** To install the VDA for the Hosted Virtual Desktops (VDI), select **Virtual Delivery Agent for Windows Single-session OS**.

Get Started		Prepare Ma	chines and	Images	
Delivery Controller		Virtual De	livery Age	ent for Windows Single-sessio	in OS
Cannot be installed on this ope	rating system.	Install this a single-sessi	agent to de ion OS virt	eliver applications and desktops f ual machines or physical machine	rom Windows ≥s.
Extend Deployment					
Extend Deployment Citrix Director Incompatible OS	•	Citrix Studio	•	Session Recording	•
Extend Deployment Citrix Director Incompatible OS Citrix License Server Incompatible OS	•	Citrix Studio Universal Print Server Incompatible OS	0	Session Recording	•

**Note:** Select Virtual Delivery Agent for Windows Multi-session OS when building an image for Microsoft Windows Server 2022.



Step 4. Select Create a master MCS Image.

Step 5. Click Next.

	Environment
Environment Core Components Additional Components Delivery Controller Features Firewall Summary Install Diagnostics Finish	<ul> <li>Configuration</li> <li>I want to:</li> <li>Oreate a master MCS image Select this option if you plan to use Citrix Machine Creation Services (MCS) to provision virtual servers from this master image.</li> <li>Oreate a master image using Citrix Provisioning or third-party provisioning tools Select this option if you plan to use Citrix Provisioning or a third-party provisioning tool (such as Microsoft SCCM) to provision virtual servers from this master image.</li> <li>Enable Brokered Connections to a Server Select this option to install the VDA on a physical or virtual server that will NOT be used by any provisioning tools.</li> </ul>

**Note:** Select Create a master image using Citrix Provisioning or third-party provisioning tools when building an image to be delivered with Citrix Provisioning tools.



- Step 6. Optional: do not select Citrix Workspace App.
- Step 7. Click Next.

	Core Components
Environment Core Components Additional Components Delivery Controller Features Firewall Summary Install Diagnostics Finish	Location: C:\Program Files\Citrix       Change         Virtual Delivery Agent (Required)       The software agent that is installed on the virtual or physical machine that provides the virtual desktop or application to the user.         Citrix Workspace App       Client software that enables users to access their documents, applications, and desktops from any device, including smartphones, tablets, and PCs.

**Step 8.** Select the additional components required for your image. In this design, only default components were installed on the image.

## Step 9. Click Next.

	Additional Components for Master MCS Image		
Environment	Component (Select all)		
Core components     Additional Components     Delivery Controller     Features     Firewall     Summary     Install     Diagnostics     Finish	Workspace Environment Management This component will significantly improve server scalability and application responsiveness while reducing logon times with: • Resource Management • Configuration Management • User Profile Management		
	Rendezvous Proxy Configuration If you plan to use the Rendezvous protocol with the Gateway Service in your environment, and have a non-transparent proxy in your network for outbound connections, specify the proxy here. Only HTTP proxies are supported. Learn more.		
	Citrix Personalization for App-V - VDA Enables this machine to launch App-V packages. <u>Learn more</u>		
	Citrix Supportability Tools Installs the Citrix Health Assistant and VDA Cleanup Utility. Learn more		
	Citrix Profile Management Manages user personalization settings in user profiles. Omitting this component affects monitoring and troubleshooting VDAs with Citrix Director. Learn more		

**Step 10.** Configure **Delivery Controllers** at this time by letting MCS do it automatically. **Step 11.** Click **Next**.

	Delivery Controller
<ul> <li>Environment</li> <li>Core Components</li> <li>Additional Components</li> <li>Delivery Controller</li> <li>Features</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	Delivery Controller         Configuration         How do you want to enter the locations of your Delivery Controllers?         Do it later (Advanced)         Do it manually         Choose locations from Active Directory         Let Machine Creation Services do it automatically         If you are using Machine Creation Services, you do not need to enter a Delivery Controller location here. MCS will do it automatically when you register your machines.

**Note:** Manually configure **Delivery Controllers** at this time when building an image to be delivered with Citrix Provisioning tools.

	benvery controller	
<ul> <li>Environment</li> <li>Core Components</li> <li>Additional Components</li> <li>Delivery Controller</li> <li>Features</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	Configuration How do you want to enter the locations of your D Do it later (Advanced) Do it nanually Choose locations from Active Directory G5-DDC-1.FSL151KLOCAL G5-DDC-2.FSL151KLOCAL Controller address: (Enter the FQDN. IP addresse Test connection Add	elivery Controllers? Edit Delete Edit Delete s are not supported.)

Step 12. Optional: select additional features.

Step 13. Click Next.

	Features
<ul> <li>Environment</li> <li>Core Components</li> <li>Additional Components</li> <li>Delivery Controller</li> <li>Features</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	Feature (Select all)         Use Windows Remote Assistance Enable Windows Remote Assistance. Learn more.         Use Real-Time Audio Transport for audio Uses UDP ports 16500 - 16509. Learn more.         Use Screen Sharing Use TCP ports 52525 - 52625. Learn more.         Is this VDA installed on a VM in the Cloud (i.e. Azure, AWS, Google)? Communicates to Citrix that the VDA is installed in a cloud VM. Learn more.
	Back Next Canc

Step 14. Select the firewall rules to be configured Automatically.

## Step 15. Click Next.

	Firewall
<ul> <li>✓ Environment</li> <li>✓ Core Components</li> <li>✓ Additional Components</li> <li>✓ Delivery Controller</li> <li>✓ Features</li> <li>Firewall</li> </ul>	The default ports are listed below.  Controller Communications  80 TCP 1494 TCP 2598 TCP 8008 TCP 8008 TCP
Summary Install Diagnostics Finish	1494 UDP 2598 UDP
	<ul> <li>Configure firewall rules:</li> <li>Automatically Select this option to automatically create the rules in the Windows Firewall. The rules will be created even if the Windows Firewall is turned off.</li> <li>Manually Select this option if you are not using Windows Firewall or if you want to create the rules yourself.</li> <li>Back Next Cancel</li> </ul>



	Summary	
<ul> <li><sup>e</sup> Environment</li> <li><sup>e</sup> Core Components</li> <li><sup>e</sup> Additional Components</li> <li><sup>e</sup> Delivery Controller</li> <li><sup>e</sup> Features</li> <li><sup>e</sup> Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	Review the prerequisites and confirm the components you want to install.          • Restart in the components you want to install.          Installation directory       C:\Program Files\Citrix         Prerequisites       Microsoft Remote Desktop Session Host         Windows Remote Assistance Feature          Core Components         Virtual Delivery Agent          Additional Components: (4)          Citrix Supportability Tools         Citrix Profile Management         Citrix Profile Management MMI plug-in         Machine Creation Services (MCS) storage optimization	require
	Not specified Firewall Enable restore on failure	

Step 17. Optional: configure Citrix Call Home participation.

Step 18. Click Next.

	Diagnostics
<ul> <li>Environment</li> <li>Core Components</li> <li>Additional Components</li> <li>Delivery Controller</li> <li>Features</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	<ul> <li>Collect diagnostic information</li> <li>Cirix Call Home periodically collects information about system and product configuration, performance, errors, and more. The information is transmitted to Citrix so our support and product teams can resolve issues proactively.</li> <li>Learn more about Call Home.</li> <li>MOTE: The feature can be disabled later.</li> <li>Connect *Requires Citrix Cloud login</li> </ul>

## Step 19. Select Restart Machine.

Step 20. Click Finish and the machine will reboot automatically.

	Finish Installation	
✓ Environment	The installation completed successfully.	✓ Succes
<ul> <li>Core Components</li> <li>Additional Components</li> <li>Delivery Controller</li> <li>Features</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	Prerequisites <ul> <li>Microsoft Visual x64 C++ Runtime</li> <li>Microsoft Visual x86 C++ Runtime</li> <li>Microsoft Remote Desktop Session Host</li> <li>Microsoft Remote Desktop Connection</li> <li>Windows Remote Assistance Feature</li> </ul> Core Components <ul> <li>Virtual Delivery Agent</li> </ul> Post Install <ul> <li>Component Initialization</li> </ul>	Installed Installed Installed Installed Installed Installed
	To optimize desktop settings, download Citrix Optimizer completes. Learn more about Citrix Optimizer in CTX224676 I Restart machine	and run it after the restart

## Procedure 2. Install the Citrix Provisioning Server Target Device Software

The Master Target Device refers to the target device from which a hard disk image is built and stored on a vDisk. Provisioning Services then streams the contents of the vDisk created to other target devices. This procedure installs the PVS Target Device software used to build the VDI golden images.

- Step 1. Launch the PVS installer from the Citrix\_Provisioning\_2203\_CU4 ISO.
- Step 2. Click Target Device Installation.

Target Device Installation	 
Install Upgrade Wizard	
Back	Exit
Install the Target Device.	

The installation wizard will check to resolve dependencies and then begin the PVS target device installation process.

Step 3. Click Next.


**Step 4.** Indicate your acceptance of the license by selecting the **I have read, understand, and accept the terms of the license agreement**.

Step 5.	Click Next.	
---------	-------------	--

Target Device x64		×
ment in order to continu	e. Citri	×
ENT") between the en plicable providing ent includes the Data Pro- ty other documents in the Citrix product (her ANCE") determines the uy/licensing/citrix-pro	d-user customer ("you"), tity is hereinafter referred cessing Agreement, the corporated herein by einafter "PRODUCT") and he providing entity as viding-entities.html. BY	1
ment agreement	Print	
	ENT") between the en plicable providing ent includes the Data Pro- y other documents in the Citrix product (her ANCE") determines the ay/licensing/citrix-pro- populer_volt_ACP nent agreement	ENT") between the end-user customer ("you"), plicable providing entity is hereinafter referred includes the Data Processing Agreement, the y other documents incorporated herein by the Citrix product (hereinafter "PRODUCT") and ANCE") determines the providing entity as ay/licensing/citrix-providing-entities.html. BY PRODUCT_VOLLACEEE_TO_DE_POUND_BY ment

Step 6. Optionally: provide the Customer information.

Step 7. Click Next.

Customer Information			- then the
Please enter your information.			CILLIX
User Name:			
lab			
Organization:			
Cisco			
stallShield			
	< Back	Next >	Cancel

- Step 8. Accept the default installation path.
- Step 9. Click Next.



Step 10. Click Install.

🔁 Citrix 2203 LTSR CU4 - Provisioning	g Target Device x64	ļ	×
Ready to Install the Program			oitruit
The wizard is ready to begin installati	on.		CIIIIX
Click Install to begin the installation.			
If you want to review or change any exit the wizard.	of your installation se	ettings, <mark>click Back. (</mark>	Click Cancel to
InstallShield			

Step 11. Deselect the checkbox to launch the Imaging Wizard and click Finish.

🖟 Citrix Provisioning Target	Device x64 2109.0.0	×
citrix	Installation Wizard Completed	
	The Installation Wizard has successfully installed Citrix Provisioning Target Device x64 2109.0.0 . Click Finish to exit the wizard.	
	Launch Imaging Wizard	
	< Badr Finish Cancel	

Step 12. Click Yes to reboot the machine.

# Procedure 3. Create Citrix Provisioning Server vDisks

The Citrix Provisioning Server must be installed and configured before a base vDisk can be created. The PVS Imaging Wizard automatically creates the base vDisk image from the master target device.

## Step 1. Log in to PVS target virtual machine and start PVS Imaging Wizard.

Step 2. PVS Imaging Wizard's Welcome page appears. Click Next.



**Step 3.** The Connect to Farm page appears. Enter the name or IP address of a Provisioning Server within the farm to connect to and the port to use to make that connection.

Step 4. Use the Windows credentials (default) or enter different credentials.

Step 5. Click Next.

🗱 Provisioning Services	Imaging Wizard	×
Connect to Provisio	ning Services Site	
Enter the Provisioning Only stores supported	Services site server name or IP, port, and credentials. by this server will be available for vDisk assignment.	
Enter Server Details		
Server name or IP:	10.72.0.12	
Port:	54321	
Provide Logon Credent	ials for the Server	
Use my Window	vs credentials	
O Use these cred	lentials	
User name:		
Domain:		
Password:		
	< Back Next > Cance	:

Step 6. Select Create a vDisk.

Step 7. Click Next.

2 Provisioning Services Imaging Wi	izard X
Imaging Options	
What task do you want to perform?	
Create a vDisk Make a Provisioning Service	s vDisk from this device's boot hard disk.
<ul> <li>Recreate an existing vDisk</li> <li>Not available because there</li> </ul>	are no vDisks assigned to the server.
Create an image file Make an image file from this	; device's booted disk, for importing into Provisioning Services.
Copy a hard disk volume to Not available because there	a vDisk volume a are no vDisks assigned to the server.
	< Back Next > Cancel

The Add Target Device page appears.

**Step 8.** Select the Target Device Name, the MAC address associated with one of the NICs that was selected when the target device software was installed on the master target device, and the Collection to which you are adding the device.

Step 9. Click Next.

nud ranger berne		
This device is not a m	ember of the site and needs to be added.	
Target device name:	w11-pvs-base	
	Must be different from the current machine name.	
Network connection:	Ethernet0, 10.72.1.216, 00-50-56-87-98-65	~
	Select the connection that will be used to boot this machine to the server.	
Collection name:	G5-FlashStackCollection	~
	Select the site collection that this device will be added to.	

Step 10. The New vDisk dialog displays. Enter the name of the vDisk.

**Step 11.** Select the Store where the vDisk will reside. Select the vDisk type, either Fixed or Dynamic, from the drop-down list.

**Note:** This CVD used Dynamic rather than Fixed vDisks.

Step 12. Click Next.

New vDisk		
The new vDisk wil	be created in the store you select.	
vDisk name:	w11-pvs-dsk	
Store name:	Store - 99.89 GB Free	~
	Supported by Server: G5-PVS-1	
vDisk type:	Dynamic (recommended)	~

**Step 13.** In the Microsoft Volume Licensing page, select the volume license option to use for target devices. For this CVD, volume licensing is not used, so the None button is selected.

## Step 14. Click Next.

2 Provisioning Services Imaging Wizard	×
Microsoft Volume Licensing	
Choose whether the vDisk is to be configured for Microsoft KMS or MAK volume license management.	
None	
○ Key Management Service (KMS)	
O Multiple Activation Key (MAK)	
< Back Next > Canc	al

Step 15. Select Image entire boot disk on the Configure Image Volumes page.

Step 16. Click Next.

Citrix Provisioning Imaging Wizard	
What to Image	
Choose what to image.	
O Image entire boot disk	
O Choose partitions to image	
	Concel
	Caricei

Step 17. Select Optimize for hard disk again for Provisioning Services before imaging on the Optimize Hard Disk for Provisioning Services.

## Step 18. Click Next.

T Provisioning Services Imaging Wizard	×
Optimize Hard Disk for Provisioning Services	
The hard disk has already been optimized for Provisioning Services. Do you want to optimize the disk again?	
O Do not optimize the hard disk again	
Optimize the hard disk again for Provisioning Services before imaging	
Edit Optimization Settings	
<back next=""></back>	Cancel

Step 19. Click Create on the Summary page.

Summary		
Confirm that	t all settings are correct.	
Connect to Task: Crea Target dev	Site: Server: 10.72.0.15, Port: 54321 te a vDisk ice name : w11-pvs-base	4
Network co Collection:	nnection : Ethernet0, 10.72.1.216, 00-50-56-B7-98-65 G5-FlashStackCollection	
vDisk name	:: w11-pvs-dsk	
Format: VH	DX, type: Dynamic (recommended), sector size: 512 B, block size: 32 MB	
Image enti Optimize ha	re boot disk ard disk for Citrix Provisioning prior to imaging	
4		
Status:	Ready to Start	
Status: Progress:	Ready to Start	•

Step 20. Review the configuration and click Continue.

Restart Ne	eeded	
During device After device	e restart, configure the machine settings for network boot. restart, the Imaging Wizard will continue.	
Connect to Task: Crea Target dev Network co Collection: vDisk name Store: Stor Format: VH Image enti Optimize h	Site: Server: 10.72.0.15, Port: 54321 te a vDisk ice name : w11-pvs-base onnection : Ethernet0, 10.72.1.216, 00-50-56-87-98-65 GS-FlashStackCollection :: w11-pvs-dsk ie 10%, type: Dynamic (recommended), sector size: 512 B, block size: 32 MB re boot disk ard disk for Citrix Provisioning prior to imaging	
4		
Status: Progress:	Successful!	

Step 21. When prompted, click No to shut down the machine.

Reboot or	Shut Down, and S	Set Network Boot		8
?	Do you want the Before reboot or network boot.	e device to reboot, if not after shut down, config	, the device will be jure the machine :	e shut down. settings for
		Yes	No	Cancel

**Step 22.** To enable a VM to boot over the network using Acropolis CLI (aCLI). Log in as **nutanix** user to any CVM in the cluster using SSH.

Step 23. Obtain the MAC address of the virtual interface of PVS master virtual machine:

nutanix@cvm\$ acli vm.nic\_list pvs-master-vm

Step 24. Update the boot device setting so that the VM boots over the network:

nutanix@cvm\$ acli vm.update boot device pvs-master-vm mac addr=mac addr

**Step 25.** After restarting the virtual machine, log in to the master target. The PVS imaging process begins, copying the contents of the **C**: drive to the PVS vDisk located on the server.

**Step 26.** If prompted to format the disk, disregard the message, and allow the Provisioning Imaging Wizard to finish.

Imaging is likely to t	ake a long time.	
Connect to Site: S Task: Image creat Existing vDisk: Sto	E Microsoft Windows × You need to format the disk in drive E: before you can use it. Do you want to format it?	~
Stature Disc	Format disk Cancel	>
Progress:		

Step 27. A message is displayed when the conversion is complete, click Done.

The log of t	he processing done can be viewed by clicking the Log bi	utton.
Connect to Task: Imag Existing vD	o Site: Server: 10.72.0.10, Port: 54321 ge created vDisk Disk: Store\ESX-PVS-DSK	^
< Status:	Successful!	~

Step 28. Shutdown the virtual machine used as the master target.

Step 29. Connect to the PVS server and validate that the vDisk image is available in the Store.

Step 30. Right-click the newly created vDisk and select Properties.

**Step 31.** On the vDisk Properties dialog, Microsoft Volume Licensing tab select the appropriate mode for your deployment.



Step 32. On the vDisk Properties dialog, change Access mode to Standard Image (multi-device, read-only access).

Step 33. Set the Cache Type to Cache in device RAM with overflow on hard disk.

Step 34. Set Maximum RAM size (MBs): 256.

Step 35. Click OK.

General	11.00		M 0.17.1	10.000	A	1.1	
aerierai	Identifi	cation	Microsoft Volu	me Licensing	Auto Up	odate	
Site	e:	G5-Fla	shStackSite				
Stor	re:	Store					
Filer	name:	NTNX	-Dsk				
Size	e:	65,536	5 MB	Block size:	32	2,768 KB	
Acce	ss mode						
Acce	ss mode	Stand	ard Image (mult	i-device, read-	only acce	ess)	~
Cach	e type:	Cache	e in device RAN	I with overflow	on hard	disk	~
Мах	kimum R/	AM size	(MBs): 256	÷		Asynchronou	us IO
					~~~		
BIO	S boot n	nenu te	kt (optional):				
BIO	S boot m	nenu te: Active [	kt (optional): Directory machir	ne account pa	ssword m	anagement	
BIO	S boot m Enable / Enable p	nenu te Active (	kt (optional): Directory machir nanagement	ne account pa	ssword m	anagement	
	S boot n Enable / Enable s Enable s	Active [ Active ] printer n	kt (optional): Directory machir nanagement ng of this vDisk	ne account pa	ssword m	anagement	
	S boot m Enable / Enable s Enable s Cached	Active I Active I printer n streamir secrets	kt (optional): Directory machin nanagement ng of this vDisk s cleanup disabl	ne account par	ssword m	anagement	

Tech tip

Citrix recommends at least 256 MB of RAM for a Desktop OS and 1 GB for Server OS if RAM cache is being used. Nutanix prefers not to use the RAM cache. Set this value to 0, and only the local hard disk will be used to cache.

## Install and Configure FSLogix

In this CVD, FSLogix, a Microsoft tool, was used to manage user profiles.

A Windows user profile is a collection of folders, files, registry settings, and configuration settings that define the environment for a user who logs on with a particular user account. Depending on the administrative configuration, the user may customize these settings. Profile management in VDI environments is an integral part of the user experience.

FSLogix allows you to:

- Roam user data between remote computing session hosts
- · Minimize sign-in times for virtual desktop environments
- Optimize file IO between host/client and remote profile store
- · Provide a local profile experience, eliminating the need for roaming profiles
- Simplify the management of applications and 'Gold Images'

Additional documentation about the tool can be found here.

Procedure 1. FSLogix Apps Installation

Step 1. Download the FSLogix file here.

**Step 2.** Run **FSLogixAppSetup.exe** on the VDI master image (32-bit or 64-bit depending on your environment).

Step 3. Click OK to proceed with the default installation folder.

📸 Microsoft FSLogix Apps Setup	_		×
Setup Options Install location: C:\Program Files\FSLogix\Apps		E	rowse
	ОК	(	Cancel

Step 4. Review and accept the license agreement.

Step 5. Click Install.

🛣 Microsoft FSLogix Apps Setup	-		×
To continue with Microsoft FSLogix Apps (English) installation, you terms of the End-User License Agreement. To accept the agreemen below.	must a t, click	ccept the the check	box
MICROSOFT SOFTWARE LICENSE TERMS			^
FSLogix Profile Container			
FSLogix Office Container			
FSLogix Java Version Control			
ESL agiv Application Macking			~
I agree to the license terms and conditions			
Options	tall	Clos	e

Step 6. Reboot.

Procedure 2. Configure Profile Container Group Policy

**Step 1.** Copy **fslogix.admx** to C:\Windows\PolicyDefinitions, and **fslogix.adml** to C:\Windows\PolicyDefinitions\en-US on Active Directory Domain Controllers.

Step 2. Create FSLogix GPO and apply to the desktops OU:

- Go to Computer Configuration > Administrative Templates > FSLogix > Profile Containers.
- Configure the following settings:
  - Enabled Enabled
  - VHD location Enabled, with the path set to \\<FileServer>\<Profiles Directory>

**Note:** Consider enabling and configuring FSLogix logging, limiting the size of the profiles, and excluding additional directories.

# Install Citrix Virtual Apps and Desktops Delivery Controller, Citrix Licensing, and StoreFront

The process of installing the Citrix Virtual Apps and Desktops Delivery Controller also installs other key Citrix Virtual Apps and Desktops software components, including Studio, which creates and manages infrastructure components, and Director, which monitors performance and troubleshoots problems.

**Note:** Dedicated StoreFront and License servers should be implemented for large-scale deployments.

## **Procedure 1.** Install Citrix License Server

**Step 1.** To begin the installation, connect to the first Citrix License server and launch the installer from the **Citrix\_Virtual\_Apps\_and\_Desktops\_7\_2203\_4000 ISO**.

Step 2. Click Start.

Deliver applications and desktops to any user, anywhere, on any devic • Hybrid cloud, cloud and enterprise provisioning • Centralized and flexible management Manage your delivery according to your needs:	e.
Virtual Apps Deliver applications Virtual Apps and Desktops Deliver applications and desktops	Start
citrix	

Step 3. Click Extend Deployment - Citrix License Server.

Get Started	Get Started			s and	Images	
Delivery Controller			Virtual Delivery Agent for Windows Multi-session OS			os
Start here. Select and install th essential services like License S	e Delivery Contr erver.	roller and other	Install this agent multi-session OS	t to de S virtu	eliver applications and desktops f al machines or physical machines	irom Window s.
Extend Deployment				_		
Extend Deployment Citrix Director		Citrix Studio		•	Session Recording	4
Extend Deployment Citrix Director Citrix License Server	•	Citrix Studio Universal Print Serve	ər	•	Session Recording	(

**Step 4.** Read the **Citrix License Agreement**. If acceptable, indicate your acceptance of the license by selecting **I have read, understand, and accept the terms of the license agreement**.

Step 5. Click Next.

	Software License Agreement
Licensing Agreement	Printable ver
Core Components Firewall Summary	Last Revised: August 19, 2020 CITRIX LICENSE AGREEMENT This is a legal agreement ("AGREEMENT") between the end-user customer ("you"), and
Install Finish	the providing Citrix entity (the applicable providing entity is hereinafter referred to as "CITRIX"). This AGREEMENT includes the Data Processing Agreement, the Citrix Services Security Exhibit and any other documents incorporated herein by reference. Your location of receipt of the Citrix product (hereinafter "PRODUCT") and maintenance (hereinafter "MAINTENANCE") determines the providing entity as identified at https:// www.citrix.com/buy/licensing/citrix-providing-entities.html. BY INSTALLING AND/OR USING THE PRODUCT, YOU AGREE TO BE BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, DO NOT INSTALL AND/OR USE THE PRODUCT. Nothing contained in any purchase order or any other document submitted by you shall in any way modify or add to the terms and conditions contained in this AGREEMENT. This AGREEMENT does not apply to third party products sold by Citrix, which shall be subject to the terms of the third party provider. 1. PRODUCT LICENSES.
	<ul> <li>a. End User Licenses. Citrix hereby grants Customer a non-exclusive worldwide license to use the software in a software PRODUCT and the software installed in</li> <li>I have read, understand, and accept the terms of the license agreement</li> <li>I do not accept the terms of the license agreement</li> </ul>

Step 6. Click Next.

	Core Components	
Licensing Agreement	-	
Core Components		Location: C:\Program Files\Citrix Change.
Summary Install Finish	License Server (Required) Manages product licenses.	
		Back Next Cance

Step 7. Select the default ports and automatically configured firewall rules.

Step 8. Click Next.

	Firewall		
<ul> <li>Licensing Agreement</li> <li>Core Components</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Finish</li> </ul>	The default ports are listed below.          License Server         7279 TCP         27000 TCP         8083 TCP    Configure firewall rules:	Printable	versio ill be
	<ul> <li>Manually</li> <li>Select this option if you are not using Windows Fireway</li> </ul>	all or if vou want to create the rules	s

Step 9. Click Install.

	Summary
<ul> <li>Licensing Agreement</li> <li>Core Components</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Finish</li> </ul>	Review the prerequisites and confirm the components you want to install.     Installation directory   C:Program Files\Citrix   Core Components   License Server   Firewall   TCP Ports:   7279, 27000, 8083





# Procedure 2. Install Citrix Licenses

**Step 1.** Copy the license files to the default location (**C:\Program Files (x86)\Citrix\Licensing\ MyFiles**) on the license server.

📙   🛃 📕 🖛   MyFiles	5			-		×
File Home Sha	re View					~ 🕐
$\leftarrow \rightarrow \cdot \uparrow \square \cdot$	This PC > Local Disk (C:) > Program Files (x86) > Citrix > Licensing >	MyFiles	✓ Ö Search	MyFiles		Q
1	Name ^	Date modified	Туре	Size		
V P Quick access	CITRIX.opt	9/14/2021 12:22 PM	OPT File		1 KB	
Desktop 🖈	/// citrix_startup	9/14/2021 12:22 PM	LIC File		7 KB	
🔶 Downloads 🖈	FID_3a7fe72c_3612_4b10_983c_fc88d9898699	1/28/2022 4:51 PM	LIC File		4 KB	
😫 Documents 🖈	FID_73b65ddd_863a_45a2_be65_ad9264118af5	1/28/2022 4:51 PM	LIC File		4 KB	
📰 Pictures 🛛 🖈	FID_b7c160f8_7d75_4ef9_aca0_171e2a04b92d	1/28/2022 4:51 PM	LIC File		4 KB	
MyFiles	FID_c03a7294_36d9_47ae_9e91_32235f4ebfec	1/28/2022 4:51 PM	LIC File		4 KB	
	FID_c7ad4dd6_96a9_4f94_9f75_0d4979d804ff	1/28/2022 4:51 PM	LIC File		4 KB	
> 🛄 This PC	FID_ec1a5985_5769_4843_9edc_3eb605e2a9f4	1/28/2022 4:51 PM	LIC File		4 KB	
> 🔜 New Volume (E:)	FID_fc9b6dc2_0964_4e32_a432_5a443a9002e6	1/28/2022 4:51 PM	LIC File		4 KB	
9 items 7 items selecte	ed 25.0 KB					] <b> </b>

Step 2. Restart the server or Citrix licensing services so that the licenses are activated.

Step 3.	Run the	application	Citrix	License	Administration	Console
---------	---------	-------------	--------	---------	----------------	---------



Citrix <b>L</b>	icensing Manag	er		License Server Version 11.17.2.0 build 3500	• ~	¢ <b>,</b> ¢	Hello, FSL151K\	Admi
Dashboard	Historical Use	Install Licenses	Update Licenses					
License	Usage							
PRODUCT	-EDITION				MODEL	IN USE/INSTALLED	AVAILABLE	
Citrix Sta	art-up License				Serve	r 0/10000	10000 (100%)	>
Citrix Lic	ense Server Diagnost	tics License			Serve	r 0/10000	10000 (100%)	>
Citrix Vir	tual Apps and Deskto	ops Premium			Concurre	nt 0/6000	6000 (100%)	>
Citrix Pro	ovisioning for Deskto	ps			Concurre	nt 0/6000	6000 (100%)	>
Citrix Vir	tual Apps and Deskto	ops Premium			User/Devi	ce 0/6000	6000 (100%)	>

Step 4. Confirm that the license files have been read and enabled correctly.

## **Procedure 3.** Install the Citrix Virtual Apps and Desktops

**Step 1.** To begin the installation, connect to the first **Delivery Controller server** and launch the installer from the **Citrix\_Virtual\_Apps\_and\_Desktops\_7\_2203\_4000 ISO**.

Step 2. Click Start.

Deliver applications and do • Hybrid cloud, cloud and enterprise provision • Centralized and flexible management Manage your delivery according to you	esktops to any user, anywh <sup>ning</sup> ur needs:	ere, on any device.
Virtual Apps Deliver application	ons	Start
Virtual Apps and Desk	Ktops Deliver applications and desktops	Start
	citrıx	

**Step 3.** The installation wizard presents a menu with three subsections. Click **Get Started - Delivery Controller**.

Get Started			Prepare Machines	and	Prepare Machines and Images		
Delivery Controller			Virtual Delivery	Age	nt for Windows Multi-session	n OS	
Start here. Select and install th essential services like License S	e Delivery Conti Server.	roller and other	Install this agent multi-session OS	to de virtu	liver applications and desktops al machines or physical machine	from Window: :5.	
Extend Deployment				_		_	
Extend Deployment Citrix Director	•	Citrix Studio		•	Session Recording	6	
Extend Deployment Citrix Director Citrix License Server	•	Citrix Studio Universal Print Ser	ver	•	Session Recording	•	

**Step 4.** Read the **Citrix License Agreement**. If acceptable, indicate your acceptance of the license by selecting **I have read, understand, and accept the terms of the license agreement**.

Step 5. Click Next.

	Software License Agreement
Licensing Agreement	Printable ve
Core Components Features	Last Revised: August 19, 2020 CITRIX LICENSE AGREEMENT
Firewall Summary Install Diagnostics License Server Data Finish	<ul> <li>This is a legal agreement ("AGREEMENT") between the end-user customer ("you"), and the providing Citrix entity (the applicable providing entity is hereinafter referred to as "CITRIX"). This AGREEMENT includes the Data Processing Agreement, the Citrix Services Security Exhibit and any other documents incorporated herein by reference. Your location of receipt of the Citrix product (hereinafter "PRODUCT") and maintenance (hereinafter "MAINTENANCE") determines the providing entity as identified at https://www.citrix.com/buy/licensing/citrix-providing-entities.html. BY INSTALLING AND/OR USING THE PRODUCT, YOU AGREE TO BE BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, DO NOT INSTALL AND/OR USE THE PRODUCT. Nothing contained in any purchase order or any other document submitted by you shall in any way modify or add to the terms and conditions contained in this AGREEMENT. This AGREEMENT does not apply to third party products sold by Citrix, which shall be subject to the terms of the third party provider.</li> <li><b>1.</b> PRODUCT LICENSES.</li> <li>a. End User Licenses. Citrix hereby grants Customer a non-exclusive worldwide license to use the software in a software PRODUCT and the software installed in</li> </ul>
	I have read, understand, and accept the terms of the license agreement

Step 6. Select the components to be installed on the first Delivery Controller Server:

- Delivery Controller
- Studio
- Director
- Step 7. Click Next.

	Core Components
<sup>e</sup> Licensing Agreement Core Components Features	Location: C:\Program Files\Citrix Change
Firewall Summary Install	Delivery Controller Distributes applications and desktops, manages user access, and optimizes connections.
Diagnostics Finish	Studio Create, configure, and manage infrastructure components, applications, and desktops.
	Director Monitor performance and troubleshoot problems.
	License Server This component must be installed at least once.

**Step 8.** Since a dedicated SQL Server will be used to Store the Database, leave "Install Microsoft SQL Server 2014 SP2 Express" unchecked.

Step 9. Click Next.

	Features
<ul> <li>Licensing Agreement</li> <li>Core Components</li> <li>Features</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	Feature (Select all)         Install Microsoft SQL Server 2019 Express CU22         This is an optional component. If you have an existing SQL Server for storing desktop and application configurations and settings, do not select this option.         Install Windows Remote Assistance         Select this only if you need the shadowing feature of Director Server.

Step 10. Select the default ports and automatically configured firewall rules.

Step 11. Click Next.

	Firewall	
Licensing Agreement	The default ports are listed below.	Printable versio
Core Components		
✓ Features	Delivery Controller	Director
Firewall	80 TCP	80 TCP
Summary	89 TCP	443 TCP
Install	443 TCP	
Diagnostics		
Finish		
	Configure firewall rules: <ul> <li>Automatically</li> <li>Select this option to automatically</li> <li>created even if the Windows Firew</li> </ul>	create the rules in the Windows Firewall. The rules will be rall is turned off.
	<ul> <li>Manually Select this option if you are not us yourself.</li> </ul>	ing Windows Firewall or if you want to create the rules

**Step 12.** Click **Install** to begin the installation.

	Summary
<ul> <li>Licensing Agreement</li> <li>Core Components</li> <li>Features</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	Summary Review the prerequisites and confirm the components you want to install.  Installation directory C:\Program Files\Citrix Prerequisites Microsoft Visual x64 C++Runtime Local Host Cache Storage (LocalD8) Microsoft Visual x86 C++ Runtime Microsoft Internet Information Services Core Components Delivery Controller Studio Director  Firewall TCP Ports: 80, 89, 443
	Enable restore on failure

**Note:** Multiple reboots may be required to finish installation.

Step 13. Optional: Check Collect diagnostic information/Call Home participation.

Step 14. Click Next.

	Diagnostics
Licensing Agreement	Collect diagnostic information
<sup>®</sup> Core Components <sup>®</sup> Features	Citrix Call Home periodically collects information about system and product configuration, performance, errors, and more. The information is transmitted to Citrix so our support and product teams can resolve issues proactively.
<sup>e</sup> Firewall	Learn more about Call Home.
* Summary * Install	NOTE: The feature can be disabled later.
Diagnostics	Connect *Requires Citrix Cloud login

Step 15. Click Finish to complete the installation.

**Step 16.** Optional: Check Launch Studio to launch the Citrix Studio Console.

	Finish Installation	
<ul> <li>Licensing Agreement</li> <li>Core Components</li> <li>Features</li> <li>Firewall</li> <li>Summary</li> <li>Install</li> <li>Diagnostics</li> <li>Finish</li> </ul>	The installation completed successfully.         Prerequisites <ul> <li>Microsoft Visual x64 C++ Runtime</li> <li>Local Host Cache Storage (LocalDB)</li> <li>Microsoft Visual x86 C++ Runtime</li> <li>Microsoft Internet Information Services</li> </ul> <ul> <li>Microsoft Visual x86 C++ Runtime</li> <li>Microsoft Internet Information Services</li> </ul> <ul> <li>Microsoft Internet Information Services</li> </ul> <ul> <li>Delivery Controller</li> <li>Studio</li> <li>Director</li> </ul> <ul> <li>Component Initialization</li> </ul>	✓ Succes Installed Installed Installed Installed Installed Installed Initialized
	Launch Studio	Finish

## **Procedure 4.** Nutanix AHV Plug-in for Citrix Virtual Apps and Desktops

Nutanix **AHV Plug-in for Citrix** is designed to create and manage VDI VMs in a Nutanix Acropolis infrastructure environment. The plug-in is developed based on the Citrix defined plug-in framework and must be installed on a Delivery Controller or hosted Provisioning Server. Additional details on AHV Plug-in for Citrix can be found here.

**Step 1.** Download the latest version of the Nutanix AHV Plug-in for Citrix installer MSI (.msi) file NutanixAHV\_Citrix\_Plugin.msi from the <u>Nutanix Support Portal</u>.

**Step 2.** Double-click the **NutanixAHV\_Citrix\_Plugin.msi** installer file to start the installation wizard. In the welcome window, click **Next**.



**Step 3.** The End-User License Agreement details the software license agreement. To proceed with the installation, read the entire agreement, select **I accept the terms in the license agreement** and click **Next**.

Please read the following license agreement carefully.	NUTAND
Nutanix License and Services Agreement	
This Nutanix License and Services Agreement ("Agreement") gove receipt and use of any Products (as defined below) and becomes when you (a) issue a purchase order for the Products; (b) click the button when downloading or installing the Software; and/or (c) acc use the Software or Cloud Services. This Agreement is entered int Nutanix Inc., located at 1740 Technology Dr. Ste. 150, San Jose, C United States, if You are contracting in the Americas, or Nutanix Ne B.V., located at Mercuriusplein 1, 2132 HA Hoofddorp, The Netherl	rns Your effective "ACCEPT" ess or o between A 95110, therlands ands, if ontracting ~
You are contracting anywhere else in the world, or both if you are c	

Step 4. Select the XD MCS AHV Plugin in the Setup Type dialog box and click Next.

×
cel

Step 5. Click Next to confirm installation folder location.

💏 Nutanix AHV MCS plugin for Citrix XenDesktop 7.15 or later Setup Wizard	×
Installation Folder	NUTANIX.
The installer will install Nutanix AHV MCS plugin for Citrix XenDesktop 7.15 or late following folder.	er in the
Location: C:\Program Files\Common Files\Citrix\HCLPlugins\CitrixMachineCreation\v1.0.0.0\NutanixAH	Λ
< Back Next >	Cancel

**Step 6.** Select **Yes, I agree** at the Data Collection dialog box of the installation wizard to allow collection and transmission. Click **Install** to start the plug-in installation.

	NUTA	N
This plugin can collect and s selecting 'Yes, I agree', you sent. Please note that the d Nutanix Prism.	end data described below to Nutanix. By are permitting such data to be collected and lata will be sent only when Pulse is enabled on	
DAT	A COLLECTION DETAILS	
i. Reading from the Re Path:- HKEY_LOCAI Plugin Key:- "Installer Type" ii. This Registry Key wi 1. For MCS:s	egistry of the System where Plugin is installed. MACHINE\SOFTWARE\Nutanix Inc.\Citrix MCS '. Il be added at the time of installation of Plugin. ending "MCS"	

Step 7. Click Finish to complete Installation.



### Procedure 5. Create Site

Citrix Studio is a management console that allows you to create and manage infrastructure and resources to deliver desktops and applications. It provides wizards to set up your environment, create workloads to host applications and desktops and assign applications and desktops to users.

Citrix Studio launches automatically after the Delivery Controller installation, or it can be launched manually if necessary. Studio is used to create a Site, which is the core of the Citrix Virtual Apps and Desktops environment consisting of the Delivery Controller and the Database.

Step 1. From Citrix Studio, click Deliver applications and desktops to your users.

	Actio	ons
	Citri	ix Studio 🔺
Welcome Studio Help		View •
Welcome to Citrix Studio To begin, select one of the three options below.		Refresh Help
Site setup		
Deliver applications and desktops to you	r users	
Remote PC Access		
Enable your users to remotely access the	ir physical machines	
Scale your deployment		
Connect this Delivery Controller to an ex	isting Site	

Step 2. Select the An empty, unconfigured Site radio button. Enter a site name and click Next.

e Setup	
Studio	Introduction
Introduction	You have two options when creating a new Site. The simplest option is to automatically create a fully configured, production-ready Site. The second, more advanced option is
Databases	to create an empty Site, which you must configure yourself.
Licensing	What kind of Site do you want to create?
Summary	A fully configured, production-ready Site (recommended for new users)
	An empty, unconfigured Site
	Site name:
	ССНІ
	Back Next Cancel

Step 3. Provide the Database Server Locations for each data type. Click Next.

**Note:** For an SQL AlwaysOn Availability Group, use the group's listener DNS name.

Note: Additional controllers can be added later.

Studio	Databases			
	Databases store	information about Site setup, co	nfiguration logging and monitorin	g.
	Choose how yo	u want to set up the databases. L	earn more	
Introduction	Create and	set up databases from Studio	Generate scripts to manually	set up
Databases	(You can p databases)	rovide details of existing empty	databases on the database s	erver
Licensing	Devide database			
Summary	Provide databas	e details		
	Data type	Database name	Location (formats)	
	Site:	CitrixCCHISite	FS-SQL-1	
	Monitoring:	CitrixCCHIMonitoring	FS-SQL-1	
	Logging:	CitrixCCHILogging	FS-SQL-1	
	1 For an Alw	vaysOn Availability Group, specify	the group's listener in the location	h.
	Specify addition	al Delivery Controllers for this Sit	e Learn more	Select
	1 selected			

- Step 4. Provide the FQDN of the license server.
- Step 5. Click Connect to validate and retrieve any licenses from the server.
- Note: If no licenses are available at this time, you can use the 30-day free trial or activate a license file.
- **Step 6.** Select the appropriate product edition using the license radio button.
- Step 7. Click Next.

Setup	
Studio	Licensing
	License server address: ANY
✓ Introduction	Connected to trusted serv View certifica
✓ Databases	I want to:
<b>Licensing</b> Summary	Use the free 30-day trial You can add a license later.
Summery	Use an existing license The product list below is generated by the license server.
	Product Model
	Ocitrix Virtual Apps and Desktops Premium Concurrent
	Citrix Virtual Apps and Desktops Premium User/Device
	Allocate and download
	Back Next Cancel

Step 8. Verify information on the Summary page. Click Finish.

Studio	Summary	
	Site name:	ССНІ
Introduction	Site database:	CitrixCCHISite FS-SQL-1 (no high availability)
<ul> <li>Databases</li> <li>Licensing</li> </ul>	Monitoring database:	CitrixCCHIMonitoring
Summary	Logging database:	FS-SQL-1 (no high availability)
	Delivery Controllers:	NTX-DDC-1.FSL151K.LOCAL
	License server:	ANY

# **Procedure 6.** Configure the Citrix Virtual Apps and Desktops Site Hosting Connection

Citrix Studio					– 0 ×
File Action View Help					
Citrix Studio (FlashStack)					Actions
Search				_	Hosting 🔺
Machine Catalogs	Name +	Type	Address	State	Add Connection and R
Applications		ijpe	, idol ess		View
Policies					
📝 Logging					Q Refresh
V 🖗 Configuration					P Help
Administrators					
Hosting					
k Licensing					
StoreFront					
App-V Publishing					
Unies Unies					
			_		
	1				1

## Step 1. Go to Configuration > Hosting in Studio, click Add Connection and Resources.

**Step 2.** On the Connection page:

- Select the Connection type of Nutanix AHV.
- Nutanix cluster virtual IP address (VIP).
- Enter the username.
- Provide the password for the admin account.
- Provide a connection name.
- Select the tool to create virtual machines: Machine Creation Services or Citrix Provisioning.

Step 3. Click Next.

Studio	Connection				
	Connection type:	Nutanix AHV		•	
Connection	Connection address:	10.10.70.90			
Network	User name:	admin			
Summary	Password:	•••••			
	Connection name:	CCHN-ISM			
	Create virtual machines	using: g tools (Machine Creat	ion Services or Citrix	Provisioning)	
			Back	Next	

Step 4. Select the Network to be used by this connection and click Next.

Studio	Network
	Name for these resources:
Connection Network	The name helps identify the storage and network combination associated with the connection.
	Name     4       VLAN-70     VLAN-71       VLAN-72     VLAN-72


	Summary	
studio	Summary	
	Connection type:	Nutanix AHV
Connection	Connection address:	10.10.70.90
Network	Connection name:	CCHN-ISM
Summary	Create virtual machines with:	Citrix provisioning tools (Machine Creation Services or Citrix Provisioning)
	Connection zone:	Primary
	Networks:	VLAN-72
	Scopes:	All

**Procedure 7.** Configure the Citrix Virtual Apps and Desktops Site Administrators

Step 1. Connect to the Citrix Virtual Apps and Desktops server and open the Citrix Studio Management console.

**Step 2.** From the Configuration menu, right-click **Administrator** and select **Create Administrator** from the drop-down list.



Step 3. Select or Create the appropriate scope and click Next.

Studio	Administrator and Scope
	Select an administrator:
	FSL151K\Domain Admins Browse
Administrator and Scope	Select a Scope:
Summary	Scopes are objects that represent something meaningful in an organization and that an administrator is allowed to manage (for example, a set of Delivery Groups used by the Finance team). Click a scope to see the objects in it.
	Scope name
_	All All objects
_	
	Create scope
	Back Next Cancel

Step 4. Select an appropriate Role.

Studio	Role		
	Select	a role. Click a role name to view its permissions.	
Administrator and Scone		Name +	Туре
Role	0	Delivery Group Administrator Can deliver applications, desktops, and machines; can also manage the	Built In
Summary	0	Full Administrator Can perform all tasks and operations.	Built In
	0	Help Desk Administrator Can view Delivery Groups, and manage the sessions and machines ass	Built In
	0	Host Administrator Can manage host connections and their associated resource settings.	Built In
	0	Machine Catalog Administrator Can create and manage Machine Catalogs and provision machines.	Built In
	0	Read Only Administrator Can see all objects in specified scopes as well as global information, b	Built In
	Creat	ie role	

Step 5. Review the Summary, check Enable administrator and click Finish.

ate Administrator		
Studio	Summary	
<ul> <li>Administrator and Scope</li> <li>Role</li> <li>Summary</li> </ul>	Administrator: Scope: Role:	FSL151K\Domain Admins All Full Administrator
	Enable administrator Clear check box to disa Save full permissions repo	able the administrator. No settings will be lost. ort Back Finish Cancel

#### Procedure 8. Install the Citrix Virtual Apps and Desktops on the additional controller

**Note:** After the first controller is completely configured and the Site is operational, you can add additional controllers. In this CVD, we created two Delivery Controllers.

**Step 1.** To begin installing the second Delivery Controller, connect to the second server virtual machine and launch the installer from the **Citrix\_Virtual\_Apps\_and\_Desktops\_7\_2203\_4000 ISO**.

Step 2. Click Start.

Step 3. Click Delivery Controller.

**Step 4.** Repeat the same steps used to install the first Delivery Controller; <u>Install the Citrix Virtual Apps and</u> <u>Desktops</u>, including the AHV Plugin for Citrix.

**Step 5.** Review the Summary configuration and click **Finish**.

Step 6. Open Citrix Studio.

**Step 7.** From Citrix Studio, click **Connect this Delivery Controller to an existing Site.** Follow the prompts to complete this procedure.

### Procedure 9. Install and Configure StoreFront

Citrix StoreFront stores aggregate desktops and applications from Citrix Virtual Apps and Desktops sites, making resources readily available to users. In this CVD, we created two StoreFront servers on dedicated virtual machines.

**Step 1.** To begin the installation of the StoreFront, connect to the first **StoreFront server** and launch the installer from the **Citrix\_Virtual\_Apps\_and\_Desktops\_7\_2203\_4000 ISO**.

Step 2. Click Start.

Deliver applications and desktops to any user, anywhere, on any device. • Hybrid cloud, cloud and enterprise provisioning • Centralized and flexible management Manage your delivery according to your needs: Virtual Approx	
Virtual Apps Deliver applications Virtual Apps and Desktops Deliver applications and desktops Start Cancel	
citrix	



Get Started		Prepare Machines and Images				
Delivery Controller	Virtual Delivery Agent for Windows Multi-session OS					
Start here. Select and install th essential services like License S	e Delivery Cont Server.	roller and other	Install this agen multi-session O	nt to de S virtu	eliver applications and desktops fr al machines or physical machines	rom Windows
Extend Deployment				_		_
Extend Deployment Citrix Director		Citrix Studio		•	Session Recording	
Extend Deployment Citrix Director Citrix License Server	•	Citrix Studio Universal Print Serve	er	•	Session Recording	•

**Step 4.** Indicate your acceptance of the license by selecting **I have read, understand, and accept the terms of the license agreement**.

Step 5. Click Next.

Citrix StoreFront	27		×
StoreFront			
License agreement			
You must accept the terms of the license agreement to continue.			
CITRIX LICENSE AGREEMENT			
Use of this component is subject to the Citrix license or terms of service covering (s) and/or service(s) with which you will be using this component. This component use only with such Citrix product(s) and/or service(s).	the Citrix p nt is license	oroduct d for	
CTX_code EP_R_A10352779			
✓ I accept the terms of this	s license agr	reement	
< Back	Next >	Car	ncel

Step 6. On the Prerequisites page click Next.

Citrix StoreFront	8 <u>7</u>		
oreFront			
Review prerequisites			
StoreFront requires the following software before it can operate correctly. Refres	h		
<ul> <li>Internet Information Services (IIS)</li> <li>The required roles will be deployed automatically.</li> </ul>			
< Back	c Next >	Ca	nce

Step 7. Click Install.

Citrix StoreFront	8	
reFront		
Ready to install		
Setup is ready to install. Please review the notes and summary information below.		
Install now: Prerequisites Internet Information Services (IIS)		
Install now: Roles and subcomponents StoreFront Citrix StoreFront 2203.0.4000.13		

Step 8. Click Finish.

Citrix S	toreFront	82		
oreFr	ont			
Succe	essfully installed StoreFront			
StoreFi	ont has been successfully installed.			
0	Internet Information Services (IIS) installed successfully.			
0	StoreFront installed successfully.			
	Citrix StoreFront 2203.0.4000.13 installed successfully.			
0	<b>Note:</b> StoreFront must be configured before it can be used. The admir start automatically after you click Finish.	nistration co	onsole w	ill
			Ei	nie

ľ

Reboot		×
?	A reboot is required to complete the installation. to reboot now. Click on No to reboot at a later p	Click on Yes oint of time.
	Yes	No

Step 10. Open the StoreFront Management Console.

Step 11. Click Create a new deployment.



Step 12. Specify a name for your Base URL.

Step 13. Click Next.

Create New Deployment			
ax storer			s
Charles Frank	Enter a Ba	ise URI	ew
StoreFront	Litter a bi	Se one	efresh
	Confirm th specify the	e base URL for services hosted on this deployment. For multiple server deployments, load-balanced URL for the server group.	elp
Base URL			
Getting Started	Base URL:	http://ntx-sf-1/	
Store Name		•••	
Delivery Controllers			
Remote Access			
Authentication Methods			
XenApp Services URL			
Summary			
		Next Cancel	

Step 14. For a multiple server deployment, use the load balancing environment in the Base URL box.Step 15. Click Next.



Step 16. Specify a name for your store.



Step 17. Click Add to specify Delivery controllers for your new Store.

Create Store				
ix StoreF				
Stores Server G				
StoreFront	Delivery Controlle	rs		
	Specify the Citrix Vir	tual Apps and Desktops delivery cont	rollers or XenApp servers for this store.	
	Citrix recommends g	rouping delivery controllers based or	n deployments.	
✓ Base URL	Name	Type	Servers	
✓ Getting Started	Traine.	type	Scivers	
✓ Store Name				
Remote Access				
Authentication Metho	ds			
Van Ann Sanvisas IIPI				
ACTIADD SERVICES UKL				
Summary	Add	dit Remove		
Summary	Add	dit Remove		
Summary	Add	dit Remove		
Summary	Add	drt Kemove		
Summary	Add	dit Kemove		
Summary	Add	drt Kemove		
Summary	Add	drt Kemove		
Summary	Add	drt Kemove		
Summary	Add	drt Kemove	Back Next Cancel	

Step 18. Add the required Delivery Controllers to the store.

Step 19. Click OK.

CI.	eate Store				
tores		Add Delivery Contro	ller		s StoreFro
erver G	StoreFront	Display name:	Controller		ew
		Туре:	Citrix Virtual Apps and Desktops	vers for this store.	elp
	✓ Base URL		O XenApp 6.5		
	✓ Getting Started	Servers (load balanced):	G5-DDC-1	Servers	
	✓ Store Name Delivery Controlle		*		
	Remote Access				
	Authentication Met		Add Edit Remove		
	XenApp Services UF		Servers are load balanced		
	,	Iransport type:			
		Port	ou		
		Advanced Setting	gs		
		advanced setting	s using the 'Settings' dialog.		
				-	
			OK Cancel	Cancel	

Step 20. Click Next.

**Step 21.** Specify how connecting users can access the resources, in this environment only local users on the internal network are able to access the store.

Step 22. Click Next.

Create Store toref res		
StoreFront  StoreFront  Sase URL  Getting Started  Store Name Delivery Controllers  Remote Access  Authentication Methods XenApp Services URL Summary	Remote Access         Enabling remote access will allow users outside the firewall to access it o add a Citrix Gateway once remote access is enabled.         Enable Remote Access         Select the permitted level of access to internal resources         Image: Allow users to access only resources delivered through StoreFront         Image: Allow users to access all resources on the internal network (Full VP)         Users may require the Citrix Gateway plug-in to establish a full VPP         Citrix Gateway appliances:	resources securely. You need (No VPN tunnel)
	Add Default appliance: Back	• Next Cancel

**Step 23.** From the **Authentication Methods** page, select the methods your users will use to authenticate to the store. The following methods were configured in this deployment:

• Username and password: Users enter their credentials and are authenticated when they access their stores.

• Domain passthrough: Users authenticate to their domain-joined Windows computers and their credentials are used to log them on automatically when they access their stores.

Step 24. Click Next.



**Step 25.** Configure the **XenApp Service URL** for users who use PNAgent to access the applications and desktops.

Step 26. Click Create.



Step 27. After creating the store click Finish.

Create Store		
StoreF		5
erver G		storeFrom
StoreFront	Store created successfully	ew
	Store Namer CCHI	efresh
	Remote Access: Disabled	elp
✓ Base URL	Authentication Methods: User name and password, Domain pass-through	
Setting Started		
Store Name	Store IIDI	
Delivery Controllers	Export Provisioning File	
Pemoto Assess	Citrix	
A therefore Methods	Receiver	
✓ Authentication Methods	Receiver for Web Site	
✓ XenApp Services URL	Test Site	
Summary	Store Browser	
	XenApp Services URL	
	Priagent	
	Back Finish Cancel	
		5 C

### Procedure 10. Configure Additional StoreFront Servers

After the first StoreFront server is completely configured and the Store is operational, you can add additional servers.

**Step 1.** Install the second **StoreFront** using the same installation steps in <u>Procedure 9 Install and Configure</u> <u>Storefront</u>.

Step 2. Connect to the first StoreFront server.

**Step 3.** To add the second server and generate the authorization information that allows the additional StoreFront server to join the server group, select **Add Server** the Actions pane in the Server Group.

Actions					
Server Group					
Add Server					
Change Base URL					
View 🕨					
Q Refresh					
👔 Help					

Step 4. Copy the authorization code.

Stores       Server Group         G       Add Server         B       Authorize New Server         Enter authorization information for the server you want to add.       Withorizing server: ntx-sf-1         Authorization code:       61190495         ©       Please wait	Citrix StoreFront	Actions
Server Group          Add Server       Add Server         Bin       Authorize New Server         Enter authorization information for the server you want to add.       Authorizing server: ntx-sf-1         Authorization code:       61190495               Please wait        Cancel	Stores	Server Group
G Add Server B N Authorize New Server Enter authorization information for the server you want to add. Authorizing server: ntx-sf-1 Authorization code: 61190495 ↓ Please wait Cancel	Server Group	Add Server Change Bas.
Bi   Authorize New Server   Enter authorization information for the server you want to add.   Authorizing server: ntx-sf-1   Authorization code: 61190495    Please wait      Cancel	G Add Server	View Q Refresh
	Bit         N         Authorize New Server         Enter authorization information for the server you want to add.         Authorizing server:       ntx-sf-1         Authorization code:       61190495         Cance       Cance	Help

Step 5. From the StoreFront Console on the second server select Join existing server group.



**Step 6.** In the Join Server Group dialog, enter the name of the first Storefront server and paste the Authorization code into the Join Server Group dialog.

Step 7. Click Join.

Citrix StoreFront	
	Actions
	Citrix StoreFront
CONTRACTOR OF A DESCRIPTION OF A DESCRIP	View 🕨
	Refresh
Welcome to StoreFront	Help
Select an option below to create a new store or extend your existing deployment	
Join Server Group	
To authorize this server, first connect to a server in the group and choose "Add Server". Enter the provided authorization information here.	
Authorization code: 61190495	
Join Cancel	

A message appears when the second server has joined successfully.

### Step 8. Click OK.

Join Server Group		
Authorizing server:	ntx-sf-1	
Authorization code:	61190495	
Joined Sud "NTX-SF-2"	cessfully is now part of a multiple server deployment.	
		ОК

The second StoreFront is now in the Server Group.

lu server		
Authorizing s	erver: ntx-sf-1	
Authorization	code: 40343805	
Diesce v	usit	
in Flease v	Value.	
C "NT	X-SF-2" added to Server Group	
"NT	X-SF-2" added to Server Group	
Interview	X-SF-2" added to Server Group	^
Details Servers	X-SF-2" added to Server Group Status	^
Details Servers NTX-SF-2	X-SF-2" added to Server Group Status Completed	^
Details Servers NTX-SF-2	X-SF-2" added to Server Group Status Completed	^

## Install and Configure Citrix Provisioning Server

In most implementations, there is a single vDisk providing the standard image for multiple target devices. Thousands of target devices can use a single vDisk shared across multiple Provisioning Services (PVS) servers in the same farm, simplifying virtual desktop management. This section describes the installation and configuration tasks required to create a PVS implementation.

The PVS server can have many stored vDisks, and each vDisk can be several gigabytes in size. Your streaming performance and manageability can be improved using high-performance storage solutions. PVS software and hardware requirements are available in the <u>Provisioning Services 2203 LTSR</u> document.

#### Procedure 1. Configure Prerequisites

Step 1. Set the following Scope Options on the DHCP server hosting the PVS target machines:

♥     DHCP       ♥     ■       fs-ad-1.fs1151k.local       ♥     ■       IPv4	Option Name 003 Router 006 DNS Servers	Vendor Standard Standard	Value 10.72.0.1 10.10.71.11	Policy Name None None
Server Options	011 Resource Location Servers	Standard Standard	10.72.0.10, 10.72.0.11, 10.72.0.12 FSL151K.LOCAL	None None
Scope [10.72.0.0] VLAN72     Address Pool     Address Leases	066 Boot Server Host Name 067 Bootfile Name	Standard Standard	pvs-lb pvsnbpx64.efi	None None
<ul> <li>Reservations</li> <li>Scope Options</li> <li>Policies</li> </ul>				
<ul> <li>Scope [10.10.71.0] VLAN71</li> <li>Policies</li> <li>Filters</li> </ul>				
> 🖥 IPv6				

Step 2. Create a DNS host records with multiple PVS Servers IP for TFTP Load Balancing:

🏩 DNS Manager						
File Action View Help						
🛔 DNS	Name	Туре	Data	Timestamp		
FS-AD-1	W2019-MCS-Base	Host (A)	10.72.9.2	12/21/2021 12:00:00 PM		
> Cached Lookups	W19-MCSIMG-0105	Host (A)	10.72.9.18	1/6/2022 9:00:00 AM		
Forward Lookup Zones	pvs-lb	Host (A)	10.72.0.10	static		
S FSI 151K LOCAL	pvs-lb	Host (A)	10.72.0.12	static		
Reverse Lookup Zones	pvs-lb	Host (A)	10.72.0.11	static		
Trust Points	purefile	Host (A)	10.10.71.50	static		
Conditional Forwarders	MCS-W2019-128	Host (A)	10.72.9.75	1/10/2022 10:00:00 AM		

**Note:** Only one MS SQL database is associated with a farm. You can choose to install the Provisioning Services database software on an existing SQL database server, if that machine can communicate with all Provisioning Servers within the farm or create new.

Note: Microsoft SQL 2019 was installed separately for this CVD.

**Procedure 2.** Install and Configure Citrix Provisioning Service

**Step 1.** Connect to **Citrix Provisioning server** and launch **Citrix Provisioning Services 2203 LTSR ISO** and let AutoRun launch the installer.

Step 2. Click Console Installation.



Step 3. Click Install to start the console installation.

	_
Citrix 2203 LTSR CU4 - Provisioning Console x64 - InstallShield Wizard	
Citrix 2203 LTSR CU4 - Provisioning Console x64 requires the following items to be installed on your computer. Click Install to begin installing these requirements.	
Status Requirement	]
Pending CDF x64	
Pending Remote PS SDK	
Install Cancel	

Step 4. Click Next.



**Step 5.** Read the **Citrix License Agreement**. If acceptable, select **I accept the terms in the license agreement**.

Step 6. Click Next.

🖟 Citrix 2203 LTSR CU4 - Provisioning Console x64 - InstallShield Wizard	×
License Agreement	oitroit
You must view the entire license agreement in order to continue.	CIITIX
Last Revised: November 1, 2018	^
CITRIX LICENSE AGREEMENT	
This is a legal agreement ("AGREEMENT") between the end-user custom and the providing Citrix entity (the applicable providing entity is hereinaft to as "CITRIX"). This AGREEMENT includes the Data Processing Agreen Citrix Services Security Exhibit and any other documents incorporated her reference. Your location of receipt of the Citrix product (hereinafter "PROI maintenance (hereinafter "MAINTENANCE") determines the providing en identified at https://www.citrix.com/buy/licensing/citrix-providing-entities DIST ALL DIG AND (OP USING THE PRODUCT, YOUR ACREE TO BE DOD	er ("you"), ter referred ment, the rein by DUCT") and ntity as .html. BY
• I accept the terms in the license agreement	Print
$\bigcirc$ I do not accept the terms in the license agreement	
InstallShield	
< Back Next >	Cancel

Step 7. Optional: provide User Name and Organization.

Step 8.	Click	Next.
---------	-------	-------

🖟 Citrix 2203 LTSR CU4 - Provisioning C	onsole x64 - InstallShield Wizard	×
Customer Information		oitriv
Please enter your information.		CITTX
User Name:		
lab		
Organization:		
Cisco		
Install this application for:		
<ul> <li>Anyone who uses this co</li> </ul>	mputer (all users)	
Only for me (Windows Us	ser)	
InstallShield		
	< Back Next >	Cancel

Step 9. Accept the default path.



### Step 10. Click Install.

Citrix 2203 LTSR CU4 - Provisioning Console x64 - InstallShield Wizard	×
Ready to Install the Program	oitriv
The wizard is ready to begin installation.	CIIIIX
Click Install to begin the installation.	
If you want to review or change any of your installation settings, click Back. Cl exit the wizard.	ick Cancel to
InstallShield	
< Back Install	Cancel

Step 11. Click Finish after successful installation.



Step 12. From the main installation screen, select Server Installation.

	Console Installation	
	Server Installation	
	Target Device Installation	
	Help and Support	
4	Browse DVD	E <u>x</u> it
	Install the Server and its dependencie	s.

Step 13. Click Install on the prerequisites dialog.



Step 14. When the installation wizard starts, click Next.



**Step 15.** Review the license agreement terms. If acceptable, select **I accept the terms in the license agreement**.

Step 16. Click Next.



Step 17. Select Automatically open Citrix PVS Firewall Ports.

Source	Destination	Туре	Port	^
CPV Server	CPV Server	UDP	6890-6909	
CPV Server	MS SQL Server	ТСР	1433	
CPV Server	Domain Controller	ТСР	389	
CPV Target Device	DHCP Server	UDP	67/4011*	~
Automatically open all C CTX 10 18 10 for more inf	itrix Provisioning ports. Refer formation.	to support	article	Print

Step 18. Provide User Name and Organization information. Select who will see the application.

Step 19. Click Next.

🖟 Citrix 2203 LTSR CU4 - Provisioning Server x64	×
Customer Information	oitrui
Please enter your information.	CIITIX
User Name:	
lab	
Organization:	
Cisco	
Install this application for:	
<ul> <li>Anyone who uses this computer (all users)</li> </ul>	
Only for me (Windows User)	
InstallShield	
< Back Next >	> Cancel

Step 20. Accept the default installation location.

# Step 21. Click Next.

🖟 Citrix 22	03 LTSR CU4 - Provisioning Server x64	×
Destinati Click Nex	ion Folder kt to install to this folder, or dick Change to install to a different folder.	citrix
	Install Citrix 2203 LTSR CU4 - Provisioning Server x64 to: C: \Program Files \Citrix \Provisioning Services \	Change
InstallShield -	< Back Next >	Cancel

Step 22. Click Install to begin the installation.

🖟 Citrix 2203 LTSR CU4 - Provisioning Server x64	×
Ready to Install the Program	citrix
The wizard is ready to begin installation.	CITIX
Click Install to begin the installation.	
If you want to review or change any of your installation settings, dick Back. exit the wizard.	Click Cancel to
InstallShield	
< Back Install	Cancel

Step 23. Click Finish when the install is complete.

🖟 Citrix 2203 LTSR CU4 - Provi	isioning Server x64	Х
citrix	Installation Wizard Completed	
	The Installation Wizard has successfully installed Citrix 2203 LTSR CU4 - Provisioning Server x64. Click Finish to exit the wizard.	
	< Back Finish Cancel	

Procedure 3. Configure Citrix Provisioning

Note: If Citrix Provisioning services configuration wizard doesn't start automatically, follow these steps:

Step 1. Start the PVS Configuration Wizard.



Step 2. Click Next.



**Step 3.** Since the PVS server is not the DHCP server for the environment, select **The service that runs on another computer**.

Step 4. Click Next.

Citrix Provisioning Configuration Wizard	×
DHCP Services	
Specify the service that will provide IP address assignments to Citrix Provisioning target devices.	
O The service that runs on this computer	
<ul> <li>Microsoft DHCP</li> <li>Citrix Provisioning BOOTP service</li> <li>Other BOOTP or DHCP service</li> </ul>	
In the service that runs on another computer	
< Back Next > Cano	:el

**Step 5.** Since DHCP boot options are used for TFTP services, select **The service that runs on another computer**.

## Step 6. Click Next.

Citrix Provisioning Configuration Wizard	Х
<b>PXE Services</b> Specify which service will deliver this information to target devices.	
During the PXE boot process the bootstrap file name and FQDN/IP address of the TFTP server hosting the bootstrap are delivered via a PXE service or DHCP options 66/67.	
O Citrix Provisioning PXE service on this computer	
The service that runs on another computer	
< Back Next > Cance	ł

- Step 7. Since this is the first server in the farm, select Create farm.
- Step 8. Click Next.

Citrix Provisioning Configuration Wizard	×
Farm Configuration	
Create a new Farm or join an existing Farm. Can be skipped if already configured.	
Ocreate farm	
◯ Join existing farm	
< Back Next >	Cancel

Step 9. Enter the FQDN of the SQL server.

Step 10. Click Next.

Citrix Provisioning Co	nfiguration Wizard	×
Database Server		
Enter the server and in and SOAP Services to u	stance names, and the database credentials for the Stream se.	
Server name:	FS-SQL-1 Browse	
Instance name:		
Authentication:	Active Directory Integrated $\sim$	
	Connect using your current Windows identity.	
	Connection Options	
	< Back Next > Cancel	

Step 11. Provide the Database, Farm, Site, and Collection name.

Step 12. Click Next.
Citrix Provisioning C	Configuration W	izard			×
New Farm					
Enter the new Datab	ase and Farm nam	ies.			
Database name:	NTXPvs			~	
Farm name:	NTXFarm				
Site name:	NTXSite				
Collection name:	NTXCollection				
Use Active Director	ory groups for sec	urity			
O Use Windows grou	ups for security				
Farm Administrator g	roup:				
FSL151K.LOCAL/Use	rs/Domain Admins	ş		~	
			< Back	Next >	Cancel

Step 13. Provide the vDisk Store details.

Step 14. Click Next.

Citrix Provisionin	g Configuration Wizard	х
New Store	and default path.	
Store name: Default path:	Store E:\Store Browse	
	< Back Next > Cance	

**Note:** For large-scale PVS environment, it is recommended to create the share using support for CIFS/SMB3 on an enterprise-ready File Server, such as Nutanix Files SMB shares.

Step 15. Provide the FQDN of the license server.

**Step 16.** Optional: provide a port number if changed on the license server.

Step 17. Click Next.

Citrix Provisioning Configuration Wizard	×
License Server	
Enter the license server hostname and port.	
License server name:	
License server port: 27000	
☑ Validate license server communication	
Select Citrix Provisioning license type:	
On-premises	
Use Datacenter licenses for desktops if no Desktop licenses are available	
< Back Next >	Cancel

**Step 18.** If an Active Directory service account is not already setup for the PVS servers, create that account before clicking Next on this dialog.

#### Step 19. Select Specified user account.

**Step 20.** Complete the User name, Domain, Password, and Confirm password fields, using the PVS account information created earlier.

#### Step 21. Click Next.

#	Citrix Provisioning Configuration Wizard			×	
	User account				
	The Stream and SOAP Services user account you will use.	will run under an u	ser account. Please select wha	it	
	Note: The database will be configured for access from this account. If a Group Managed Service Account (gMSA) is used, use the 'UserName\$' format for the username.				
	O Network service account				
	Specified user account				
	User name:	pvs_srvc			
-	Domain:	FSL151K.LOCAL			
	Password:	•••••			
	Confirm password:	•••••			
			< Back Next	> Cancel	

Step 22. Set the Days between password updates to 7.

**Note:** This will vary per environment. "7 days" for the configuration was appropriate for testing purposes.

Step 23. Click Next.

Citrix Provisioning Configuration Wizard	×
Active Directory Computer Account Password	
Automate computer account password updates?	
Automate computer account password updates	
Days between password updates: 7 ~	
< Pade Next >	Capital
< Dduk INEXT >	Carlee

#### **Tech tip**

This setting requires the Group Policy Object (GPO) where the target device is located for the policy **Disable machine account password changes** to be **enabled**. Refer to the <u>Citrix documentation</u> for more details.

Step 24. Keep the defaults for the network cards.

#### Step 25. Click Next.

Citrix Provisioning Configur	ration Wizard	×
Network Communications	5	
Specify network settings.		
Streaming network cards:	▶ ■罰 10.72.0.15	
Management network card:	. ● ■ 10.72.0.15	
Enter the base port that will b are required. You must also se	e used for network communications. A total of 20 ports elect a port for console communications.	
Note: All servers must have the	he same port configurations.	
First communications port:	6890	
Console port:	54321	
	< Back Next > Ca	ncel

Step 26. Select Use the Provisioning Services TFTP service.

Step 27. Click Next.

Citrix Provisioning Configuration Wizard	×	:
TFTP Option and Bootstrap Location		
Typically only one TFTP server is deployed as part of Citrix Provisioning		
Use the Citrix Provisioning TFTP service		
C:\ProgramData\Citrix\Provisioning Services\Tftpboot\ARDBP32.BIN	Browse	
		_
< Back	Next > Cancel	ĺ

Step 28. If Soap Server is used, provide the details.

### Step 29. Click Next.

Citrix Provisioning	g Configuration Wiza	ard		×
Soap SSL Config	uration			
For Linux target imaging using the PVS Soap Server, the Linux target requires a SSL connection using an X.509 certificate. You must add a certificate to the local machine certificate store on the PVS server and then select it from the list below. You should also extract the public certificate from the local certificate store using the Certificates snap-in and install it on the Linux Imaging Machine.				
Specify SSL Setting	js			
SSL port:	54323			
SSL certificate:	Subject	Issuer	Expiration Date	
		< 1	Back Next > Cancel	

Step 30. If desired, fill in Problem Report Configuration.

Step 31. Click Next.

Citrix Provisioning C	onfiguration Wizard	Х		
Problem Report Config	Problem Report Configuration			
Optionally enter your My C	itrix credentials in order to submit problem reports.			
These credentials can also	be configured from the console or when you submit a problem report.			
My Citrix Username:	1			
Password:				
Confirm password:				
Note: The password will no	t be saved as a token will be acquired.			
The Wizard enables the co folder at ProgramData \Citi Troubleshooting section in	llection of Always on Tracing (AOT) logs. They are stored in the AOT ix\Provisioning Services\Log. For more information, refer to the the Citrix Provisioning documentation.			
	< Back Next > Cancel			

Step 32. Click Finish to start the installation.

Citrix Provisioning Configuration Wizard	×
Finish	
Confirm configuration settings.	
PXE - Not used Database Server = FS-SQL-1	
Database Authentication = Active Directory Integrated Farm = NTXPvs:NTXFarm	
Site and Collection = N1XSite, N1XCollection AD Group = FSL151K.LOCAL/Users/Domain Admins	
License Server:Port = any:27000	
Computer account password changes every 7 days	
Console - Soap Port = 54321	
Management NIC - Selected IP = 10.72.0.1	
Automatically Start Services	
< Back Finish Cancel	

Step 33. When the installation is completed, click Done.

🗱 Citrix Prov	isioning Configuration Wizard	×
<b>Finish</b> Confirm co	nfiguration settings.	
8 8 8 8	Stopping Network Services Stopping Software Stream Service Configuring Services Starting Software Stream Services Starting Network Services	
	< Back Done Cancel	

### Procedure 4. Install Additional PVS Servers

Complete the installation steps on the additional PVS servers up to the configuration step, where it asks to Create or Join a farm. In this CVD, we repeated the procedure to add a total of two PVS servers.

Step 1. On the Farm Configuration dialog, select Join existing farm.

```
Step 2. Click Next.
```

Citrix Provisioning Configuration Wizard	×
Farm Configuration	
Create a new Farm or join an existing Farm. Can be skipped if already configured.	
○ Create farm	
Oin existing farm	
< Back Next > Cancel	

**Step 3.** Provide the **FQDN** of the SQL Server and select appropriate authentication method

Step 4. Click Next.

🞇 Citrix Provisioning (	Configuration Wizard	×
Database Server		
Enter the server and and SOAP Services to	instance names, and the database credentials for the Stream o use.	
Server name:	FS-SQL-1	
Instance name:	Diowsc	
Authentication:	Active Directory Integrated $\checkmark$	
	Connect using your current Windows identity.	
	Connection Options	
	< Back Next > Cance	el

Step 5. Accept the Farm Name.

Step	6.	Click	Next.
------	----	-------	-------

🞇 Citrix Provisioning Confi	guration Wizard	×
Existing Farm		
Select the Farm.		
Farm name: NTX-P	S:NTXFarm V	
	< Back Next >	Cancel

- Step 7. Accept the Existing Site.
- Step 8. Click Next.

Select a Site or enter a r	new Site and Collection.	
Existing site		
Site name:	NTXSite ~	
○ New site		
Site name:	Site	
Collection name:	Collection	

Step 9. Accept the existing vDisk store.

### Step 10. Click Next.

Citrix Provisioning C	nfiguration Wizard				
Store					
Select a Store or ente	a new Store and def	ault path.			
Existing store					
Store name:	Store			$\sim$	
○ New store					
Store name:					
Default path:					
		<	Back	Next >	Cancel

Step 11. Provide the FQDN of the license server.

Step 12. Optional: provide a port number if changed on the license server.

Step 13. Click Next.

Citrix Provisioning Configuration Wizard	×
License Server	
Enter the license server hostname and port.	
License server name:	ſ
License server port: 27000	
☑ Validate license server communication	
Select Citrix Provisioning license type:	
On-premises	
Use Datacenter licenses for desktops if no Desktop licenses are available	
< Back Next >	Cancel

Step 14. Provide the PVS service account information.

Step 15. Click Next.

🔀 Citrix Provisioning Configurat	ion Wizard		×
User account			
The Stream and SOAP Services user account you will use.	will run under an u	user account. Please select what	
Note: The database will be confi Managed Service Account (gMS/ username.	igured for access A) is used, use the	from this account. If a Group e 'UserName\$' format for the	
○ Network service account			
Specified user account			
User name:	pvs_srvc		
Domain:	fsl151k.local		
Password:	•••••		
Confirm password:	•••••		
		< Back Next >	Cancel

Step 16. Set the Days between password updates to 7.

Step 17. Click Next.

Citrix Provisioning Configuration Wizard	×
Active Directory Computer Account Password	
Automate computer account password updates?	
Automate computer account password updates	
Days between password updates: 7 $\sim$	
< Back Next > Cancel	

Step 18. Accept the network card settings.

# Step 19. Click Next.

Citrix Provisioning Configuration Wizard					
Network Communications	;				
Specify network settings.					
Streaming network cards:	<b>☑ Ⅲ</b> 10.72.0.16				
Management network card:	. ■ 10.72.0.16				
Enter the base port that will b are required. You must also se	e used for network communications. A total of 20 ports elect a port for console communications.				
Note: All servers must have the	ie same port configurations.				
First communications port:	6890				
Console port:	54321				
	< Back Next > Cancel				

Step 20. Check the box for Use the Provisioning Services TFTP service.

Step 21. Click Next.

Citrix Provisioning Configuration Wizard	×
TFTP Option and Bootstrap Location	
Use the Citrix Provisioning TFTP service	
C:\ProgramData\Citrix\Provisioning Services\Tftpboot\ARDBP32.BIN Browse	
< Back Next >	Cancel

Step 22. Click Next.

#	Citrix Provisioning Cor	nfiguration Wi	zard		×
	Stream Servers Boo	t List			
	Specify at least 1 and at	t most 4 boot s	ervers.		
	The bootstrap file specif boot process.	ies what serve	rs target devices may o	contact to complete the	
	Server IP Address	Server Port	Device Subnet Mask	Device Gateway	
	10.72.0.15	6910			
	Add Ec	lit Re	move		
	Advanced				
			<	Back Next >	Cancel

**Step 23.** If Soap Server is used, provide details.

Step 24. Click Next.

🞇 Citrix P	rovisioning	g Configuration Wiz	ard		×
Soap SSL Configuration For Linux target imaging using the PVS Soap Server, the Linux target requires a SSL connection using an X.509 certificate. You must add a certificate to the local machine certificate store on the PVS server and then select it from the list below. You should also extract the public certificate from the local certificate store using the Certificates snap-in and install it on the Linux Imaging Machine. Specify SSL Settings SSL port: 54323					
SSL ce	rtificate:	Subject	Issuer	Expiration Date	
			<	Back Next >	Cancel

Step 25. If desired, fill in Problem Report Configuration.

# Step 26. Click Next.

Citrix Provisioning Configuration Wizard	×
Problem Report Configuration	
Optionally enter your My Citrix credentials in order to submit problem reports.	
These credentials can also be configured from the console or when you submit a problem report.	
My Citrix Username:	
Password:	
Confirm password:	
Note: The password will not be saved as a token will be acquired.	
The Wizard enables the collection of Always on Tracing (AOT) logs. They are stored in the AOT folder at ProgramData\Citrix\Provisioning Services\Log. For more information, refer to the Troubleshooting section in the Citrix Provisioning documentation.	
< Back Next > C	ancel

Step 27. Click Finish to start the installation process.

Citrix Provisioning Configuration Wizard				×
Finish				
Confirm configuration settings.				
PXE - Not used Database Server = FS-SQL-1\			^	
Database Authentication = Active Directory Integrated Farm = G5-FlashStackDb:G5-FlashStackFarm Site = G5-FlashStackSite				
Store = Store License Server:Port = ANY:27000				
Oser Account = 181151k.local/pvs_srvc Computer account password changes every 7 days Communications - First Port = 6890, Last Port = 6909				
Console - Soap Port = 54321 NIC - Selected IP = 10.72.0.16 Management NIC - Selected IP = 10.72.0.16				
TFTP - Install Service			>	
Automatically Start Services				
	< Back	Finish	Ca	ncel

Step 28. Click Done when the installation finishes.

🞇 Citrix Provi	isioning Configuration Wizard			×
<b>Finish</b> Confirm co	nfiguration settings.			
	Stopping Network Services Stopping Software Stream Service Configuring Services Starting Software Stream Services Starting Network Services			
		< Back	Done	Cancel

**Note:** Optionally, you can install the Provisioning Services console on the second PVS server following the procedure in the section Installing Provisioning Services.

**Step 29.** After installing the one additional PVS server, launch the Provisioning Services Console to verify that the PVS Servers and Stores are configured and that DHCP boot options are defined.

Step 30. Launch the Provisioning Services Console and select Connect to Farm.

n	Provisioning Services Console	
I File Action View Window	Help	_ 8 ×
	· · ·	
Console Provisioning Services Console	Connect to Farm	
	Create a Boot Device	
	View <b>&gt;</b>	
	New Window from Here	
	Refresh	
	Help	
	< III	>
Connect to a Provisioning Services fa	m.	

Step 31. Enter localhost for the PVS1 server.

Step	32.	Click	Connect	
------	-----	-------	---------	--

	Connect to Farm
Server Information	n
<u>N</u> ame: Loc	alhost 🗸
(Na	me or IP address of a server on the farm.)
P <u>o</u> rt: 543	21
(Po	rt configured for server access.)
Credentials	
Use mv Wi	ndows credentials to login
O Use these	credentials to login
<u>U</u> semame	:
<u>D</u> omain:	
Password:	
	Save password
🖌 Auto-login (	on application start or reconnect
	Connect <u>C</u> ancel <u>H</u> elp

Step 33. Select Store Properties from the drop-down list.

Citrix Provisioning (	Console v Window Help	,				×
🗢 🏟 🖄 📰 👔						
Citrix Provisioning C NTXFarm (localh V Sites Sites NTXSite NTXSite NTXSite Sites Views Views Views Views	Console nost)	Name	Site NTXSite	Connections 0	Size 65,536 MB	Mode Cache in Device RAM.
	Properties Create vDisk Add or Import Exist Add vDisk Versions. Audit Trail	ing vDisk				
	View New Window from Delete	> Here				
-	Refresh Help					
		<				>
Add new Disk Versions.						

**Step 34.** In the Store Properties dialog, add the Default store path to the list of Default write cache paths. Click **OK**.

😫 Citrix Provisioning Console					- 🗆 🗙
🗱 File Action View Window Help					- 8 ×
💠 🔿 🚺 📰					
Citrix Provisioning Console  Citrix Provisioning Console  Sites  Sites  Citrix Citrix Citric	Name	Site NTXSite	Connections 0	Size 65,536 MB	Mode Cache in Device RAM.
> Views Store Properties				×	
Views     Stores     General Servers     Default store path     E:\Store     Default write cac     E:\Store	Paths		Ai Er Move	dd dd dit move ve Up	
	Validate	OK	Cancel H	lelp	
	<				>

Step 35. Synchronize vDisk between the Local Stores of the Provisioning Service Servers using robocopy:

robocopy <sourcepath> <destinationpath> /xo vdiskname.\*

**Note:** Using a central storage solution for vDisks in a Citrix PVS environments can offer several compelling advantages in ease of management, scalability, and performance compared to the Local PVS store. Using <u>Nutanix Files</u> for PVS vDisk storage can significantly enhance the efficiency and reliability of your provisioning services.

Step 36. Select Load Balancing from the vDisk drop-down list

Citrix Provisioning Console     Generation View Window He     Generation View Window He     Generation View Window He	lp				- D X
Citrix Provisioning Console	Name	Site       Properties       Versions       Load Balancing       Replication Status       Mount vDisk       Show Usage       Manage Locks       Unassign from Selected I       Copy vDisk Properties       Export vDisk       Audit Trail       Copy       Delete       Refresh       Help	Connections Device(s)	Size 65,536 MB	Mode Cache in Device RAM
	0				

Manage the locks for this vDisk.

Step 37. Verify the vDisk is load balanced.

	uniting				
A load bala	ncing algorit	hm may	be used to provid	le the vDisk t	o the
		0 001 101	may be asea.		
<ul> <li>Use the</li> </ul>	load balanc	ing algo	ithm		
Subnet	Affinity	None		~	
Reba	alance Enab	led	Trigger Percent	25	
O Use this	server to pr	ovide the	e vDisk		
Server:	NTX-P	VS-1		$\sim$	
					_
			Camaa	Lala	

#### **Procedure 5.** Nutanix AHV Plug-in for Citrix Provisioning Services

Nutanix AHV Plug-in for Citrix is designed to create and manage VDI VMs in a Nutanix Acropolis infrastructure environment. The plug-in is developed based on the Citrix defined plug-in framework and must be installed on a Delivery Controller or Provisioning Server is hosted. Additional details on AHV Plug-in for Citrix can be found here.

**Step 1.** Download the latest version of the **Nutanix AHV Plug-in for Citrix installer MSI (.msi)** file **NutanixAHV\_Citrix\_Plugin.msi** from the <u>Nutanix Support Portal</u>.

**Step 2.** Double-click the **NutanixAHV\_Citrix\_Plugin.msi installer file** to start the installation wizard. At the welcome window, click **Next**.



**Step 3.** The End-User License Agreement screen details the software license agreement. To proceed with the installation, read the entire agreement, select **I accept the terms in the license agreement** and click **Next**.

Nutanix AHV plugin for Citrix XenDesktop Setup Wizard	2
End-User License Agreement Please read the following license agreement carefully.	
Nutanix License and Services Agreement	^
This Nutanix License and Services Agreement ("Agreement") governs Your receipt and use of any Products (as defined below) and becomes effective when you (a) issue a purchase order for the Products; (b) click the "ACCEPT" button when downloading or installing the Software; and/or (c) access or use the Software or Cloud Services. This Agreement is entered into between Nutanix Inc., located at 1740 Technology Dr. Ste. 150, San Jose, CA 95110, United States, if You are contracting in the Americas, or Nutanix Netherlands, if You are contracting anywhere else in the world, or both if you are contracting <b>except</b> the terms in the License Agreement	~
< <u>B</u> ack <u>N</u> ext > Can	cel

Step 4. Select the PVS AHV Plugin in the Setup Type dialog box and click Next.

Cotup Tupo	idesktop setup mizar	u	
Choose the setup type that best s	uits your needs		X
			NUTANIX.
O XD MCS AHV Plugin			
MCS Plugin for Citri	ix XenDesktop will be in:	stalled	
CWA MCS AHV Plugin			
MCS Plugin for Citri	ix Cloud Connector will l	be installed	
PVS AHV Plugin			
PVS Plugin for Citris	x Provisioning Console v	vill be installed	
		March S	Canad

Step 5. Click Next to confirm installation folder location.

/ PVS plugin Setup Wizard	>
Folder	
will install Nutanix AHV PVS plugin in the following folde	er.
C:\Program Files\Common Files\Citrix\HCLPlugins\CitrixMachineCreation\v1.0.0.	.0\NutanixAHV\
	V PVS plugin Setup Wizard Folder r will install Nutanix AHV PVS plugin in the following folde C:\Program Files\Common Files\Citrix\HCLPlugins\CitrixMachineCreation\v1.0.0

**Step 6.** Select **Yes, I agree at the Data Collection** dialog box of the installation wizard to allow collection and transmission. Click **Install**.

Ready to install Nutanix AHV PVS plugin	NUTAN
This plugin can collect and send data described belo selecting 'Yes, I agree', you are permitting such dat sent. Please note that the data will be sent only wh Nutanix Prism.	w to Nutanix. By a to be collected and m Pulse is enabled on
DATA COLLECTION DETAILS	
i. Reading from the Registry of the System whe Path:- HKEY_LOCAL_MACHINE\SOFTWARE Plugin Key:- "Installer Type". ii. This Registry Key will be added at the time of 1. For MCS : sending "MCS"	re Plugin is installed. Nutanix Inc.\Citrix MCS installation of Plugin.
0	

Step 7. Click Finish to complete the installation.

🖟 Nutanix AHV PVS plugin Set	up Wizard	×
	Nutanix AHV PVS plugin Setu Wizard	р
	Click the Finish button to exit the Wizard.	
NUTANIX	DN .	
	< Back Finish Cancel	

# Provision Virtual Desktop Machines

This chapter contains the following:

- <u>Citrix Provisioning Services</u>
- <u>Citrix Machine Creation Services</u>
- <u>Create Delivery Groups</u>
- <u>Citrix Virtual Apps and Desktops Policies and Profile Management</u>

# **Citrix Provisioning Services**

This section provides the procedures for Citrix Provisioning Service.

**Procedure 1.** Citrix Provisioning Services Citrix Virtual Desktop Setup Wizard - Create PVS Streamed Virtual Desktop Machines

**Step 1.** Create Virtual Machine without disks or NICs (Nutanix does support a single CD-ROM if attached inside the snapshot template). Make sure to select only one core per CPU.



**Step 2.** After creating the VM (without disks or NICs), take a snapshot of the VM in the Prism Element web console.

Step 3. Start the Citrix Virtual Apps and Desktops Setup Wizard from the Provisioning Services Console.

Step 4. Right-click the Site.

Step 5. Select Citrix Virtual Desktop Setup Wizard... from the context menu.

Image: State of the state o	Image: Name         g Console         alhost)         Properties         Rebalance Devices         Set Max Transmission Unit         Import Devices         Audit Trail	Description	
Citrix Provisioning NTXFarm (loca Sites Sites Sites Sites Sites Sites Sites Sites Sites	g Console alhost) Name International State Neperties Rebalance Devices Set Max Transmission Unit Import Devices Audit Trail	Description	
> 📴 N > 🔂 View > 🤷 Store	Properties Rebalance Devices Set Max Transmission Unit Import Devices Audit Trail		
-			
L	Citrix Virtual Desktops Setup Wizard Streamed VM Setup Wizard Export Devices Wizard Auto-Add Wizard Report a problem		
	New Window from Here		
	Delete Refresh		
	Help		

Step 6. Click Next.



Step 7. Enter the address of the Citrix Virtual Desktop Controller that will be used for the wizard operations.

# Step 8. Click Next.

Citrix Virtual Desktops Setup	×
Citrix Virtual Desktops Controller Enter the address of the Citrix Virtual Desktops C	Controller you want to configure
Please select the type of DDC you wish to comm	nunicate with:
O Citrix Cloud	
Customer-Managed Control Plane	
Citrix Virtual Desktops Controller address:	
	( Back Next ) Cancel

Step 9. Select the Host Resources that will be used for the wizard operations.Step 10. Click Next.

Citrix Virtual Desktops Setup	×
Citrix Virtual Desktops Host Resources Select the Citrix Virtual Desktops Host Resources you want to use:	
Citrix Virtual Desktops Host Resources	
AHV-VDI	
AHVI-VDI AHV2-VDI	
	0
< Back Next >	Cancel

Step 11. Provide the Citrix Virtual Desktop Controller credentials.

# Step 12. Click OK.

Citrix Vir	tual Desktops Host Resources t the Citrix Virtual Desktops Host Resources you want to use:	6
AHV-VD AHV1-VI AHV2-VI	Citrix Virtual Desktops Host Resources Credentials	
	< Back Next > Cancel	

Step 13. Select the template created earlier.

SIEP 14. OHUK NEXL	Step	14.	Click	Next
--------------------	------	-----	-------	------

Select the Template you want to u	se:	
Select a template for the Citrix Virtual	Desktops Host Resources.	
Virtual Machine Template		
pvs-tmpl-nodsk		
rds-mcs_8724_0900		
rds-mcs_8724_1030		
vdi-mcs_82724_950		
vdi-mcs_8724_1405		
vdi-tmpl-813		
<		>
Select the VDA version installed on th	is template:	
7.9 (recommended)	· ·	
7.5 (cconincilacity		

**Step 15.** Select the virtual disk (vDisk) that will be used to stream the provisioned virtual machines.

# Step 16. Click Next.

Citrix Virtual Desktops Setup		×
<b>vDisk</b> Select an existing standard-mode vDisk.		
Standard-mode vDisk: <u>Store\NTNX-Dsk</u> Store\w11-pvs-dsk Store\w2022-rds-dsk		
	< Back Next > Ca	ancel

Step 17. Select Create new catalog.

Step 18. Provide a catalog name.

Step 19. Click Next.

trix Virtual Desk	tops Setup			×
Catalog				
Select your C	Catalog preferences.			
Create a ne	w catalog			
O Use an exis	sting catalog			
Catalog name:	ahv-3-w11			
Description:		 		
	-			

Step 20. Select Single-session OS for Machine catalog Operating System.

# Step 21. Click Next.

Citrix Virtual Desktops Setup	×
<b>Operating System</b> Select an operating system for this Machine Catalog.	
<ul> <li>Multi-session OS         The multi-session OS Machine Catalog provides hosted shared desktops for a large-scale deployment of standard Windows multi-session OS or Linux OS machines     </li> <li>Single-session OS         The single-session OS Machine Catalog provides VDI desktops ideal for a variety of different users.     </li> <li>Note:         This infrastructure will be built using virtual machines.         Virtual disk images will be managed using Citrix Provisioning (PVS)     </li> </ul>	i.
< Back Next > Ca	incel

Step 22. Select random for the User Experience.

# Step 23. Click Next.

Citrix Virtual Desktops Setup × User Experience Setup logon characteristics and the appearance for the user's virtual desktop. At logon, connect users to: A random, pooled virtual desktop each time. The same (static) virtual desktop With a static desktop, the user retains the same machine, however, any changes made to the virtual desktop are discarded when logging off.
User Experience         Setup logon characteristics and the appearance for the user's virtual desktop.         At logon, connect users to:         A random, pooled virtual desktop each time.         The same (static) virtual desktop         With a static desktop, the user retains the same machine, however, any changes made to the virtual desktop are discarded when logging off.
Setup logon characteristics and the appearance for the user's virtual desktop.         At logon, connect users to:         A random, pooled virtual desktop each time.         The same (static) virtual desktop         With a static desktop, the user retains the same machine, however, any changes made to the virtual desktop are discarded when logging off.
At logon, connect users to: A random, pooled virtual desktop each time. The same (static) virtual desktop With a static desktop, the user retains the same machine, however, any changes made to the virtual desktop are discarded when logging off.
<ul> <li>A random, pooled virtual desktop each time.</li> <li>The same (static) virtual desktop</li> <li>With a static desktop, the user retains the same machine, however, any changes made to the virtual desktop are discarded when logging off.</li> </ul>
O The same (static) virtual desktop With a static desktop, the user retains the same machine, however, any changes made to the virtual desktop are discarded when logging off.
With a static desktop, the user retains the same machine, however, any changes made to the virtual desktop are discarded when logging off.
< Back Next > Cancel

Step 24. On the Virtual machines dialog, specify the following:

Citrix Virtual Desktons Setun	X
Citrix Virtual Desktops Delegated Administrator So Select the scope for the new catalog:	xope
Scope	
< Bac	k Next > Cancel

Step 25. On the Virtual machines dialog, specify the following:

• The number of virtual machines to create

**Note:** Create a single virtual machine at first to verify the procedure.

- 2 as Number of vCPUs for the virtual machine
- 4096 MB as the amount of memory for the virtual machine
- 10 GB as the Local write cache disk

#### Step 26. Click Next.

Virtual machines Select your virtual machine prefe	erences.		
Number of virtual machines to	create:	200 🗘	
vCPUs:	2	2	
Memory:	2000 MB	4096 🔶 ME	3
Local write cache disk:	6 GB	10 🖨 GE	3
Boot mode:	a running PXE servi	ce)	
<ul> <li>BDM disk (create a</li> </ul>	i boot device manag	er partition)	

Step 27. Select AHV Container for desktop provisioning.

Citrix Virtual Desktops Setup	×
Container Select a Nutanix Acropolis hypervisor container.	23
Containers	
default-container-61470195232803 Nutanix/ManagementShare SelfServiceContainer VDI	
< Back Next >	Cancel

Step 28. Select Create new accounts.

#### Step 29. Click Next.

Citrix Virtual Desktops Setup		×
Active Directory Select your computer account option.		
Create new accounts		
Import existing accounts		
	< Back Next >	Cancel

**Step 30.** Specify the Active Directory Accounts and Location. This is where the wizard should create computer accounts.

**Step 31.** Provide the Account naming scheme. An example name is shown below the naming scheme selection location in the text box.

Step 32. Click Next.

Citrix Virtual Desktops Set	xup ×
Active Directory accor Create Active Director	unts and location y accounts.
Active Directory location for	or computer accounts:
Domain: FSL151K.LOC/	AL Ý
<ul> <li>FSL151K.LOCAL</li> <li>LoginEnt</li> <li>Launchers</li> <li>RDS</li> <li>Users</li> <li>VDI</li> <li>NTX</li> <li>LoginVSI</li> </ul>	
FSL151K.LOCAL/LoginEr	nt/VDI/NTX
Account naming scheme: Starting Index:	ahv-w11-3#### 0-9 ~ 1 • ahv-w11-3001
	< Back Next > Cancel

Step 33. Verify the information on the Summary screen.

Step 34. Click Finish to begin the virtual machine creation.

C-+-l	-h 211
Catalog hame	anv-3-will
	7.9 (meanmanded)
Citrix Victural Decktope Heat Resources	AUV/VDI
Vitual machine template	AHV-VDI
Frieting v Dick	NTNY Del
	2
Memory per VM	2 4096 MR
local write cache diek	10 GB
Boot mode	PXE
Active Directory accounts	Create 200
Account naming scheme	aby-w11-3#### (0-9)
Starting Index	1
ogress	

**Step 35.** When the wizard is done provisioning the virtual machines, click **Done**.

VDI PVS Random
2106 (or newer)
AHV2-VDI
4pvsDeploy
NTNX-Dsk
2
4096 MB
10 GB
PXE
Create 200
ahv-w11-2### (0-9)
1

**Step 36.** When the wizard is done provisioning the virtual machines, verify the Machine Catalog on the Citrix Virtual Apps and Desktops Controller.

# **Citrix Machine Creation Services**

This section provides the procedures to set up and configure Citrix Machine creation services.

**Procedure 1.** Machine Catalog Setup (Single-Session OS)

- Step 1. Connect to a Citrix Virtual Apps and Desktops server and launch Citrix Studio.
- Step 2. Select Create Machine Catalog from the Actions pane.

Citrix Studio					- 0 ×
File Action View Help					
<ul> <li>Citrix Studio (FlashStack)</li> <li>Search</li> <li>Machine Catalogs</li> <li>Delivery Groups</li> <li>Applications</li> <li>Policies</li> <li>Logging</li> <li>Configuration</li> <li>Administrators</li> <li>Controllers</li> <li>Hosting</li> <li>Licensing</li> <li>StoreFront</li> <li>App-V Publishing</li> <li>Zones</li> </ul>	Machine Catalog ↓	Machine type	No. of machines	Allocated machin	Actions Machine Catalogs Create Machine Catalog View Refresh Help

Step 3. Click Next.

Introduction
<ul> <li>Machine Catalogs are collections of physical or virtual machines that you assign to users. You create Catalogs from Master Images or physical machines in your environment.</li> <li>Important: The Master Image or physical machine that you use to create a Catalog must have a Virtual Delivery Agent installed. Also, ensure that the operating system is up-to-date and that applications are installed.</li> <li>Before you begin, make sure that you:</li> <li>Identify the types of desktops and applications your users need</li> <li>Choose a Catalog infrastructure (for example, whether to power manage virtual machines)</li> <li>Have a technology for creating and managing machines (such as Machine Creation services or Citrix Provisioning)</li> <li>Prepare your environment, including the Master Image, computer accounts, and network interface card configuration.</li> <li>Learn more</li> <li>Don't show this again</li> </ul>



# Step 5. Click Next.

Studio	Operating System
Stadio	
	Select an operating system for this Machine Catalog.
Introduction	<ul> <li>Multi-session OS</li> <li>The multi-session OS machine catalog provides hosted shared desktops for a large-scale</li> </ul>
Operating System	deployment of standardized Windows multi-session OS or Linux OS machines.
Machine Management	Single-session OS The single-session OS machine catalog provides VDI decktops ideal for a variety of
Desktop Experience	different users.
Container	Remote PC Access
Master Image	The Remote PC Access machine catalog provides users with remote access to their physical office desktops, allowing them to work at any time.
Virtual Machines	
Computer Accounts	There are currently no power management connections suitable for use with Remote PC
Summary	Access, but you can create one after completing this wizard. Then edit this machine catalog to specify that connection.

**Step 6.** Select the appropriate machine management.

Ston	7	Click	Novt
Step	/.	CIICK	next.

Studio	Machine Management
	This Machine Catalog will use:
	Machines that are power managed (for example, virtual machines or blade PCs)
✓ Introduction	<ul> <li>Machines that are not power managed (for example, physical machines)</li> </ul>
Operating System	
Machine Management	Deploy machines using:
Desktop Experience	Citrix Machine Creation Services (MCS)
Container	Resources:
Master Image	VDI (Zone: Primary)
Virtual Machines	Citrix Provisioning
Computer Accounts	Another service or technology
Summary	I am not using Citrix technology to manage my machines. I have existing machines already prepared.
	Note: For Linux OS machines, consult the administrator documentation for guidance.

Step 8. Select (static and dedicated) for Desktop Experience.

Step 9. Click Next.
Studie	Desktop Experience
<ul> <li>Studio</li> <li>Introduction</li> <li>Operating System</li> <li>Machine Management</li> <li>Desktop Experience</li> <li>Container</li> <li>Master Image</li> <li>Virtual Machines</li> <li>Computer Accounts</li> <li>Summary</li> </ul>	<ul> <li>Which desktop experience do you want users to have?</li> <li>I want users to connect to a new (random) desktop each time they log on.</li> <li>I want users to connect to the same (static) desktop each time they log on.</li> <li>Do you want to save any changes that the user makes to the desktop?</li> <li>Yes, create a dedicated virtual machine and save changes on the local disk.</li> <li>No, discard all changes and clear virtual desktops when the user logs off.</li> </ul>
	Back Next Cancel

Step 10. Select the container for vDisk placement and click Next.

Studio	Com	amen	
	Selec	t the container where the virtual machines' identity disks will be placed.	
Introduction	0	Container name default-container-61470195232803	+
Operating System	0	NutanixManagementShare	
Machine Management	0	SelfServiceContainer	
Desktop Experience	0	VDI	
Container			
Master Image			
Virtual Machines			
Computer Accounts			
Summary			
,			

**Step 11.** Select a Virtual Machine to be used for Catalog Master Image.

Step 12. Click Next.

Studio	Master Image	
	The selected snapshot of a master image will be the template for all virtual machines in catalog (A master image is also known as clone, golden image or base image.)	this
Introduction	Select a snapshot:	
Operating System	Snapshot name	+
Machine Management	base	
Desktop Experience	🔘 base	
Container	optimized	
Master Image	O pvs-tmpl	
master image	ords-mcs_8724_0900	
Virtual Machines	ords-mcs_8724_1030	
Computer Accounts	O vdi-mcs_82724_950	
Summary	vdi-mcs_8724_1405	
	vdi-tmpl-813	
	Select the minimum functional level for this     7.9 (or newer)	•
	catalog: Machines will require the selected VDA version (or newer) in order to register in Delivery	y Groups

**Step 13.** Specify the number of desktops to create and machine configuration.

**Step 14.** Set amount of memory (MB) to be used by virtual desktops.

**Step 15.** Set vCPU and cores to be used by virtual desktops.

Step 16. Click Next.

Studio	Virtual Machines		
✓ Introduction	How many virtual machines do you want to create?		
<ul> <li>✓ Operating System</li> <li>✓ Machine Management</li> </ul>	Configure your machines. Total memory (MB) on each machine:	4096	- +
✓ Desktop Experience	Virtual CPUs:	2	- +
✔ Container	Cores per vCPU:	1	
✔ Master Image			
Virtual Machines			
Computer Accounts			
Summary			

Step 17. Specify the AD account naming scheme and OU where accounts will be created.

## Step 18. Click Next.

Studio	Active Directory Computer Accounts
✓ Introduction	Each machine in a Machine Catalog needs a corresponding Active Directory computer account. Select an Active Directory account option: <ul> <li>Create new Active Directory accounts</li> </ul>
Operating System	Use existing Active Directory accounts
r Machine Management	Active Directory location for computer accounts:
Container     Macter Image	Domain: FSL151K.LOCAL V
Virtual Machines	Users
Computer Accounts Summary	Control Contro Control Control Control Control Control Control Control Control Co
	Selected location: OU=VDI,OU=LoginEnt,DC=FSL151K,DC=LOCAL Account naming scheme: NTX-MCS2-#### 0-9 + NTX-MCS2-0123

Step 19. On the Summary page specify Catalog name and click Finish to start the deployment.

Studio	Summary			
<ul> <li>Introduction</li> <li>Operating System</li> <li>Machine Management</li> <li>Desktop Experience</li> <li>Container</li> <li>Master Image</li> <li>Virtual Machines</li> <li>Computer Accounts</li> <li>Summary</li> </ul>	Machine type: Machine management: Provisioning method: Desktop experience: Resources: Nutanix container: Master Image name: VDA version: Number of VMs to create:	Single-session OS Virtual Machine creation services (MCS) Users connect to the same desktop each time they log on Save changes on the local disk VDI VDI VDI vdi-mcs_82724_950 7.9 (or newer)		
Summary	Machine Catalog name:			
	NTX-W11-MCSFC			
	Machine Catalog description fo	or administrators: (Optional)		
	Example: Windows 7 SP1 deskt	ops for the London Sales office		
	To complete the deployment, as Delivery Groups and then Creat	ssign this Machine Catalog to a Delivery Group by selecting e or Edit a Delivery Group.	rel	

# **Procedure 2.** Machine Catalog Setup Machine (Multi-Session OS)

Step 1. Connect to a Citrix Virtual Apps and Desktops server and launch Citrix Studio.

Step 2. Select Create Machine Catalog from the Actions pane.

Citrix Studio					– 0 X
File Action View Help					
Citrix Studio (FlashStack)					Actions
Search					Machine Catalogs
Delivery Groups	Machine Catalog +	Machine type	No. of machines	Allocated machin	💼 Create Machine Catalog
Applications			10		View 🕨
Policies					Refresh
Configuration					12 Help
Administrators					
Controllers					
Hosting					
StoreFront					
App-V Publishing					
Zones					
		_			
	(]				1

Step 3. Click Next.

г

Studio	Introduction
Introduction Operating System Machine Management Container Master Image Virtual Machines Computer Accounts Summary	<ul> <li>Machine Catalogs are collections of physical or virtual machines that you assign to users. You create Catalogs from Master Images or physical machines in your environment.</li> <li>Important: The Master Image or physical machine that you use to create a Catalog must have a Virtual Delivery Agent installed. Also, ensure that the operating system is up-to-date and that applications are installed.</li> <li>Before you begin, make sure that you: <ul> <li>Identify the types of desktops and applications your users need</li> <li>Choose a Catalog infrastructure (for example, whether to power manage virtual machines)</li> <li>Have a technology for creating and managing machines (such as Machine Creation Services or Citrix Provisioning)</li> </ul> </li> <li>Prepare your environment, including the Master Image, computer accounts, and network interface card configuration.</li> </ul>
	Don't show this again     Back     Next     Cancel

## Step 4. Select Multi-session OS.

Step 5. Click Next.

Studio	Operating System
	Select an operating system for this Machine Catalog.
Introduction	Multi-session OS The multi-session OS machine catalog provides hosted shared desktops for a large-scale deployment of standardized Windows multi-session OS or Linux OS machines.
Machine Management Container	Single-session OS The single-session OS machine catalog provides VDI desktops ideal for a variety of different users.
Master Image Virtual Machines	Remote PC Access The Remote PC Access machine catalog provides users with remote access to their physical office desktops, allowing them to work at any time.
Computer Accounts	
Summary	There are currently no power management connections suitable for use with Remote PC Access, but you can create one after completing this wizard. Then edit this machine catalog to specify that connection.

**Step 6.** Select the appropriate machine management.

# Step 7. Click Next.

Studio	Machine Management
	This Machine Catalog will use:
	Machines that are power managed (for example, virtual machines or blade PCs)
<ul> <li>Introduction</li> </ul>	<ul> <li>Machines that are not power managed (for example, physical machines)</li> </ul>
Operating System	
Machine Management	Deploy machines using:
Container	Citrix Machine Creation Services (MCS)
Master Image	Resources:
Virtual Machines	AHV1-VDI (Zone: Primary)
Computer Accounts	Citrix Provisioning
Summary	Another service or technology I am not using Citrix technology to manage my machines. I have existing machines already prepared.
	Note: For Linux OS machines, consult the administrator documentation for guidance.

- Step 8. Select Container for disk placement.
- Step 9. Click Next.

Studio	Cont	ainer	
	Select	the container where the virtual machines' identity disks will be placed.	
		Container name	4
Introduction	0	default-container-61470195232803	
Operating System	0	NutanixManagementShare	
Machine Management	0	SelfServiceContainer	
Container	0	VDI	
Master Image			
Virtual Machines			
Computer Accounts			
Summary			
,			

**Step 10.** Select a Virtual Machine to be used for Catalog Master Image.

### Step 11. Click Next.

Studio	Master Image	
	The selected snapshot of a master image will be the template for all virtua catalog (A master image is also known as clone, golden image or base ima	I machines in this age.)
Introduction	Select a snapshot:	
Operating System	Snapshot name	4
Machine Management	4pysDeploy	
/ Container	base	
Master Image	base	
waster image	optimized	
Virtual Machines	pvs-tmpl	
Computer Accounts	pvs-tmpl-nodsk	
Summary	O rds-mcs_8724_0900	
	ords-mcs_8724_1030	
	vdi-mcs_82724_950	
	vdi-mcs_8724_1405	
	A unit internal 012	*
	<ol> <li>Select the minimum functional level for this</li> <li>7.9 (or newer)</li> </ol>	-
	catalog:	
	Machines will require the selected VDA version (or newer) in order to regis	ster in Delivery Groups

**Step 12.** Specify the number of desktops to create and machine configuration.

Step 13. Set the amount of memory (MB) to be used by virtual desktops.

**Step 14.** Select the number of vCPUs and cores.

Step 15. Click Next.

	Mintral Marking				
Studio	Virtual Machines				
	How many virtual machines do you want to create?				
	32 -+				
Introduction	Configure your machines.				
Operating System	Total memory (MB) on each machine:	24	576	-	+
Machine Management	Virtual CPI Is:	2	=		
V Container	Virtual of 03	2			-
Vistual Machines	Cores per vCPU:	2		-	+
Virtual Machines					
Computer Accounts					
Summary					

Step 16. Specify the AD account naming scheme and OU where accounts will be created.Step 17. Click Next.

Studio	Active Directory Computer Accounts
	Each machine in a Machine Catalog needs a corresponding Active Directory computer account. Select an Active Directory account option:
Introduction	Create new Active Directory accounts
Operating System	Use existing Active Directory accounts
Machine Management	Active Directory location for computer accounts:
Container	Domain: FSL151KLOCAL -
Master Image	
Virtual Machines	Eaunchers
Computer Accounts	T RDS
Summary	Users
	VDI
	Fill LoginVSI
	Im Managed Service Accounts
	Selected location: OU=RDS,OU=LoginEnt,DC=FSL151K,DC=LOCAL
	Account naming scheme:
	MCS-W22-A-#### 0-9 👻
	MCS-W22-A-0123

Step 18. On the Summary page specify Catalog name and click Finish to start the deployment.

Studio	Summary		
	Machine type:	Multi-session OS	-
✓ Introduction	Machine management:	Virtual	
✓ Operating System	Provisioning method:	Machine creation services (MCS)	
Machine Management	Resources:	AHV1-VDI	
d Container	Nutanix container:	VDI	
♥ Container	Master Image name:	rds-mcs_8724_0900	
✓ Master Image	VDA version:	7.9 (or newer)	
✓ Virtual Machines	Number of VMs to create:	32	
Computer Accounts	Virtual CPUs:	2	
Summary	Cores per vCPU:	2	-
	Machine Catalog name:		
	ahv-tc-w22		
	Machine Catalog description fo	or administrators: (Optional)	
	Example: Windows 7 SP1 deskt	ops for the London Sales office	
	To complete the deployment, as Delivery Groups and then Creat	ssign this Machine Catalog to a Delivery Group by selecti e or Edit a Delivery Group.	ng

## **Create Delivery Groups**

Delivery Groups are collections of machines that control access to desktops and applications. With Delivery Groups, you can specify which users and groups can access which desktops and applications.

#### **Procedure 1.** Create Delivery Groups

This procedure details how to create a Delivery Group for persistent VDI desktops. When you have completed these steps, repeat the procedure for a Delivery Group for RDS desktops.

Step 1. Connect to a Citrix Virtual Apps and Desktops server and launch Citrix Studio.

Step 2. Select Create Delivery Group from the drop-down list.

#		Citrix Studio
<u>File</u> <u>Action</u> <u>View</u> <u>H</u> el	p	
Console Root ⊿ II Citrix Studio (Site) ○ Search	citrix.	
Machine Catalog	S Delivery Groups Applications (0)	
▲       Delivery Gro         ➡       Policies         ✔       Logging         ▲       ♣         Configuration       ♣         Adminis       ➡         ➡       Hosting         ▲       Licensing	Create Delivery Group Machine typ View Refresh Help	pe No. of machi
Cicensing	ni	

# Step 3. Click Next.

eate Delivery Group	
Studio	Getting started with Delivery Groups
Introduction Machines Machine allocation Users Applications Desktop Assignment Rules Summary	Delivery Groups are collections of desktops and applications (which could be in Application Groups) that are created from Machine Catalogs. Create Delivery Groups for specific teams, departments, or types of users. Make sure you have enough machines available in desktop OS or server OS Machine Catalogs to create the Delivery Groups you need.
	Don't show this again Back Next Cancel

**Step 4.** Specify the Machine Catalog and increment the number of machines to add.

# Step 5. Click Next.

	machines		
	Select a Machine Catalog.		
	Catalog	Туре	Machine
Introduction	WIN10-FS-MCS	VDI MCS Static Local Disk	210
Machines	MCS WIN10 1809		
Delivery Type			
Users			
Desktop Assignment Rules			
Construction of the Constr			
Summary	Choose the number of machines fo	or this Delivery Group: 210	- +
Summary	Choose the number of machines fo	or this Delivery Group: 210	-+
Summary	Choose the number of machines fo	or this Delivery Group: 210	-+

**Step 6.** Specify what the machines in the catalog will deliver: Desktops, Desktops and Applications, or Applications.

# Step 7. Select Desktops.

Step 8. Click Next.

Studio	Delivery Type
Introduction Machines Delivery Type Users Desktop Assignment Rules Summary	You can use the machines in the Catalog to deliver desktops or applications to your users. Use the machines to deliver: <ul> <li>Desktops</li> <li>Applications</li> </ul> <li>Note: For Linux OS machines, consult the administrator documentation for guidance.</li>

**Step 9.** You must add users to make the Delivery Group accessible. Select **Allow any authenticated users to use this Delivery Group**.

**Note:** User assignment can be updated any time after Delivery group creation by accessing Delivery group properties in Desktop Studio.

Step 10. Click Next.

e beinery oroup	
Studio	Users
	Specify who can use the applications and desktops in this Delivery Group. You can assign users and user groups who log on with valid credentials.
✓ Introduction	Allow any authenticated users to use this Delivery Group.
✓ Machines	Restrict use of this Delivery Group to the following users:
Users Applications Desktops Summary	Add users and groups
	Add Remove  Sessions must launch in a user's home zone, if configured.  Back Next Cancel

Step 11. Click Next (no applications are used in this design).

ce beareary or oup	
Studio	Applications
<ul> <li>✓ Introduction</li> <li>✓ Machines</li> </ul>	To add applications, click "Add" and choose a source. Then select applications from that source If you choose Application Groups, all current and future applications in the selected groups wil be added. You can also place new applications in a non-default folder and change application properties.
🗸 Users	Add applications
Applications Desktops	
Summary	
	Add
	Place the new applications in folder:
	/ Applications
	Change
	Change

Step 12. Enable Users to access the desktops.

Step 13. Click Next.

Display name:	AnydesktopAnyuser
Description:	Example: Assigned desktops for Finance Dept.
	The name and description are shown in Receiver.

#### Allow everyone with access to this Delivery Group to have a desktop assigned

#### Restrict desktop assignment to:

Add use	rs and groups		10.00
			104
Add	Remove		
Maximum desktop	os per user: 1	- +	
Enable desktop Clear this chec	p assignment rule k box to disable delivery	of this desktop.	
			K Cancel

**Step 14.** On the Summary dialog, review the configuration. Enter a Delivery Group name and a Description (Optional).

## Step 15. Click Finish.

Create Delivery Group

Studio	Summary		
	Machine Catalog:	WIN10-FS-MCS	[
Introduction	Machine type:	Desktop OS	
Machines	Allocation type:	Static	
Delivery Type	Machines added:	VCCFSLAB\w10-mcs-001 VCCFSLAB\w10-mcs-002	
/ Users		VCCFSLAB\w10-mcs-003	
A Dealthan Ansianment Bulan		VCCFSLAB\w10-mcs-004	
Desktop Assignment Rules		VCCFSLAB\w10-mcs-005 VCCFSLAB\w10-mcs-006	
Summary		VCCFSLAB\w10-mcs-007	
		VCCFSLAB\w10-mcs-008	
		VCCFSLAB\w10-mcs-009	
		VCCFSLAB\w10-mcs-011	
		VCCFSLAB\w10-mcs-012	
	Delivery Group name:		
	WIN10-DG-MCS-STATIC		
	Delivery Group description	, used as label in Receiver (optional):	

Citrix Studio lists the created Delivery Groups as well as the type, number of machines created, sessions, and applications for each group in the Delivery Groups tab.

Step 16. From the drop-down list, select Turn on Maintenance Mode.

## **Citrix Virtual Apps and Desktops Policies and Profile Management**

Policies and profiles allow the Citrix Virtual Apps and Desktops environment to be easily and efficiently customized.

#### **Configure Citrix Virtual Apps and Desktops Policies**

Citrix Virtual Apps and Desktops policies control user access and session environments, and are the most efficient method of controlling connection, security, and bandwidth settings. You can create policies for specific groups of users, devices, or connection types with each policy. Policies can contain multiple settings and are typically defined through Citrix Studio. The policy used in testing was generated from the **Higher Server Scalability Template** with the additional setting shown in <u>Table7</u>.

The Windows Group Policy Management Console can also be used if the network environment includes Microsoft Active Directory and permissions are set for managing Group Policy Objects.

Figure 8 shows the policies for Login VSI testing in this CVD.

Policies	Testing Policy	
1 Unfiltered	Overview Settings Assigned to	
2 Testing Policy	Auto connect client drives     User setting - ICA\File Redirection     Disabled (Default: Enabled)	
3 VDI Policy 4 RDS Policy	<ul> <li>Auto-create client printers</li> <li>User setting - ICA\Printing\Client Printers</li> <li>Do not auto-create client printers (Default: Auto-create all client printers)</li> </ul>	
	<ul> <li>Client printer redirection</li> <li>User setting - ICA\Printing</li> <li>Prohibited (Default: Allowed)</li> </ul>	
	<ul> <li>Concurrent logons tolerance</li> <li>Computer setting - Load Management</li> <li>Value: 4 (Default: Value: 2)</li> </ul>	
	<ul> <li>CPU usage Computer setting - Load Management</li> <li>Disabled (Default: Disabled)</li> </ul>	
	<ul> <li>CPU usage excluded process priority Computer setting - Load Management Disabled (Default: Below Normal or Low)</li> </ul>	
	<ul> <li>Flash default behavior</li> <li>User setting - ICA\Adobe Flash Delivery\Flash Redirection</li> <li>Disable Flash acceleration (Default: Enable Flash acceleration)</li> </ul>	
	<ul> <li>Memory usage Computer setting - Load Management Disabled (Default: Disabled)</li> </ul>	
	<ul> <li>Memory usage base load</li> <li>Computer setting - Load Management</li> <li>Disabled (Default: Zero load: 768 MBs)</li> </ul>	

#### Figure 8. Citrix Virtual Apps and Desktops Policy

# 

#### Table 6. Additional testing policy settings

Setting	Value
HX Adaptive Transport	Off
Client Fixed Drives	Prohibited
Client Optical Drives	Prohibited
Client Network Drives	Prohibited
Client Removable Drives	Prohibited
Use Video Codec for compression	Do not use video codec
View window contents while dragging	Prohibited
Windows Media fallback prevention	Play all content

#### Figure 9. Delivery Controllers Policy

# Validate

This chapter contains the following:

- <u>Test Methodology and Success Criteria</u>
- <u>Test Procedure</u>

# **Test Methodology and Success Criteria**

All validation testing was conducted on-site within the Cisco labs in San Jose, California.

The testing results focused on the entire virtual desktop lifecycle by capturing metrics during desktop boot-up, user logon and virtual desktop acquisition (also referred to as ramp-up), user workload execution (also referred to as steady state), and user logoff for the RDSH/VDI Session under test.

Test metrics were gathered from the virtual desktop, storage, and load generation software to assess the overall success of an individual test cycle. Each test cycle was not considered passing unless all the planned test users completed the ramp-up and steady-state phases (described below) and unless all metrics were within the permissible thresholds as noted as success criteria.

Three successfully completed test cycles were conducted for each hardware configuration, and results were relatively consistent from one test to the next.

You can obtain additional information and a free test license from http://www.loginvsi.com

# **Test Procedure**

## Pre-Test Setup for Single and Multi-Blade Testing

All virtual machines were shut down utilizing the Citrix Studio.

All Launchers for the test were shut down. They were then restarted in groups of 10 each minute until the required number of launchers were running with the Login Enterprise UI started and registered with Login Enterprise Virtual Appliance.

### **Test Run Protocol**

To simulate real-world environments, Cisco requires the log-on and start-work sequence, known as Ramp Up, to be completed in 48 minutes. For testing, we deem the test run successful with up to 1% session failure rate.

In addition, Cisco performs three consecutive load tests with knowledge worker workload for all single server and scale testing. This assures that our tests represent real-world scenarios. For each of the three consecutive runs on single server tests, the same process was followed.

To do so, follow these steps:

- 1. Time 0:00:00 Start Performance Logging on the following system:
  - a. Prism Element used in the test run.
- 2. All Infrastructure virtual machines used in test run (AD, SQL, brokers, image mgmt., and so on)
- 3. Time 0:00:10 Start Storage Partner Performance Logging on Storage System if used in the test.
- 4. Time 0:05: Boot Virtual Desktops/RDS Virtual Machines using Citrix Studio.
- 5. The boot rate should be around 10-12 virtual machines per minute per server.

- 6. Time 0:06 First machines boot.
- 7. Time 0:30 Single Server or Scale target number of desktop virtual machines booted on 1 or more blades.
- 8. No more than 30 minutes for boot up of all virtual desktops is allowed.
- 9. Time 0:35 Single Server or Scale target number of desktop virtual machines desktops registered in Citrix Studio.
- 10. Virtual machine settling time.
- 11. No more than 60 Minutes of rest time is allowed after the last desktop is registered on the Citrix Studio. Typically, a 30-45-minute rest period is sufficient.
- 12. Time 1:35 Start Login Enterprise Load Test, with Single Server or Scale target number of desktop virtual machines utilizing a sufficient number of Launchers (at 20-25 sessions/Launcher).
- 13. Time 2:23 Single Server or Scale target number of desktop virtual machines desktops launched (48 minute benchmark launch rate).
- 14. Time 2:25 All launched sessions must become active.
- 15. Time 2:40 Login Enterprise Load Test Ends (based on Auto Logoff 15 minutes period designated above).
- 16. Time 2:55 All active sessions logged off.
- 17. Time 2:57 All logging terminated; Test complete.
- 18. Time 3:15 Copy all log files off to archive; Set virtual desktops to maintenance mode through broker; Shutdown all Windows machines.
- 19. Time 3:30 Reboot all hypervisor hosts.
- 20. Time 3:45 Ready for the new test sequence.

#### **Success Criteria**

Our pass criteria for this testing is as follows:

• Cisco will run tests at a session count level that effectively utilizes the blade capacity measured by CPU utilization, memory utilization, storage utilization, and network utilization. We will use Login Enterprise to launch Knowledge Worker workloads. The number of launched sessions must equal active sessions within two minutes of the last session launched in a test as observed on the Login Enterprise Web Management console.

The Citrix Studio will be monitored throughout the steady state to make sure of the following:

- · All running sessions report In Use throughout the steady state
- · No sessions move to unregistered, unavailable, or available state at any time during steady state
- Within 20 minutes of the end of the test, all sessions on all launchers must have logged out automatically.
- Cisco requires three consecutive runs with results within +/-1% variability to pass the Cisco Validated Design performance criteria.

We will publish Cisco Validated Designs with our recommended workload following the process above and will note that we did not reach a VSImax dynamic in our testing. Cisco Compute Hyperconverged with Nutanix in Intersight Standalone Mode and Citrix Virtual Apps and Desktops 2203 LTSR Test Results.

The purpose of this testing is to provide the data needed to validate CVAD Remote Desktop Sessions (RDS) and CVAD Virtual Desktop (VDI) PVS streamed and CVAD (VDI) MCS provisioned full-clones using CCH with Nutanix in ISM to virtualize Microsoft Windows 11 desktops and Microsoft Windows Server 2022 sessions on Cisco UCS HCIAF240C M7 Servers.

The information contained in this section provides data points that a customer may reference in designing their own implementations. These validation results are an example of what is possible under the specific environment conditions outlined here, and do not represent the full characterization of Cisco and Citrix products.

Four test sequences, each containing three consecutive test runs generating the same result, were performed to establish single blade performance and multi-blade, linear scalability.

## About Login VSI

Login VSI helps organizations proactively manage the performance, cost, and capacity of their virtual desktops and applications wherever they reside – traditional, hybrid, or in the cloud. The Login Enterprise platform is 100% agentless and can be used in all major VDI and DaaS environments, including Citrix, VMware, and Microsoft. With 360° proactive visibility, IT teams can plan and maintain successful digital workplaces with less cost, fewer disruptions, and lower risk. Founded in 2012, Login VSI is headquartered in Boston, Massachusetts, and Amsterdam, Netherlands. Visit <u>www.loginvsi.com</u>.

## Login Enterprise

Login Enterprise, by Login VSI, is the industry-standard software used to simulate a human-centric workload used for the purpose of benchmarking the capacity and performance of a VDI solutions. The performance testing documented in this Reference Architecture utilized the Login Enterprise benchmarking tool (<u>https://www.loginvsi.com/platform/</u>). The virtual user technology of Login Enterprise simulates real-world users performing real-world tasks while measuring the time required for each interaction. Login Enterprise assesses desktop performance, application performance, and user experience to determine the overall responsiveness of the VDI solution. Using Login Enterprise for VDI capacity planning helps to determine the optimal hardware configuration to support the desired number of users and applications.

### About the EUX Score

The Login Enterprise End-User Experience (EUX) Score is a unique measurement that provides an accurate and realistic evaluation of user experience in virtualized or physical desktop environments. The score is based on metrics that represent system resource utilization and application responsiveness. The results are then combined to produce an overall score between 1 and 10 that closely correlates with the real user experience. See the table below for general performance guidelines with respect to the EUX Score.

Score	Assessment
Greater than 8.5	Excellent
7.5-8.5	Very Good
6.5 - 7.5	Good
5.5 - 6.5	Fair

Score	Assessment
Less than 5.5	Poor

See the following article for more information: <u>https://support.loginvsi.com/hc/en-us/articles/4408717958162-</u> Login-Enterprise-EUX-Score-

# About VSImax

The Login Enterprise VSImax is a performance metric used to measure the maximum user capacity or scalability of a virtualized desktop infrastructure (VDI) environment. The EUX Score is used to determine the VSImax, and it represents the maximum number of virtual users that can be supported by the infrastructure while still maintaining acceptable performance levels.

## Login Enterprise Workloads

Login Enterprise Workloads are human-centric workloads designed to simulate a user interacting with predetermined applications in a human-paced way. The industry-standard workloads that come with Login Enterprise are Knowledge Worker and Task Worker. These workloads are based on the Microsoft Office suite and popular browsers used in the enterprise. Other workloads are available from Login VSI.

## Knowledge worker

An enterprise knowledge worker is a medium to heavy duty productivity user that regularly uses a web browser, an email client, and specializes in a wide range of software to create spreadsheets, documents, and presentations. It is common for knowledge workers to have multiple applications and browsers open at once, regularly switching between these applications. The knowledge worker expects a responsive user experience and has little tolerance for variation in performance.

# Task worker

An enterprise task worker is a light duty productivity user that regularly uses a static web browser to access internal sites, an email client and an application that is the basis for their task. Task workers stay focused on the task at hand and switch between apps on occasion. The task worker is tolerant of some workspace lag. Task workers often take the form of data processing workers, call center agents, tellers, and receptionists.

# Test Setup, Configuration, and Load Recommendation

This chapter contains the following:

- <u>Cisco UCS Test Configuration for Single Blade Scalability</u>
- <u>Cisco UCS Test Configuration for Full Scale Testing</u>

We tested a single Cisco UCS HCIAF240C M7 server and four Cisco UCS HCIAF240C M7 servers in a fournode cluster to illustrate linear scalability for each workload use case studied.

# **Cisco UCS Test Configuration for Single Blade Scalability**

This test case validates the Recommended Maximum Workload per host server using Citrix Virtual Apps and Desktops 2203 LTSR with 224 Multi-session and 200 Single-session OS sessions.

# Figure 10. Test Configuration for Single Server Scalability Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs





Figure 11. Test configuration for Single Server Scalability Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs



Figure 12. Test configuration for Single Server Scalability Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs

Hardware components

• 1 Cisco UCS HCIAF240C M7 All-NVMe/All-Flash Server with Intel(R) Xeon(R) Gold I6454S CPU 2.2GHz 32-core processors, 1TB 4800MHz RAM, 6 3.8TB 2.5 NVMe High Perf Medium Endurance for all cluster servers

• 2 Cisco Nexus 93180YC-FX Access Switches

Software component:

- Cisco UCS C-Series 4.3(3.240043)
- AOS 6.8.0.1
- AHV 20230302.100187 for host blades
- Prism Central 2024.1.0.1
- Nutanix AHV Plugin 2.7.7
- Citrix Virtual Apps and Desktops 2203 LTSR
- Microsoft SQL Server 2019
- Microsoft Windows 11 64 bit (22H2), 2vCPU, 4 GB RAM, 64 GB HDD (master)
- Microsoft Windows Server 2022 (21H2), 4vCPU, 24GB RAM, 90 GB vDisk (master)
- Microsoft Office 2021 64-bit

- FSLogix 2210 hotfix 3
- Login Enterprise 5.11.12 Knowledge Worker Workload

# **Cisco UCS Test Configuration for Full Scale Testing**

These test cases validate eight blades in a cluster hosting three distinct workloads using Citrix Virtual Apps and Desktops 2203 LTSR with:

- 600 MCS Single-session OS sessions
- 600 PVS Single-session OS sessions
- 672 MSC Multi-session OS sessions

Note: Server N+1 fault tolerance is factored into this solution for the cluster/workload.

# Figure 13. Test Configuration for Full Scale Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs





Figure 14. Test Configuration for Full Scale Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs



Figure 15. Test Configuration for Full Scale Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs

Hardware components

• 4 Cisco UCS HCIAF240C M7 All-NVMe/All-Flash Server with Intel(R) Xeon(R) Gold I6454S CPU 2.2GHz 32-core processors, 1TB 4800MHz RAM, 6 3.8TB 2.5 NVMe High Perf Medium Endurance for all cluster servers

• 2 Cisco Nexus9000 C93180YC-FX Access Switches

Software components

- Cisco UCS C-Series 4.3(3.240043)
- AOS 6.8.0.1
- AHV 20230302.100187 for host blades
- Prism Central 2024.1.0.1
- Nutanix AHV Plugin 2.7.7
- Citrix Virtual Apps and Desktops 2203 LTSR
- Microsoft SQL Server 2019
- Microsoft Windows 11 64 bit (22H2), 2vCPU, 4 GB RAM, 64 GB HDD (master)
- Microsoft Windows Server 2022 (21H2), 4vCPU, 24GB RAM, 90 GB vDisk (master)
- Microsoft Office 2021 64-bit

- FSLogix 2210 hotfix 3
- Login Enterprise 5.11.12 Knowledge Worker Workload

# **Test Results**

This chapter contains the following:

- Single-Server Recommended Maximum Workload Testing
- Full Scale Workload Testing

# Single-Server Recommended Maximum Workload Testing

This section shows the key performance metrics that were captured on the Cisco UCS host blades during the single server testing to determine the Recommended Maximum Workload per host server. The single server testing comprised of following tests:

- 200 MCS Single-session OS sessions (Static)
- 200 PVS Single-session OS sessions (Random)
- 224 MCS Multi-session OS sessions (Random)

# Single-Server Recommended Maximum Workload for MCS Single-session OS Static Sessions with 200 Users

The recommended maximum workload for a Cisco UCS HCIAF240C M7 server with dual Intel(R) Xeon(R) Gold I6454S CPU 2.2GHz 32-core processors, 1TB 4800MHz RAM is 200 Windows 11 64-bit persistent MCS virtual machines with 2 vCPU and 4 GB RAM.

Login VSI performance data is shown below.





Performance data for the server running the workload is shown below.



#### Figure 17. Single Server | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Host CPU Utilization



Figure 18. Single Server | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Host Memory Utilization



Figure 19. Single Server | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Host Network Utilization

# Single-Server Recommended Maximum Workload for PVS Single-session OS Random Sessions with 200 Users

The recommended maximum workload for a Cisco UCS HCIAF240C M7 server with dual Intel(R) Xeon(R) Gold I6454S CPU 2.2GHz 32-core processors, 1TB 4800MHz RAM is 200 Windows 11 64-bit VDI non-persistent PVS virtual machines with 2 vCPU and 4GB RAM.

Login VSI performance data is as shown below.



Figure 20. Single Server | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | EUX Score

Performance data for the server running the workload is shown below.



Figure 21. Single Server Recommended Maximum Workload | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Host CPU Utilization



Figure 22. Single Server Recommended Maximum Workload | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Host Memory Utilization



#### Figure 23. Single Server | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Host Network Utilization

# Single-Server Recommended Maximum Workload for MCS Multiple-session OS Random Sessions with 224 Users

The recommended maximum workload for a Cisco UCS HCIAF240C M7 server with dual Intel(R) Xeon(R) Gold I6454S CPU 2.2GHz 32-core processors, 1TB 4800MHz RAM is 224 Windows Server 2022 sessions. The blade server ran 32 Windows Server 2022 Virtual Machines. Each virtual server was configured with 4 vCPUs and 24GB RAM.

LoginVSI data is shown below.



Figure 24. Single Server Recommended Maximum Workload | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | EUX Score

Performance data for the server running the workload is shown below.


Figure 25. Single Server Recommended Maximum Workload Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Host CPU Utilization

Figure 26. Single Server Recommended Maximum Workload | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Host Memory Utilization





#### Figure 27. Single Server | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Host Network Utilization

Performance data for the RDS Virtual Machine running the workload is shown below.



Figure 28. Single Server Recommended Maximum Workload | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Virtual Machine CPU Utilization

Figure 29. Single Server Recommended Maximum Workload | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Virtual Machine Memory Utilization





#### Figure 30. Single Server Recommended Maximum Workload | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Network Utilization

### Full Scale Workload Testing

This section describes the key performance metrics that were captured on the Cisco UCS, during the full-scale testing. Full Scale testing was done with following Workloads using four Cisco UCS HCIAF240C M7 Servers configured in a single four-server cluster, and designed to support single Host failure (N+1 Fault tolerance):

- 600 MCS Single-session OS sessions (Static)
- 600 PVS Single-session OS sessions (Random)
- 672 MCS Multi-session OS sessions (Random

To achieve the target, sessions were launched against each workload set. As per the Cisco Test Protocol for VDI solutions, all sessions were launched within 48 minutes (using the official Knowledge Worker Workload), and all launched sessions became active within two minutes after the last logged-in session.

# Full Scale Recommended Maximum Workload Testing for MCS Single-session OS Machine VDAs with 600 Users

This section describes the key performance metrics captured on the Cisco UCS during the full-scale testing with 600 MCS Single-session OS machines using four servers in a single cluster.

The workload for the test is 600 Persistent VDI users. To achieve the target, sessions were launched concurrently against all workload hosts. As per the Cisco Test Protocol for VDI solutions, all sessions were launched within 48 minutes (using the official Knowledge Worker Workload) and all launched sessions became active within two minutes subsequent to the last logged-in session.

The configured system efficiently and effectively delivered the following results:



## Figure 31. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs| EUX Score

Figure 32. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Host CPU Utilization





Figure 33. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Host Memory Utilization







Figure 35. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Host Network Utilization TX

Figure 36. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Avg Read Latency Chart msec





Figure 37. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Avg Write Latency Chart msec

Figure 38. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Read IOPS Chart





### Figure 39. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Single-session OS machine VDAs | Write IOPS Chart

# Full Scale Recommended Maximum Workload Testing for PVS Single-session OS Machine VDAs with 600 Users

This section describes the key performance metrics that were captured on the Cisco UCS using the persistent desktop full-scale testing with 600 PVS Single-session OS machines using four servers in a single cluster.

The workload for the test is 600 Non-Persistent VDI users. To achieve the target, sessions were launched concurrently against all workload clusters. As per the Cisco Test Protocol for VDI solutions, all sessions were launched within 48 minutes (using the official Knowledge Worker Workload in VSI Benchmark Mode), and all launched sessions became active within two minutes after the last logged-in session.

The configured system efficiently and effectively delivered the following results:

### Figure 40. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | EUX Score





## Figure 41. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Host CPU Utilization







Figure 43. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Host Network Utilization RX

Figure 44. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Host Network Utilization TX





## Figure 45. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Read Latency Chart msec

Figure 46. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Write Latency Chart msec





## Figure 47. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Read IOPS Chart

Figure 48. Full Scale | 600 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Single-session OS machine VDAs | Read IOPS Chart



# Full Scale Recommended Maximum Workload for MCS Multi-session OS Random Sessions with 672 Users

This section describes the key performance metrics captured on the Cisco UCS during the MCS multi-session OS full-scale testing with 672 desktop sessions using four servers in a single cluster.

The solution's multi-session OS workload is 672 users. To achieve the target, sessions were launched against all workload clusters concurrently. As per the Cisco Test Protocol for VDI solutions, all sessions were launched within 48 minutes (using the official Knowledge Worker Workload), and all launched sessions became active within two minutes after the last logged-in session.

The configured system efficiently and effectively delivered the following results:

## Figure 49. Full Scale | 672 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | EUX Score





Figure 50. Full Scale | 672 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Host CPU Utilization

Figure 51. Full Scale | 672 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Host Memory Utilization





Figure 52. Full Scale | 672 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Read Latency Chart

Figure 53. Full Scale | 672 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Write Latency Chart





Figure 54. Full Scale | 672 Users | Citrix Virtual Apps and Desktops 2203 LTSR MCS Multi-session OS machine VDAs | Read IOPS Chart

Figure 55. Full Scale | 672 Users | Citrix Virtual Apps and Desktops 2203 LTSR PVS Multi-session OS machine VDAs | Write IOPS Chart



### Conclusion

Compute Hyperconverged with Nutanix in Intersight Standalone Mode, offers a reliable and robust solution for enterprise end-user computing deployments. This hyper-converged infrastructure provides compute density, storage capacity, and expandability in a single system to support a wide range of workloads in your data center.

Cisco Intersight makes it easy to deploy the Cisco Compute Hyperconverged with Nutanix in Intersight Standalone Mode. It simplifies the deployment process, reduces project risk and IT costs, as well as enhances visibility and orchestration across the entire data center, allowing you to modernize your infrastructure and operations.

Compute Hyperconverged with Nutanix in Intersight Standalone Mode on Cisco Compute Hyperconverged HCIAF240C M7 Servers with 4th Gen Xeon processors has undergone validation using industry-standard benchmarks, ensuring it meets the highest performance, management, scalability, and resilience standards. It makes an ideal choice for customers seeking enterprise-class hyper-converged infrastructure for virtual desktop infrastructure (VDI) deployments and allows you to focus on your core business objectives.

### About the Author

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Vadim Lebedev has been a part of Cisco's Computing Systems Product Group team for the last seven years, where he focuses on designing, testing validating solutions, creating technical content, and conducting performance testing and benchmarking. He has extensive experience in server and desktop virtualization and is considered an expert in desktop/server virtualization, Cisco Unified Computing System, Cisco Nexus Switching, and NVIDIA Graphics.

### Appendix

This appendix contains the following:

- <u>Appendix A References used in this guide</u>
- Appendix B Bill of Materials

#### Appendix A - References used in this guide

Windows 11 on Nutanix AHV: <u>https://portal.nutanix.com/page/documents/solutions/details?targetId=TN-2164-</u> <u>Windows-11-on-AHV:TN-2164-Windows-11-on-AHV</u>

AHV Plug-in for Citrix: <u>https://portal.nutanix.com/page/documents/details?targetId=NTNX-AHV-Plugin-</u> <u>Citrix:NTNX-AHV-Plugin-Citrix</u>

Citrix Virtual Apps and Desktops on G8: Windows 11 Desktops:

https://portal.nutanix.com/page/documents/solutions/details?targetId=RA-2111-Citrix-Virtual-Apps-and-Desktops-G8-Windows-11:RA-2111-Citrix-Virtual-Apps-and-Desktops-G8-Windows-11

### Appendix B - Bill of Materials

Part Number	Description	Qty
HCIAF240C-M7SN	Cisco Compute Hyperconverged HCIAF240cM7 All Flash NVMe Node	4
HCI-IS-MANAGED	Deployment mode for Standalone Server Managed by Intersight	4
HCI-NVME4-3840	3.8TB 2.5in U.2 15mm P5520 Hg Perf Med End NVMe	24
HCI-M2-240G	240GB M.2 SATA Micron G2 SSD	8
HCI-M2-HWRAID	Cisco Boot optimized M.2 Raid controller	4
HCI-RAIL-M7	Ball Bearing Rail Kit for C220 & C240 M7 rack servers	4
HCI-TPM-002C	TPM 2.0, TCG, FIPS140-2, CC EAL4+ Certified, for servers	4
HCI-AOSAHV-68-SWK9	HCI AOS AHV 6.8 SW	4
UCSC-HSHP-C240M7	UCS C240 M7 Heatsink	8
UCSC-BBLKD-M7	UCS C-Series M7 SFF drive blanking panel	72
UCS-DDR5-BLK	UCS DDR5 DIMM Blanks	64
UCSC-M2EXT-240-D	C240M7 2U M.2 Extender board	4
UCSC-FBRS2-C240-D	C240 M7/M8 2U Riser2 Filler Blank	4
UCSC-FBRS3-C240-D	C240 M7/M8 2U Riser3 Filler Blank	4

Part Number	Description	Qty
HCI-CPU-I6454S	Intel I6454S 2.2GHz/270W 32C/60MB DDR5 4800MT/s	8
HCI-MRX64G2RE1	64GB DDR5-4800 RDIMM 2Rx4 (16Gb)	64
HCI-MLOM	Cisco VIC Connectivity	4
HCI-M-V5D200GV2	Cisco VIC 15237 2x 40/100/200G mLOM C-Series w/Secure Boot	4
HCI-RIS1A-24XM7	C240 M7 Riser1A; (x8;x16x, x8); StBkt; (CPU1)	4
HCI-PSU1-1200W	1200W Titanium power supply for C- Series Servers	8
NO-POWER-CORD	ECO friendly green option, no power cable will be shipped	4
N9K-C93180YC-FX3	Nexus 9300 48p 1/10/25G, 6p 40/100G, MACsec,SyncE	2
MODE-NXOS	Mode selection between ACI and NXOS	2
NXK-AF-PE	Dummy PID for Airflow Selection Port- side Exhaust	2
NXK-ACC-KIT-1RU	Nexus 3K/9K Fixed Accessory Kit, 1RU front and rear removal	2
NXA-FAN-35CFM-PE	Nexus Fan, 35CFM, port side exhaust airflow	8
NXK-MEM-16GB	Additional memory of 16GB for Nexus Switches	2
NXA-PAC-650W-PE	Nexus NEBs AC 650W PSU - Port Side Exhaust	4
CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	4
SVS-L1N9KA-XF-3Y	CX L1 Support:DCN Advantage Term N9300 XF, 3Y	2
C1A1TN9300XF-3Y	DCN Advantage Term N9300 XF, 3Y	2
NXOS-CS-10.3.2F	Nexus 9300, 9500, 9800 NX-OS SW 10.3.2 (64bit) Cisco Silicon	2
NXOS-SLP-INFO-9K	Info PID for Smart Licensing using Policy for N9K	2
C1-N9K-SYNCE-XF-3Y	DCN SyncE Term N9300 XF, 3Y	2
SVS-L1N9K-SYNCE-3Y	CX L1 Support: DCN SyncE Term	2

Part Number	Description	Qty
	N9300 XF, 3Y	

### Feedback

For comments and suggestions about this guide and related guides, join the discussion on <u>Cisco Community</u> at <u>https://cs.co/en-cvds</u>.

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