

NUTANIX SOLUTION NOTE

Citrix Virtual Apps and Desktops on AHV



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1. Executive Summary

Citrix Virtual Apps and Desktops offer a fully integrated application and desktop virtualization and delivery suite that lets you deploy all types of desktop and application workloads, either persistent or nonpersistent. When running Virtual Desktops on the Nutanix Enterprise Cloud, you have the advantage of unlimited scalability, data locality, AHV clones, and a single datastore. Nutanix takes the Citrix commitment to simplicity to another level with streamlined management, reduced rollout time, and enhanced performance. This solution note provides an overview of the Nutanix Enterprise Cloud with an emphasis on AHV, an overview of Citrix Virtual Apps and Desktops, and a discussion of the benefits of deploying these technologies together.



2. Introduction

2.1 AUDIENCE

This solution note, part of the Nutanix Solutions Library, describes the Citrix Virtual Apps and Desktops on Nutanix AHV solution. It provides a technical introduction to the solution for IT architects and administrators.

2.2 PURPOSE

This document covers the following subject areas:

- Overview of the Nutanix solution.
- Overview of Citrix Virtual Apps and Desktops.
- The benefits of implementing Citrix Virtual Apps and Desktops on AHV.

Unless otherwise stated, the solution described in this document is valid on all supported AOS releases.

VERSION NUMBER	PUBLISHED	NOTES
1.0	November 2015	Original publication.
1.1	April 2016	Platform update.
1.2	June 2017	Terminology update.
1.3	October 2017	Platform update.
1.4	March 2019	Updated Nutanix overview.

Table 1: Document Version History



3. Nutanix Enterprise Cloud Overview

Nutanix delivers a web-scale, hyperconverged infrastructure solution purpose-built for virtualization and cloud environments. This solution brings the scale, **resilience**, and economic benefits of web-scale architecture to the enterprise through the Nutanix Enterprise Cloud Platform, which combines three product families—Nutanix Acropolis, Nutanix Prism, and Nutanix Calm.

Attributes of this Enterprise Cloud OS include:

- Optimized for storage and compute resources.
- Machine learning to plan for and adapt to changing conditions automatically.
- Self-healing to tolerate and adjust to component failures.
- API-based automation and rich analytics.
- Simplified one-click upgrade.
- Native file services for user and application data.
- Native backup and disaster recovery solutions.
- Powerful and feature-rich virtualization.
- Flexible software-defined networking for visualization, automation, and security.
- Cloud automation and life cycle management.

Nutanix Acropolis provides data services and can be broken down into three foundational components: the Distributed Storage Fabric (DSF), the App Mobility Fabric (AMF), and AHV. Prism furnishes one-click infrastructure management for virtual environments running on Acropolis. Acropolis is hypervisor agnostic, supporting two third-party hypervisors—ESXi and Hyper-V—in addition to the native Nutanix hypervisor, AHV.

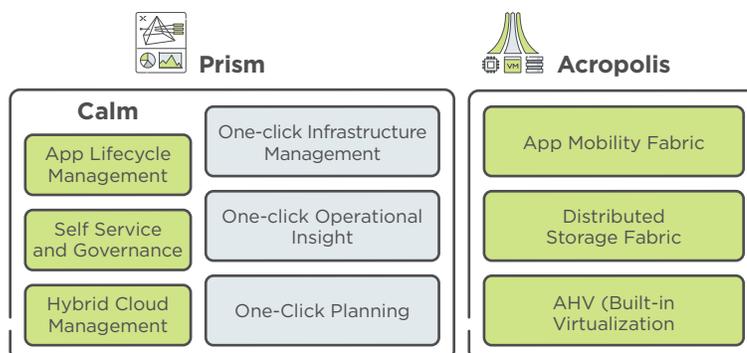


Figure 1: Nutanix Enterprise Cloud

3.1. NUTANIX ACROPOLIS ARCHITECTURE

Acropolis does not rely on traditional SAN or NAS storage or expensive storage network interconnects. It combines highly dense storage and server compute (CPU and RAM) into a single platform building block. Each building block delivers a unified, scale-out, shared-nothing architecture with no single points of failure.

The Nutanix solution requires no SAN constructs, such as LUNs, RAID groups, or expensive storage switches. All storage management is VM-centric, and I/O is optimized at the VM virtual disk level. The software solution runs on nodes from a variety of manufacturers that are either all-flash for optimal performance, or a hybrid combination of SSD and HDD that provides a combination of performance and additional capacity. The DSF automatically tiers data across the cluster to different classes of storage devices using intelligent data placement algorithms. For best performance, algorithms make sure the most frequently used data is available in memory or in flash on the node local to the VM.

To learn more about the Nutanix Enterprise Cloud, please visit the [Nutanix Bible](#) and [Nutanix.com](#).



4. Citrix Virtual Apps and Desktops

Citrix Virtual Apps and Desktops are application and desktop virtualization and delivery solutions that transform desktops and applications into secure, on-demand services available to any user, anywhere, on any device. With Virtual Apps and Desktops, you can deliver individual Windows, web, and SaaS applications, or full virtual desktops to PCs, Macs, tablets, smartphones, laptops, and thin clients with a high-definition user experience. Citrix Virtual Apps and Desktops provide a complete virtual desktop delivery system by integrating several distributed components with advanced configuration tools that simplify the creation and real-time management of the virtual desktop infrastructure. The core components of Virtual Apps and Desktops follow:

- [Delivery Controller \(CDC\)](#)
Installed on servers in the datacenter, the controller authenticates users, manages the assembly of users' virtual desktop environments, and brokers connections between users and their virtual desktops. It controls the state of the desktops, starting and stopping them based on demand and administrative configuration. In some editions, the Citrix license needed to run Virtual Desktops also includes profile management to manage user personalization settings in virtualized or physical Windows environments.
- [Studio](#)
Citrix Studio is the management console that allows you to configure and manage your Citrix Virtual Desktops environment. It provides different wizard-based deployment or configuration scenarios to publish resources using desktops or applications.
- [Machine Creation Services \(MCS\)](#)
MCS is the building mechanism of the Citrix DC that automates and orchestrates the deployment of desktops using a single image. MCS communicates with the orchestration layer of your hypervisor, providing a robust and flexible method of image management.
- [Virtual Desktop Agent](#)
Installed on virtual desktops, this agent enables direct FMA (FlexCast Management Architecture) connections between the virtual desktop and user devices.
- [Workspace app](#)
Installed on user devices, the Citrix Workspace app enables direct ICA connections from user devices to virtual desktops.

- **FlexCast Management Architecture (FMA)**
Citrix Virtual Desktops with the unified FlexCast Management Architecture lets you deliver virtual desktops and applications tailored to meet the diverse performance, security, and flexibility requirements of every worker in your organization through a single solution. Centralized, single-instance management helps you deploy, manage, and secure user desktops more easily and efficiently.

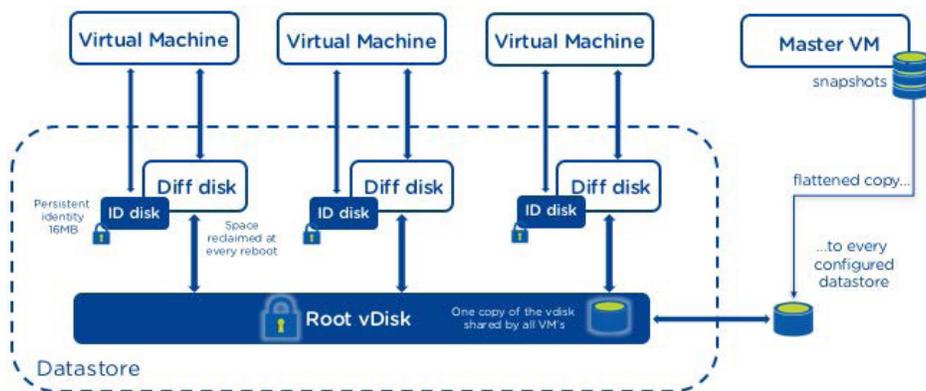
4.1. CITRIX MACHINE CREATION SERVICES

Citrix Virtual Apps and Desktops offers a fully integrated desktop virtualization suite for both virtual desktop VDAs and server VDAs. The Citrix Virtual Apps and Desktops configuration and management console, Citrix Studio, lets users deploy all types of desktop and application workloads, whether persistent or nonpersistent, and the built-in Citrix Machine Creation Services (MCS) can derive each of these from master images and clone them on the spot.

When nonpersistent environments use MCS, the broker copies the master image to each configured datastore that the Studio host connection specifies. This configured datastore can be either local on each host or shared on a SAN or NAS. The administrator then selects the available datastores, which are read from the hypervisor cluster through VMware vCenter, Microsoft SCVMM, Citrix XenCenter, or the Nutanix Prism interface. After this copy is complete (which can take some time, depending on the number of datastores configured), the broker points all the VMs in the catalog to these local copies.

MCS works as shown in the following figure. Each supported hypervisor has its own specific MCS disk management implementation, but the net effect is the same.

> MCS high level vdisk architecture





To make each VM unique and able to write data, MCS uses two disks in addition to the master disk.

The ID disk is a very small disk (16 MB maximum) that contains identity information; this information provides a unique name for the VM and allows it to join Active Directory (AD). The broker fully manages this process; the administrator only needs to provide AD accounts that the VMs can use. The broker then creates a unique ID disk for every VM. The difference disk, also known as the write cache, separates the writes from the master disk, while the system still functions as if the write has been committed to the master disk. VMware environments do not write changes to the difference disk file; instead, MCS on VMware utilizes a VMDK disk chain with multiple child disks. On Hyper-V and Citrix Hypervisor, MCS uses VHD chaining, an approach similar to VMware's, though slightly different in execution and disk naming. Nutanix AHV uses copy-on-write, which avoids disk chaining as well as the potential disk corruption and performance issues associated with disk chaining.



5. Citrix Virtual Apps and Desktops on AHV

In addition to savings on licensing (virtualization) and datacenter costs, and reduced opex from simplified management overhead, running Citrix Virtual Apps and Desktops with AHV offers the following benefits:

- **No infrastructure restraints**
AHV pushes past the HA object limit of other hypervisors, including VMware vSphere. A host access from Citrix Studio to the cluster IP creates a connection to any of the cluster CVMs. This adds scalability and provides built-in HA capability.
- **Data locality**
Nutanix CVMs provide data locality using the information life cycle management (ILM) functionality. Memory and SSD serve reads; writes go to SSD and then drain to spinning disks. The Acropolis Distributed Storage Fabric performs all operations a.) with a preference for data coming from local storage and b.) on the same physical system where the VM accessing it is located.
- **AHV clones**
By using full clones on AHV, you avoid some of the limitations of linked clones, such as reads to differencing disks that cause network bottlenecks. With AHV, every VM is a full clone, maintaining data locality—each desktop's traffic is conducted on the same node that hosts the VM. Using AHV clones also allows you to dedupe and compress your images for greater efficiency.
- **Single datastore**
The Nutanix architecture lends itself to simplified VDI datastores. Legacy three-tier architectures tend to need separated storage for user data, boot disks, and so on. The DSF, which presents to each VM as a set of simple disks, optimizes storage in a VDI environment.
- **First-rate performance**
The Nutanix Enterprise Cloud delivers fast, consistent, and scalable performance. You can easily run your Citrix Virtual Apps and Desktops deployments alongside your most I/O-hungry applications without fear of noisy neighbors.
- **PVS support for AHV**
Nutanix Enterprise Cloud software offers consumer-grade simplicity for both MCS and PVS implementations. The choice is yours.
- **vGPU support for AHV**
As GPUs are becoming more mainstream in the end-user computing world, Nutanix has added vGPU capabilities to its hypervisor, enabling graphics-intensive workloads alongside the full Nutanix Enterprise Cloud OS feature set.



6. Conclusion

The Nutanix Enterprise Cloud and AHV provide a powerful foundation for the proven capabilities of Citrix Virtual Apps and Desktops—together they are a flexible, reliable, and economical solution for desktop and application delivery. Nutanix both streamlines and enhances storage infrastructure configuration and overall deployment, enabling a responsive desktop and application experience with zero downtime.



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