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Seven Ways to Simplify Your Digital Workspace Deployment

Table of Contents

Introduction

The modern workplace has changed dramatically and organizations everywhere are adopting digital workspace solutions to ensure business productivity, continuity, agility, and security, all while lowering costs. However, adopting a digital workspace is easier said than done.

Digital workspaces aren't new, but too often deployment and operational complexity have kept organizations from realizing the benefits these solutions offer. Fortunately, there are solutions that can help significantly reduce this complexity. Building a simple, secure, and performant digital workspace solution requires choosing the right technologies at every layer of the stack.

In this eBook, we discuss how running Citrix Virtual Apps and Desktops on Nutanix Hybrid Cloud Platform simplifies your solution, delivering an excellent user experience, improved productivity, greater business agility, lower risk, and higher ROI.

Each chapter addresses a key aspect of a complete digital workspace solution. We discuss the traditional challenges that administrators face, and explain how a Citrix-on-Nutanix hybrid and multicloud solution helps you to avoid the pitfalls that have bedeviled admins for years, resulting in interminable delays, substandard performance, poor user experience, and excessive operational overhead costs. Read on to learn more about Citrix on Nutanix!

The **Advantages** of a **Citrix-on-Nutanix** Digital Workspace Solution

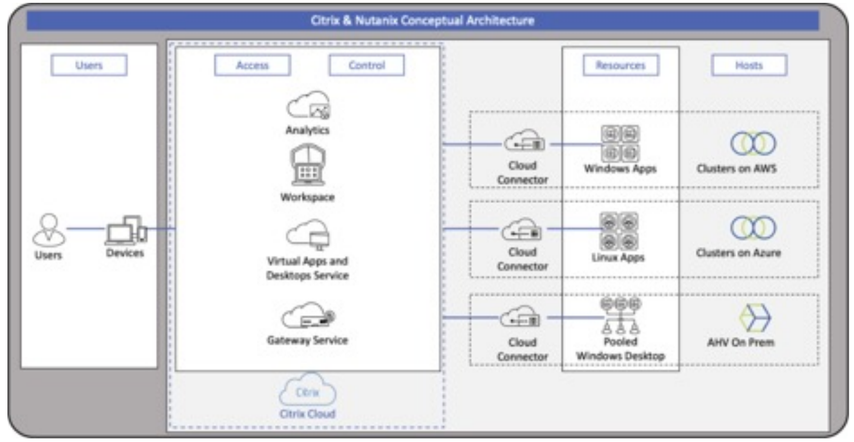
Citrix and Nutanix have more than a decade of experience delivering industry standard EUC solutions to thousands of organizations. Together, they provide users secure and responsive access to applications, desktops, and data—both on-premises and in the cloud.

When you run Citrix Cloud services with the Nutanix Cloud Platform, you get cloud-based management and delivery for all Citrix Workspace technologies.

This means you can deliver a great user experience without all the legacy complexity of the datacenter. The same team that manages desktops and apps can also easily manage servers, storage, and virtualization. Resolve issues in minutes, instead of days. And you can guarantee the same linear cost and performance, whether you scale from 500 to 50,000 users.

Citrix Cloud services on Nutanix gives you access to true hybrid and multicloud capabilities. Thanks to seamless portability among on-prem and public clouds, you can burst 2,000 Citrix Desktops to the cloud in under two hours.

And a Citrix-on-Nutanix digital workspace solution enables you to start small and scale as needed, with excellent ROI. Customers have found that the combination of Nutanix and Citrix technologies reduces CapEx and OpEx by approximately 164 percent. This means the solution can pay for itself in as little as six months.



1. How to **Simplify** Digital Workspace **Server** and **Storage Resource Management**

Virtualizing apps and desktops requires highly performant, scalable, and easy-to-manage servers and storage. When desktop virtualization emerged, organizations relied on silos of blade servers and SAN storage appliances, with discrete physical networks for management, storage, and user traffic. While this "three-tier architecture" got the job done, there were a number of pitfalls that often stalled virtual app and desktop projects.

THREE-TIER ARCHITECTURES ARE NOT DESIGNED FOR CLOUD

Customers found SANs to be expensive purchases that drove up the initial cost of virtualization. SANs were originally designed for server workloads and were not tuned for desktop workloads, with user profiles, antivirus scanning, boot and login storms, and other desktop-specific events. The architecture of SAN controllers and SAN fabrics often meant the overall throughput was inherently capped by the capability of the controllers and switches purchased up front. Over time, as more users were added, performance tended to decrease.

Blade servers were also expensive and difficult to support, requiring expensive chassis with integrated switches. Updating BIOS and other system firmware became more complex with these new systems and patching these physical systems usually required hours-long maintenance windows where the systems could be taken offline.

As a tacit acknowledgement of the complexity and difficulty of setting up and supporting these systems, vendors started teaming up to offer "converged" architecture. But these alliances didn't alter the fundamental architectural flaws of these solutions, and the challenges of three-tier architecture largely remained.

ENTER HCI: SIMPLER, FASTER, AND MORE COST EFFICIENT

About a decade ago, several vendors started offering hyper-converged infrastructure (HCI). Led by Nutanix, this movement dispensed with the idea of blade servers and discrete storage networks and appliances, instead offering traditional rack-mount servers with virtualized storage controllers. It continued the theme of a software-defined datacenter, assuming there was nothing about a SAN controller that required it to be physical. Like almost all other datacenter workloads, it could be virtualized with demonstrable benefits. Nutanix took this a step further by offering a truly scale-out architecture with "web scale" principles. If the big internet players could have thousands of servers working together, why couldn't other businesses?

One of the great benefits for virtualizing desktops on Nutanix is data locality. Windows workloads were built with locally attached drives and perform best with low disk latency. Rather than reading and writing data across a network, Nutanix offers lower latency from direct-attached SSDs. Reading from a PCI controller is an order of magnitude faster than reading from a network. This data locality performance optimization continues to set Nutanix apart from all of the other storage offerings.

NUTANIX SHADOW CLONES IMPROVE END USER EXPERIENCE

In addition to data locality, Nutanix invented Shadow Clones specifically for linked clone imaging technology. This means that non-persistent desktops, especially with Citrix Machine Creation Services, can clone and boot much faster than other systems. Booting hundreds of desktops could happen 50 percent faster with this feature. Without getting too technical, Shadow Clones cache the data each desktop frequently accesses on the SSD drives of every server that hosts virtual desktops. And it automatically enables itself when it detects machines built using linked clones, like with Citrix Machine Creation Services.

PORTABLE SUBSCRIPTIONS PROVIDE FREEDOM OF CHOICE

While Nutanix originally offered a turnkey appliance, today Nutanix is licensed as a portable subscription that can be used with all leading server vendors. With Nutanix Clusters, you can use this same portable subscription on bare metal servers in popular public clouds. Nutanix frees you from both server and cloud lock in.

LINEAR AND COST EFFICIENT SCALING

As many virtual desktop environments scale out with dozens or hundreds of users at a time, it's important to be able to scale capacity linearly and cost effectively. Nutanix further enables this with an imaging tool called Foundation. Foundation enables clusters from one server to dozens of servers to be installed within a couple hours in a fully automated fashion. Once a cluster is up and running, servers can be added in increments of as little as one at a time. You can add or remove servers from a cluster with no downtime and conduct maintenance during normal working hours.

AUTOMATED LIFE CYCLE MANAGEMENT: FAST, EASY, ALWAYS-ON

Finally, Life Cycle Management is the latest Nutanix capability for managing hordes of physical servers. This technology automatically scans all hardware and firmware that Nutanix software is running on for new versions of BIOS, firmware, and software. Life Cycle Management checks for compatibility and ensures components are updated in the correct order. Like all Nutanix maintenance tasks, an administrator kicks off the process, but the system automates the bulk of activity, ensuring virtual desktop live migration if a component needs to restart. This accelerates performance and patching, with no impact on end users and removing the requirement for IT staff to work late nights, holidays, and weekends.

2. How to **Simplify** the Citrix Virtual Apps and Desktops **control plane**

Citrix has provided secure remote access solutions for years. Now the Citrix Virtual Apps and Desktops service gives end users the flexibility to work from anywhere, while reducing IT's dependence on physical infrastructure. IT can centrally manage virtual apps and desktops with ease, increasing IT visibility and control, even as it lowers total cost of ownership.

In a traditional Citrix Virtual Apps and Desktops environment, admins must deploy, update, and manage all administrative Citrix components — including Studio, Director, Delivery Controllers, SQL, and StoreFront. These components all need to be architected for redundancy and high availability, as well as kept up to date.

With the Citrix Virtual Apps and Desktop service, Citrix deploys and manages all the administrative components. This service provides organizations the flexibility and agility to scale quickly as needed, while retaining control of their images and resources. Admins have the flexibility to manage their VDAs in multiple resource locations — on-premises, in the cloud, or in a hybrid approach. They can keep these images on the current release version or the long-term service release version. Additionally, Citrix Virtual Apps and Desktops service ensures that your environment always has the latest features and security patches, making formerly tedious administrative tasks simple and efficient.

The Citrix Virtual Apps and Desktops service gives you several options for architecting your solution. Your resources can be hosted on premises, within a public cloud, or via a hybrid approach to fit your environment and your specific business needs. Learn more about the power of Citrix Virtual Apps and Desktops service, the different supported architecture scenarios, and the benefits of moving to Citrix Virtual Apps and Desktop service in our Tech Brief on Citrix Tech Zone.

3. How to **Simplify** Digital Workspace Solution **Virtualization & File Services**

A digital workspace requires an enterprise-class hypervisor and a highly performant system for hosting user data. No less important, however, they should be built in and so easy to use that they are practically invisible.

Before Nutanix, most customers licensed a separate hypervisor from a third-party vendor that required specialized training and complex upgrades. These hypervisor architectures relied on separate management software (which also had to be licensed) that had to be manually configured for high availability. These were so complex that many customers didn't bother to implement it.

File services for user data required dedicated hardware like a NAS appliance or complex clustering configurations with virtual machines. Management of these file server systems is separate and unintuitive. Performance at scale is often inconsistent, resulting in intermittent performance issues that are difficult to troubleshoot.

All Nutanix systems include a built-in hypervisor (AHV) optimized for running virtual apps and desktops on Nutanix hyperconverged infrastructure clusters and public cloud. AHV management is so intuitive that most administrators don't require formal training and feel comfortable within the first week of implementation.

The hypervisor management software is built into the Nutanix cluster, so it's always highly available and doesn't require installation. Nutanix's automated data migration tool, Move, imports existing persistent desktops or base images from other hypervisors or public cloud. The tool seeds data in the background, installs required Nutanix drivers, and is easy to rollback if there are any issues.

Nutanix Files is a scale-out clustered file services solution that is managed from the same Prism admin interface. Files has built-in backup and user-restore capabilities and benefits from Nutanix's excellent storage performance. It can even be run on the same hardware as the users' virtual desktops for an all-in-one solution. Every Nutanix cluster includes a license for 1 TB of user data and additional capacity can be licensed as needed. Files also offers data analytics for even more insights into the user data.

4. How to **Simplify** Digital Workspace **Security**

Citrix Gateway service provides secure remote access with a broad set of identity and access management options. When deploying Citrix Gateway on-premises, administrators are responsible for implementing and maintaining multiple sites, public IP addresses, network devices, and firewall rules. Citrix Gateway service hosted within Citrix Cloud removes the management overload while providing additional benefits.

With Citrix Gateway service, Citrix administers implements the network appliances, so they always have the latest features and security patches. This also accelerates onboarding, allowing you to scale easily as you grow. Additionally, Citrix Gateway service operates in multiple PoPs around the world, which ensures high availability without administrators having to deploy additional hardware.

With so many employees working remotely, security must be top of mind. So how do you provide end-users with the flexibility they need to be productive, while still securing your intellectual property? Citrix Secure Workspace Access service allows administrators to provide a complete experience. This includes giving end users single-sign-on, remote access, as well as content inspection. It allows administrators to publish SaaS applications with enhanced security policies, such as watermarking or restricted clipboard capabilities.

Last but not least, because end users use web browsers to be productive, they are vulnerable to browser-based attacks. The Citrix Secure Browser service isolates web browsing to protect the corporate network from these attacks. Deploying web browsers that are completely isolated and off the corporate network helps protect intellectual property, while providing end users with the tools they need.

All in all, Citrix Cloud services, including Citrix Virtual Apps and Desktop service, Citrix Secure Browser service, and Citrix Gateway service, remove the complexity of managing your virtual workspaces, while giving you the tools you need to provide your end users with secure remote access. Now more than ever it is crucial to have a flexible solution that allows your users to work from anywhere!

5. Simplifying Reporting, Analysis, and Issue Remediation

Information overload is real, making it hard for administrators to get the information they need to address issues proactively and reactively in their environment. Citrix Analytics for Performance is a service that enables you to track, aggregate, and visualize key performance indicators in your environment. By gathering data from different data sources, it provides administrators with a cohesive view of their environment and provides prescriptive insights to remediate the environment proactively. Through its different dashboards, Citrix Analytics provides administrators with easy-to-consume data alongside actions they can apply.

The user experience dashboard shows administrators information on the experience their users are having. Citrix Analytics does multi-site aggregation, making it easier for administrators to have a holistic view of their environment or filter out for a specific site. Although Citrix Analytics is a cloud service, it is able to gather information for both on-premises or cloud environments alike.

The user experience score is calculated based on different performance factors that affect a user session including: session logon duration, session responsiveness, session availability, and session resiliency. These factors also have sub-factors associated with them. The factors are dynamically calculated on a per customer basis and recalibrated based on metrics collected during the past 30 days. This is to account for any changes that were made within an environment. Administrators are able to look at exactly what is causing a user to have a poor experience and dig deep into the factors/subfactors. Citrix Analytics even provides administrators with insights as to why someone might not be having an optimal experience; allowing administrators to proactively resolve issues before they become a problem.

Beyond the end-user experience analysis, Citrix Analytics for Performance provides machine statistics which allow administrators to easily correlate high CPU or memory usage with session failures or poor user experience. Citrix Analytics also points out any failure insights such as communication errors or failures caused by black-hole machines. Administrators are able to complete actions straight from the Citrix Analytics dashboard; allowing them to do things like restart or put a machine in maintenance mode. Citrix Analytics for Performance provides administrators with the tools and information they need to help ensure their machine health is optimal and their end users have the best experience possible.

Even though planning and sizing are key components prior to implementation, sometimes the issues related to the user experience lie deeper in the environment. The administrators of the environment need to quickly dig in and find the root cause of the performance issues that are causing poor user performance. Having all the data and tools available in a single pane of glass, through the Nutanix Prism® interface, allows administrators to quickly identify bottlenecks. Even better, Prism alerts administrators to where the problem exists in the infrastructure, thereby cutting the discovery time significantly.

Identification of any underlying issues is a first step, but the end goal is to remediate issues as quickly and simply as possible. For example, if the virtual desktops are configured with too little memory, it would be too time consuming for the administrator to add memory to every desktop. Using Prism X-Play™ automation tool allows administrators to automate the task with zero coding, instantly improving operational productivity. Furthermore, with Nutanix X-Play administrators can set up a policy to trigger automatically when a condition or an action is detected.

No company is immune from regulatory oversight. Sooner or later reports of the changes in the environment need to be produced to comply with regulations. Through the same interface, Nutanix provides a robust reporting engine that shows the actions taken, but can also show what-if scenarios related to possible future events, such as adding more users or acquiring the assets of a company.

6. How to **Simplify** a **Unified Workspace**

In the past, end users only needed virtual apps and desktops to get their work done, but today's reality is very different. There has been a proliferation of web and SaaS apps that end users need. Additionally, end users need access to their files and data. Citrix Workspace provides users with access to SaaS apps, web apps, Windows apps, Linux apps, desktops, and data from any device. It provides a unified experience with SSO regardless of where your apps are hosted. This enables users to maximize their productivity and to work anywhere, from any device.

End users have the flexibility of logging into their workspace through a browser or through the locally installed Citrix Workspace app, which is available for Android, Chrome OS, HTML5, iOS, Linux, Mac, and Windows. Depending on how the administrators have configured Citrix Workspace, end users will authenticate using their credentials. Citrix Workspace enables administrators to pick a primary identity from multiple options. Even though many of the services provided to the user require an identity different from the user's primary workspace identity, Citrix Workspace is able to provide SSO access. Learn more about Citrix Workspace identity.

Once users are authenticated into their workspace they are able to see the different resources provided by their administrators. Through microapps, administrators can deliver relevant, actionable notifications combined with intuitive workflows. This allows users to save time by reducing context switching and eliminating the need to learn how to use different applications. Additionally, end users have access to actions that are user-initiated activities taken within the microapps that then provide input to the business applications. Learn more about Citrix Workspace and microapps.

Through Citrix Workspace, administrators can provide access to Citrix Virtual Apps and Desktops. With Citrix Virtual Apps and Desktops service, administrators can securely deliver high-performance Windows and Linux applications on any endpoint. Citrix Virtual Apps and Desktops service allows you to manage on-premises datacenter and public cloud workloads together in a hybrid environment. Learn more about Citrix Virtual Apps and Desktops service.

Finally, end users need access to their files. Citrix Content Collaboration allows administrators to provide business-class file sharing, streamlined workflows, and real-time collaboration. Citrix Files not only allows users to access those files anywhere on any device, it also makes file sharing easier and more secure.

With Citrix Workspace, administrators can enable their end users to be productive anywhere and have the flexibility they need. Citrix Workspace is a complete digital workspace solution that delivers secure access to information, apps, and other content that is relevant to that person's role and organization.

7. Simplifying Business Continuity and Hybrid Multicloud

The challenges of maintaining a modern workforce are various and can be daunting. Desktops and user data must be available across multiple geographies to enable your business to continue if and when disaster strikes. A subset of end-users accesses their desktops and specialized apps infrequently. Hosting these solutions in a traditional on-prem datacenter isn't economically feasible. As we have seen in recent months, end-users may be required to work from home or a remote location. Traditional on-prem solutions cannot scale within hours for rapid changes in workforce mobility and increase the demand for access. Many companies have come to realize the value of leveraging cloud providers to augment their on-prem environment. However, maintaining separate infrastructures is more complex and requires specialized replication.

Citrix Virtual Apps and Desktops service provides users with the tools they need to work from anywhere. Citrix Virtual Apps and Desktops service enables admins to keep their images on-premises and have desktop-as-a-service (DaaS) in the cloud. This allows them to be prepared when there is a failure with their on-prem VDAs or when there is increased demand, causing their VDAs to be overloaded. Migrating to the Citrix Virtual Apps and Desktops service lets IT focus on business needs, and end-users can take advantage of the latest features and functionality. Citrix Cloud services help you to transition to cloud at your own pace. With a hybrid, multi-cloud approach, you have the flexibility to choose the appropriate datacenter or cloud to host each application.

Citrix Virtual Apps and Desktop service is cloud and hypervisor agnostic. You avoid lock-in and give your organization true resource flexibility. Citrix Cloud services give your business the agility needed to respond to a disaster recovery or business continuity event without having to deploy new infrastructure. By utilizing Autoscale, administrators can prioritize on-premises resources first and only burst to the cloud when the on-premises capacity is utilized. Admins have the option of deploying within their own public cloud tenants or within Citrix's Azure tenant — in a fully managed DaaS solution. You can find more information on how to use Citrix within your business continuity strategy in this Reference Architecture.

Other considerations when moving to the cloud are the uptime and fault tolerance of the cloud-based solution. Citrix Cloud services are built with high availability in mind. Citrix Cloud has an SLA of at least 99.9 percent monthly uptime. Citrix Cloud services use Azure availability zones to ensure that the broker and the associated databases are resilient to cloud outages. Specifically, Citrix Virtual Apps and Desktop service has different features to make it resilient and fault-tolerant. The Rendezvous protocol allows HDX sessions to bypass Citrix Cloud Connectors and connect directly to Citrix Gateway service. With service continuity, users can launch their virtual apps and desktops regardless of the cloud services' health status. Service continuity allows users to connect to their virtual apps and desktops during outages, as long as the user device maintains a network connection to a resource location. Users can connect to virtual apps and desktops during outages in Citrix Cloud components or in public and private clouds. Users can connect directly to the resource location or through the Citrix Gateway service. Check out this deep dive into how Citrix Cloud services are architected and built for resiliency.

Combining the solution from Citrix along with the simplicity and resilience of the Nutanix Cloud Platform allows your organization to provide end-to-end availability, ensuring continuous business operations. Leveraging various cloud providers for business continuity may be as simple as swiping a credit card, however, it is fraught with risk and operational inefficiencies. Each cloud provider is unique in their management plane, networking stack, and security management. Nutanix Clusters addresses these issues by bringing automated installation and a single management interface to public cloud bare metal offerings, such as AWS and Azure. Along with the management interface, Nutanix Clusters allows you to scale out as demands increase with zero downtime.

Leveraging the single management interface to enable, manage, and monitor the replication of user data and applications removes the need for specialized tools, thereby reducing costs and operational complexity. Replication can be enabled in a point-to-point or a multipoint configuration, across the same cloud provider or disparate providers, including your on-prem solution. Depending on the latency between sites and business requirements, Nutanix can offer an RTO as low as a minute.

Conclusion

As you can see, running Citrix virtual apps and desktops on Nutanix results in a true hybrid and multicloud digital workspace solution with seamless access to apps, virtual desktops, and protected data – from any cloud, on any device, in any location and at scale.

Nutanix and Citrix experts have the skill and expertise to help you make the right decisions for your organization, so you can deploy and operate Citrix Virtual Apps and desktops in a hybrid multicloud environment.

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