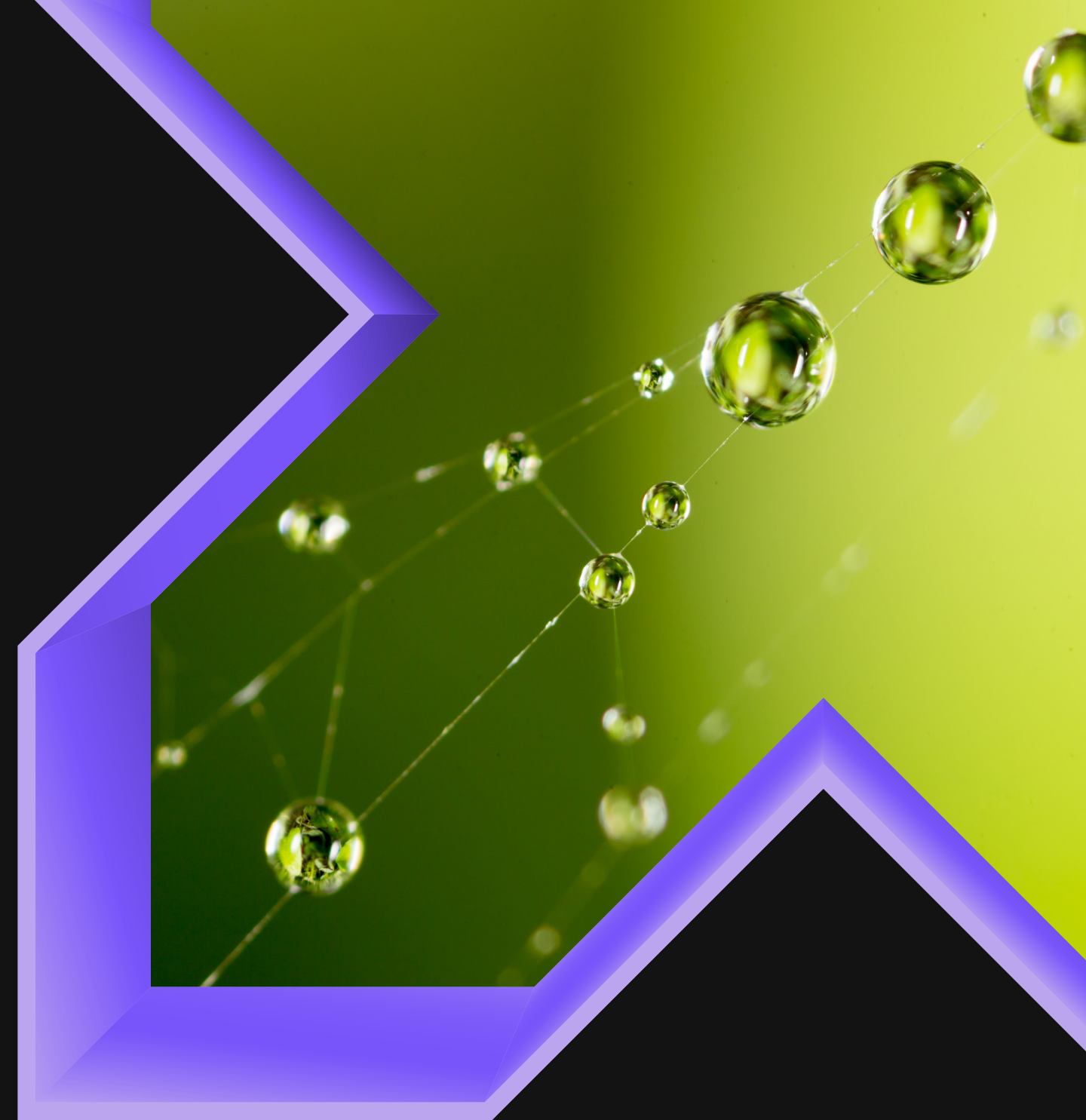


7 Ways to Simplify Your Digital Workspace Deployment



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 significantly reduce this complexity. Building a simple, secure and high-performance Digital Workspace solution requires choosing the right technologies at every layer of the stack.

In this eBook, we discuss how running Citrix on Nutanix 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 solution helps you to avoid the pitfalls that have bedeviled administrators 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.

Table of Contents

Chapter 1: How to Simplify Digital Workspace Resource Management.....	04
Chapter 2: How to Simplify the Citrix Control Plane.....	07
Chapter 3: How to Simplify Hybrid Multicloud Virtualization and File Services.....	08
Chapter 4: How to Simplify Digital Workspace Security.....	09
Chapter 5: Accelerate Reporting, Analysis and Issue Remediation.....	10
Chapter 6: How to Simplify a Digital Workspace.....	12
Chapter 7: Simplifying Business Continuity and Hybrid Multicloud.....	13
Conclusion.....	15



Advantages of a Citrix on Nutanix Digital Workspace Solution

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

When you run Citrix with Nutanix Cloud Platform, you get a cloud operating model for all Citrix Desktop technologies.

This means you can deliver a superb 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 on Nutanix gives you access to true hybrid multicloud capabilities. Thanks to seamless portability among on-premises 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. In fact, the solution delivers a three-year ROI of 123% and can pay for itself in as little as eight months.



1 How to Simplify Digital Workspace Resource Management

Virtualizing apps and desktops requires high-performance, 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 architectures largely remained.

Enter HCI: Simpler, Faster and More Cost Efficient

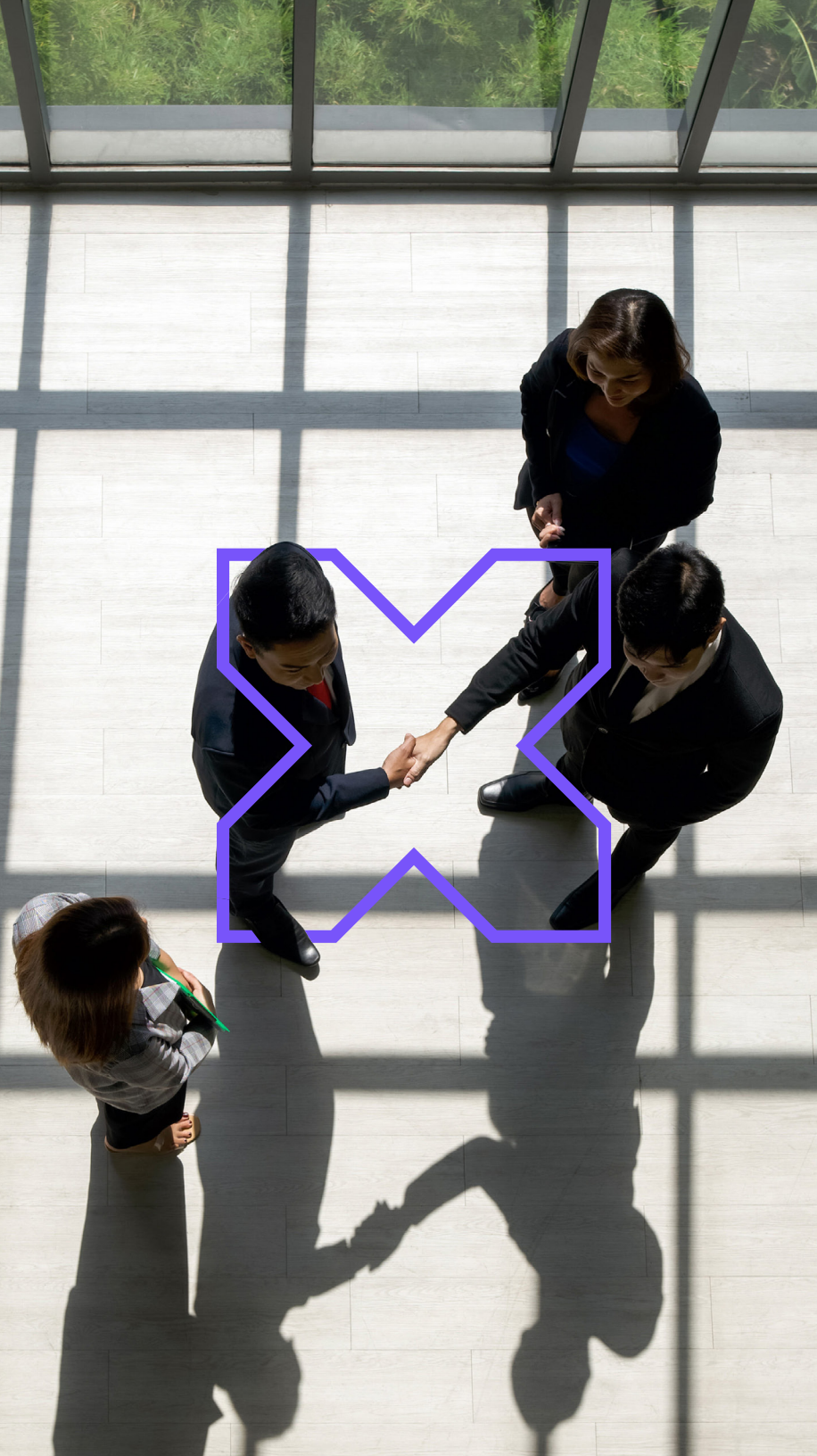
About a decade ago, several vendors started offering hyperconverged infrastructure (HCI). Led by Nutanix, this movement dispensed with the idea of blade servers and discrete storage networks and appliances, instead offering traditional rack-mount servers with virtualized storage controllers.

HCI 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 true 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 of virtualizing desktops on Nutanix is data locality. Windows workloads were built with locally attached drives and perform best with low disk-latency.

Instead of reading and writing data across a network, Nutanix offers lower latency from direct-attached solid-state drives (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 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% faster with this feature. Shadow Clones cache the data each desktop frequently accesses on the SSD of every server that hosts virtual desktops. And it automatically enables itself when it detects machines built using linked clones, such as 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 Cloud Clusters (NC2), you can use this same portable subscription on bare metal servers in popular public clouds. Nutanix frees you from 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 up to dozens 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 Lifecycle Management: Fast, Easy, Always-On

Finally, lifecycle management is the latest Nutanix capability for managing legions 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. Lifecycle 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 eliminates the need for IT staff to work late nights, holidays and weekends.



How to Simplify the Citrix Control Plane

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

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

With Citrix Desktop-as-a-Service (DaaS), Citrix deploys and manages all the administrative components. This service provides organizations with the flexibility and agility to scale quickly as needed, while retaining control of images and resources.

Administrators have the flexibility to manage their Citrix Virtual Delivery Agents (VDAs) in multiple resource locations – on-premises, in the cloud or in hybrid multicloud environments. They can keep these images on the current release version or the long-term service release version. Additionally, Citrix universal service ensures that your environment always has the latest features and security patches, making formerly tedious administrative tasks simple and efficient.

Citrix gives you several options for architecting your solution. Your resources can be hosted on premises, within a public cloud or via a hybrid multicloud approach to fit your environment and your specific business needs.



3 How to Simplify Hybrid Multicloud Virtualization and File Services

A Digital Workspace requires an enterprise-class hypervisor and a high-performance system to host user data. No less important, however, they should be built-in and sufficiently easy to use so 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 required a license – that had to be manually configured for high availability. These were so complex that many customers didn't bother to implement them.

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 the built-in AHV hypervisor, which is uniquely optimized to run virtual apps and desktops on Nutanix HCI 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. The Nutanix Move automated data migration tool imports existing persistent desktops or base images from other hypervisors or public clouds. 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 Prism, the same administrative interface used to manage Nutanix HCI. It features built-in backup and restore capabilities and optimized storage performance.

Files can even 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 unprecedented insights into 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 DaaS eliminates management overload while providing additional benefits.

Citrix Gateway service administers and implements 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 points of presence around the world, which ensures high availability without requiring administrators 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 enables administrators to publish SaaS applications with enhanced security policies, such as watermarking or restricted clipboard capabilities.

Finally, because end users must rely on web browsers to stay productive, they are vulnerable to browser-based cyberattacks. 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.

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

Accelerate Reporting, Analysis and Issue Remediation

Information overload is real, making it difficult for administrators to get the information they need to address issues proactively and reactively in their environment. Citrix Analytics for Performance enables you to track, aggregate and visualize key performance indicators in your environment.

By gathering data from different sources, Citrix Analytics gives administrators a cohesive view of their environment and provides prescriptive insights to proactively remediate any issues. 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 multisite aggregation, making it easier for administrators to have a holistic view of their environment or filter out a specific site. Although Citrix Analytics is a cloud service, it is able to gather information for on-premises as well as cloud environments.



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 ensures an accounting for any changes that were made within an environment. Administrators get a precise view of what is causing a user to have a poor experience and dig deep into the factors and subfactors. Citrix Analytics even provides administrators with insights as to why someone might not be having an optimal experience. This enables administrators to proactively resolve issues before they become a problem.

Beyond the end user experience analysis, Citrix Analytics provides machine statistics that 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 provides administrators with the tools and information they need to ensure that machine health is optimal and end users have the best experience possible.

Although planning and sizing are key considerations before implementation, issues related to the user experience sometimes run deeper in the environment. As a result, administrators must quickly dig in and find the root cause of the performance issues that are impeding user productivity.

Having all the data and tools available through a single pane of glass in the Nutanix Prism interface allows administrators to quickly identify bottlenecks. Even better, Prism alerts administrators to where the problem exists in the infrastructure, which significantly speeds up discovery time.

Identification of any underlying issues is a first step, but the end goal is to remediate issues as quickly and as simply as possible.

For example, virtual desktops configured with insufficient memory require administrators to manually add memory to every desktop – a time-consuming chore. Using the Prism X-Play automation tool allows administrators to automate the task with zero coding, instantly improving operational productivity. Furthermore, Nutanix X-Play enables administrators to set up a policy that triggers automatically when a condition or action is detected.

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



How to Simplify a Digital Workspace

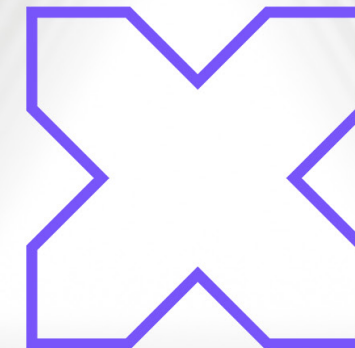
In the past, end users only needed virtual apps and desktops to get their work done, but today's reality is very different. There has been a proliferation of web and SaaS apps that end users need.

Additionally, end users need access to their files and data. Citrix 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 work anywhere, from any device.

End users have the flexibility to log into their workspace through a browser or through the locally installed Citrix app, which is available for Android, Chrome OS, HTML5, iOS, Linux, Mac, and Windows.

Depending on how administrators have configured Citrix, end users will authenticate using their credentials. Citrix enables administrators to pick a primary identity from multiple options. Although many services provided to a user require an identity different from the user's primary workspace identity, Citrix is able to provide SSO access.

Once users are authenticated into their workspace, they are able to see the different resources provided by their administrators. Through Citrix, administrators can provide access to virtual apps and desktops. Citrix also enables administrators to securely deliver high-performance Windows and Linux applications on any endpoint. Citrix Virtual Apps and Desktops allows you to manage on-premises datacenter and public cloud workloads together in a hybrid environment.



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-premises datacenter isn't economically feasible.

Traditional on-premises solutions cannot scale within hours to accommodate rapid changes in workforce mobility and the increased demand for access. Many companies have come to realize the value of leveraging cloud providers to augment their on-premises environment. However, maintaining separate infrastructures is more complex and requires specialized replication.

Citrix provides users with the tools they need to work from anywhere. Citrix service enables administrators to keep their images on-premises and have DaaS in the cloud. This allows them to be prepared when there is a failure with their on-premises VDAs or when there is increased demand, causing their VDAs to be overloaded.

Migrating to Citrix lets IT focus on business needs and allows end users to take advantage of the latest features and functionality. Citrix helps you to transition to the cloud at your own pace. With a hybrid multicloud approach, you have the flexibility to choose the appropriate datacenter or cloud to host each application. Hybrid multicloud is not a step along the journey but is the destination for many enterprise organizations.

Citrix is cloud and hypervisor agnostic. You avoid lock-in and give your organization true resource flexibility. Citrix gives your business the agility needed to respond to a disaster recovery or business continuity events without deploying a new infrastructure. By utilizing Autoscale, administrators can prioritize on-premises resources first and only burst to the cloud when on-premises capacity is utilized.

Administrators have the option of deploying within their own public cloud tenants or within Citrix Azure tenants – 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 solutions are built with high availability in mind. Citrix has an SLA of at least 99.9% monthly uptime. Citrix uses Azure availability zones to ensure that the broker and the associated databases are resilient to cloud outages. Specifically, Citrix Virtual Apps and Desktop has different features to make it exceptionally 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 get access regardless of 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 during outages in Citrix components or in public and private clouds as well as directly to the resource location or through the Citrix Gateway service.

Combining the solution from Citrix along with the simplicity and resilience of Nutanix Cloud Platform allows your organization to provide end-to-end availability, ensuring continuous business operations.

Although leveraging various cloud providers for business continuity may be as simple as swiping a credit card, it can be fraught with risk and operational inefficiencies. Each cloud provider is unique in its management plane, networking stack and security management.

Nutanix Cloud 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 Cloud 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 eliminates 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-premises solution. Depending on the latency between sites and business requirements, Nutanix can offer an RTO as low as a minute.



Conclusion

Running Citrix on Nutanix creates a true Digital Workspace solution with seamless access to applications, virtual desktops and protected data – at scale from any cloud, on any device and in any location.

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

Visit nutanix.com/citrix to learn more.

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