INTRODUCTION TO VMWARE HORIZON 7 FOR CITRIX ADMINISTRATORS

VMware Horizon 7
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Introduction
Today's workforce requires access to applications, at any time, from any device. In this new mobile-cloud world, managing and delivering services to end users with traditional PC-centric tools remains a challenge.

VMware Horizon® 7 with VMware JMP technologies provides IT with a new streamlined approach to deliver, protect, and manage Windows, Linux, SaaS, web, and mobile desktops and applications while ensuring that end users can work anytime, anywhere, on any device.

For administrators who have deployed Citrix XenApp and XenDesktop in the past, this guide offers a tour of Horizon 7, how the Citrix components map to a Horizon 7 deployment, and the steps to get you started in evaluating Horizon 7.

The tour of Horizon 7 covers some of the recent advances in Horizon 7, as well as how VMware JMP technologies delivers an enterprise-class, innovative solution. In addition, we introduce the key areas where Horizon 7 delivers a modern, enterprise-secure, and consumer-simple virtual desktop and application solution:

• Enterprise-class application-publishing and virtual-desktop solution
• Simple, fast, efficient management at scale
• Consistent, adaptive user experience
• Flexible, robust security

Deploying Horizon 7 is simple and straightforward; you can set up a basic environment in just a few hours. This document points you to step-by-step guides and interactive labs to get you quickly set up, running, and comfortable with a Horizon 7 deployment.

Audience
This guide is for Citrix administrators and anyone with a Citrix background who wants to learn more about Horizon 7.
Advances in VMware Horizon 7

In 2007, VMware introduced one of the first virtual desktop management solutions, addressing use cases that server-based computing could not. Today, Horizon 7 represents a leap forward in managing and delivering not just virtual desktops, but also published applications and desktops in a scalable, secure, and enterprise manner. If you are a Citrix administrator, perhaps you have not had a chance to stay informed about the latest Horizon 7 features:

• Frequent enhancements to VMware Horizon 7
• VMware JMP, a next-generation approach to virtual desktops and applications.

Frequent Enhancements to VMware Horizon 7

VMware has delivered 12 new feature packs since the Horizon 6 release in 2014. On average, that is one release every 3 months, and with each release VMware is improving or adding new features.

Since the introduction of VMware Horizon 6, VMware has progressively developed and improved the administrative and client features for published applications and desktops.

VMware offers published applications as part of Horizon 7 or as part of VMware Horizon Apps. The only difference between these products is that Horizon Apps focuses on published applications and desktops, and Horizon 7 offers published applications and desktops, plus virtual desktops.

Figure 2 contains a sample of the features available in Horizon 7 and VMware Horizon Apps.

![Sample of Features Available with Horizon 7 and Horizon Apps](image)

Not only has VMware frequently enhanced the features of Horizon 7 and Horizon Apps, but also VMware has developed a modern display protocol in Blast Extreme. Blast Extreme is an adaptive display protocol that takes advantage of modern codecs and technologies such as H.264 and GPU-based hardware offloading—on both the client and host.
Horizon 7 and Horizon Apps now offer a choice in protocol—Blast Extreme or PCoIP—with protocol feature-parity and broad support for client devices.

**Figure 3: VMware Blast Extreme and PCoIP Feature Parity**
VMware JMP – Next-Generation Approach to Virtual Desktops and Applications

Horizon 7 introduced a new concept in managing virtual desktops and published applications and desktops—just-in-time management and delivery.

The Just-in-Time Management Platform, JMP (pronounced jump) represents capabilities in VMware Horizon 7 Enterprise Edition that deliver Just-in-Time Desktops and Apps in a flexible, fast, and personalized manner. JMP is composed of the following VMware technologies:

- **VMware Instant Clone Technology** for fast desktop and Remote Desktop Session Host (RDSH) provisioning
- **VMware App Volumes™** for real-time application delivery
- **VMware User Environment Manager™** for contextual real-time policy and user profile management

JMP allows components of a desktop or RDSH server to be decoupled and managed independently in a centralized manner, yet reconstituted on demand to deliver a personalized user workspace when needed. JMP is supported with both on-premises and cloud-based Horizon deployments, providing a unified and consistent management platform regardless of your deployment topology. The JMP approach provides several key benefits, including simplified desktop and RDSH image management, faster delivery and maintenance of applications, and elimination of the need to manage “full persistent” desktops.
Figure 4 shows that application-management containers are managed separately from the desktop OS. Similarly, user data files and OS- and application-specific configurations are decoupled from the OS and kept on separate file shares.
The following components of JMP work together to compose a just-in-time personalized desktop:

- **User Environment Manager share** – A file share that stores user-specific desktop and application settings, making them available across multiple devices, Windows versions, and application instances. Application settings are imported and applied at application launch. Windows settings (such as the desktop background, desktop screensaver, and keyboard settings) are imported at login. When a user quits an application, or logs out of the OS, settings are exported and saved on a file share.

- **User profile share** – A file share that stores personal user data, documents, pictures, and so on that are redirected from specific folders inside the VM. This strategy minimizes the number of files that must be copied to the VM when the user logs in.

- **Writable volume** – A one-to-one, user-specific, read-and-write container for user-installed applications or for applications that require a local cache, because a writable volume appears as part of the local C drive.

Users must ordinarily have administrator permissions to install applications in a virtual desktop, just as they would for a physical desktop. User Environment Manager 9.2 has a Permission Elevation feature that administrators can now use so that users can install applications without having to have full administrator permissions.

**Important:** In companies that require tight control over virtual desktops and apps, you need not provide users with a writable volume. In this case, when users log out, they lose any changes they might have made to the OS, as well as any data they might have saved to a folder location that is not redirected.

- **AppStack** – A read-only container for one-to-many delivery of IT-managed applications.
  - For virtual desktops, AppStacks are assigned to an Active Directory user or group, and assigned AppStacks are attached to the desktop when a user logs in.
  - For RDSH servers, which provide published apps and shared session-based desktops, AppStacks are assigned to the group object in Active Directory that contains the computer objects for the servers. Assigned AppStacks are attached to the RDSH server at boot time.

- **Instant clone** – A new type of cloned VM that is created using vSphere vmFork technology to rapidly clone both the memory and the disk of a running parent VM.

  Instant Clone Technology requires half the required steps compared to View Composer linked-clone technology when deploying or scaling. In VMware lab tests, an instant-clone farm of 200 RDSH servers was created in less time than View Composer took to create a single RDSH server.
Introduction to VMware Horizon 7

Horizon 7 is a complete solution that delivers, manages, and protects virtual desktops, RDSH-published desktops, and applications across devices and locations. This section describes key areas that make Horizon 7 an enterprise-class solution:

- Enterprise-class application publishing and virtual desktops
- Simple, fast, efficient management at scale
- Consistent, adaptive user experience
- Flexible, robust security

Enterprise-Class Application-Publishing and Virtual-Desktop Solution

Horizon 7 provides a single management platform for delivering virtual desktops and RDSH-published desktops and applications to end users at scale. From provisioning to management and monitoring, VMware Horizon 7 offers an integrated stack of enterprise-class technologies. With mobile device support and identity-driven workspaces, VMware Horizon 7 offers a consumer-simple, enterprise-secure user experience. VMware Horizon Apps provides a standalone option focusing specifically on published applications and desktops.

Table 1 summarizes the products and features in Horizon 7 and Horizon Apps that help deliver an enterprise-class solution.

<table>
<thead>
<tr>
<th>ENTERPRISE-CLASS PRODUCTS AND FEATURES</th>
<th>HORIZON 7 ENTERPRISE EDITION</th>
<th>HORIZON APPS ADVANCED EDITION</th>
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</thead>
<tbody>
<tr>
<td>Horizon 7 published applications and published desktops</td>
<td>✔</td>
<td>✘</td>
</tr>
<tr>
<td>VMware Identity Manager™ for a unified workspace containing desktops and applications, including Horizon 7 published applications, XenApp published applications, virtualized applications, and SaaS and web applications</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>VMware App Volumes for real-time application delivery</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Just-in-time desktop delivery with Instant Clone Technology</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>VMware User Environment Manager to retain user personalization and customization across sessions and devices</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Adaptive display protocols – Blast Extreme or PCoIP</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>VMware Horizon HTML5 access</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>USB, file, multimedia, URL, and client drive redirection technologies</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>VMware ThinApp® for application isolation</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>VMware Horizon 7 for Windows virtual desktops</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>VMware Horizon 7 for Linux virtual desktops</td>
<td>✗</td>
<td>✗</td>
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</tbody>
</table>

Table 1: Comparison of Enterprise-Class Products and Features Available in Horizon 7 Enterprise Edition and Horizon Apps Advanced Edition
**Integrated Enterprise-Class Technologies**

VMware Horizon 7 includes and is tightly integrated with the enterprise-class and enterprise-proven VMware SDDC technology stack—including VMware vSphere® and VMware vSAN™. In addition, Horizon 7 is built upon a set of integrated operating system, application, and user-environment technologies—VMware JMP. Horizon 7 leverages JMP to provide an even faster way to provision fully personalized and customized virtual desktops or RDSH hosts. VMware vSphere Instant Clone Technology, combined with User Environment Manager and App Volumes, dramatically improves application delivery and management at scale.

**Figure 5:** VMware App Volumes Management Console

Horizon 7 Enterprise Edition includes not only real-time application delivery, user personalization, fast desktop provisioning, and application packaging, but also VMware vRealize® Operations for Horizon for predictive health-and-performance analytics. VMware vRealize Operations for Horizon provides performance metrics across the infrastructure and also analyzes the user experience through integration with PCoIP and Blast Extreme session statistics.

**Consumer-Simple, Enterprise-Secure**

Horizon 7 comes with an identity-driven workspace in VMware Identity Manager (deployed on premises). Optionally, a SaaS-based version of VMware Identity Manager is available separately as VMware Workspace™ ONE™. VMware Identity Manager (or Workspace ONE) provides a unified application catalog and portal for enterprise-secure access to Horizon 7 virtual desktops and published applications, and VMware ThinApp, SaaS, and even Citrix XenApp published applications.
A consumer-simple experience is driven across devices with the Workspace ONE app. The app can be downloaded from public app stores, and users can then access their desktops and applications from mobile devices through VMware Identity Manager. For more information, see Setting up the VMware Workspace ONE Application on Devices on the VMware Identity Manager Documentation page (select On-Premise 2.8 from the drop-down menu).

The Workspace ONE app launches device-native versions of the VMware Horizon Client™ to provide seamless access to Microsoft Windows-based applications and desktops on any device. The VMware Horizon Client, in combination with VMware Identity Manager, supports features such as biometric authentication, multi-factor authentication, single sign-on, and policy-controlled access to applications.

VMware Horizon Apps for Published Applications and Desktops
VMware provides you with the opportunity to deploy enterprise software for published applications and desktops, with or without VDI. VMware has recently introduced VMware Horizon Apps to the market—a standalone offering that focuses on delivering and managing published RDSH applications, including session-based desktops. Horizon Apps is essentially the same as VMware Horizon 7 but without the option to deploy virtual desktops. Horizon Apps is available in two editions—Horizon Apps Standard and Horizon Apps Advanced. Both editions offer secure published application delivery. Horizon Apps Advanced additionally includes App Volumes and Horizon with View.

Simple, Fast, Efficient Management at Scale
The new deployment reality for Horizon 7 at scale is automatic deployment of hundreds of customized desktops and RDSH servers in a few minutes from centralized single images. Horizon 7 supports real-time application delivery and management through VMware JMP technologies. Instant Clone Technology provides a faster way to provision virtual machines in VMware vSphere with reduced deployment complexity. When administrators combine App Volumes, User Environment Manager, and Instant Clone Technology, they can rapidly spin up RDSH-shared or virtual desktops that retain user customization across sessions, even though the desktop itself is destroyed when the user logs out.

Following are some features and products that contribute to simple, fast, and efficient management at scale for Horizon 7:

- Instant Clone Technology for fast provisioning of virtual machines
- Cloud Pod Architecture and VMware vSAN storage architecture for efficient deployment at scale
- VMware vRealize Operations for Horizon for monitoring operations of large-scale deployments

Table 2 lists features and products that provide simplified management of virtual applications and desktops at scale, for Horizon 7 and Horizon Apps.

<table>
<thead>
<tr>
<th>MANAGEMENT AT SCALE: PRODUCTS AND FEATURES</th>
<th>HORIZON 7 ENTERPRISE EDITION</th>
<th>HORIZON APPS ADVANCED EDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMware App Volumes for single-instance application delivery to multiple desktops and RDSH servers</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>VMware Instant Clone Technology to rapidly provision virtual machines and to scale-out desktop pools</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Cloud Pod Architecture to scale-out an environment supporting up to 120,000 sessions across 25 pods and up to 5 sites</td>
<td>✔</td>
<td>✔</td>
</tr>
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</table>
Simple and scalable deployment architecture for user environment management

VMware Horizon Migration Tool to migrate from Citrix to a Horizon 7 environment

VMware vSAN to provision and manage hyper-converged storage

VMware vRealize Operations for Horizon to monitor health and performance

Table 2: Management at Scale: Products and Features of Horizon 7 Enterprise Edition and Horizon Apps Advanced Edition

<table>
<thead>
<tr>
<th>MANAGEMENT AT SCALE: PRODUCTS AND FEATURES</th>
<th>HORIZON 7 ENTERPRISE EDITION</th>
<th>HORIZON APPS ADVANCED EDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple and scalable deployment architecture for user environment management</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>VMware Horizon Migration Tool to migrate from Citrix to a Horizon 7 environment</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>VMware vSAN to provision and manage hyper-converged storage</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>VMware vRealize Operations for Horizon to monitor health and performance</td>
<td>✓</td>
<td></td>
</tr>
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Provisioning of Virtual Machines

Instant Clone Technology for RDSH farms allows administrators to instantly spin up new RDSH farms and quickly refresh existing RDSH farms, with zero downtime.

Figure 6: Adding an Automated RDSH Farm in VMware Horizon 7 Administrator

After the single master image has been published in the environment, it can take only 1 to 2 seconds, on average, to create a VM. Scaling out from 1 RDSH VM to 51 RDSH VMs takes less than 2 minutes.
Deployment at Scale

A single Horizon 7 virtual-desktop pod consists of Horizon Connection Servers, shared storage, a database server, and vSphere and network infrastructure. With Cloud Pod Architecture, you can join multiple pods together and manage this pod federation globally through a single entitlement layer.

Cloud Pod Architecture now scales to support up to 120,000 sessions across up to five sites, with 25 pods of infrastructure. IT can aggregate multiple pods in either the same data center or different data centers, and entitle users to a desktop in any location.

VMware vSAN (included as part of Horizon 7 Enterprise Edition) offers simple, hyper-converged storage that is easy to provision and manage. When combined with Horizon 7, VMware vSAN offers the ability to deploy a linear, scalable hyper-converged virtual desktop and application solution. VMware vSAN has tight integration with Horizon 7 and provides optimized storage policies that are automatically enabled, depending on the deployment type.

![Figure 7: Horizon 7 vSAN Storage Policies](image-url)
Monitoring Operations

VMware vRealize Operations for Horizon provides cloud analytics and operations management for virtual desktop and application environments, allowing IT to optimize the health, availability, performance, and efficiency of desktop and application services. VMware vRealize Operations for Horizon also analyzes metrics for server, storage, and networking for other key elements of your end-user-computing deployment, including VMware ESXi™ hosts and vSAN operations.

The latest version of vRealize Operations for Horizon allows you to monitor Horizon Blast Extreme protocol metrics for the best end-user performance.

![Horizon End-User Experience Dashboard in vRealize Operations for Horizon](image)

**Figure 8:** Horizon End-User Experience Dashboard in vRealize Operations for Horizon
Consistent, Adaptive User Experience

Horizon 7 delivers a complete and consistent end-user experience through the following technologies:

- VMware Identity Manager (on-premises) application store for fast, secure, and mobile contextual application access
- Blast Extreme protocol for optimized user experience
- User Environment Manager for continuity and consistency across desktop sessions and applications

VMware Identity Manager, the Blast Extreme protocol, and User Environment Manager all contribute to the consistent and adaptive user experience in Horizon 7 and Horizon Apps. Table 3 summarizes some of the user experience products and features in Horizon 7 Enterprise Edition and Horizon Apps Advanced Edition.

<table>
<thead>
<tr>
<th>USER EXPERIENCE PRODUCTS AND FEATURES</th>
<th>HORIZON 7 ENTERPRISE EDITION</th>
<th>HORIZON APPS ADVANCED EDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workspace ONE mobile application for consistent user experience when accessing applications and desktops</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>VMware Identity Manager for a unified workspace containing software-as-a-service (SaaS), published, and ThinApp applications</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>VMware Blast Extreme Adaptive Transport (BEAT) display protocol for superior user experience across many different networks</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>VMware User Environment Manager to retain user personalization and customization across sessions and devices</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>Seamless “unity” application experience with Blast Extreme and published applications</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>NVIDIA vGPU GRID 3D graphics</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>USB, file, URL, multimedia, and client drive redirection</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>Unauthenticated access (kiosk mode) for direct access to published applications</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>Microsoft Skype for Business and Microsoft Lync 2013 integration</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>Real-time audio and video for online conferencing applications such as Skype and WebEx</td>
<td>✅</td>
<td>✅</td>
</tr>
<tr>
<td>Location-based printing, printer redirection, and policy-based access to network printers with ThinPrint and User Environment Manager</td>
<td>✅</td>
<td>✅</td>
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</table>

Table 3: Sample of VMware Horizon 7 and Horizon Apps User Experience Features and Products
Fast, Secure, and Contextual Application Access
Horizon 7 Enterprise Edition includes VMware Identity Manager—an identity-driven workspace and self-service app store. Workspace ONE is the cloud version of the on-premises VMware Identity Manager and is available separately.

Workspace ONE and VMware Identity Manager provide a consistent user experience for accessing all corporate applications, regardless of deployment technology. Whether deployed on premises or in the cloud, the self-service app store provides fast single sign-on to user applications and desktops without the need to remember multiple passwords. A variety of secure-access mechanisms, including multi-factor authentication, are supported. In addition, customized policies can deliver context-aware access to applications and desktops.

Figure 9: VMware Workspace ONE / VMware Identity Manager Application Catalog Provides a Consistent User Experience

Innovative and Advanced Display Protocol
Some remote display protocols are acceptable across high-bandwidth and low-latency networks, but they degrade under non-ideal conditions. VMware has developed Blast Extreme Adaptive Transport—an extension of the Blast Extreme protocol—to improve user experience across varying network conditions. Blast Extreme has been optimized to perform well under non-ideal conditions such as public Wi-Fi and mobile networks. Blast Extreme adapts to low bandwidth and dropped packets, and, by offloading to the client-device GPU, reduces the impact on battery life and improves user experience.
In the data center, Blast Extreme can be offloaded (using NVIDIA NVENC technology) to a virtual GPU attached to a virtual desktop or RDSH virtual machine to improve user experience and reduce CPU overhead. Finally, by using VMware User Environment Manager, Blast Extreme session settings can be customized and personalized based on a number of different factors. The following screenshot shows how a bandwidth profile can be set through User Environment Manager.

**Figure 10:** VMware Blast Extreme Options in Horizon Smart Policies (Through User Environment Manager)
Customized and Persistent User Experience

VMware User Environment Manager offers a complete user environment management solution without requiring additional back-end infrastructure servers. It can manage user and Windows settings and dynamically configure the desktop or RDSH session. For example, User Environment Manager can create drive and printer mappings, file type associations, and shortcuts. User Environment Manager can even manage virtual applications for users.

User Environment Manager is used to provide a consistent user experience across physical and virtual desktop and published application sessions, regardless of the device used for access.

When VMware JMP-based desktops and RDSH servers are refreshed, User Environment Manager ensures user customizations, settings, personalization, policies, and application configurations are delivered just in time when a user logs in.

Flexible, Robust Security

Security is at the forefront of the VMware Horizon 7 architecture. VMware takes security seriously across all product areas, from the data center and network to the endpoint, including mobile devices.

Examples of security features include

- VMware Unified Access Gateway™ for secure external access
- User Environment Manager for policies that provide granular access-control
- VMware NSX® for virtual networking and micro-segmentation

Table 4 lists security features and products related to VMware Horizon 7 and Horizon Apps.

<table>
<thead>
<tr>
<th>SECURITY PRODUCTS AND FEATURES</th>
<th>HORIZON 7 ENTERPRISE EDITION</th>
<th>HORIZON APPS ADVANCED EDITION</th>
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</thead>
<tbody>
<tr>
<td>VMware Unified Access Gateway for secure external access to desktops and applications</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>VMware Horizon Smart Policies for context-aware policy controls</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>VMware Identity Manager for application and desktop access with single sign-on and True SSO</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Multi-factor, smart-card, and biometric authentication</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Centralized data in the data center</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Smart-card support on mobile devices</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>URL-content redirection for secure browsing</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>VMware NSX for network data separation using micro-segmentation</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

Table 4: VMware Horizon 7 and Horizon Apps Security Features and Products
Secure External Access
VMware Unified Access Gateway provides secure external access and supports the Blast Extreme and PCoIP protocols, single sign-on (SSO), and integration with Workspace ONE (cloud) or VMware Identity Manager (on premises).

Granular Access Control
With User Environment Manager, policy-managed client features give IT granular control at the application, user, device, and network levels. For example, IT can enable or disable features such as clipboard redirection, USB, printing, and client drive redirection. Policies can ensure that a desktop login from an unsecure network location results in the disabling of cut-and-paste features or USB-drive access.

Advanced Virtual Networking and Micro-Segmentation
Optionally, VMware NSX provides micro-segmentation for network data separation. NSX advantages include providing security within the hypervisor, no additional hardware requirement, and integration with VMware vSphere.
INTRODUCTION TO VMWARE HORIZON 7 FOR CITRIX ADMINISTRATORS

How Citrix XenApp and Citrix XenDesktop Map to VMware Horizon 7

Citrix XenApp and XenDesktop are very similar in architecture to VMware Horizon 7. Both solutions use a combination of connection brokers, web-based application catalogs, and RDSH or VDI servers to securely deliver virtual desktops.

Figure 12 compares the major Citrix XenApp and XenDesktop components to those of VMware Horizon 7.

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<tbody>
<tr>
<td>Remote Desktop Services</td>
<td>Microsoft RDSH with Citrix XenApp 6.x Session-Handling and Load-Management Components</td>
<td>Microsoft RDSH with Citrix Virtual Delivery Agent</td>
<td>VMware RDSH with VMware Horizon Agent</td>
</tr>
<tr>
<td>User Portal</td>
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<td>Citrix PVS and MCS</td>
<td>VMware Instant Clone Technology and View Composer</td>
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## Introduction to VMware Horizon 7 for Citrix Administrators

**Citrix XenApp 6.x Platinum**

- **User Environment Manager**: Citrix User Profile Management

**Citrix XenApp / XenDesktop 7.x Platinum**

- **User Environment Manager**: Citrix User Profile Management

**VMware Horizon 7 Enterprise Edition**

- **User Environment Manager**: VMware User Environment Manager

### Comparison of Components

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**Figure 12**: Comparison of the Components of Horizon 7 and Citrix XenApp and XenDesktop

Following are details of each of the component comparisons in Figure 12.

### Remote Desktop Services

Both Citrix XenApp and XenDesktop and VMware Horizon 7 are enhancements to Microsoft Remote Desktop Services. VMware Blast Extreme and PCoIP are tightly integrated into Remote Desktop Services using Microsoft APIs.

### User Portal

Citrix provides a “user portal” through Citrix Web Interface or Citrix StoreFront.

The equivalent VMware user portal is an identity-driven application and desktop catalog provided by Workspace ONE (cloud) or VMware Identity Manager (on premises). This application and desktop catalog supports Horizon 7 and Citrix XenDesktop virtual desktops, Horizon 7 and Citrix XenApp published applications and shared desktops, SaaS applications like Salesforce, and ThinApp applications.
Administrator Portal
Management and administration of Citrix XenApp 6.x is performed using a legacy Microsoft Management Console (MMC) application. Citrix XenApp and XenDesktop 7.x provides an MMC-based or web-based administration console.

The VMware Horizon 7 administration console is web-based. The Horizon Administrator console provides the ability to manage virtual desktops, RDSH servers, and published applications and desktops, all from a single console.

Figure 13 displays the VMware Horizon 7 Administrator console. The following is an overview of the Inventory items in the left pane.

- **Dashboard** – Display an overview of the system health for the environment, including Connection Servers, RDSH farms, datastores, ESXi hosts, VMware vCenter Server® instances, and more.
- **Users and Groups** – Add desktop and application entitlements to users and groups.
- **Catalog** – Manage your desktop pools, application pools, and ThinApp repositories.
- **Resources** – Manage your RDSH farms, individual machines, and persistent disks.
- **Monitoring** – Monitor the event database for machine issues and manage your desktop and application sessions.
- **Policies** – Manage virtual desktop policies such as MMR, USB access, and PCoIP hardware acceleration.
- **View Configuration** – Manage virtual-desktop environment configuration, including servers, licensing, domain administrators for instant clones, ThinApp repository, Cloud Pod Architecture, and event database.

![Figure 13: VMware Horizon 7 Administrator Console](image-url)
License Server
Citrix XenApp and XenDesktop require installation and maintenance of a license server. VMware Horizon 7 does not require use of a license server.

Session Handling and Load Management
In XenApp 6.5 and earlier versions, session handling and load management are performed on the RDSH servers. In XenApp and XenDesktop 7.x, the Citrix Delivery Controller servers perform these management tasks using a different framework.

The Horizon Connection Servers perform session handling and load management. VMware Horizon 7 provides a flexible and granular method to load-balance RDSH servers. Using a very simple optional script mechanism, RDSH load balancing can be customized based on any Microsoft Windows operating system metric.

Database Server
Citrix requires administrators to deploy and maintain database servers to support published applications and shared desktops.

As with the license server, VMware does not require a database server to support published applications and shared desktops.

Automated Provisioning
Both Citrix and VMware have two automated deployment systems. VMware Instant Clone Technology is similar to Citrix Provisioning Services (PVS), but offers benefits such as rapid deployment of desktops in fewer steps. Instant Clone Technology shares a virtual machine image running in RAM, “forking” this image to create copies at RAM speed.

Because Instant Clone Technology is built into VMware vSphere, no extra components are required, which reduces deployment complexity.

VMware View Composer is similar to Citrix Machine Creation Services (MCS), but offers benefits such as scalability and large-scale deployment capabilities.

User Environment Management
Citrix User Profile Management (UPM) applies users’ personal settings to virtual desktops and applications, regardless of location and endpoint device. However, because UPM is limited to managing only profiles, users require a third-party solution for complete user personalization.

In contrast, VMware User Environment Manager offers complete user personalization, including drive mappings, shortcuts, printers, and customization across sessions and devices. VMware User Environment Manager can be used for virtual and physical desktops as well as RDSH.

Real-Time Application Delivery
Citrix delivers real-time applications with AppDisk and Citrix App Layering (formerly Unidesk). AppDisk cannot be assigned per user (it is assigned per machine) and does not support physical desktops.

In Horizon 7 and Horizon Apps, App Volumes offers the same functionality, and more. App Volumes provides real-time application delivery with application life-cycle management in virtual desktop (VDI) and published application environments. App Volumes can be assigned per user and per machine, and it supports physical desktops.
Single Sign-On and Application Catalog
Citrix NetScaler Unified Gateway provides contextual access and single sign-on to web, VDI, and mobile applications.

In Horizon 7, Workspace ONE (cloud) or VMware Identity Manager (on premises) provides contextual access and a unified enterprise application store with single sign-on across Windows, web, and native mobile applications. The Unified Access Gateway component is used to provide secure connectivity to applications and desktops.

Clients and Protocols
Both Horizon 7 and Citrix XenApp support a broad range of client devices, including Android and Apple-based smart phones and tablets, Windows and macOS-based personal computers, Google Chromebooks, specialized devices like thin clients and zero clients, and any web browser that supports HTML5.

VMware supports PCoIP, Microsoft RDP, and the Blast Extreme protocol. PCoIP and Blast Extreme cover all use cases. Blast Extreme provides equal and, in most scenarios, better performance than Citrix HDX.
Migrating from Citrix to Horizon 7

The Horizon Migration Tool helps you migrate from Citrix XenDesktop and XenApp to Horizon 7. This tool supports the following scenarios:

- Migration from XenDesktop 7.6 and later to Horizon 7 and Horizon 7.1
- Migration from XenApp 5.0, 6.0, 6.5, 7.6, and later to Horizon 7 and Horizon 7.1
- Migration from XenDesktop 7.6 and later to Horizon Cloud 16.11.0 and 17.1.0

The wizard-based Horizon Migration Tool migrates virtual desktops and published application settings pertaining to pools, farms, and entitlements.

![Horizon Migration Tool](image)

Figure 14: Horizon Migration Tool
Getting Started
Now that you have been introduced to Horizon 7 features and capabilities, you can delve deeper into the product with the following resources. Start with the Hands-on Labs for practical experience without additional infrastructure—all you need is access to a web browser. Create and optimize a proof-of-concept environment using our reviewer’s guides and optimization tools. Finally, deploy a large-scale environment using the reference architecture and multi-site guides for assistance.

VMware Hands-On Labs
VMware Hands-on Labs is a free online portal that provides access to the latest products in a tested and documented cloud-based virtual lab environment. Explore the features and functionalities of Horizon 7 using only a web browser.

Introduction to Horizon 7: Virtual Desktop and Apps (HOL-1751-MBL-1)
Horizon 7: Application Delivery (HOL-1751-MBL-2)
Horizon 7 Suite: Extend Your Value (HOL-1751-MBL-3)
Horizon 7: Architecture and Performance (HOL-1751-MBL-4)
Horizon 7: End to End Security (HOL-1751-MBL-5)
Horizon 7 Advanced Concepts (HOL-1751-MBL-6)

Horizon 7 Reviewer’s Guides
The Horizon 7 Reviewer’s Guides provide guidance when you are ready to deploy a proof-of-concept environment.

Reviewer’s Guide for View in Horizon 7: Overview
Reviewer’s Guide for View in VMware Horizon 7: Installation and Configuration
Reviewer’s Guide for View in VMware Horizon 7: Preparing Virtual Machines for Desktop Pools
Reviewer’s Guide for View in VMware Horizon 7: Instant Clones
Reviewer’s Guide for View in VMware Horizon 7: Desktop Pools
Quick-Start Guide: Publishing Applications with VMware Horizon 7
Reviewer’s Guide for View in VMware Horizon 7: Smart Policies
Reviewer’s Guide for View in VMware Horizon 7: Provisioning Users

Optimize the Environment
To optimize master images, use the VMware OS Optimization Tool. This tool helps optimize a variety of Windows systems for use with VMware Horizon 7. The optimization tool includes customizable templates to enable or disable Windows system services and features, per VMware recommendations and best practices, across multiple systems.
Deploy a Large-Scale Environment
When you are ready to set up a production environment, refer to the reference architecture and multi-site guides to design your deployment.

VMware Horizon 7 Enterprise Edition Reference Architecture
VMware Horizon 7 Enterprise Edition Multi-Site Reference Architecture
VMware Workspace ONE Enterprise Edition Reference Architecture

Additional Resources
For more information, see the following resources:
• VMware Horizon 7 product web page
• VMware Horizon 7 product documentation
• VMware Horizon 7 download
• VMware vSphere 6 documentation
• VMware End-User-Computing blog site, filtered for Horizon 7
• VMware End-User-Computing YouTube Channel: Horizon 7
• How to Migrate Citrix XenApp to VMware Horizon 7
• Horizon Migration Tool Fling

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