XenApp 7.6 Upgrade Guide

What’s New in XenApp 7.6?

The purpose this document is to help execute an upgrade from XenApp 6.5 to XenApp 7.6 by presenting existing XenApp admins with the design considerations, product capabilities, and details of the new XenApp 7.6 infrastructure. It is intended to be used as a planning guide for architects and administrators of XenApp, as well as Citrix partners helping other organizations with these processes.
With the release of XenApp 7.6, Citrix is making it easier and more appealing for existing XenApp 6.5 customers to make the transition to the new FlexCast Management Architecture (FMA). While Citrix XenApp 6.5 continues to be a robust solution that is fully supported for years to come, FMA is the future and Citrix encourages all XenApp administrators, whether on XenApp 6.5 or earlier versions, to become knowledgeable on the FMA architecture and functionality. FMA architecture offers some distinct advantages over IMA such as single, unified architecture for virtual app and desktops, simultaneously manage and deliver virtual apps from multiple operating systems, decouple XenApp version upgrades from operating system upgrades, support for Windows Server 2012 R2, and improved scalability, monitoring, and management.

Customers planning to adopt XenApp 7.6 will need to create a new site, and deploy new infrastructure components, such as Delivery Controllers. StoreFront or Web Interface can be used to aggregate published apps and desktops from existing XenApp 6.x farms as well as the new XenApp 7.x sites.

Additional information and XenApp upgrade guidance can be found on [www.citrix.com/xenapp/upgrade](http://www.citrix.com/xenapp/upgrade).

**What’s new in XenApp 7.6?**

XenApp 7.6 provides a large number of new features to the FMA architecture with key improvements to XenApp, StoreFront, Provisioning Services, and Citrix Director.

For further information about new features, please refer to the Citrix.com ‘What’s New’ page. Key highlights include.

- Connection Leasing
- Anonymous Users
- Session Pre-launch and Linger
- Application Folders
Overview
XenApp 7.6 has a fundamentally different architecture than XenApp 6.5 and earlier. The first step towards a successful roll-out of XenApp 7.6 is to ensure familiarity with the new FlexCast® Management Architecture, including the new capabilities and changes to system requirements. Within this section, the core advantages and differences of this architecture will be discussed in detail.

Benefits of FMA
FMA provides a large number of new features and enhancements over XenApp 6.5. The key improvements are outlined below.

• **Unified Management Infrastructure:** XenApp 7.x on FMA provides admins with a control layer and management experience that unifies the delivery of published applications or desktops (XenApp), as well as flexibility to deliver VDI virtual desktops (XenDesktop®). This means a XenApp environment can be extended to provide users with VDI virtual desktops or remote access to physical PCs by simply applying a new license key and adding new workers (where appropriate).

• **Simplified Upgrades:** The new FMA architecture enables IT organizations to combine Controllers with workers of different Microsoft operating systems and XenApp versions in a single site. XenApp simplifies upgrades significantly, since it enables admins to rollout changes in phases. For example a specific desktop catalog can be upgraded to the latest version of Microsoft Server OS in order to deliver the latest applications, without changing the Controller infrastructure and possibly impacting the whole environment. Please note that the support is limited to +/- one major XenApp version.

• **Hybrid Cloud Provisioning:** XenApp can provision applications and desktops workloads to any private or public cloud based on Citrix CloudPlatform™ (powered by Apache CloudStack®) as well as the Amazon AWS platform. This enables admins to create, manage and upgrade as well as publish resources from virtual XenApp workers hosted in a cloud, by means of simple-to-use wizards in Citrix Studio. This means the management experience is the same for every virtual XenApp worker, regardless where it is hosted.

• **Windows Server 2012 (R2):** XenApp 7.x supports Windows Server 2012 and 2012 R2 in addition to Windows Server 2008 R2. Further information about supported operating systems can be found in eDocs – System requirements for XenApp 7.6 and XenDesktop 7.6.

• **Citrix Director:** Director is a separate monitoring tool that is installed on every controller by default. This console has been specifically created to provide admins and help desk employees with information to monitor the environment, shadow user devices, troubleshoot common IT issues, and monitor historical trends for users and sites. Further information can be found in eDocs – Director.
• **Machine Creation Services (MCS):** In addition to Provisioning Services, Machine Creations Services can provide single image management for virtual XenApp servers. This can simplify XenApp environments and reduce management overhead significantly, since it enables admins to use a single console for resource creation and day-to-day management tasks.

• **HDX SuperCodec / H.264:** XenApp 7.x includes the new HDX™ SuperCodec which automatically determines the optimal HDX compression algorithm for each part of the screen, resulting in higher frame rates, better image quality and best-in-class bandwidth efficiency. The SuperCodec also features H.264 based deep-compression, which enables HDX to deliver high-definition videos over low bandwidth connections with excellent user experience.

• **GPU Sharing for RDS Workloads:** HDX 3D Pro allows graphics-heavy applications running in Windows Server OS sessions to render on the server’s graphics processing unit (GPU). By moving OpenGL, DirectX, Direct3D and Windows Presentation Foundation (WPF) rendering to the server’s GPU, the server’s CPU is not slowed by graphics rendering. Additionally, the server is able to process more graphics because the workload is split between the CPU and GPU. When using HDX 3D Pro, multiple users can share graphics cards. Further information can be found in eDocs–GPU Acceleration for Windows Server OS.

**New Terminology and Concepts**

It is essential to understand the following terms and concepts introduced with XenApp 7.x and continued in the 7.6 release.

• **Sites instead of Farms:** In the FMA architecture, XenApp “farms” are known as “sites.” Unlike in traditional IMA-based XenApp farms, Citrix recommends a site to be contained to a single physical/geographical location or datacenter.

• **Session Machine Catalog:** A machine catalog is a collection of virtual machines (VMs) and physical machines managed as a single entity. A machine (whether virtual or physical) belongs to only one catalog. The same applications or desktops are available on all machines of the catalog. Machine catalogs specify the following:
  – VMs or physical computers available to host applications or published desktops
  – The Active Directory computer accounts assigned to those VMs or computers

• **Delivery Group:** Delivery Groups are designed to deliver applications and published desktops to users. A Delivery Group can contain machines from multiple machine catalogs, and a single machine catalog can contribute machines to multiple Delivery Groups. However, one machine can belong to only one Delivery Group.

**FlexCast Management Architecture (FMA)**

Although not a complete list, the following are a few architectural differences that have a significant impact to the overall upgrade.
• **Delivery Controllers:** A key aspect of the FMA architecture is simplifying management through the clear separation of Controllers and workers (i.e. between machines that are managing the environment and machines that are hosting user sessions). Controllers are systems dedicated to site and user session management. This means:
  - There is no zone master. In XenApp 6.5 and earlier, there is a single zone master or data collector responsible for user connection requests and load management of the farm members. In this release, this function is distributed evenly across all Controllers in the site. Citrix recommends a minimum of two Controllers for redundancy.
  - Remote Desktop Services (RDS) / Terminal Services are no longer needed on Controllers. However, RDS and also RDS CALs are still required on the servers that are hosting and delivering virtual applications and published desktops.
  - Workers with different operating systems can also be managed by the same Controller (i.e. XenApp workers using the Windows 2008 R2 and Windows 2012 R2). This enhances resource delivery by providing multiple delivery platforms within a single site.

• **Virtual Delivery Agents:** The Virtual Delivery Agent (VDA) enables connections to applications and desktops. The VDA is installed on the machine that runs the virtual applications or published desktops for the user. It enables the machines to register with Delivery Controllers and manage the High Definition experience (HDX) connection to a user device.
  - In XenApp 6.5, session hosts ran applications for the user and communicated with data collectors. In XenApp 7.6, the VDA communicates with Controllers that manage the user connections. Abstracting the full XenApp install from every server and utilizing the VDA improves scalability of the workers. Additionally it allows workers with varying operating systems to be added and managed within one XenApp site.
  - The VDA installs on:
    - **Server OS machines:** Physical or virtual machines running a Windows desktop operating system
    - **Desktop OS machines:** Physical or virtual machines running a Windows desktop operating system

• **Site Database:** A XenApp site uses a Microsoft SQL database for both configuration and session information. This means:
  - The database is used as a message bus between the Controllers. Therefore the database configuration needs to follow Microsoft best practices for high availability and redundancy. More information can be found in eDocs — Fault Tolerance or the Citrix Virtual Desktop Handbook – Design/Infrastructure Controllers/Database section.
  - For additional redundancy, connection leasing enables users to connect and reconnect to their most recently used applications and desktops when the site database is not available. When connection leasing is enabled, the Controller caches user connections to the most recently used applications and desktops. Further information, including considerations and limitations, can be found in eDocs – Connection Leasing.
  - Only Controllers, not workers, will connect to the SQL database.
  - The supported databases for XenApp 7.6 can be found in eDocs – System requirements for XenApp 7.6 and XenDesktop 7.6.
• **Active Directory**: All Controllers, workers and users accessing the published resources have to be member of a Microsoft Active Directory infrastructure.

• **Citrix Studio**: Citrix Studio replaces the AppCenter and Delivery Services Console for configuring the environment. Instead of using Worker Groups as a unit for application management and load-balancing needs, in Studio user access to applications is managed through Delivery Groups and load balancing can be applied to Delivery Groups via group policy.

• **Delegated Administration**: In XenApp 6.5 or earlier, custom administrators can be created and permissions can be assigned based on folders and objects. In contrast, in XenApp 7.x permissions for custom administrators are based on role and scope pairs. A role represents a job function and has defined permissions associated with it. A scope represents a collection of objects. Scopes can be used to group objects in a way that is relevant to each organization (for example, the set of Delivery Groups used by the Sales team). This release also offers several built-in administrator roles (other than the full administrator role), such as help desk, applications, hosting, and catalog. Each of these built-in roles includes specific management permissions. Further information can be found in eDocs - [Delegated Administration](#).

• **Citrix Director**: Citrix Director is a web-based technical support and monitoring tool. It is installed by default on each Delivery Controller. Additionally, the monitoring agent is included within the VDA. No additional configurations are required to monitor all of the workers within a XenApp site. From the Director console, administrators and help-desk support staff can monitor the XenApp environment, shadow user sessions, and troubleshoot IT issues for users and sites. These permissions are controlled using delegated administration and can be modified if required. For example, help desk administrators can work only with individual users on specified sites, while full administrators can monitor the entire deployment and resolve system-wide IT issues. More information on Director and how it enables IT support can be found in eDocs - [Director](#).

• **Shadow with Microsoft Remote Assistance**: The shadow feature, launched from the Director console, allows authorized support staff to view and interact with users’ sessions remotely. It leverages Microsoft Remote Assistance, which is installed by default on the VDA. Without Microsoft Remote Assistance installed users session cannot be shadowed remotely.

• **SDKs**: XenApp provides an extensive PowerShell SDK that enables administrators to perform the same tasks as with the Citrix Studio console. In addition advanced configuration option not exposed in Studio (e.g. fine adjustment of virtual desktop power management) can be adjusted using the XenApp SDK. Further information can be found in eDocs – [About the XenApp and XenDesktop SDK](#).
The following diagram outlines the new FlexCast Management Architecture (FMA):

**Upgrade and Rollout Strategies**

Defining a strategy for an upgrade and rollout is a key aspect of every upgrade project. This section outlines the approaches recommended by Citrix.

**Upgrade Strategy: Parallel Upgrade**

During a parallel upgrade a new infrastructure based on the new software version is built in parallel to the existing environment. The advantages of this approach are:

- The production environment cannot be affected.
- Testing is simple and isolated.
- Rolling back to previous configuration in case of issues is possible without affecting users.

Considerations for this approach include:

- Additional server resources are required in order to build the new infrastructure in parallel.
- Thorough planning and design work is required.

**Rollout Strategy: Phased Rollout**

This is the recommended approach and typical strategy for enterprise customers, who usually conduct the upgrade on per department or per location basis. Doing so requires a longer upgrade period, but implies a smaller risk since fewer users are affected. Nevertheless solid rollback planning needs to be performed as well.
**Recommended Upgrade Steps**

For most large scale and enterprise customers Citrix recommends a phased parallel upgrade, in order to minimize the risk during upgrade and to ensure a stable and resilient upgraded environment.

In addition the upgrade can be split into multiple phases. In each phase only one part of the infrastructure will be upgraded / modified. This approach keeps the failure domain small and simplifies troubleshooting. The following diagram outlines the upgrade approach discussed within this document.

This guide assists with the planning for an upgrade from XenApp 6.5 to XenApp 7.6. For more information on migrating from XenApp 7.5 to 7.6 please refer to eDocs – [Upgrade a deployment](mailto:https://www.citrix.com/eDocs/Upgrades/).

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**Step 1: Planning and Design**

It is strongly recommended to perform a detailed planning and design phase before starting to implement the changes. Due to the new architecture and the large number of new features this phase is key to a successful upgrade. Valuable information for designing XenApp infrastructures on FMA can be found in the [Citrix Virtual Desktop Handbook](https://www.citrix.com/eDocs/Upgrades/).

XenApp 7.6 supports Windows Server 2008 R2 and Windows Server 2012 R2. If the planning phase identifies a requirement for application compatibility verification, Citrix AppDNA™ can be utilized for large scale application compatibility testing and can reduce the efforts significantly. AppDNA is now available without additional cost for XenApp Platinum customers. Further information can be found on the Citrix website - [AppDNA](https://www.citrix.com/).
Step 2: Upgrading to StoreFront 2.6

This step of the upgrade focuses on the Web Interface and StoreFront infrastructure.

Task 1: Active Directory User Groups

In order to be able to move users quickly to the new environment and roll them back in case of unforeseen issues, two user groups have to be created in Active Directory. One user group (e.g. "Old_Environment") will contain all users of the current environment. The second user group (e.g. "New Environment") will not contain any users at this point in time.

It is recommended to assign users to the “NewEnvironment” group in phases. These phases are discussed in Task 5 – Rollout. This will allow a small group of users to test the new environment before a larger group is exposed to it.

Task 2: Web Interface

In order to add the new XenApp 7.6 environment to the existing Web Interface site(s) without exposing it to all users, the user roaming feature of Web Interface can be used. This feature enables Web Interface to filter access to XenApp based on user group memberships. To configure this feature, the new XenApp 7.6 environment will need to be added to the available server farms in Web Interface by means of the Web Interface Management Console. Thereafter the WebInterface.conf file needs to be modified as outlined in eDocs – To configure User Roaming.

Hereby the Farm1 (old environment) should be accessible to the user group “Old_Environment” and Farm2 (XenApp 7.6) should be accessible to the group “New_Environment” only. Below a sample configuration is provided:

```
Farm1=<name_of_old_data_collector>Name:<name_of_old_farm>,XMLPort:80,Transport:HTTP,SSLRelayPort:443,BypassDuration:60,LoadBalance:On,TicketTimeToLive:200,RADETicketTimeToLive:200


Farm1Groups=<domain_name>\Old_Environment

Farm2Groups=<domain_name>\New_Environment
```
Please note that it is assumed that the latest version of Web Interface (5.4.2) is used to access the existing XenApp environment. Otherwise Web Interface should be upgraded as part of this task.

In case StoreFront is already used to access the existing XenApp environment, the user mapping feature should be used to aggregate apps from the old and the new XenApp environment. Further information can be found in eDocs – To configure load balancing, failover, disaster recovery, and user mapping for a store.

Task 3: StoreFront
Build and configure a new StoreFront 2.6 infrastructure in parallel to the existing Web Interface based on the design created in Step 1 – Planning and Design. Further information about designing a StoreFront infrastructure can be found in the Design/Access Layer section of CTX139331 – Citrix Virtual Desktop Handbook.

Instructions on how to setup and configure a StoreFront 2.6 server or server group can be found in eDocs – Install and Setup StoreFront. Please note that Citrix strongly recommends implementing at least two StoreFront 2.6 servers for redundancy.

Task 4: Load Balancing
Since StoreFront is the central point of access for all users of a XenApp 7.6 environment, it is strongly recommended to implement StoreFront with high availability. This can be achieved by load balancing multiple StoreFront servers by means of an intelligent load balancing appliance (e.g. Citrix NetScaler®). Such appliances are able to verify the availability of the StoreFront service on a constant basis. Other less sophisticated load balancing mechanisms such as Windows NLB are not able to perform similar checks and might forward user requests to StoreFront Servers which are unable to process new requests.

In order to upgrade the user base to StoreFront, two approaches can be used:

• Dedicated Address: The easiest approach is to setup a new load balancing instance and configure it with a separate address for the new StoreFront Server Group. The advantage of this approach is that the production environment cannot be impacted. The downside is that in order to upgrade users onto the new platform, the Citrix Receiver™ on the endpoint has to be re-configured (e.g. by means of Group Policies) or users have to be trained to connect to a new web address when accessing XenApp based resources.
• **Seamless upgrade by means of Content Switching**: In this approach a new load balancing instance for the StoreFront Server Group is configured in addition to a context switching instance. This context switching instance is able to distribute users across multiple separately load balanced backend resources. To make the transition seamless the context switching instance takes over the IP address and SSL certificate (if applicable) of the Web Interface load balancing instance, rendering this non-directly addressable. The user distribution can be controlled by means of NetScaler policies, which enables a gradual upgrade of the users, based on properties such as their IP address, IP subnet or HTTP header. In scenarios where user authentication is performed on the NetScaler (e.g. remote access with NetScaler Gateway™) properties such as username or user group memberships can be used in addition. This means filtering logics such as the following can be configured:

- A set of pilot users could be determined and their IP addresses added to the context switching policy. The context switching instance would then determine the client IP of every incoming request and forward the specified users to StoreFront, while all other users are forwarded to Web Interface.
- A policy based on the HTTP header (e.g. `REQ.HTTP.HEADER User-Agent CONTAINS CitrixReceiver`) could be created to only upgrade mobile devices to StoreFront.

The following diagram outlines an architecture in which a load balanced StoreFront Server Group and a context switching instance were added to an existing Web Interface infrastructure:
Task 5: Rollout
It is critical to perform multi-phase testing before moving all users to the new StoreFront 2.6 environment. The recommended approach is as follows:

1. **Technical Acceptance Testing (TAT):** Subject matter experts, members of the Citrix team, and application managers test the functionality of the environment and the applications.
2. **User Acceptance Testing (UAT):** A selected group of end users will use the new environment for day-to-day work.
3. **Production:** Remaining users are switched to new environment gradually.

Step 3: Upgrading to XenApp 7.6
This step of the upgrade focuses on the Delivery Controller and worker infrastructure.

Task 1: License Server
The first component which should be upgraded is the Citrix License Server, to ensure XenApp 7.6 is able to check-out licenses. In contrast to the general recommendation to perform a parallel upgrade, it is recommended to in-place upgrade the license server for simplicity reasons. Since the default license grace period for Citrix products is 30 days, the risk of negatively impacting the production environment is low. In order to minimize the risk even further, the upgrade should be performed out of common office hours and the license server should be backed-up before starting the procedure.

To upgrade the license server, start the XenApp 7.6 installation, navigate through the setup wizard screens to Citrix Licensing and follow the instructions.

Further information can be found in eDocs – Upgrade.

Task 2: Controllers
Build a new XenApp 7.6 Controller infrastructure in parallel to the existing environment according to the design created earlier. Furthermore configure the XenApp 7.6 site as defined within the design.

Instructions on how to configure a XenApp 7.6 site and information on XenApp 7.6 system requirements can be found in eDocs – System Requirements for XenApp 7.6 and XenDesktop 7.6 and eDocs – New deployments. Citrix strongly recommends implementing at least two XenApp 7.6 Controllers for redundancy.

Task 3: Workers
After the controllers have been installed and the site has been configured, the new XenApp 7.6 workers can be implemented or existing XenApp 6.5 workers can be upgraded using the XenApp In-Place Upgrade Utility.
The **XenApp In-place Upgrade Utility** is a set of tasks in the XenApp VDA installer that removes the XenApp 6.5 servers configured in session-host only mode from the farm, removes the XenApp 6.5 software, and then installs a new Virtual Delivery Agent (VDA) for Windows Server OS. Further information can be found in eDocs – [Upgrade a XenApp 6.5 worker to a new VDA for Windows Server OS](https://docs.citrix.com/en-us/xenapp/6.5/release_notes.html). Before updating an existing XenApp 6.5 worker, back up the image and ensure all users are logged off.

It is possible to continue using the Windows 2008 R2 platform for the XenApp 7.6 workers. The advantage of remaining on Windows 2008 R2 is that the existing server and application installation and configuration procedures can be used and only very limited application compatibility testing needs to be performed. This can simplify and therefore accelerate the upgrade project.

When using this approach it is important to consider important milestones for Windows Server 2008 R2 including the end of mainstream support (2015) and the end of extended support (2020), commonly known as end of life, more information and exact dates can be found on the [Microsoft website](https://docs.microsoft.com/en-us/windows-server/system-center/system-update-cycle).

**Task 4: Application settings, Group Policy, and Application Folders**

The **XenApp Upgrade Utility** is used to capture the infrastructure configuration of the XenApp 6.5 farm and help efficiently transition from a XenApp 6.5 farm to a XenApp 7.6 site. The **XenApp Upgrade Utility** is a collection of PowerShell scripts and other files that export policy and application settings from a XenApp 6.5 controller and store them in XML files for import into the new XenApp site. Further information can be found in eDocs – [Migrate XenApp 6.5](https://docs.citrix.com/en-us/xenapp/6.5/release_notes.html).

After exporting XenApp 6.5 settings using the **XenApp Upgrade Utility** a preview import for the XenApp 7.6 Site can be created. The preview can identify any issues which can be addressed by making changes to the XML files before running the actual import. For example, a preview might detect that an application with the same name already exists in the new XenApp site. Log files generated from the preview can be used as a step-by-step guide to perform the import. Carefully review all policy settings that are imported and not imported to ensure there is a proper configuration.

**Task 5: Rollout**

It is critical to perform multi-phase testing before moving all users to the new XenApp 7.6 environment. The recommended approach is as follows:

1. **Technical Acceptance Testing (TAT):** Subject matter experts, members of the Citrix team, and application managers test the functionality of the environment and the applications.
2. **User Acceptance Testing (UAT):** A selected group of end users will use the new environment for day-to-day work.
3. **Production:** Remaining users are switched to new environment gradually.
Step 4: Upgrading Receiver

The final step of the XenApp 7.6 upgrade focuses on upgrading Citrix Receiver. This can be achieved by means of a large variety of tools and procedures.

1. Most enterprise customers leverage Enterprise Software Deployment (ESD) tools for endpoint management. These tools should also be used for managing and/or upgrading Citrix Receiver. Further information about installing and configuring Receiver from the command line, can be found in eDocs – [Configure and install Receiver for Windows using command-line parameters](#).
2. In case an ESD tool is not available for upgrading Citrix Receiver, Active Directory Group Policy Objects (GPOs) can be used to rollout Receiver to the endpoints or computer startup scripts can be used instead. The XenApp installation media contains sample scripts in the “Citrix Receiver and Plug-ins\Windows\Receiver\Startup_Logon_Scripts” folder. An efficient option to assign scripts to a large number of computers is to use GPOs. Additional information can be found in eDocs – [Deliver Receiver using Active Directory and sample startup scripts](#).
3. Alternatively StoreFront Receiver for Web can be used to deploy the latest version of Receiver. By default, when a user accesses a Receiver for Web site from a computer running Windows or Mac OS X, the site attempts to determine whether Citrix Receiver is installed on the user’s device. If Citrix Receiver cannot be detected, the user is prompted to download and install the appropriate Citrix Receiver for their platform from the Citrix website. Further information about this feature and its configuration can be found online in eDocs – [Deploy Receiver from Receiver for Web and eDocs – To make Citrix Receiver installation files available on the server](#).
4. In case Receiver for Web cannot be used and none of the aforementioned techniques is available (e.g. BYO), users can be pointed to [http://receiver.citrix.com](http://receiver.citrix.com) to manually download and install the latest version of Citrix Receiver. It is recommended to configure Email-based account discovery in this scenario. This feature enable users who install Citrix Receiver on a device for the first time to set up their accounts by entering their email addresses rather than server names or IPs. Additional information can be found in eDocs – [Configure email-based account discovery](#).

Similar to all steps made earlier, it is critical to perform multi-phase testing before moving all users to the new Receiver version. The recommended approach is as follows:

1. **Technical Acceptance Testing (TAT)**: Subject matter experts, members of the Citrix team, and application managers test the functionality of the environment and the applications.
2. **User Acceptance Testing (UAT)**: A selected group of end users will use the new environment for day-to-day work.
3. **Production**: Remaining users are switched to new environment gradually.
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