XenApp 7.6 migration guide
With the XenDesktop 7 release server hosted applications and desktops (XenApp) are unified with virtual desktops (XenDesktop) within a single architecture and management experience. The capabilities previously available within XenApp are now delivered within the FlexCast Management Architecture (FMA) shared with the infrastructure and components of XenDesktop.

Unlike XenApp 6.5 and earlier that were build on the Independent Management Architecture (IMA), XenApp 7.6 is built on the more scalable and cloud-enabled FMA architecture. Because of this architectural change, a simple upgrade from XenApp 6.x to XenApp 7.6 is not possible mainly because of the new schema of the configuration database. Customers planning to adopt to XenApp 7.6 will need to create a new XenApp 7.6 (or XenDesktop 7.6) site, and deploy a new Delivery Controller. StoreFront and Web Interface can be used to aggregate published apps and desktops from existing XenApp farms as well as the new XenApp 7.6 sites.

While Citrix is actively working on a migration tool to help ease the migration process, this document discusses design considerations, product capabilities, and details of the new XenApp infrastructure for XenApp 6.5 planning to adopt XenApp 7.6. It is intended to be used as a planning guide for architects and administrators of XenApp & XenDesktop, as well as Citrix partners helping other organizations with these processes.

Please note that for simplicity reasons XenDesktop / XenApp 7.6 will be referred to as XenApp 7.6 within this document.

**Overview**

As mentioned above, XenApp 7.6 has a fundamentally different architecture than the commonly deployed IMA-based version of XenApp. 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 differences and advantages of this architecture will be discussed in detail.

**New terminology and concepts**

It is imperative to understand the following terms and concepts in order ensure a successful XenApp 7.6 roll-out.

**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 data center.
Machine catalog. A machine catalog is a collection of virtual machines (VMs) and physical machines managed as a single entity. Machine catalogs specify the following:

- VMs or physical computers available to host applications or desktops
- The Active Directory computer accounts assigned to those VMs or computers
- In some cases, the master image that is copied to create the VMs

Delivery group. A Delivery Group is a collection of servers that specify who can use a set of applications. A single Delivery Group can contain applications from a number of machine catalogs. Also, a single Delivery Group can be published to users so that a single user can access multiple applications in the group.

FlexCast Management Architecture (FMA)

Although not a complete list, the following are a few critical architectural differences that have a significant impact to the overall XenApp 7.6 migration:

Delivery controllers. A key aspect of the new FMA architecture is a clear separation of Controllers and Workers. Controllers are systems dedicated to site and user session management and cannot provide any resources to users (e.g. published applications). This means:

- There is no dedicated zone master. In XenApp, 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 Delivery Controllers. However, RDS and also RDS CALs are still required on the servers that are hosting and delivering applications and desktops.

No IMA data store. This release does not use the IMA data store as the central database in which to store configuration information. Instead, it uses a Microsoft SQL Server database as the data store for both configuration and session information. This means:

- The database is used as message bus between the Delivery Controllers. Therefore the database configuration needs to follow Microsoft best practices for high availability and redundancy. In the event the Controller to Controller communication is interrupted due to a database outage, users will not be able to connect to resources published in the affected site (existing users sessions are not affected). For high-availability of the database Mirroring, Clustering and Always-On are supported. More information can be found in eDocs - Ensure database fault tolerance.
- Only Delivery Controllers but not Workers will connect to the database.
- Database requirements are different. Microsoft Access and Oracle are no longer supported databases.
**Active directory.** All XenApp 7.6 controllers, workers and users accessing the published resources have to be member of a Microsoft Active Directory infrastructure.

**Citrix Studio.** In XenApp 7.6, Citrix Studio replaces the AppCenter / Delivery Services Console for configuring the environments and provide users with access to applications and desktops. For example, instead of using folders and worker groups to organize applications, servers, and other resources, in Studio those resources can be organized using a combination of machine catalogs, tags, delivery groups, and delegated administrators.

**Delegated administration.** In XenApp, custom administrators can be created and permissions can be assigned based on folders and objects. In contrast in XenApp 7.6, 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 designed and build for XenApp and XenDesktop infrastructures, which is installed by default on each Delivery Controller. From the Director console, administrators and help-desk support staff (depending on their delegated administration permissions) can monitor the XenApp environment, shadow user sessions, and troubleshoot IT issues for users and sites. 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 - Monitor environments with Director.

**Shadow with Microsoft Remote Assistance.** For an administrator to view and interact with other users’ sessions remotely, the shadow feature launched from Director console can be used, which uses Microsoft Remote Assistance to connect to user machines. Remote Assistance is installed by default on the VDA, unless disabled during installation. Without remote assistance installed users session cannot be shadowed remotely.

**SDKs:** XenApp 7.6 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 performed by means of the PoSH SDK. Further information can be found in eDocs – About the XenDesktop SDK.
The following diagram outlines the new FlexCast Management Architecture (FMA):

![Diagram of the new FlexCast Management Architecture](image)

**What's new in XenApp 7.6**

XenApp 7.6 provides a large number of new features and enhancements over XenApp 6.5. The key improvements are outlined below:

- **Unified management infrastructure.** XenApp 7.6 on the FlexCast Management Architecture provides admins with a controller layer and management experience that unifies the delivery of server hosted applications or desktops (XenApp), as well as flexibility to deliver VDI virtual desktops (XenDesktop). This means a XenApp 7.6 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 and/or workers with different Microsoft OS and XenApp versions installed in a single site. XenApp on 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 +/- one major XenApp version.

- **Hybrid cloud provisioning.** XenApp 7.6 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 7.6 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 – Platform Support.

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 ITw issues and monitor historical trends for users and sites. The level of information provided in Director exceeds AppCenter / Delivery Services Console by far. Further information can be found in eDocs – Monitor environments with Director.

Machine Creation Services (MCS). Machine Creations Services provide single image management for virtual XenApp servers and virtual desktops. This can simplify XenApp environments and reduce management overhead significantly, since it enables admins to use a single console for desktop creation and day-to-day management tasks.

HDX SuperCodec / H.264. XenApp 7.6 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.

For further information about new features, please refer to the Citrix Website.

General guidance
The following diagram outlines the general migration and deployment guidance for customers in regards to XenApp 7.6:

- **XenApp 4.5 and 5 workloads**
  - MOVE
  - Migrate apps to Windows Server 2012/2012R2 and XenApp 7.5
  - Leverage new AppDNA entitlement if Platinum
  - Immediate value from:
    - Simplified infrastructure
    - HDX optimizations / HDX Mobile
    - Scale / Performance
    - Streamlined operations

- **XenApp 6.5 workloads**
  - PLAN
  - No immediate need to move as tools are coming to automate workload and policy migration
  - New! Leverage existing Web Interface
  - Following features planned for delivery later in 2014:
    - Anonymous login
    - Simple HA for small deployments
    - Session prelaunch / linger
    - App folders (for large app collections)

- **Any New Customers or Deployments**
  - ACT
  - Deliver new Windows Server 2008R2-2012R2 apps through XenApp 7.5
  - Deploy new StoreFront for seamless access or leverage existing Web Interface and Migrate to StoreFront over time
  - Simple to setup and run
  - Easy to leverage public clouds
  - Built-in provisioning and image mgmt.
  - Full power of HDX innovations
Migration tools
Citrix is actively working on a migration tool to help XenApp 6.5 customers migrate to the XenApp-FMA architecture. These tools are anticipated to export specific configuration items such as applications and Citrix policies and import them into the new XenApp FMA environment. Furthermore, the tools can be used to migrate XenApp workers to the new environment without reinstalling operating system or applications.

To monitor the progress on the migration tools development and release, please follow the Citrix blogs, where information will be posted in the coming months.

Migration and rollout strategies
Defining a strategy for migration and rollout is a key aspect of every migration project. This section will outline common approaches and provide general guidance.

Migration strategies
There are two common migration strategies:

**In-place migration.** During an in-place migration an environment will be migrated by upgrading the infrastructure components and re-integrating them into the existing environment without building a new infrastructure in parallel. The advantages of this approach are:

- Minimal planning and design work is required only.
- No or minimal additional server resources are required.
- Considerations for this approach include:
  - In-place migrated environments have a higher tendency for issues and troubleshooting is typically more complex.
  - Testing an upgrade of an infrastructure component is difficult and the production environment may be affected.
  - Rolling back to previous configuration / version in case of issues is difficult.
  - Not all software does support in-place upgrades.

**Parallel migration.** During a parallel migration a new infrastructure based on the new software version is build 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 / version in case of issues is difficult.
- Considerations for this approach include:
  - Additional server resources are required in order to build the new infrastructure in parallel.
  - Detailed planning and design work is required.
Rollout strategies

Two rollout strategies are commonly used:

- **Big-bang.** In a big-bang rollout all users are migrated to the new environment at once. This approach ensures a fast migration but incurs a high risk. Solid rollback planning is key for this approach.

- **Phased rollout.** This is the typical approach of enterprise customers, who usually conduct the migration on a per department or per location basis. Doing so requires a longer migration period, but implies a smaller risk since fewer users are affected. Nevertheless solid rollback planning needs to be performed as well.

Recommended migration approach

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

In addition the migration 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 migration approach discussed within this document.

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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 migration. Valuable information for designing XenDesktop and XenApp infrastructures can be found at the [Citrix Virtual Desktop Handbook](https://www.citrix.com).

For customers migrating from XenApp 5.0 or older versions it is important to understand that XenApp 7.6 does not support operating systems older than Windows Server 2008 R2. This means the operating system has to be upgraded, which includes a transition from 32 bit to 64 bit, since all operating systems from Windows 2008 R2 on are 64 bit only. Therefore an application compatibility verification project becomes a mandatory part of the migration project. Citrix AppDNA has been build for large scale application compatibility testing and can reduce the efforts significantly. Citrix AppDNA is now available without additional cost for XenApp / XenDesktop Platinum customers. Further information can be found on the Citrix website - [AppDNA](https://www.citrix.com).
Step 2 – Upgrading to XenApp 7.6

This step of the migration focuses on the XenApp 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 migration, 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, please 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 – Citrix Licensing 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 and eDocs – Build a new environment. Please note that Citrix strongly recommends implementing at least two XenApp 7.6 controllers for redundancy reasons.

Task 3 – Workers

After the controllers have been installed and the site has been configured, the XenApp workers can be implemented. Hereby it is possible to continue using the Windows 2008 R2 platform for the new 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 migration project.

When using this approach it is important to consider the end of the mainstream support for Windows Server 2008 R2 on January 3, 2015. More information about the lifecycle dates for Windows Server 2008 R2 can be found at the Microsoft website.

Task 4 – 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.

Task 5 – 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/XenDesktop farms or sites based on user group memberships. To configure this feature the new XenApp 7.6 environment needs 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
...
```

This configuration will enable Web Interface to route all members of the “Old_Environment” group to the old XenApp farm. No resources published in the XenApp 7.6 site will be exposed to these users.

In turn members of the New_Environment user group will be able to access resources in the XenApp 7.6 environment only. Users who are members of both user groups will be able to access both environments.

Further information about the user roaming feature can be found in the Citrix Blog – Migrations Smooth and Easy.

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
and Blog - Building modular XenDesktop infrastructures by means of StoreFront
Multi-Site Configurations.

Task 6 – 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:

• Test. Members of the IT team and application managers test the
  functionality of the environment and the applications.

• Pilot. A selected group of users will use the new environment for day-to-
  day work.

• Production. Remaining users are switched to new environment gradually.

Step 3 – Upgrading to StoreFront 2.5

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

Task 1 – StoreFront

Due to the new architecture of StoreFront (when compared to Web Interface),
the large number of new features and the different user experience, it is
strongly recommended to perform a detailed planning and design phase
before starting to implement the changes (in case StoreFront was not already
covered during step 1). Further information about designing a StoreFront
infrastructure can be found in CTX139331 - Citrix Virtual Desktop Handbook
and CTX136547 - StoreFront Planning Guide.

After completing the design, build and configure a new StoreFront 2.5
infrastructure in parallel to the existing Web Interface environment according to
the design created earlier.

Instructions on how to setup and configure a StoreFront 2.5 server or server
group can be found in eDocs – Install and Setup StoreFront. Please note that
Citrix strongly recommends implementing at least two StoreFront 2.5 servers
for redundancy reasons.

Task 2 – 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 migrate 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 migrate 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 migration 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 migration 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 Citrix Receiver) could be created to only migrate 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 3 – Rollout**

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

- **Test.** Members of the IT team test the functionality of the environment.

- **Pilot.** A selected group of users will use the new environment to connect to XenApp on a daily basis.

- **Production.** Remaining users are switched to new environment gradually.

**Step 4 – Upgrading receiver**

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

- **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](#).

- **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](#).

- **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.

- **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:

- **Test.** Members of the IT team test the functionality of the environment when accessed by means of the new Receiver version.

- **Pilot.** A selected group of users will use the new Receiver to connect to XenApp on a daily basis.

- **Production.** The new Receiver is rolled out to the remaining users gradually.