



# Migrating Users from Physical Workstations to XenDesktop

Citrix Consulting recommendations and best practices for migrating users from a physical desktop to a virtual desktop hosted by Citrix XenDesktop.

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# Overview

Virtual desktops can dramatically reduce the maintenance and security concerns associated with maintaining a physical workstation for each employee. The key to making a successful move from physical to virtual desktops lies in gaining employee support by providing the smoothest possible transition.

This document provides recommendations and best practices for moving a user's data from their physical corporate workstations into the virtual Citrix XenDesktop environment. The following assumptions are made with regard to the environment:

- A proof-of-concept or pilot environment has already completed successfully. If a XenDesktop proof-of-concept has not yet been completed, Citrix strongly recommends first setting up such an environment and an easy-to-follow Getting Started Guide for XenDesktop can be found in the [Appendix](#).
- The user process flows and the application delivery methods have been analyzed and optimized for the environment. If this has not yet been completed, check out the XenDesktop Design Handbook referenced in the [Appendix](#).
- The XenDesktop infrastructure has been designed to support the expected production load. If this has not yet been completed, check out the XenDesktop Design Handbook referenced in the [Appendix](#).
- The decision has been made to move forward with pooled desktops using shared Provisioning Services vDisk images.

For maximum benefit, the reader should have a basic technical understanding of the environment from where the users will be migrated. After reading this document, the reader will have a better understanding of and the answers to the following key user data migration questions:

- What user data is important to move to the virtual desktop environment?
- Where is the user data located today?
- What options are available for migrating user data?
- How will users access their new XenDesktop?

## Understanding User Data

User data is a broad term used to describe all the information that a user has added to a physical computer since receiving it. To have a successful transition from a physical to a virtual environment the user's data must also move with desktop. When moving user data into the XenDesktop environment, consider the three different components of that data:

- Operating system settings – desktop personalization (wallpaper, colors, etc.), printers, etc.
- Application settings – application settings such as view options, toolbars, favorite links, etc.
- Application data – documents generated by the applications such as spreadsheets.

The most successful migrations will move all of the information seamlessly between the environments. Before discussing the guidance around moving the data, a brief introduction to the data and where it is stored is warranted.

## Operating System Settings

For Microsoft Windows products, the user-specific settings are kept in a user profile. The user profile is a static folder structure that includes the registry data and files necessary to preserve a user's environment. Settings such as the desktop wallpaper, network locations, printers, and Internet Explorer bookmarks are kept in the profile.

Multiple profiles can exist for a user in the enterprise environment. For the purpose of this document, three of profile types will be discussed: Local, Roaming, and Terminal Server.

### *Local*

Local profiles are profiles stored on the workstation or terminal server that processes the user's logon. The first time a user logs onto a device, a profile is automatically created for the user from the default user profile. The information in the local user profile is not shared between devices. No special configuration is necessary to setup local profiles.

### *Roaming*

Roaming profiles contain the same information as local profiles but the information is stored in a network location. At logon time, the user's profile is downloaded from the network and merged with the user's local profile. At logoff, all changes are saved back up to the network location. Roaming profiles are configured by setting the network location for the user's profile in the Active Directory object of the user.

### *Terminal Server*

Terminal server profiles contain similar information to the local profile. However, since the application settings could be stored in a different location in the registry for terminal services applications the profiles are generally kept separate from the roaming profile per Microsoft's recommendation.

## Application Settings

Application settings represent the configuration information stored by the application for each user. Generally, this information is kept in the registry and merged in during the profile load. Some applications store user-specific information in configuration files. These files are normally found in the Application Data folder of the user's profile. These items might include the Microsoft Outlook mailbox and folder location, custom dictionaries, or toolbar preferences.

Occasionally, the user-specific data is stored erroneously in the Local Machine portion of the registry or in configuration files that are kept outside of Application Data. Part of the preparation for a migration should include a thorough application assessment that identifies where the configuration information is stored.

## Application Data

Application data is the generic term applied to the user's data files that are generated by the applications. These files include items such as word processing documents, spreadsheets, presentations, and pictures. This data could be contained within the user profile itself (My Documents) or stored elsewhere on a local disk or remote network drive. Information stored on the local drive will need to be migrated. Information stored on remote or network drives will not.

Folder redirection provides a way to move the user's documents out of the profile that downloads at logon time, but maintain the association with other user data. In Windows XP five folders could be redirected via Group Policy: My Documents, My Pictures, Application Data, Desktop, and Start Menu. Any folders redirected to a network location will not need to be moved as long as that location is still accessible from the XenDesktop.

## Vista Profile Changes

The user profile has changed significantly between Windows XP (Windows 2003) and Windows Vista (Server 2008), primarily to facilitate roaming profiles. The changes create a more defined separation between the application settings and the application data. Microsoft has added a “v2” to the end of the Windows Vista roaming profile to distinguish it from profiles created in previous versions of Windows.

The most prominent change is the organizational structure of the profile itself. New folders were added to support data that was user and machine specific versus just user specific. In addition, Windows Vista allows the redirection of 10 profile folders instead of the 5 found in Windows XP.

The change with the most impact on migration is that Windows Vista will not load profiles from previous operating systems. Conversely, the previous versions will not be able to load the new profiles. This creates a challenge when migrating from physical computers running Windows XP or Windows 2000 to a XenDesktop running Windows Vista.

For more information on the changes in the V2 profiles, see the Microsoft document *Managing Roaming User Data Deployment Guide* referenced in the [Appendix](#).

# Guidance on Migrating User Data

Most corporations currently have some type of profile management strategy already in place. If there is no user profile management system currently in place, then the first consideration is to determine which type of profile management system will best meet the needs of the enterprise.

Any profile management solution selected must allow a user to move between computers easily by storing the user’s personalized settings independent of the physical computer and keeping it available on the network. This behavior is desired with XenDesktop pooled desktops because the user will be routed to the next available desktop and their profile may not exist yet on that desktop.

Choices for profiles management range from something simple like Microsoft roaming profiles to something more advanced such as a third party solution provided by a certified Citrix Ready partner. In most cases the functionality available with Microsoft’s roaming profiles is sufficient to meet the XenDesktop requirements. XenDesktop Standard, Advanced, and Platinum Editions include Profile Management<sup>1</sup>, an improved roaming profile management solution. Other solutions are available from Citrix Ready partners and a link to them has been provided in the [Appendix](#). Using any profile management solution provides additional benefits such as the improving logon speeds, managing profile sizes, and eliminating profile corruption.

Once the most suitable profile management solution has been identified, the user data migration strategies that most benefit the user and the IT administration can be implemented. Remember that any profile management solution implemented in the environment should be thoroughly tested and configured prior to attempting any user migration scenarios. Special considerations for the different types of user data are discussed below.

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<sup>1</sup> To avoid any confusion when distinguishing between the Profile Management feature that is provided with Citrix XenDesktop and profile management in general, when referring to the Profile Management feature, the words will be capitalized. When referring to any profile management solution the term “profile management” will be in all lower case.

## Operating System Settings

Operating system settings are managed completely via the user profile. In most cases, implementing roaming profiles or a third-party profile solution will migrate the operating system settings seamlessly. Roaming profiles automatically migrate local user profiles to the network once enabled. Migration will be more complex when moving from Windows XP to Vista on XenDesktop because the profiles are not interchangeable.

Since Windows Vista cannot load or use the profiles from prior operating systems, some type of profile migration must occur. Microsoft has provided the User State Migration Tool which can capture user personalization settings, application settings, and even the user data files. This file can later be imported back into the user's Vista profile. This tool can be run by the user or by the administrator. More information on the User State Migration Tool is available by clicking on the link provided in the [Appendix](#).

Consider implementing a profile management solution beyond roaming profiles if any of the following are true in the environment:

- Users are migrating from physical workstations with Windows XP or Windows 2000 to XenDesktop running Windows Vista
- Users are accessing XenApp applications with the same user profile for virtual desktops and applications
- User profile size is slowing logon time considerably
- Users have multiple profiles that need to be migrated into a single profile

## Application Settings

Application settings in most cases are contained completely within the user profile, either in the registry hive or the Application Data folder for the user. In the situations where this is the case, then roaming profiles are sufficient to migrate the user information. To determine if the application settings are contained within the user profile, a complete application and profile assessment will need to be completed to analyze where all the application settings are stored. For more information on the steps for this assessment, see the XenDesktop Design Handbook referenced in the [Appendix](#).

Consider implementing a profile management solution beyond roaming profiles if any of the following are true in the environment:

- Users run the same application both locally and published from a XenApp server
- Applications store user configuration data outside the Application Data folder
- User configuration files are heavily accessed or are extremely large in size
- Users are likely to run the same application from multiple locations simultaneously

## Application Data

In a XenDesktop pooled environment, the desktop images are read-only when delivered by Citrix Provisioning Services and reset upon each reboot of the virtual workstation. In addition, when users connect to the pool, they will be routed to the next available desktop in the pool and not necessarily be placed back on their previous desktop. Therefore application data files should never reside locally on the XenDesktop.

Three options are available for storing documents off the desktop: Network drives, Home drives, and Redirected folders. Each of these options is briefly introduced below.

### *Network Drives*

Network drives are remote drives that store the data for the users. The users will need to know how to locate these drives and be trained to store data there instead of locally. Most organizations map these drives automatically for the user by means of a logon script.

### *Home Drives*

Home drives are a special instance of network drives. The user's home drive can be managed through settings on the Active Directory user account. The users will need to be trained to store items on their home drive instead of locally on the desktop. When managed via Active Directory, the drive is mapped automatically for the user.

### *Redirected Folders*

Redirected folders are a way to seamlessly map local folders to remote storage locations. As discussed earlier, Windows XP allows the redirection of common folders such as My Documents or the Desktop to a network location. Redirected folders are managed via Active Directory group policy. Less training is required for users if they already save the data in one of the redirected locations.

Any user data currently not stored on a remote location will need to be moved prior to the migration so user data is not lost. Consider implementing a profile management solution beyond roaming profiles if any of the following are true in the environment:

- User data exists outside of the standard re-directed folders (My Documents, Desktop, etc.)
- Applications default to storage locations on the local disk that are not redirected

## Migration Strategies

During a migration from physical workstation to virtual desktops, the user's number one priority is to keep these settings intact, avoid costly downtime and receive an almost seamless transition to a virtual desktop for the user. The user's priority may not take precedence in all environments, but understanding the impact of migration strategies upon the user can help minimize the disruption.

When determining the overall user data migration strategy, three options exist for handling the old and new profiles: Keep Existing Profiles, Create New Profiles, or Receive a Simplified Profile.

### *Keep Existing Profiles*

With this option, the existing user profile is maintained within the virtual desktop environment. This choice is generally simple to implement and it keeps all the user information in place. With this configuration, the profiles may be unnecessarily larger in size resulting in slower logins and strange application behavior since the profiles may include information not necessary for the new environment.

### *Create New Profiles*

With this option, the existing user profile data is not migrated to the virtual desktop. This choice is generally quick to implement and provides the fastest login experience for the user. When setting up new profiles, a central storage location is required and the users will need the profile location set. With this configuration the user will need to spend time reconfiguring all their application and profile settings, resulting in a loss of productivity. When migrating from Windows XP to Windows Vista this is the only option.

### *Receive a Simplified Profile*

With this option, the user settings required in the environment are copied to a new user profile and unnecessary data is not migrated. This choice results in a lighter and faster-loading profile for the user.

With this configuration the administration team will have the burden of creating scripts to move the appropriate data between the old and new profiles. Leveraging a profile management solution may be extremely beneficial in this scenario.

The best option to choose depends primarily on the migration scenario being supported. The top migration scenarios are discussed in the next section.

## Key Migration Scenarios

Although a myriad of possible migration scenarios exist, the vast majority of migrations start with the user running Windows XP on the local workstation and then fall into one of three scenarios. The first, and most common, is that users with roaming profiles are migrating to XenDesktop running Windows XP. The second is users with local profiles are migrating to XenDesktop running Windows XP. The final scenario is that users are migrating to XenDesktop running Windows Vista. In the case of the Windows XP to Vista migration, the migration guidance would be identical regardless of whether the profile is local or roaming.

In order to provide useful guidance around how to handle profiles in each of the key migration scenarios, the following assumptions about the environment have been made.

- Users will be moving to pooled desktops that utilize a shared disk image.
- Any XenApp hosted or streamed applications will continue to be delivered the same way on the virtual desktop as previously delivered to the physical workstation.
- XenApp profiles will be kept separate from the profiles used by the user on the desktop.

### Migrating to Windows XP with Roaming Profiles

This migration is by far the most common and the easiest of the three scenarios to implement. Enterprises that already have some type of profile management solution in place are in the best position to move to a virtual desktop. When profile management is already implemented, the user's operating system settings and application settings are roaming with them between their workstations and the users have been trained to store their data in remote locations.

Implementing XenDesktop in this scenario is as simple as configuring the virtual workstations to use the same group policies for folder redirection and roaming profile settings as currently used in production. The user experience will be the same as moving between physical workstations.

When migrating from Windows XP with existing roaming profiles enabled, consider these points as well:

- If the user profiles are misbehaving, such as getting bloated or causing strange application behavior, then the recommendation is to use this opportunity to streamline the profiles and move to a simplified profile approach by moving only the required information to the user's XenDesktop profile.
- If users have been storing files locally on desktops, then use this opportunity to either have the users manually move the files or to automatically move them using the profile management solution or an automated script.

### Migrating to Windows XP with Local Profiles

When users have local-only profiles a profile solution will be required to store their profile information on the network before accessing it from the virtual desktops. The profile management system should be put in place as soon as possible so that the user data becomes managed and not lost. The profile management solution chosen will depend on what data needs to be moved off of the local workstations.

Implementing Microsoft roaming profiles is generally the quickest way to move the user's operating system settings to the network. In most instances this can be completed by simply adding a roaming profile path to the user object in Active Directory. The system will automatically copy the local profile to the roaming path location.

In most cases, redirecting the Application Data folder for the user will move the application settings. However, not all applications leverage that location for storing user-specific settings and further research around where the application stores its data may be required. In situations where the source or destination of user data is unknown, monitoring utilities such as filemon (for monitoring file access) and regmon (for monitoring registry access) from Microsoft (<http://technet.microsoft.com/en-us/sysinternals/default.aspx>) will be invaluable. Once identified, the information will need to either be moved into a redirected folder location, external folders or files will need to be synchronized via the profile management solution.

Centralize the user's local data if it is not already stored on the network. The easiest method for moving this data is to create a central storage location for user's folders and then configure folder redirection using group policy. Microsoft handles the folder synchronization by default for all folders configured for redirection the next time the user logs into the network. If users have been storing documents outside of the standard redirected folders (primarily My Documents and Desktop), then they will need to be asked to place their data on a network share, home drive, or in one of the redirected folders.

Any data files that reside in a redirected folder will be available as long as the folder is redirected in the XenDesktop environment to the same location. Any data stored outside of any normal redirected folders will need to then be saved off. If data exists outside of the redirected folders, the profile management solution chosen for XenDesktop will need to be able to synchronize this folder as part of the profile management.

When migrating from Windows XP with local-only profiles enabled, consider these items as well:

- The central storage location for the user data and profiles should be located on storage that is configured for high-availability and supports a high network throughput, such as a SAN or NAS. If the user profile storage location is not available, users will receive the default user profile, which is not optimized for them.
- If users have data that is outside of the redirected folders, then consider leveraging either the Profile Manager feature of XenDesktop or a Citrix Ready partner solution to synchronize external profile folders for the user.
- If the local user profiles are misbehaving, then consider creating a new roaming profile and selectively move the application settings for the user.
- If users have multiple profiles, then the recommendation is to leverage either the Profile Manager feature in XenDesktop or a Citrix Ready partner solution to merge the profiles into a single user profile rather than using Microsoft roaming profiles to do the migration. Microsoft roaming profiles will only migrate the full profile as one entity instead of merging the individual profiles together.
- If users are responsible for moving their own data, then a wise course of action would be to provide access to both the physical and virtual desktops during a transition period so users can go back and get data they may have forgot to move.
- Folder Redirection can introduce significant app performance issues. Some apps just do not like their data being accessed over the network (latency etc).

## Migrating to Windows Vista

The migration of Windows XP to Windows Vista is considerably more complex than moving between the same operating systems. The majority of the complexity is related to the new organization of the user profiles in Vista. Because the two profile versions are not interchangeable, when users are moving from a Windows XP (v1) profile a new Windows Vista (v2) will need to be created. Unfortunately, in most cases this means the user will have to setup their operating system and application settings again on the Vista platform. The User State Migration Toolkit (referenced in the [Appendix](#)) is available from Microsoft and can provide assistance in migrating the application settings or application data in some environments.

Leveraging folder redirection will be the best way to keep the user's data available during the migration. If the user's data is not already centralized, then follow the same recommendations for moving the data as provided for migrating from local profiles. Windows Vista handles the folder synchronization automatically and will synchronize with the older Windows XP redirected folders. As noted earlier, if user data exists outside of the redirected folders, the profile management solution chosen for XenDesktop will need to be able to synchronize these folders as well.

When migrating to Windows Vista, consider these points as well:

- Verify that the same application settings from Windows XP will work with the application when it is run on Windows Vista. Most applications expect an in-place upgrade of the operating system at which time the application will migrate its own data.
- Some Citrix Ready partners offer profile management solutions that will assist in cross-operating system migrations such as Windows XP to Vista. These solutions can auto-map the old Windows XP settings to the new Vista desktop. For more information, see the link titled "Citrix Ready Partners for Profile Management" in the [Appendix](#).
- Most often the best approach is to build a new Vista XenDesktop environment and roll that out in parallel with the existing Windows XP desktops. Allowing the users to access their new Vista desktop from their existing workstation for a transitional period will help the users get used to the new Vista interface while keeping their application data and settings available.

## Migrating User Desktop Access

Once users are migrated to their new XenDesktop, they will need to access it from a device that includes the Citrix Desktop Receiver. The Desktop Receiver can be installed in two modes: Normal and Kiosk.

In normal mode the Desktop Receiver allows the user to switch between the local desktop and the XenDesktop. This method is very beneficial if the users are required to migrate their personalized settings manually. In normal mode, the user can toggle between the virtual and physical desktop.

The figure below depicts the user experience when running with the Desktop Receiver in normal mode.



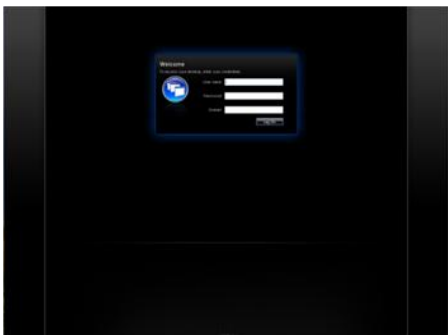
**Windowed**



**Full-Screen**

**Figure 1: Desktop Receiver in Normal Mode**

The Desktop Receiver has a second installation mode called kiosk which makes it function exactly like a desktop appliance. In the kiosk mode only the XenDesktop is accessible and the local desktop is blocked from being accessed. The logon sequence in kiosk mode is depicted in Figure 2. When the enterprise leverages existing workstations by repurposing them, they can deploy the Desktop Receiver first in normal mode during transition, and then later switch it to kiosk mode with a second MSI package.



**login**



**Full-Screen**

**Figure 2: Desktop Receiver in Kiosk Mode**

Given that user personalization settings are of the most importance when migrating between a physical and virtual desktop, best practices recommend first deploying the Desktop Receiver in normal mode to allow users to still access their existing desktop during the early part of the migration. After the migration to the virtual desktop is complete, then the administrators should look at the security options associated with the kiosk mode deployment.

## Repurposing Existing Desktop PCs

Several methods exist for repurposing an existing desktop PC. Each of the methods is discussed below along with the requirements.

### Install the Desktop Receiver

Installing the Desktop Receiver on an existing computer is the easiest method of the three to implement. The Desktop Receiver comes packaged as an MSI and can be deployed via AD Group Policy or any MSI-based deployment technology. By only installing the Desktop Receiver, users will still have access to their local desktop for data that was not migrated or as a fallback plan if the XenDesktop environment becomes inaccessible. This is a great method for getting users introduced to XenDesktop, while leaving the user with the comfort of their current workstation.

## Stream the Desktop Receiver

Using Citrix Provisioning Services to stream an image that contains the Desktop Receiver to the physical device is another option. This option works best when the majority of the devices to stream to are the same type of physical PC. Provisioning Services does support multiple device types with a single image, but it requires additional work to create the initial image. With this option, the existing PCs must have pre-boot execution environment (PXE) capable network interface cards and a Provisioning Services license. Two Provisioning Services licenses will be in use for this scenario: One license is required to stream the operating system to the physical device and a secondary license is required to connect to the virtual XenDesktop. This method provides a fallback plan as well because the streamed image does not replace the existing hard disk image.

## Build a Boot Environment

Building a self-contained boot environment that will launch the Desktop Receiver directly from the local hard-disk, a USB drive, or a CD-ROM is also an option. This environment could use Linux or even a stripped down version of Windows XP. This method would work well for creating a hardened-OS that would then connect to the XenDesktop via the installed Desktop Receiver. If copied to the hard disk of the local PCs it will prevent any fallback as the existing data would be lost. However, if booted off of a USB or CD-ROM device, then the fallback would be to boot off the local drive. The downside is that if changes needed to be made to the boot environment, a manual update to all the USB devices, CD-ROMS or local hard disks would have to be completed individually.

Table 1 summarizes the characteristics of each repurposing method discussed above.

	Install	Stream	Build
Ease of deployment	High	Medium	Low
Fallback support	High	High	Medium
Ongoing maintenance	High	Low	High
Cost to implement	Low	High	Low

**Table 1: Repurposing Existing PC Decision Matrix**

In most situations, installing the Desktop Receiver will provide the lowest cost and quickest deployment of the three options.

# General Rollout Guidance

The following section provides additional information available to help ensure that the user migration to a virtual desktop experience is as seamless as possible. The following sections provide general guidance around using policies, printing, testing, and user preparation.

## Using Policies with XenDesktop

Policies provide a way to both customize and secure an environment and can be linked to users, groups, or machines. Within the XenDesktop environment the three primary policy types are Active Directory policies, XenDesktop Policies and XenApp Policies. Although each of these policy engines support numerous policies, only the policies applicable to the migration process will be discussed. A general description of each policy type is below.

- **Active Directory Policies:** These policies are configured from within Active Directory and can be applied to organizational units, domains, sites, etc within the Active Directory Tree. The policy can affect the physical computer, the user it is applied onto, or both the computer and the user.

- **XenDesktop Policies:** These policies are configured from within the XenDesktop farm and are applied to virtual desktops and their connections. The policies can be filtered by server, group, or user.
- **XenApp Policies:** These policies are configured from within the XenApp farm and are applied to the XenApp sessions and their connections. The policies can be filtered server, group, or user.

Policy application for virtual machines works the same as with physical workstations. Therefore, the best practices for policy application would be the same for a XenDesktop as for a physical desktop. The following general best practice guidelines are solid advice in the XenDesktop environment.

- Create a base policy that applies to all users and configure the most common policy settings in that policy.
- Apply policies at the highest level possible. Place policies at the parent OU or group to ease administration and reduce the number of policies to be processed.
- Keep the number of policies at a minimum. Place as few policies as possible to meet the requirements. Policies can contain multiple, unrelated settings. Policies are generally applied and created by user group rather than specific contents. For example, remote users will have one set of policies while local users a different set.

#### *Active Directory Policy Recommendations*

In most circumstances the current corporate Active Directory policies should continue to be applied to the virtual machines. These policies include the Internet Explorer settings, desktop lockdown policies, or preferences such as the home page or drive mappings. The same logon scripts may also be left in place.

One additional Active Directory policy has direct application in the XenDesktop environment. In the **Computer Configuration >> Administrative Templates >> System >> User Profiles** group policy is a setting called **Delete cached copies of roaming profiles** which prevents Windows from keeping a copy of the cached profile on the pooled desktop.

When the desktops are not rebooted after each logon, old copies of the profile are left in the write cache for the Provisioning Services image and could be accidentally merged into the user's roaming profile. Enabling this setting will reduce the size of the write cache and provide a more consistent user experience.

#### *XenDesktop and XenApp Policy Recommendations*

The same policy engine is used for both the XenApp and XenDesktop farms. Most of these policies were designed to either improve the user experience, especially in WAN environments, or secure the environment. Optimizing performance in any WAN environment can be achieved by restricting the amount of data that crosses the link. The following policies are useful in controlling the data that traverses the data link.

- **Bandwidth >> Visual Effects:** Enable these policies to disable the common visual effects found in Windows. By disabling the visual effects, the operating system will seem to respond quicker.
- **Bandwidth >> SpeedScreen:** Enable the highest compression possible to decrease the bandwidth required on WAN connections. Higher compression could also be helpful in LAN environments.
- **Bandwidth >> Session Limits:** On limited bandwidth connections, limiting the amount of bandwidth that can be consumed by audio, printers, and file copying will improve the response for other users on the same connection.

- **Client Devices >> Resources:** Use the resources section to disable any devices that will not be necessary to map between the client and the desktop. This policy tree can also be used to disabled the mapping of USB devices or drives when that behavior is desirable within XenDesktop.

## Printing from XenDesktop

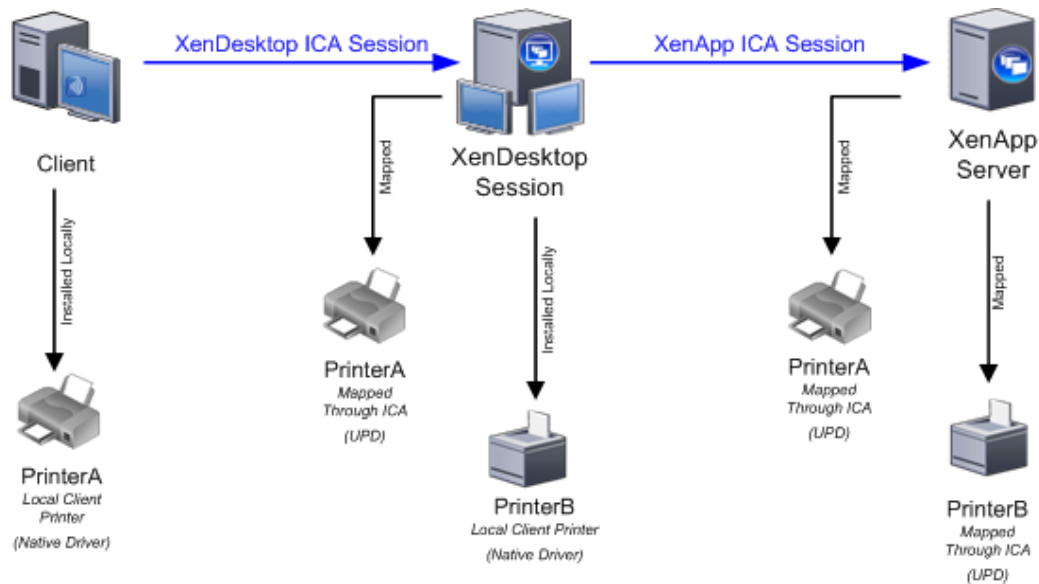
As users transition to a virtual desktop environment, they will inherently expect to have the same experience with printing from a virtual desktop as printing from their current local desktop. This section provides a high-level overview of printing within a XenDesktop session when accessing applications hosted on XenApp.

Since XenDesktop and XenApp use the same policies for printing, they both have the ability to utilize either network or auto-created printers. Network printers are typically administratively designated within the imported network print server properties; whereas, auto-created printers are based on printers that have been pre-configured on the client workstation and passed through to the ICA session. An auto-created network printer is a network print device that has been pre-configured on the client device.

When using XenApp from XenDesktop, the user's printer could be located at either the client device (local printer) or available through the XenDesktop (network printer). Ideally, the native printer drivers will be used only on the desktop of the client where the printer is configured. For all printers mapped through ICA, the Universal Printer Driver (UPD) should be used. Figure 3 shows the expected configuration for printers in most combined environments.

Utilizing the UPD will minimize the overhead incurred by testing, installing and maintaining a large number of print drivers, and will eliminate the possible need to map print driver names at the client device to the names on the Citrix XenApp Server. Of course, this configuration assumes that the UPD will meet most of the printing requirements. However, if the UPD is unable to meet all the environment requirements the native drivers will need to be installed and replicated to address those needs. The following policies are used in configuring the printing environment.

- **Printing >> Client Printers >> Auto-creation >> Auto-create all client printers:** Use this policy to enable XenDesktop users to print to the printer attached locally to their client workstation. This policy is also used from the XenApp sessions to pass the printing through.
- **Printing >> Drivers >> Universal driver >> Use universal driver only if requested driver is unavailable:** Use this setting to leverage the UPD as much as possible which keeps native printer driver maintenance down to a minimum.
- **Printing >> Session printers:** Use this policy to add any network printers for the user and to set the client's default printer. Use this setting to cause the XenDesktop default printer to match the local client device's default printer. This can also be used by XenApp to daisy chain the default printer of the XenDesktop session as the default printer for the XenApp session.



**Figure 3: XenDesktop and XenApp Printer Configuration**

## Test the Migration

The first step in any migration is to verify that the design meets the project requirements. The best way to verify these design requirements is to build a test environment that matches as closely as possible the existing enterprise environment. Once this test environment is built, create test user accounts and workstations that would be representative of the users that will be migrated. A full testing cycle must be completed before a production rollout.

## Involve the Help Desk

Prepare the help desk personnel with preliminary training so they will be ready to handle any issues during the pilot and the production rollouts. Use the pilot to test the processes and define clear lines for escalation to more experienced support personnel, such as email aliases and voice numbers. Identify the most common issues likely to be experienced and provide FAQ documents and KB articles. When planning the rollout, be sure to include the help desk management in the coordination of the plans.

Track and resolve issues discovered during the production rollout. Listening to the user experiences during the rollout can provide excellent guidance for refining the rollout or lifecycle management processes. Consider providing a survey or hosting a user feedback meeting to find out about their experience so any negative items can be addressed for the future.

## Prepare the Users

Prepare the users prior to providing a XenDesktop by providing them with access to XenDesktop training. The training needs to provide the users with an understanding of the new access paradigm, what to expect during the rollout process, and contact information for any issues that may arise. One of the key successes in any migration is end-user training on the new product. Remember to develop both the user training (web, instructor-led, brochures) and end-user notifications to communicate the different stages of the rollout.

# Conclusion

The key to completing a successful migration of user data is to identify what user data is important and where that data currently resides in the environment. In most situations, the user data will be stored in the user's operating system profile or in their application data folders.

When working in a XenDesktop environment, users will not be able to store any data on their desktop. The user's personalization settings and all their documents will need to reside remotely and be loaded at logon. To store the user personality remotely, a profile management solution must be implemented. If the enterprise has an existing profile management solution and it can be leveraged then that approach will provide the easiest migration path. Users will need store data on network shares or in profile folders that can be redirected to network locations.

Migrating from Windows XP to Windows XP on a virtual desktop is the simplest of the migration scenarios. Moving from Windows XP to Windows Vista will require additional planning and a parallel transition plan is highly recommended since user profile information does not map directly across between the two operating systems.

The Citrix Desktop Receiver can be used to grant users access to both the physical and virtual desktops during a transition period and then later leveraged as a kiosk for access. Finally, during the rollout be sure to verify the migration and the printing environment prior to the rollout.

# Appendix

## XenDesktop Design References

[Simplifying Application Delivery to the Virtual Desktop - Getting Started Guide](#) (CTX120515)

[Simplifying Application Delivery to the Virtual Desktop - Implementation Guide](#) (CTX120514)

[Simplifying Application Delivery to the Virtual Desktop - Reference Architecture](#) (CTX120516)

[XenDesktop - Design Handbook](#) (CTX120760)

[XenDesktop 2.1 Scalability Analysis](#) (CTX119775)

[Designing an Enterprise XenDesktop Solution](#) (CTX121478)

## User Profile References

### **Citrix**

[User Profile Management Deployment Best Practices](#) (CTX119036)

[Using Citrix User Profile Manager with XenDesktop](#) (CTX119186)

[User Profile Best Practices for XenApp 5](#) (CTX120285)

[Citrix User Profile Manager White Paper](#)

[Citrix Ready Partners for Profile Management](#)

### **Microsoft**

[Group Policy Recommendations for Roaming User Profiles](#)

[Managing Roaming User Data Deployment Guide](#)

[How to Create and Copy Roaming User Profiles in Windows XP](#) (Q314478)

[How to configure a user account to use a roaming profile in Windows Server 2003, Windows 2000 Server or Windows NT 4.0](#) (Q316353)

[User State Migration Tool](#)

### **AppSense**

[AppSense UEM Citrix XenDesktop Brochure](#)

# Revision History

Revision	Change Description	Updated By	Date
V 1.0	Solution Center Team	Paul Wilson	13 July 2009

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