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The Essentials Series: Important Questions in  
Implementing Virtual Desktops

# Where Do I Start With Virtual Desktops?

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by Greg Shields

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# Where Do I Start with Virtual Desktops?

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Virtualization by itself is a mature and smart move for the business data center. Compressing large numbers of physical servers into small numbers of virtual hosts, the move to virtualization reduces the raw costs of running a data center while improving your management of individual servers.

Yet virtualization needn't necessarily stop with the conversion of servers to virtual servers. Its enhancements to overall systems administration and reductions in cost play equally when virtualizing user desktops. The very same virtualization infrastructure you use for your servers today can be naturally extended to support the hosting of desktops as well. As a result, users gain the flexibility of connecting to a well-managed desktop from virtually any network endpoint. The business reduces its overall costs in maintaining its distributed computing infrastructure. And your IT organization gains previously-unseen levels of security and control that arrive as a function of centralization.

But how do you get there? What exactly are virtual desktops and how are they presented to their users? What technologies, both hardware and software, are necessary to achieve this end goal? What are today's best use cases for deployment? This series will attempt to answer these important questions in implementing virtual desktops, leaving you with the right set of information to make an educated decision about extending your own virtual infrastructure.

## What Is a Virtual Desktop?

Simply put, *a virtual desktop is a virtual machine*. These operating system (OS) instances are the very same kinds of virtual machines that you may already host atop virtual platforms, such as VMware vSphere or ESX. As a virtual machine, a virtual desktop automatically enjoys the same kinds of workflow and consolidation benefits as do all types of virtual machines:

- Multiple virtual desktops can be *hosted on a single physical server*, increasing utilization of existing hardware.
- A virtual desktop's initial configuration is often based on a reference image, making possible its *rapid and automated deployment*.
- Being hosted within your protected data center, and with only screen updates and mouse/keyboard commands traversing the network, their data is *dramatically more secure* than in a traditional distributed infrastructure.
- As an instance that is designed for remote access, users can access their full-fidelity desktop *from any network connection*.

The primary difference between a virtual desktop and a virtual server lies within its OS and end user. Virtual servers are used for processing workloads in the data center, such as file services, email services, databases, and network applications. Virtual desktops are instances of desktop OSs such as Windows XP, Windows Vista, and Windows 7. Their end user is the individual employee in your organization, with each virtual desktop supporting the processing needs of one individual. Different than a physical desktop, a virtual desktop is connected to via the network using some form of endpoint technology. That network can be either the local LAN or WAN, or, with the proper routing and security in place, it can also be the Internet.

This one-to-one ratio between virtual desktop and user is fundamentally different than the architectures used by other remote access solutions such as Microsoft's Terminal Services or Citrix's XenApp. Within these products, application use is shared by multiple users on the same server. Thus, the same instance of Microsoft Word is leveraged by every user using that application on that server.

Although this type of access is good with the right kinds of applications and when application needs are slight, many applications simply do not function in a multi-user environment. Also, applications with high resource needs tend to experience overload conditions in these environments, which reduces the overall user experience. Most importantly, these environments require a high level of administrative control in order to keep collocated users from stepping on each other, which limits users' ability to customize their environments to their liking. Virtual desktops make sense when *full-fidelity* desktops are necessary for users, with each user enjoying their own individual OS instance that is not shared with others.

### Types of Virtual Desktops

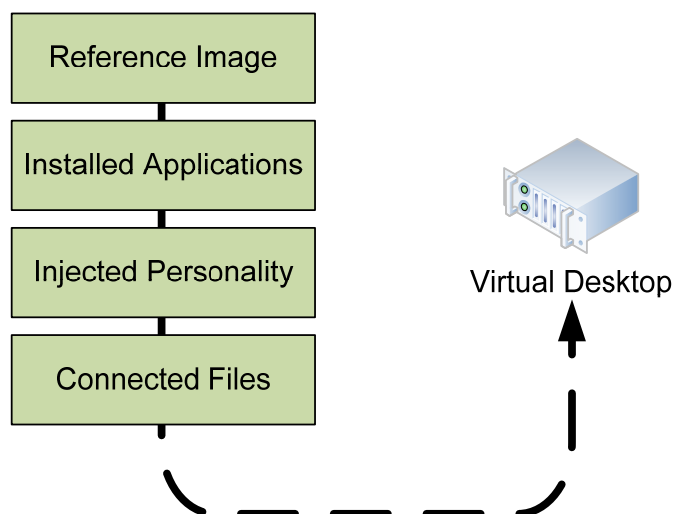
Considering the previous statement, there are in fact a number of architectures by which full-fidelity desktops can be delivered to users. Depending on the needs of your users, any of these may make sense for your business:

- **Assigned desktops.** The assigned desktops architecture fits well in environments that want the highest level of desktop configurability for users. In this environment, a virtual desktop is created and specifically assigned to each user. When a user connects into the virtual desktop infrastructure, the user always receives the same desktop. Because desktops are assigned, one-off applications can be installed for specific users, and users can customize their desktop instances according to their needs.

- **Pooled desktops.** Environments that leverage a more standardized set of applications can enjoy a more efficient use of resources by pooling desktops. In this architecture, a set of desktops is made available for concurrently-connecting users. As no assignment of user to desktop is made, any user may randomly connect to any desktop. Desktops are preloaded with necessary applications, and limited state information is injected onto the desktop as part of the login operation. In this environment, it is often the case that a smaller count of desktops is necessary, as the number of available desktops need only meet the concurrent user count rather than the total user count. Further, as pooled desktops are deployed with the assumption of random assignment, it is easier to refresh the pool en masse when updates are required.
- **Kiosk/lab desktops.** Virtual desktops provide a significant advantage to kiosk and lab environments due to their ability to be quickly refreshed, deleted, and re-created on demand. This is particularly the case in low-security kiosk and lab environments where desktop refreshes are necessary and often must be accomplished with short notice and within a short timeframe. Here, entire labs can be quickly rebuilt to support new missions through a few mouse clicks.
- **Converted desktops.** This scenario is similar in delivery to assigned desktops but is different in that users' original physical desktops are converted to virtual desktops through some mechanism. These desktops are then operated with the same configuration as the original desktops but function with the benefits of virtual desktops. This architecture tends to enjoy the lowest level of automation flexibility because individual desktops are not created from a central source. Further, directly converting physical desktops to hosted desktops is an option that is typically only considered on an exception basis due to their inherent lack of commonality.

In all of these scenarios, a primary management benefit relates to the ability to rebuild any virtual desktop instance on demand. A virtual desktop arrives as the combination of a reference desktop image, installed applications, injected user personality information, and connections to documents and files (see Figure 1). These four elements are laid down using an automated interface:

- The desktop's OS image is copied from a reference image, creating the base OS environment for the desktop.
- Applications that are not already part of the reference image are installed automatically to the desktop.
- The user's individual personality configurations such as desktop and Internet shortcuts, backgrounds, colors, and any other customization are injected into the image as the user connects to it.
- Any files needed by the user and stored on alternative servers are connected through drive mappings or shortcuts.



**Figure 1: Provisioning a new virtual desktop involves the automated invocation of four steps.**

This means that the entire set of user-specific data can be rolled from one instance to another at will. Should a user experience a problem with his or her desktop—if its configuration is corrupted or if it is inadvertently or maliciously infected with malware—an administrator needs only to re-provision a new virtual desktop image to the user.

## Where to Start?

Due to their flexibility, virtual desktops can be rolled out to an organization using essentially any plan that works for the business. A business can elect to roll out virtual desktops to a select group of individuals first, while slowly implementing them for others in the organization. Virtual desktop rollouts can be further implemented based on the capacity of the virtual infrastructure. As your business incrementally transitions resources from physical purchases to a virtual infrastructure, more processing power and client endpoints can be implemented into the environment. This horizontal scaling of resources enables more users to move to virtual desktops.

For environments that aren't ready for full conversion, virtual desktops needn't necessarily operate as full desktop replacements. Virtual desktops leverage the same network infrastructure as distributed physical desktops, so users can leverage virtual desktop use for specialized circumstances such as work-from-home situations or in maintaining operations during a disaster. Article three will talk more about some of these potential situations and their benefits.

Virtual desktops also make sense in limited implementations when users are highly mobile in their workday patterns. For example, doctors and nurses in hospitals or students in university settings, both of which involve users who must connect multiple times per day in multiple locations. Call centers are excellent targets for a virtual desktop infrastructure because of their limited application set, highly mobile workforce, and limited need for desktop customization.

In the case of call centers as well as in the retail sector, virtual desktops have a large advantage over alternative remote application infrastructures due to their extensive support of peripherals. Unlike traditional remote application infrastructures, which tend to have limited support for point-of-sale and call center peripherals, virtual desktops that leverage the right kind of client endpoint can use any peripheral that is supported by the virtual desktop's OS.

## Virtual Desktops Solve Many IT Problems

You can see in this article that a virtual desktop infrastructure has the potential to solve many of the administrative nightmares faced by IT. Centralizing the otherwise distributed desktop infrastructure means tighter security, easier administration, and more rapid problem resolution. At the same time, it enables desktops to be presented to users no matter where they may be located.

The next step is in implementing its technologies. There is no single product or technology that represents an entire virtual desktop infrastructure. Instead, getting to this management nirvana requires the integration of a set of technologies from virtualization infrastructures to client endpoints. Solutions that offer out-of-the-box integration of principal components can significantly accelerate the successful deployment of virtual desktops within an organization. Article two in this series will outline what you'll need for your own infrastructure.