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# Real World Considerations for Implementing Desktop Virtualization

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# Introduction to Desktop Virtualization for the IT Pro

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Since the creation of the traditional desktop computer, administrators and end users alike have appreciated the computing power but have been frustrated by the associated expense, complexity, and security issues that result from desktops used in the enterprise. These issues are caused not from lack of investment by the business or lack of effort by administrators but simply by how desktop computers are designed. With traditional desktops:

- All processing and most storage is on the local desktop
- Operating systems (OSs) and applications are installed individually, imaging software is used, or remote installation is done
- Roaming profiles are employed for user customization
- File shares are used for storage
- Applications and OSs are updated with a software deployment tool



This design is inefficient and everyone pays the price. Organizations end up with:

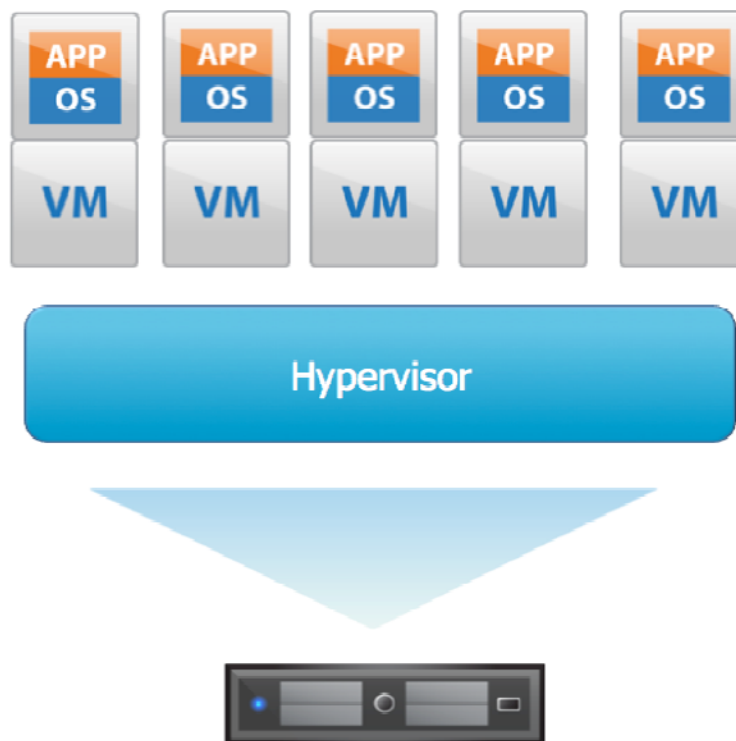
- Too many desktops to easily deal with
- Too much time spent administering those desktops
- Too many application updates
- A never-ending desktop life cycle replacement process
- Issues with roaming users and remote access
- Frustrated end users
- Exhausted desktop admins

There is a better way! The solution is desktop virtualization.

## What Is Desktop Virtualization?

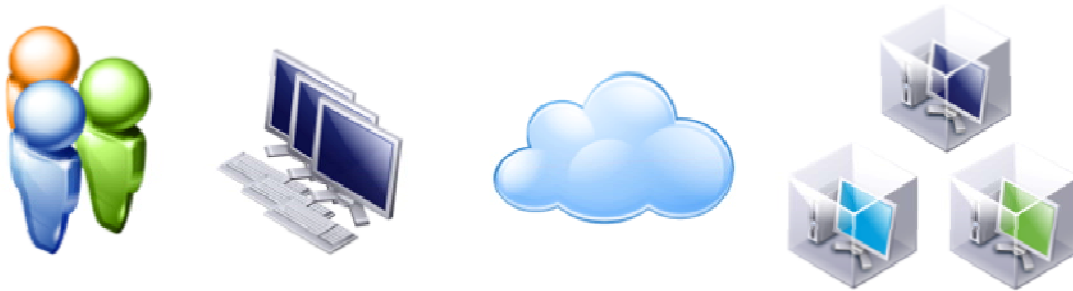
With desktop virtualization, administrators deliver end user desktops as a managed service from the company data center. For those in IT, the thought of offering controlled and reliable services from the data center is a comforting feeling and a solution to the problems with traditional desktops.

How does it work? With desktop virtualization (specifically VDI, or virtual desktop infrastructure), your end user desktop computers are virtualized and run as virtual machines, on your servers, in the data center. For those familiar with server virtualization, the end user desktops run on the hypervisor just like virtualized servers. The end user virtual machines contain the user's OS, applications, personalizations, and data, as Figure 1 shows.



**Figure 1: Desktop virtualization.**

What makes desktop virtualization different from server virtualization is that the end user virtual machines (desktops) are accessed remotely, over the network, using a remote access protocol such as Remote Desktop Protocol (RDP) or PC Over IP (PCoIP), as Figure 2 shows.



**Figure 2: In VDI, end user virtual machines (desktops) are accessed remotely, over the network.**

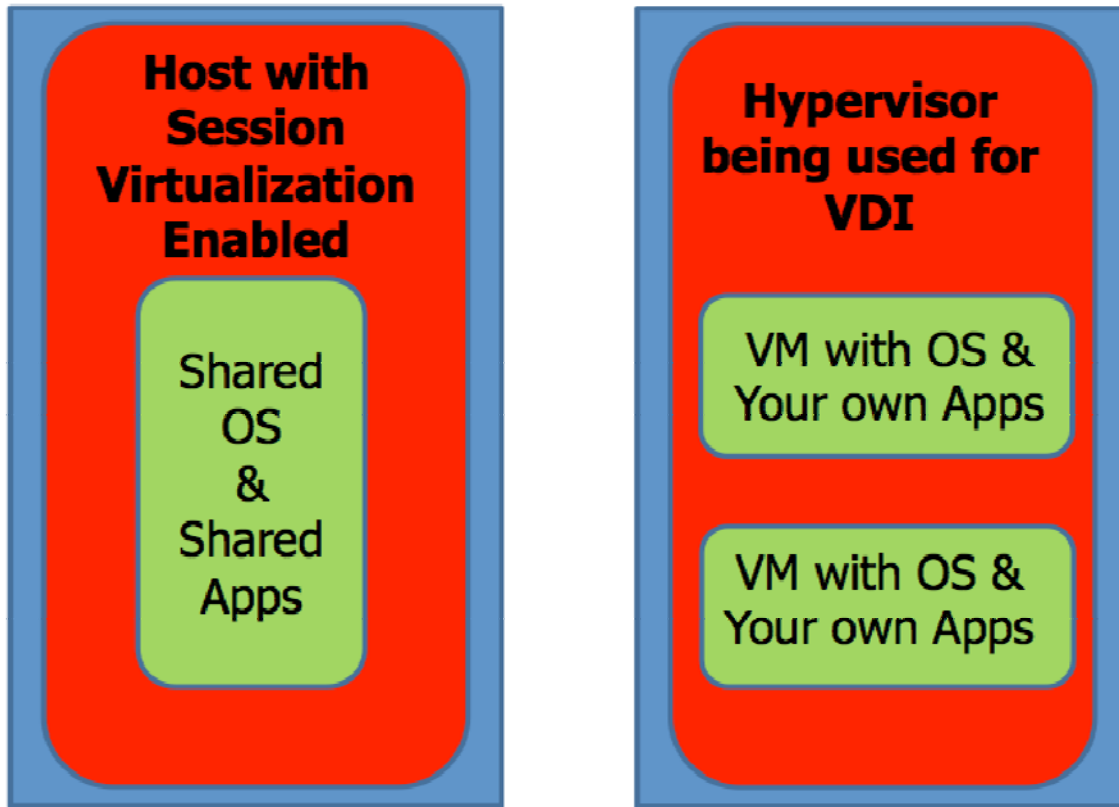
Something else that makes VDI different from server virtualization is the VDI connection broker. This specialized piece of software is what controls what user or device will access what virtual desktop (the virtual machine running on the hypervisor) or pool of desktops.

Desktop, laptop, or thin client devices can all be used to access the virtual desktops, running as virtual machines, on top of the hypervisor, in the data center. Those devices could be very close, on a local area network (LAN), or around the world, connected via the Internet, virtual private network (VPN), or private wide area network (WAN).

#### **VDI vs. Session Virtualization**

There is a lot of confusion about VDI versus session virtualization. With VDI, each user or device has its own virtual machine that contains an OS, applications, data, and persona/user customizations.

With session virtualization, a physical server is loaded with an OS, session virtualization software, and end user applications. The OS and applications are then shared by the users connected to that host (see Figure 3).



**Figure 3: Comparison of session virtualization and VDI.**

This sharing of the OS and applications (which is typically unsupported by application vendors) can cause problems, as the applications were never designed to be shared. In addition, one end user can cause performance issues or even crash an entire physical server that is being shared with session virtualization.

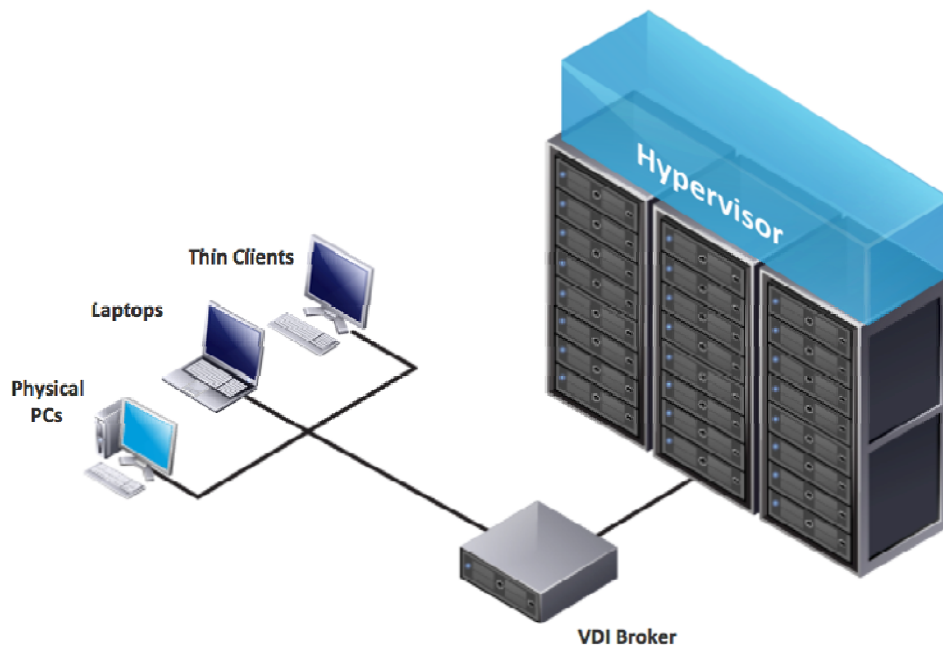
Despite this, virtualization is popular for specific use cases. Namely for a large group of task-based users that need access only to the same few applications. If there is no customization of applications for end users, and a very short list of applications can be delivered to a large group of similar end users, session virtualization can be a good fit. Also, because all users are sharing the same host OS and applications, you can get more session virtualization user connections per host than with you can with VDI.

The problem that most companies run into with session virtualization (and the same problems I have experienced) is that, initially, end users start off being task-oriented and, later, you find out that they need many more custom applications than originally indicated. Unexpected actions by end users can slow down other users (or all users on a server), and even, in some cases, bring down the server. I know first hand that tracking down and troubleshooting these types of issues is a very painful process for admins and end users alike.

Although VDI will use more server resources than session virtualization will use, by each user getting their own connection (OS and applications), there is no chance of them making trouble for other VDI users. It's easy to install and offer custom application. For these reasons (and more), VDI is a much more reliable, robust, and secure solution than is session virtualization.

## What Makes Up a VDI Implementation?

You might be wondering what makes up a desktop virtualization implementation. Chances are that you have many of the pieces already in your data center. Consider the illustration in Figure 4.



**Figure 4: Example VDI.**

A VDI setup includes:

- Infrastructure—Traditional physical servers, storage, and network equipment in the data center
- Hypervisor—Running on top of the physical servers
- VDI broker—A specialized piece of software that directs end user devices to their virtual desktop
- Thin clients/desktops with software/mobile devices—The end user client devices
- OSs and applications—Installed inside each virtual desktop, you have common end user desktop OSs and applications
- End user customizations—The end users (with their desktop customizations) are the reason you're building a VDI



## Benefits of Desktop Virtualization

By using desktop virtualization, administrators, end users, and organizations will gain many benefits. The following sections explore how desktop virtualization benefits organizations.

### Benefits for IT Desktop Admins

Daily, IT admins struggle with patching, updating, securing, and tracking end user desktops. The solution to these struggles isn't a new desktop management tool. The remedy is to change the design of desktop infrastructure to a more intelligent design.

The following list highlights ways that desktop virtualization can help IT desktop admins:

- **Patching**—Keeping applications up to date will no longer require sending updates to many machines over the network (and sometimes having to roll back the updates due to failed updates and application conflicts). With desktop virtualization, thanks to its link to application virtualization tools, admins can run different versions of the same application concurrently and update an application simply by replacing the application package.
- **Deployment**—No longer will admins have to manually build desktop PCs and painfully deploy them to end users. Desktop virtualization provides the ability to simply clone a golden image to create a new virtual machine. That virtual machine can then be linked to by all end users' virtual machine disks. Only the changes from the original virtual disk will be saved and will consume disk space. End users can easily access their virtual desktop using any form of thin client device including software clients on desktops, laptops, tablets, or thin-client devices.
- **Disaster recovery**—All virtual desktops are stored in the data center, making backup, recovery, and disaster recovery (DR) of desktops and virtual machine files easy. Thanks to the separation of end user data from apps and the OS, only end user data needs to be backed up.

### Benefits for End Users

Not only will IT benefit from desktop virtualization but so will end users. Although end users might not know to ask for “desktop virtualization” by name, they will enjoy the benefits once they try it. End user benefits include:

- **Identical user experience on every device**—Regardless of whether they are at their desks, on laptops, using tablets, or at home, end users get the exact same desktop customizations, applications, and data. Plus, unlike remote access with a VPN, desktop virtualization will deliver predictable performance no matter what end users do.
- **Gain new application and OS updates faster**—Desktop virtualization makes it much easier to test and deploy new applications, enabling end users to gain access to the latest applications and OSs without delay.

- Fast deployment for new users—When one or multiple new employees start at a company, all they need is a thin-client device to begin using the same applications as everyone else. No longer is there a long wait to order a new desktop PC, configure the OS, and install applications. Plus, users can bring their own device (BYOD) and immediately get to work, thanks to desktop virtualization.

### Benefits for the Company

With IT desktop admins and end users enjoying the benefits of desktop virtualization, the organization as a whole gains:

- Agility—With end users able to access the same applications and data no matter where they are, and IT able to deploy new desktops in a few minutes, the business has the ability to quickly bring up new employees on company applications and move employees around to whatever office works best.
- Standardization—All companies appreciate the efficiency of standardization. Desktop virtualization standardizes the applications, access, and experience of end users while making IT more efficient.
- Security—The additional security offered by desktop virtualization means that IT (and the company) retains control and are able to secure company data in the data center.

### Pros and Cons of Desktop Virtualization

Every business choice must consider the good and bad. Desktop virtualization is no different. The following list highlights pros and cons of desktop virtualization:

- Pro—Streamline IT desktop management, making IT desktop admins more efficient
- Pro—Provide the business with agility, scalability, standardization, and security
- Pro—Offer a consistent user experience that reduces support calls while giving end users greater flexibility
- Con—Initiative is needed by IT to learn, pilot, and deploy this more intelligent and efficient design for end user desktops
- Con—Business leaders must be open to change in order to leverage the power of desktop virtualization

### VDI Display Protocol

Unlike a traditional desktop where the display, keyboard, and mouse are all local, a VDI requires a special display protocol. The job of the display protocol is to send the virtual desktop's display to the end user device (whatever that might be) and to receive (from the end user device) back on the virtual desktop computer in the data center.

The VDI display protocol needs to be fast and efficient. If a user is watching a video or making updates to a presentation, the user expects the display to perform as well as it did on a physical desktop, even if the user is working across the country, thousands of miles from the actual virtual desktop. Additionally, as there could be very limited bandwidth at remote locations (like a coffee shop or hotel), the display protocol must be efficient on the bandwidth that it uses and what it sends across the network.

## VDI Persona Management

“Personas” are end user desktop customizations such as a change to the desktop background or the speed that the mouse moves. Traditionally, these types of changes were stored in the OS and then, wherever the user logged in, these changes were downloaded and applied. However, as users move around to different devices or work remotely, it is common to have trouble with this legacy method.

By having “persona management” built into a desktop virtualization solution, IT admins no longer have to rely on the OS to preserve and apply these important end user customizations. Persona management preserves user profiles and dynamically synchronizes them with a remote profile repository.

## VDI Storage Management

As desktop virtualization implementations grow, intelligent management of virtual desktop storage is crucial. Virtual machine disk files must be linked to a single golden image so that your disk utilization doesn’t grow proportionately to the number of virtual machines you add. Also, efficient caching, virtual disk reclamation, and coordination with hardware storage all become critical to ensuring that something like a mass power-on or antivirus storm doesn’t slow the performance of your desktop virtual infrastructure.

VDI desktops are stored in shared storage used by the virtual infrastructure; thus, shared storage needs to be taken into account. Although it’s possible to store VDI desktops on local storage, such as virtualized servers, VDI desktops are typically stored on SAN or NAS storage.

With VDI having greater I/O demands than traditional do virtualized servers, new specialized VDI solutions have come to market. They include solid state drives(SSDs) only storage and tiered SSD storage, both of which offer the much better I/O performance than dedicated SS or tiered SSD storage.

## Summary

Implementing desktop virtualization is one of the best moves an organization can make, as it offers so many benefits for desktop admins, end users, and companies as a whole. Built on top of a solid virtual infrastructure and hypervisor, a VDI setup utilizes a VDI broker to connect end user devices to their virtualized desktops. As not all VDI solutions are equal, you'll want to make sure that the solution you choose offers advanced features such as a robust display protocol, persona management, and advanced storage features. Additionally, keep in mind that VDI is not only a technology solution but also a business solution. As part of your VDI proof of concept, you'll want to ensure that you achieve business buy-in. That business buy-in will be crucial as you deploy VDI across your organization.