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Real World Considerations for Implementing Desktop Virtualization

The Essentials Series

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Ensuring Desktop Virtualization Success

I was working in virtualization back when most people had never heard of it. Prior to the creation of virtual desktop infrastructure (VDI), I started by piloting session virtualization for a group of 10 users sharing their desktop and applications—all running on a single server. Back then, application vendors wouldn't support an application if the vendors found out the application was running with virtualization. Many applications weren't designed to be "multi-user" and there were application incompatibilities.

Over time, virtualization software advanced and so did applications. We expanded our user base, at one point, to as many as 400 users accessing their virtual desktop over a wide area network (WAN) connected to 75 locations across four US states. Session virtualization was a huge success for most of our task-based end users.

However, for "power users" and users with specialized applications, session virtualization just didn't provide what they needed. We had a poor display protocol. Graphical applications ran slowly. Some applications were still incompatible, and some users still had to run some applications on desktop computers.

These limitations of session virtualization pushed us to look for a new solution. The best solution for our problems was VDI. With desktop virtualization/VDI, every end user had their own virtual desktop. Each user had their operating system (OS), applications, and data. Application incompatibilities were immediately solved. Power users were even allowed to perform their own application upgrades or installations (something never possible with session virtualization).

Additionally, the new VDI solution came with a more robust display protocol that allowed us to use multiple monitors on thin client devices and even to gain greater graphics performance for graphically intensive applications. The new display protocol allowed us to be more efficient with our VDI desktop bandwidth utilization on the wide-area network.

Over time, all users whose daily job wasn't limited to a few very specific applications were moved to VDI. Virtualization allowed us to do more with less, be more efficient, and provide end users capabilities that just weren't possible before.

Sizing Your Desktop Virtualization Environment

What will the scope be of this new desktop virtual infrastructure? How will you size it? What applications will it offer? Who will use it? Is it for everyone?

Application Discovery

As part of any desktop virtualization implementation, you'll need to perform application inventory. You need to find out what applications are running on your existing desktop computers. Those same applications will need to be available in the virtualized desktops.

To ensure those applications are available in the virtual infrastructure, you'll first have to inventory, or discover, what applications are in use at your company today on physical desktops. This process doesn't have to be manual. Assessment tools can automate the process.

Assessment Tools

At enterprises with hundreds or thousands of end user desktops, perhaps spread across many locations, using an assessment tool is crucial. By employing an assessment tool, you'll be able to save time and make smart decisions regarding VDI. Assessment tools will:

- Identify what applications are in use
- Analyze user and application usage
- Determine the number of desktops at your company
- Make recommendations on the best way to virtualize those desktops (such as session virtualization or desktop virtualization) and the best hypervisor and VDI solution to use
- And perhaps even help you create a migration plan

Is Desktop Virtualization for Everyone?

Every company needs to perform an assessment to determine whether desktop virtualization is right for them. Most companies will find that desktop virtualization offers huge benefits. However, there is a possibility that desktop virtualization isn't the right solution. For example, desktop virtualization might not work for video editors (due to the heavy graphic requirement) or for locations where there is very limited or unreliable bandwidth back to a central data center.

Calculating Total Cost of Ownership and Return on Investment for Desktop Virtualization

We have explored how desktop virtualization can help in so many ways, but what about the financial benefits? As most enterprises are in the business of making money, most in IT will be pressured or even required to show that desktop virtualization will offer the company financial benefits. There are two common ways to determine those benefits: total cost of ownership (TCO) and return on investment (ROI).

TCO vs. ROI

TCO and ROI are both used to determine whether a particular technology will provide the company financial benefits, but they do so from different directions.

TCO is used to determine the direct and indirect costs of a solution. In this case, the solution being considered is desktop virtualization. To make this determination, you compare the total cost of desktop virtualization to the total cost of your existing solution—traditional physical desktops. If desktop virtualization has a lower TCO than does traditional desktops, your company will save money by implementing it, as Figure 1 illustrates.



Figure 1: TCO illustrated.

ROI, in contrast, is a financial calculation that determines the ratio of money gained or lost on an investment relative to the amount of money invested. In the case of desktop virtualization, you calculate the ROI of the amount of money invested for software, hardware, and effort (time to implement) to determine whether the return was greater than the investment. The return, in the case of desktop virtualization, is lower cost of hardware, lower cost of software, time saved on management, and efficiencies gained by end users.

Soft Costs vs. Hard Costs

In calculating TCO and ROI, you'll need to include both soft and hard costs. "Hard costs," or direct costs, are easy to calculate. In the case of desktop virtualization, hard costs are the software licenses, servers, storage, and thin client devices that will be used. These are real and tangible costs. "Soft costs" are less tangible and include factors such as the time saved by reducing administrative burden, the efficiency savings for end users, and the faster deployment for new devices. The following sample matrix highlights soft and hard dollar costs to help you visualize how these expenses can be broken down.

Hard Costs	Soft Costs
Physical hosts	Improved productivity via better remote access for users
Thin client devices	Less costly OS and app upgrades because they're easy
VDI broker licenses	Fast application rollout means improved productivity
Hypervisor licenses	Fast new user device rollout
VDI performance / management tool	Reduced support calls lowers Help desk costs
Additional storage for VDI desktops	Greater security and control
Microsoft Windows Virtual Desktop Access (VDA) licenses	

Stateless Reference Architectures

Have you ever walked up to a kiosk computer in a store or public place and found that it didn't work? Have you ever had a call center desktop (or all desktops) running slow or become unavailable due to a user installing an application? These problems cause downtime and result in lost profits for companies.

For applications such as kiosks or call centers, stateless VDI desktops offer the best ROI. Every time they are powered on, the user gets the exact same reliable desktop and applications that they need to do their job. "Stateless" means that an application or OS doesn't maintain the what's-been-done-in-past-sessions state.

The latest desktop virtualization software has the ability to take the stateless concept and apply it to all VDI OSs. By separating applications and user data from the OS, your OS virtual machine could be stateless with the apps and user data are just layered on top, every time you log in.

Consider the power of this setup when you need to do an OS upgrade. You could simply swap the old stateless OS disk with the latest OS disk and all virtual desktop users would be upgraded to the latest OS with their apps and user data still layered on top.

Driving Down VDI Implementation Costs

In addition to using stateless desktops when possible, there are a number of options available to drive down VDI implementation costs. For example, there is no requirement to start off with an enterprise-wide deployment of VDI. To reduce startup costs, you could phase in VDI as employee's desktops are replaced on lease or as new employees are hired.

Another way to save on startup costs is to utilize local storage (SATA or SSD) for VDI virtual desktop storage instead of SAN/NAS storage. Most VDI desktops don't contain any data that needs high availability or that can't be easily reproduced.

You can also save money on startup costs by repurposing old desktops. In fact, you can add VDI software clients to your existing company desktops and never have to buy a single piece of end user hardware.

Using Calculators

Desktop virtualization vendors, third-party software companies, and even some bloggers have published desktop virtualization TCO and ROI calculators. These calculators are very useful, but you must be able to supply the calculators with the data they need and understand certain financial numbers such as ROI and net present value (NPV). Calculators can enable you to calculate not only ROI and TCO but also the expended cost to maintain and implement a desktop virtualization infrastructure. Still, calculators are only as accurate as the numbers that you provide them with.

Summary

Everyone's experience with desktop virtualization will be different. Your experience will begin by assessing your current infrastructure and then, very likely, using an assessment tool. It's not enough just to understand the efficiency benefits of desktop virtualization. You must also analyze the potential financial gain for your company using ROI and TCO calculations.