



# HOW TO AVOID THE 7 DEADLY SINS OF APP AND DESKTOP VIRTUALIZATION

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### A Successful Project Starts with Knowing Where It Could Go Wrong

Across a wide spectrum of industries, the consumerization of IT is driving digital transformation. Cloud and mobility are changing the way people work and live—creating new requirements for IT service delivery and prompting teams to rethink management tools and processes.

To support a dynamic workforce in the era of consumerization, IT organizations need to move from the traditional desktop model to new digital workspaces. These workspaces should be designed to support mobility, changing device form factors, and the agile delivery of new apps. The virtualization of Windows desktops and apps is one of the keys to enabling this shift to digital workspaces.

In a typical route forward, IT shops leverage virtual desktop infrastructure (VDI) to virtualize desktops and Remote Desktop Session Host (RDSH) to virtualize applications.

For your IT administrators, VDI and RDSH solutions can reduce desktop administrative and management tasks and enable applications to be easily added, patched, and upgraded. They also allow your administrators to manage security and data protection from a central point of control, which can provide the business with a lower total cost of ownership and enhanced data protection.

These are just a few of the many benefits of running desktop operating systems and applications on virtual machines that are hosted on premises in the data center or off-premises in the cloud and accessed via desktop clients or mobile devices. But as many IT administrators have learned, there's a catch: The benefits of desktop and app virtualization don't come without change and a fair amount of risk.

IDC recently reported that organizations are seeing greater than 300 percent ROI from VDI and RDSH deployments while receiving significant business value.<sup>1</sup>

### THE BUSINESS CASE<sup>1</sup>

<b>413%</b> <b>RETURN ON INVESTMENT</b> IDC projects that VMware Horizon® will yield an average five-year return on investment of 413 percent.	<b>71%</b> <b>LOWER COSTS OF OPERATIONS PER DEVICE</b> IDC calculates that virtualized desktops cost an average of 71 percent less to buy, deploy, support, maintain, and use over five years on a per-device basis.	<b>76%</b> <b>USER TIME SAVINGS</b> IDC calculates that employees spend 76 percent less time on device application log-ins with VMware Horizon.
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1. IDC, "The Business Value of VMware Horizon," January 2016.

When you launch a VDI or RDSH initiative, you will impact the daily lives of people throughout your organization.

## The Wages of Sin Is a Failed Project

VDI and RDSH change the way desktops and apps are delivered to users, yet there are many temptations along the way that could cause a project to go off track. Committing one or more of these sins could slow down your VDI or RDSH deployment at any stage, from initial planning to the rollout of production systems. If you don't avoid them, you run the risk of disrupting ongoing business operations, losing staff productivity, and creating unhappy end users.

In a worst-case scenario, if users can't perform their jobs because they can't access their desktops and applications, business operations might come to a halt. For some industries, the inability to access desktops and applications could be even more damaging. Healthcare professionals, for example, might be impeded in their efforts to make life-and-death decisions and administer quality treatments at the point of care.

Given the high stakes, the message to project planners should be clear: When you launch a VDI or RDSH initiative, you will impact the daily lives of people throughout your organization. You can't afford to fall into a trap that might put their day-to-day work or productivity in jeopardy. The first step to avoiding these sins is knowing what they are.

## Sin #1: Not Laying the Foundation for Success

The success of any project is highly dependent on the right level of planning and readiness. There are two things that position you for success: (1) Conducting a pre-assessment and (2) Starting with a pilot phase.

### Shortchanging the Pre-Assessment

Doing a thorough review of your desktops and applications helps you gain an understanding of the workloads that will run in the virtualized client environment and their associated technical requirements. The information gathered in this phase is critically important to the design of your eventual VDI or RDSH solution.

#### A pre-assessment helps you:

- **Avoid making decisions based on assumptions.** It allows you to capture tangible insights, such as the applications people are using, how long it takes to launch them on a physical desktop, and how they perform on a physical desktop.
- **Lower project risk.** It helps you discover potential conflicts and issues by determining how many users are actually using specific applications, and how that may impact the way the applications are delivered to the users or the license requirements for the applications.
- **Design the right solution for your needs.** Consider utilization of CPUs, memory, disk, and network bandwidth in the physical systems—which are all crucial in properly sizing the underlying infrastructure.
- **Take technical and operational considerations into account.** You'll want to look at things like ESXi host sizing, RDSH image configuration and optimization, antivirus solutions, provisioning, and "Day 2" operations, such as recurring maintenance.
- **Avoid unnecessary costs.** Without a pre-assessment, selected hardware may not be able to provide the required compute or storage resources, which could lead to additional capital investments that could have been avoided if the solution had been sized properly.

**How to Avoid This Sin**

A number of vendors provide desktop and application pre-assessment software. These products typically use an agent installed on the local desktop that feeds metrics into a central reporting server. Reports can be generated from the administrative console to provide a detailed analysis of the current desktop environment. Reports generated by pre-assessment software give you key metrics about the performance of your existing environment, so a VDI environment can be properly designed to meet the performance and latency requirements of your end users.

**What to consider before you start your pre-assessment:**

- **Identify your objectives.** Take a step back and consider what you're trying to achieve before you think about IT requirements. For example, a desktop project focused on reducing costs will have very different requirements and priorities than a project like publishing an app with RDSH, which might be aimed at enhancing functionality.
- **Look at the bigger, people-focused picture.** Instead of diving straight into technical requirements, such as numbers of servers and sizing of WAN links, begin by exploring user needs and business drivers.
- **Uncover any special requirements.** Each project has unique requirements that will affect your pace and plan. For instance, you may need to address compliance issues, provide high availability, create disaster recovery plans, or rapidly onboard large numbers of new users due to mergers or acquisitions. Identifying these obligations ahead of time will help you plan appropriately.

**Skipping the Pilot Phase**

The pilot phase helps you more fully define and refine your VDI or RDSH deployment plan. You should put it in place as soon as some aspect of your production environment is viable, so that you can validate performance for full production scale.

Organizations that skip the pilot phase, or run a pilot that doesn't produce a clear outcome, risk failure when an environment goes into production or never advances further. A pilot should have clearly defined objectives and a specified timeframe. Objectives may include validating the performance data used to size the environment and surveying end users.

**How to Avoid This Sin**

A properly managed pilot should engage real users from various use cases to pilot the environment and generate meaningful load data. While they are often the first to want to use the VDI environment, IT administrators are not a good group to base the pilot on, as they are not representative of your entire organization's user base.

If the goal is to include an executive user in the pilot, ensure the environment has been thoroughly tested and the support processes are in place to provide the service level this user would require.

**SUCCESS TIP**

Engage desktop support teams during the pilot to prevent the project team from having to take on that task.

## Sin #2: Not Involving the Right People

As you start your VDI or RDSH project, it's important to get the right people involved from the beginning. You'll want to pay close attention to two key groups: (1) Project teams and (2) End users.

### Overlooking Key Project Contributors

A common mistake is building a team around virtualization architects rather than desktop and app administrators. While it may seem logical to begin with people who best understand virtualization, the reality is that virtualizing desktops and apps is quite different from virtualizing infrastructure.

For example, administrators who are skilled in virtualization typically don't build their own workloads, such as desktop images and virtualized apps. They tend to be more focused on operating servers in a virtualized environment. In the new world, you have to consider how you will manage virtualized desktops over time and how you will manage applications independently from desktop images and user preference for personalization.

### How to Avoid This Sin

For a successful project, you need the close involvement of the people in your organization who design and manage desktop and application environments. For example, with desktops now hosted in the data center, it is important that the storage systems hosting the desktops and the networks used to access them are properly designed, so you will want to involve storage, server, and network specialists. Coordination and collaboration are keys to success.

### Tip: Improve outcomes with skills development

- Encourage your current IT administrators to become masters of your virtualized desktop and app environment.
- Tap into resources such as certification courses from technology vendors, involvement with user groups, and interaction with IT administrators from other companies that are on the same path.

### Underestimating the Importance of End Users

End users are essential to helping your project team understand how workers perform their day-to-day jobs. Their perspective allows you to gather the full range of user and business requirements and develop a clear definition of the problem you are solving.

User involvement in the design process is also one of the keys to managing expectations and, ultimately, gaining their support for the resulting solution. Even the most technically well-executed VDI or RDSH project can fail if enough users believe that it doesn't meet their needs or expectations. Their acceptance and use of the solution will be the ultimate key performance indicator on which the success of the project will be judged.

### How to Avoid This Sin

View users as critical stakeholders in your project, and treat them as such. Involve them early on—don't wait until after important decisions have been made—and engage them in the process of moving forward.

For courses offered by VMware, visit [vmware.com/education-services.html](http://vmware.com/education-services.html)

### USE CASE: MOBILE HEALTHCARE CLINICIANS

As healthcare clinicians travel within and between facilities with mobile devices, they need fast access to patient and diagnostic data, including high-resolution medical image files from picture archiving and communication systems (PACS). In such a case, it would be critical to involve users so that you can gather all necessary requirements for response times, medical image views per minute, and other metrics to deliver the right solution.

**Tip: Clear, widespread communication fosters success**

- Interview representatives from the business units to understand their requirements and what they perceive as the current shortcomings of the existing desktop environment.
- Keep end users informed about what's coming. Set up a schedule for periodic mailings that talk about the upcoming changes and the benefits they will bring.
- During rollout, provide users with a questionnaire to give them the opportunity to express their opinions of the deployment.

**Sin #3: Defining App and Desktop Virtualization Use Cases Improperly**

App and desktop virtualization use cases are built on types of workers and their job requirements, the applications and devices they use, their requirements for storage and multimedia performance, and their network connectivity restraints. Given this reality, it's important to consider the culture of the organization and its attitudes toward the use of infrastructure when defining culture and workflow requirements.

**Ask questions like:**

- Does the organization allow multimedia streaming?
- Does it have teleworkers who watch high-definition video?

The answers to questions like these should be factored into your use cases. For example, if some workers need to stream video as part of their jobs, you might want to let video streaming run natively on laptops and publish just the most sensitive data through RDSH infrastructure. If users have no business requirement to stream video, but the practice is allowed in the work environment and happens frequently, consider the impact of video streaming in the design of your VDI solution.

Traditional desktops typically provide an abundance of resources to users and saturation of a resource will not affect other users, but with VDI, resources are shared and utilization of resources is designed to be more efficient.

**How to Avoid This Sin**

In developing use cases, take care to not oversimplify, such as lumping lots of workers into a generic category called "office worker." In practice, different users within the same office setting likely run different applications and have varying performance requirements. Create enough use cases to cover the full range of requirements of different types of users without creating a lot of special-needs desktops.

Ultimately, ensure that users receive the resources and system performance appropriate for the work they do and the way they currently perform their tasks.

**Sin #4: Not Properly Optimizing the Desktop Image or Considering an RDSH Deployment**

Teams often fail to properly optimize the standard operating environment (SOE) for VDI (via a desktop image) or RDSH (via a server image). Why do they skip this step? Because they're trying to manage virtual desktops the same way they manage existing physical desktops. Don't make this mistake. In reality, virtual desktops are quite different from physical desktops, in part because they live in a world of shared resources, and should be optimized accordingly.

**FOR EXAMPLE**

Users in accounting may need to use specific accounting applications or large spreadsheets, while users in human resources might use Microsoft Word and web-based applications. While both are categorized as "office workers," they use different applications and have different performance requirements.

**SUCCESS TIP**

Keep in mind that there is also the risk of over-optimization of the desktop image. You can over-optimize to the point of affecting system usability by disabling services that the users or applications may need or expect.

Optimizations for virtual desktops include disabling unused Windows services, streamlining the Windows user experience, and ensuring the optimal virtual hardware is selected. When applied across an environment, optimizations of the desktop image can save precious resources, such as network bandwidth and storage capacity, while enabling a better user experience.

**How to Avoid This Sin**

Work with users to understand the impact of optimizations by conducting surveys or workshops with business unit representatives. For example, while it may reduce bandwidth consumption, how will users react if you disable their desktop themes? And although it may help reduce disk growth, what will happen if you disable the recycling bin in the desktop image? Will users accidentally delete files? Or how will users react if you turn off graphics modes or printer access? You want to understand the answers to questions like these before you move down the optimization path.

In the case of an RDSH deployment, you might want to create a server silo dedicated to a particular app. This approach helps you remove a lot of the variability from the app maintenance equation. In addition, it might be advantageous to deploy RDSH server images to further define what is delivered and to scale and manage updates. Or you might leverage a server with a GPU to increase availability by offloading graphics compression from the CPU. You might then be able to run 20 to 30 videos with a GPU without negatively impacting the performance of the CPU.

**VMware App Stacks™**

Another way to solve this problem is to leverage the VMware App Stacks™ feature in VMware App Volumes™, a suite of software designed to provide fast application delivery and unified management. The App Stacks feature allows you to deliver app stacks more efficiently by injecting them into the VM as a user logs in, rather than building them into the server image. This approach allows for the temporary enablement of an application based on a specific user profile.

**BEST PRACTICE**

Do tasks in parallel to help your project team meet your deployment timelines. For example, you might perform virtualization and imaging tasks in parallel to drive toward a time-efficient deployment.

**Sin #5: Not Developing an Application Deployment Strategy**

An organization with several thousand employees might have users on a couple hundred different applications, including specialty products for particular job functions. It may have developed application deployment strategies for commonly used applications, but overlooked specialty applications because it was easier to simply install these applications for the small number of users who required them.

Cases like these underscore the need for a deployment strategy for all applications. The application deployment strategy will have a direct impact on the way the virtual desktop environment is designed. If applications are installed on user login, this limits the design choices, but a VDI or RDSH environment can still be properly designed to meet this constraint.

**How to Avoid This Sin**

Before rolling out a VDI or RDSH environment, you need a clear understanding of how you will deploy, update, and manage applications that are common across the user base, that are used only by certain user groups, and that are used by just one or two users.

Consider how applications will be packaged and the impact on performance if updates need to be pushed out to a large number of desktops in a short amount of time. Application virtualization may be challenging for some applications but could provide management benefits that outweigh the costs to package the applications.

#### VMware App Volumes

One way to enable faster delivery of desktops and applications delivery is to leverage the capabilities of VMware App Volumes. VMware App Volumes is a portfolio of application and user management solutions for Horizon, Citrix® XenApp and XenDesktop, and RDSH virtual environments.

App Volumes is a key component of Just-in-time Management Platform (JMP), the next-generation desktop and application delivery platform from VMware. JMP untangles the operating system, applications, and user personalization. By doing so, all component pieces can be reconstituted on demand to deliver just-in-time desktops and apps across any infrastructure topologies and to any device.

#### Sin #6: Incorrectly Deploying Office 365/Office Pro with VDI or RDSH

Not configuring how patching is implemented can cause problems with your Office 365 in VDI or RDSH solutions. The default behavior for Office 365 is to perform daily checks to see if its build is current. If there is a newer version available, Office will download the bits from the Content Delivery Network (CDN) and append patches accordingly. Non-persistent VDI pools are designed to refresh the desktops to their original state after being used and upon session logoff.

Here's the problem: Refreshed desktops (also applies to RDSH systems) will continuously pull down and install the same Office updates every time they are cycled. Typical updates can be several hundred megabytes in size, with frequent changes available for each channel release. This means the delta from Office build in the master image to the latest updates will accumulate over time. This can be an especially problematic scenario for environments where end users log in and out multiple times a day using an outdated Office image. Network and host infrastructure performance can be negatively impacted.

#### How to Avoid This Sin

Properly configure Office 365 for VDI and RDSH during the initial setup process by disabling the default patching behavior.

- Append the Office 365 configuration.xml file with `<Updates Enabled="FALSE"/>` to disable updating.
- Other ways to turnoff patching include using the Office ADMX GPO setting related to automatic updates or add `UpdatePath=\\server\emptyshare` to the configuration.xml file. Office will look for updates in an empty file share and disregard the patching process.

Office patching should be done manually. When new updates need to be implemented into a non-persistent VDI pool or RDSH farm, manually apply the updated build into the master image, then role the changes to the environment.

## Sin #7: Not Planning Adequately for Potential Problems

As you transition from one environment to another, or implement new VDI or RDSH functionality, unintended consequences such as performance gaps or outages may occur. It's important to think through possible issues ahead of time, specifically around: (1) Understanding the impacts on the performance of other systems; and (2) Discovering single points of failure in your architecture.

### Overlooking Performance Impact

In a traditional desktop environment, each user had full access to his or her own disk spindle (or dedicated flash drive), and poor network bandwidth for WAN sites could often be tolerated. When moving to VDI, it is important to understand the full range of performance impacts stemming from network bandwidth, storage area network (SAN) array processor utilization, and display protocols. All of these variables can affect application performance. But in some cases, application performance will improve over the WAN as the actual data between client and server apps remains in the data center.

### How to Avoid This Sin

While VMware Horizon® Planner can provide a synthetic workload for benchmarking performance, ideally the performance impacts should be fully explored through engagement with users. Your users can help you generate realistic proof-of-concept or pilot workloads to validate their requirements for graphic bandwidth, storage, I/O, and more.

Network bandwidth is an especially important consideration on wide area network (WAN) links. If your WAN links cannot provide the bandwidth for a VDI environment or the latency is too high, then you might want to consider local deployments. Also, while your SAN arrays might initially be able to handle the workload of the pilot, particularly if shared with other workloads, they may represent a performance cliff and cause a sudden degradation of performance as the environment scales.

### Assuming Your Infrastructure Is Invincible

Service availability is critical. Any component that is required to deliver a fully functioning desktop experience to a user needs to be available at all times. Yet while failures and outages can be minimized, external factors sometimes make them unavoidable. Planned maintenance tasks may need to temporarily take down an individual server or component.

To deliver a reliable uptime, the infrastructure must be redundant and robust enough to service users without reliance on an individual server or component. This is especially critical for organizations that require a 24x7 VDI or RSDH environment.

### How to Avoid This Sin

Avoid single points of failure by having multiple servers each running the services that are critical. This makes the overall service redundant and also allows it to scale. Size the quantity of servers required for the load and add extra servers (N+1) to allow for outages or maintenance without affecting the service delivered to end users.

Use load balancers in front of server components such as Connection Servers and Unified Access Gateways. These act as common namespaces for the component they are load balancing and allow individual servers to be added, removed, or upgraded

without affecting the user's ability to use the service. Up to seven Horizon Connection Servers can be grouped together behind a load balanced namespace to form a View Pod. Always keep a Pod, and all the Connection Servers that form it, within one site or location. For subsequent sites, form separate Pods and join the Pods together using Cloud Pod Architecture.

#### Considerations for disaster recovery:

- First, design for redundancy within the site. A single server outage should not render the whole service in the site unavailable and thus require a site failover.
- Next, ensure that all components are reproduced or have equivalents in the recovery site so that there are no cross-site dependencies. Remember to consider the entire end user service. Ask questions like:
  - Are the data and applications used replicated or reproduced in the recovery site?
  - Will the service delivered there match the users' primary experience and their expectations?
- Finally, consider the whole environment infrastructure and any dependencies used in the VDI or RDSH environment. Find answers to questions like:
  - Are components such as DNS, DHCP, RDS Licensing robust enough to handle the load and are they redundant?
  - Will a single server outage make that component unavailable? Are these components, and any of the dependencies that the service requires, present in a second location if disaster recovery is required?

### Avoid the Sins—and Deliver a Blissful Desktop-Like Experience

A well-designed VDI or RDSH environment can provide users with most of the functionality and performance of desktop operating systems and applications, along with higher availability and a lower risk of hardware failure.

When you take proactive steps to understand the business drivers for your projects, identify your technical requirements, involve users in the requirements gathering, and run a pilot with real users, you're on the path to success. To continue forward, take steps to optimize the design of your VDI or RDSH environment to deliver a desktop-like experience in your virtualized environment.

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