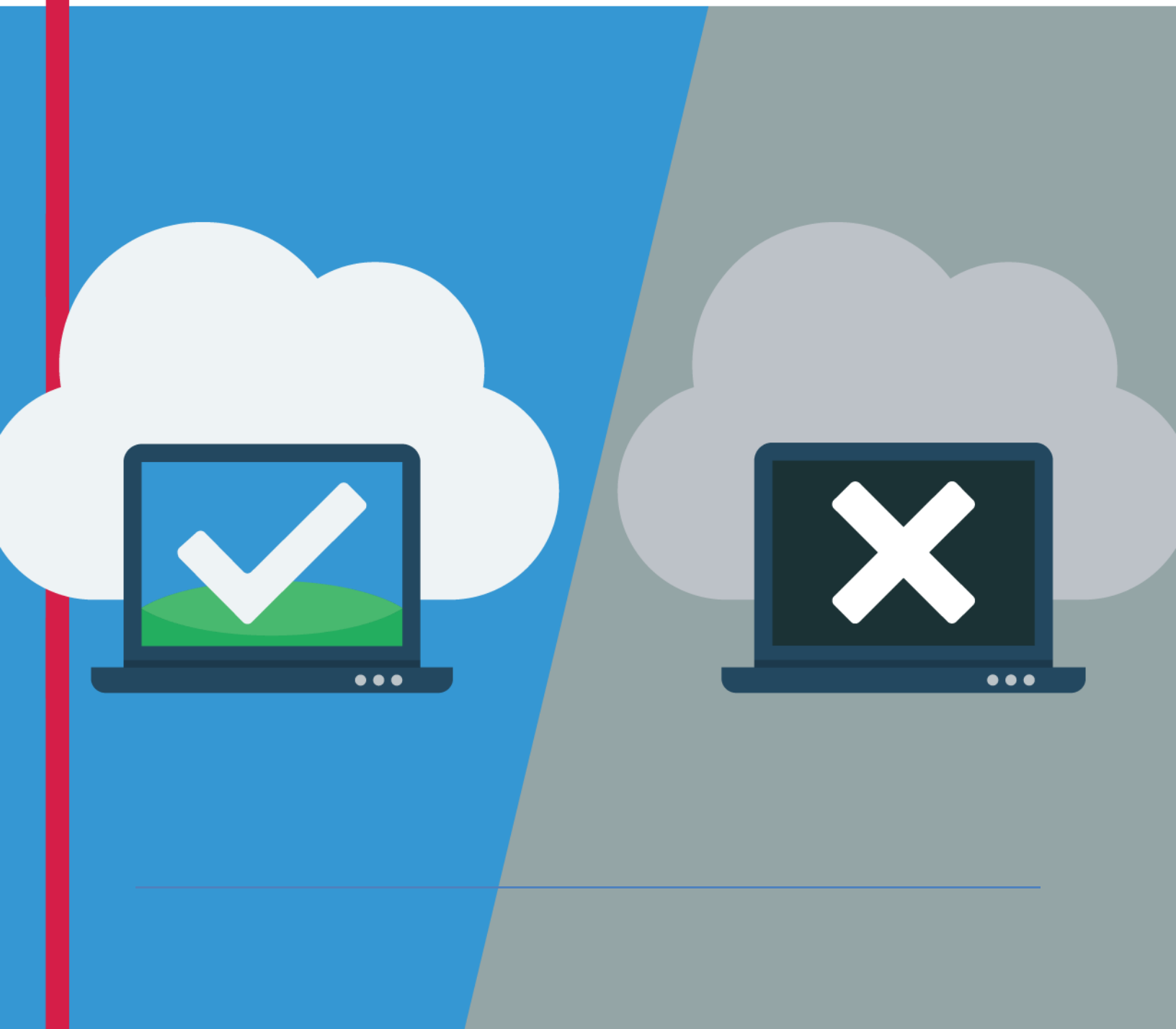
unidesk Desktop Layering for VDI™

Top 10 Reasons VDI Projects Fail (and How to Avoid Them)

Unidesk's customer VDI webinar series has featured 40 midmarket enterprises sharing their desktop virtualization successes – as well as their early failures and lessons learned. We've culled their feedback down to ten of the most common reasons VDI projects fail – and what you can do to avoid them.



Introduction

More organizations are virtualizing desktops than ever before. According to Gartner, the hosted virtual desktop market could hit 76 million users by 2016. IDC agrees, predicting the on-premise and hosted Virtual Desktop Infrastructure (VDI) market could reach $1.3 billion in the next three years.

What's driving this growth? The increased security of getting data off the edge. The anywhere-any device access and BYOD trend that enhances user mobility (and is resulting in employees working more!). The longer lifespans and lower energy footprint of zero clients compared to PCs. The potential for simpler desktop management and massive operational cost savings.

With so many clear benefits, why are many VDI projects stuck in the early stages of deployment? Why are some being scrapped entirely and companies going back to refreshing their PCs?

1) Your end users resisted the move to virtual desktops

The desktop is how work gets done in almost every organization. Unhappy users complaining about their desktops will surely get the attention of your executives. And get your VDI project on the "no-go" list.

The problem is that many people don't like change, and will resist anything that's different. How do you get them to give up their familiar PCs and accept virtual desktops?

Here are a few techniques that smart IT teams are employing to ensure VDI acceptance:

- **Arm influencers with "cool" mobile devices.** When Sunrise Health kicked off its virtual desktop deployment, the IT team gave Apple iPads to the opinion leaders in each department, and encouraged them to walk around and show off how they could access their desktops, X-rays, MRIs, and EMR apps from any floor or wing. It wasn't long before every worker wanted an iPad and a virtual desktop. VDI demand grew so quickly, it outpaced delivery of the back-end servers and storage.

- **Don't scare them with new terms.** Vigo County's approach was just to tell users "here's your new desktop" whenever a PC reached its end-of-life. The new "PC" was really a zero client connected to a virtual desktop, along with a newer, bigger flat-screen display. VMware Horizon View was needed to authenticate users and broker their desktop connections, which deviated from the standard Windows login prompt. But the IT team just told the users it was a "new way of logging in."

- **Educate them on the benefits.** Before Bernstein Shur started implementing VDI, the IT team gave demonstrations to the law firm's attorneys. They showed how virtual desktops would save their sessions, let them resume working from any device at the office, home, courts, or appointments, and give them 24x7 access to legal applications. For attorneys who are under pressure to maximize billable hours and respond quickly to clients, this was music to their ears.

- **Include them in the project.** Leading food processing manufacturer TIPPER TIE ran focus groups with end user representatives from each department during their VDI planning stage. By gathering end user input and making them feel listened to, the IT team had their backing from the start.

2) You didn't work with your IT colleagues

No matter how big or small your IT organization, you can't make VDI happen by yourself. If you don't work collaboratively with your IT colleagues early in the project to get their help and gain their buy-in, you will surely hit roadblocks and politics down the road.

Organizations that are deploying VDI successfully get everyone involved:

- Storage and server admins allocate the resources to host virtual desktops.
- Network managers may have to make network changes or upgrades to boost bandwidth or allow desktop access from home PCs.
- Desktop admins will have to learn new, more efficient methods of provisioning and configuring desktops and applications.
- Service desk personnel will have new, easier ways to handle desktop break/fix.
- Security may want to weigh-in on authentication and access procedures.

Form a cross-functional team, manage the VDI project with open lines of communication, and collaborate with your colleagues or outside consultants. This will help you stay on track for VDI success.

3) You didn't have enough storage IOPS

Insufficient storage IOPS (input/output operations per second) is a recipe for VDI disaster. You may have enough storage capacity to host your virtual desktops. But when the rotating disks in your old SAN array are all being accessed by many server-hosted desktops at once, IO performance will suffer. Desktops will act sluggish. And users will start asking for their old PCs back.

Newer storage vendors like Fusion-io (NexGen), Nimble, Nutanix, Pure, Tegile, and Tintri, as well as established players like Dell, EMC, and HP now offer storage systems that use solid state drives (SSD) for high performance IO. Some are all-flash. Others use a hybrid approach that combines flash and traditional spinning disk in the same array to optimize cost, capacity, and performance. These hybrids keep the frequently accessed "hot" data on high performance SSD, and store the infrequently accessed "cool" data on high capacity spinning disk.

Virtual desktop layering software by vendors such as Unidesk is a perfect complement to these new flash-optimized storage systems. Layered desktops are provisioned from a shared set of operating system and application images, or "layers". The layers are stored once and

referenced by many desktops, greatly reducing the amount of storage capacity required for VDI, and enabling more desktops (or other virtual workloads) to be hosted on the same storage array for lower TCO. Layering also creates a "hot" data pattern that helps the hybrid arrays keep the most frequently accessed data on SSD to maximize desktop IO performance.

Here's what four educational institutions are doing to avoid the VDI IOPS problem:

- **Colby Sawyer College.** Colby-Sawyer took the unusual step of virtualizing faculty and staff desktops first. They knew these persistent desktops had to perform at least as well as their old PCs, if not better. Fusion-io ioControl™ Hybrid Storage (formerly NexGen) and Unidesk are providing plenty of IOPS for the desktops on a small capacity footprint.
- **Mercer University.** Mercer has almost 1000 virtual lab desktops in production to deliver on its "Borderless Classroom" vision. EMC VNX FAST and Unidesk are ensuring that insufficient IOPS isn't a problem.
- **Tennessee Tech University.** TTU is using Dell EqualLogic hybrid SAN arrays and Unidesk for its lab, classroom, and health services desktops.
- **William Woods University.** William Woods wanted management simplicity and IO performance from its VDI deployment. Tintri VMstore™ VM-aware hybrid storage and Unidesk are meeting both requirements.

Don't let insufficient IOPS cause your VDI project to fail. Use this easy VDI IOPS calculator to determine your IO requirements. Then let flash-optimized storage and desktop layering cost-effectively solve your IO problem.

4) You couldn't virtualize all of your applications

The rule of thumb has always been "Virtualize your apps first, then virtualize your desktops." Not bad advice. Except that traditional application virtualization has three big problems that can stop your VDI project dead in its tracks.

1.) **It's really hard and time-consuming.** Microsoft App-V, VMware ThinApp, and other traditional app virtualization tools are awesome for isolating apps that you don't want to conflict with each other. But for the remaining 95% of your apps that just need to be delivered, this approach is often too hard. By the time you've finished the desktop setup, pre-scans, post-scans, scripting workarounds, Windows registry changes, and deployment to 50 desktops, you'll find a full day has passed. Or more. It's not unusual to spend a week virtualizing a single app. And that's if you're an expert.

2.) Not all apps can be virtualized. Even if you are an expert, there's a long list of apps that cannot be virtualized with traditional app virtualization tools. Apps with system services

and boot time drivers (e.g. antivirus, printers, scanners, etc.), homegrown apps, and apps with complex Setup procedures often won't work.

3.) **Isolated apps can't cross-communicate.** Application isolation puts apps into their own protective "bubbles," effectively hiding them from Windows and other apps. This is perfect for running multiple versions of the same software (e.g. Java or Microsoft Access) on the same desktop. But it's a showstopper for the other 95% of apps that need to share data, link to each other, and cross-communicate.

Hamilton County, Indiana found its VDI project stuck at 100 desktops for over a year with these issues. QuickBooks, Roxio DVD burner, Dymo label writer, Track-It! help desk, Odyssey court and justice software, and other apps would not virtualize. Even outside consultants couldn't make them work. The county considered scrapping VDI and buying new PCs.

Then they found a new way to virtualize applications using desktop layering software from Unidesk. Now, all apps have been virtualized as layers by the county's own IT staff. The process typically takes less than 20 minutes per app, and requires only in-house skills. Layered apps aren't isolated, so they work together as if they were natively installed. Hamilton County's VDI deployment is back on track and scaling up.

If you have more than 20 Windows apps and don't want to pay outside consultants or hire app packaging experts, look at application layering as the simpler way to virtualize apps. And keep your VDI project moving forward.

5) You had too many Windows gold images

You were probably hoping that VDI would eliminate the need to patch multiple copies of Windows. Finally, one clean master – the elusive "gold image" – that would be the foundation for all virtual desktops. Then, you were hit by "gold image sprawl." And your VDI project was again on fire.

This is what happened at Port Authority of Allegheny County. The IT team realized they couldn't virtualize their 80+ applications using application isolation tools (see #4 above). So, they started building apps into their Windows image.

But most of their desktops needed different sets of apps. Building every possible app into a single Windows image would have forced them to license every app for every user. They couldn't afford this. Plus, they didn't want to update the master image every time they needed to update one app.

So, they started creating different Windows images with different combinations of apps. The Windows image was no longer golden. And this is where VDI got stuck.

Patching a single Windows image once a month on Patch Tuesday took the county's Windows administrator the better part of a day. Patching ten Windows images could consume an entire week. That was a heavy price to pay for the lean IT team.

The Port Authority's solution was desktop layering software. Because the organization's lean IT team is able to virtualize all 80+ apps as separate layers, they are now delivering them to desktops in any combination using a single Windows 7 gold image.

Remember, you don't have to have more than one Windows image in VDI and waste entire days applying patches. Use layering to achieve the elusive "gold image."

6) You couldn't satisfy knowledge workers and power users

In the early days of VDI, everyone told you to implement non-persistent desktops. At the time, non-persistent desktops used less storage than persistent desktops, so they were considerably cheaper. And if all user changes were thrown out after each use, the desktops would be easier and less costly to support.

Sounds good in theory. But what happens when you have knowledge workers who need lots of different applications, and who are accustomed to installing apps on their own? Or, you have users who personalize their desktops for productivity reasons, and expect to have the same experience every time they login? 90% of desktop users fall into these two categories. Non-persistent desktops that throw out all of their changes flat out won't meet their needs.

And don't forget the power users who use heavy-duty apps. State, county, and city governments need GIS software such as ArcGIS for mapping and spatial analysis. Architectural services firms, building and construction firms, and engineering labs in colleges and universities require CAD software such as AutoCAD, Revit, and Civil 3D. Most marketing departments rely on Adobe Photoshop and Illustrator. Your VDI project will sink if these graphics-intensive apps don't perform well.

Vigo County, Indiana found itself facing both issues as it began deploying VDI to its employees. How is the county's IT team delivering persistent, high performance virtual desktops that satisfy its knowledge workers?

To solve the VDI persistence problem, Vigo County is using desktop layering software from Unidesk. With layering, it doesn't matter if you implement non-persistent or persistent desktops. Both use minimal storage because the Windows operating system and application layers are stored once. Now that the IT staff is creating persistent desktops, county workers are able to customize their desktops without worrying about losing their changes. The storage

savings offered by layering enables Vigo County to host its desktops on Fusion-io flash memory cards for outstanding I/O performance.

The answer to the county's VDI graphics performance challenge with ArcGIS was NVIDIA GRID™ graphics offload cards. Snap them into the server, and graphics processing is offloaded from the CPU to the GPU, enabling virtual desktops to deliver PC-like performance. Vigo County's ArcGIS users are now enjoying highly responsive windows, rich multimedia, and outstanding 3D application responsiveness.

Don't let knowledge worker requirements for persistent desktops and graphics-intensive apps sidetrack your VDI project. Use desktop layering to allow full personalization at minimal storage cost, and graphics offload cards to make even the most graphics-intensive apps fly.

7) You underestimated the complexity

Here's one we hear a lot: "Once we got VDI into production, we found our Level 1 PC staff couldn't manage virtual desktops. The tools were so complex, our Level 2 and 3 IT administrators had to take it on. These are some of our highest paid people. Not only did VDI increase the cost of desktop management, but we lost resources from our forward-facing, strategic IT projects."

This is where many VDI projects get sidetracked. The pilot went fine because you had your architects or senior technical people leading it. Then you went into production and started transitioning virtual desktop management to your PC techs. And you learned the hard way that the mix of Linked Clones, Provisioning Server, Machine Creation Services, View Composer, ThinApp, XenApp, App-V, Persona, User Profile Management, or Personal vDisk, plus more third party add-ons, is just too hard for your PC admins.

This is what stalled the VDI project at leading architecture and engineering services firm STV, Inc. The firm's Tier 1 desktop staff couldn't handle the complexity of virtual desktop management using the point tool, multi-console approach. The firm's "VDI 1.0" deployment stalled before it reached 300 users.

STV's answer was all-in-one VDI management software from Unidesk. With desktop layering technology, the need for separate desktop provisioning, storage optimization, application virtualization, image management, profile management, and user virtualization tools goes away. So do the limitations of the point tool approach. Management capabilities are delivered in a single, easy-to-use interface that is easily mastered by Tier 1 desktop admins.

STV's revamped VDI project – christened "VDI 2.0" – is now underway. Day-to-day VDI management has been transitioned to Tier 1 desktop staff. And the firm is on pace to deliver virtual desktops to over 1,000 knowledge workers.

8) You didn't understand Windows VDI licensing costs

When it comes to VDI, many organizations don't have a clear understanding of Microsoft Windows licensing. It's not always the cost of Windows licenses that derails your desktop virtualization project. It's the fact that you had to go back and ask for more money after you thought you had purchased everything you needed.

To stay in compliance, you're supposed to license Windows for virtual desktop access. Here are three ways you can do it:

1. **Windows Client Software Assurance (SA).** If you're going to reuse existing PCs as virtual desktop client devices, and those PCs are already covered under SA, you don't need to do anything. You can access your virtual desktops from those PCs at no additional charge. Check out the many Windows-based software tools that make it easier for you to repurpose old PCs as thin clients, as well as a number of non-Windows based methods.
2. **Windows Virtual Desktop Access (VDA).** If you want to use thin clients, mobile devices (e.g. employee-owned BYOD or company-supplied devices), or PCs that are not covered under SA (e.g. contractor-owned PCs or employees' home PCs), you will need to purchase a VDA license for every device that will be used to access virtual desktops. Windows VDA costs MSRP $100 per device per year (USD) through Microsoft Volume Licensing (VL) programs. The total number of Windows VDA licenses you'll need equals the total number of thin clients, mobile devices, and other non-SA devices that will be used to access VDI. To learn more about VDA, read "Microsoft VDI and Windows VDA Frequently Asked Questions."
3. **Windows Server as a Desktop with Remote Desktop Services Client Access License (RDS-CAL).** If you want to avoid the annual VDA device fee, you can run Windows Server® as your virtual desktop OS. In this case, you would have to purchase a RDS-CAL for Windows 2008 Server or Windows 2012 Server. RDS CALs can be either per user (one user can access a virtual desktop using multiple devices) or per device (one device can be used by multiple users). RDS CALs are perpetual licenses, not subscriptions, so you only have to purchase it once. Organizations that take this route typically install the Windows 7 Desktop Experience to make Windows Server look and feel like the desktop OS. Note there are reasons why you may not want to use Windows Server as your VDI desktop – the VDA FAQ above addresses these. To learn more about the RDS CAL policy, read "Licensing Windows Server 2012 R2 Remote Desktop Services."

Don't let Windows licensing for VDI surprise you. Consider your options, and plan for it up front.

9) You couldn't build a good business case

Server virtualization is easy to cost-justify:

1.) Consolidate a large number of under-utilized small servers down to a small number of fully utilized, virtualized big servers.
2.) Save money.

Desktop virtualization is harder. By the time you add up the cost of servers, storage, and thin clients, then factor in licensing for Microsoft Windows VDI (see #8 above), the hypervisor, and connection brokers, the best you're likely to do is break even on capital costs compared to buying new PCs.

This is why many VDI projects never get out of the starting blocks – you couldn't show cost savings beyond the soft benefits of enhanced mobility and security.

So how do you build a compelling business case to sell desktop virtualization to your internal decision-makers?

Two ways: Energy Savings and OpEx Savings.

Energy Savings

Let's look at energy savings first. Thin (or zero) clients use 5-14 watts of power per hour. PCs use 65-250 watts of power per hour. The difference comes from the thin clients having no hard drives, no moving parts, minimum processing power and a relatively small amount of RAM. Armed with this knowledge and some assumptions, it's easy to show that VDI will save your organization a considerable amount in yearly energy costs.

Let's assume thin clients and PCs are in active use about 9 hours a day 230 work days a year (excluding weekends, holidays, vacation, and training). The rest of the time they should be in sleep mode to conserve energy.

To be fair, let's account for the servers that will host your virtual desktops. A server hosting VDI workloads will consume 450-650 watts of power per hour, and host 60-100 virtual desktops (desktop density). Unlike PCs and thin clients, servers are in active use 24x7x365, since one of the key benefits of VDI is anywhere, anytime access to desktops.

Now add in your cost of electricity in KWH for your location, and you can calculate the savings using the following formulas.

Here's a calculation for PC costs per year:
(Number_of_PCs * PC_Energy_Use * Hours_Desktop_Non_Sleep_Mode * Number_Work_Days_Per_Year * Cost_per_KWH/1000).

Here's a calculation for VDI energy costs per year:
(Number_of_Virtual_Desktops * Thin_Client_Energy_Use * Hours_Desktop_Non_Sleep_Mode * Number_Work_Days_Per_Year * Cost_per_KWH/1000) + ((Number_of_Virtual_Desktops/Desktop Density)) * Server_Energy_Use * 365 * 24 * Cost_per_KWH/1000))

Assuming an electric rate of $.20 per KWH, the energy costs for 1,000 PCs would be about $33,000 USD per year. By comparison, the energy costs for 1,000 virtual desktops would be about $15,800. Over the 4-year lifespan of a PC, that's a savings of almost $70,000 in favor of VDI.

Download this free VDI business case spreadsheet if you'd like to plug in your own numbers and/or make tweaks to the formulas.

Operational Cost Savings

Calculating the operational cost savings of VDI vs. PCs is a bit more involved. But the results are often staggering in VDI's favor. The free eBook Desktop OpEx Savings: The Key to Cost-Justifying VDI explains in simple terms how to calculate potential savings.

The eBook looks at three areas:

1. Operating system image management
2. Application delivery
3. Desktop support

and compares how these operations are carried out in the physical PC world, traditional VDI environments, and VDI environments that are managed by new desktop layering software. It concludes with case studies on State of Ohio Department of Developmental Disabilities, Kawasaki Motors Manufacturing USA, and Tennessee Tech University substantiating the findings.

The VDI business case spreadsheet mentioned above for energy savings also calculates the OpEx savings. When you put the two together, VDI becomes a no-brainer. And an easy way to sell VDI to your decision-makers.

10) You tested the wrong things in your pilot

It's amazing how many times we've heard "Everything seemed to work fine in our VDI pilot. But once we started putting virtual desktops into production, we hit a bunch of issues we never anticipated."

Welcome to the last reason why desktop virtualization projects fail – you tested the wrong things.

Many IT organizations make the mistake of focusing solely on the end user experience. Will the virtual desktops perform well enough to make my end users happy? Will VDI support all of our devices and peripherals?

Sure, these are important. But the connection brokers are pretty mature at this point. The ICA/HDX protocol used by Citrix XenDesktop is well-proven, having been fine-tuned for over a decade with terminal services. The PCoIP protocol used by VMware Horizon View is also market-tested. And both Citrix and VMware have impressive device certification programs that have qualified every tablet, mobile device, and thin/zero client known to humans.

What you really need to test and plan for are #1-9 above.

If you want to make sure your pilot covers all the bases, download this free VDI POC test plan. It has a complete checklist and suggestions to help you plan for VDI production success. And help you avoid the Top 10 Reasons VDI Projects Fail!