The Hidden Costs of Repurposing PCs as VDI Clients

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SUMMARY:

The temptation to repurpose PCs when deploying a Virtual Desktop Infrastructure (VDI) is eminently understandable. Several open-source and retail software packages exist to help transform PCs into VDI-appropriate thin clients, and if hardware you already have can deliver the new virtualized desktops, then why not use it? In fact, companies often do begin their transition to VDI by repurposing existing PCs as thin client endpoints – usually with the intention to phase in a full complement of thin or zero clients as quickly as budget allows. For some, the reuse of existing assets helps offset the initial VDI investment costs. For others, it seems like the quicker, easier route.

Regardless the motive, repurposing PCs for desktop virtualization can present numerous challenges and drawbacks. Additionally, each of the main software approaches to converting PCs into thin clients presents both immediate difficulties as well as longer-term concerns.

Topping the list of the challenges presented by PC repurposing is a hidden, higher-than-necessary total cost of ownership. This is unfortunate, since the intent in repurposing PCs is generally to save money. However, for the same reasons that PCs are a drain in a conventional network, they continue to be a drain when used as VDI endpoints. What’s more, by using PCs in place of leaner thin or zero clients, the primary benefits of VDI are reduced or eliminated.

An often overlooked factor when evaluating the advantages and costs of VDI, the selection of endpoint clients can have a notable impact on success of the initiative. Thin and zero clients designed to support VDI will deliver the greatest degree of efficiency and cost savings. The use of repurposed PCs can strip away many of the advantages companies seek in moving to a virtualized desktop environment, particularly if the goals include reducing the costs, downtime and management burden associated with PCs.

VDI Client Comparison

**Thick clients**
- Traditional PCs with local processing & storage repurposed for use with VDI
- Require local software
- Limited by memory/processor capacity
- Hard drive and media ports introduce security risks
- Require more maintenance
- Consume more power
- Age of hardware may inhibit performance

**Thin clients**
- Locked-down embedded Windows® or Linux® operating system
- Industry-leading security solutions from Citrix® and Microsoft®
- Hardware-optimized performance for HDX and RemoteFX® protocols
- Solid state design – no moving parts
- Low energy consumption
- Greater TCO savings

**Zero clients**
- Designed specifically for VMware® Horizon View™
- Hardware-optimized performance for PCoIP® protocol
- No operating system
- Immune to viruses
- Solid state design – no moving parts
- Fastest boot up
- Low energy consumption
- Greater TCO savings

**Mobile clients**
- Tablets and smartphones configured to deliver virtual desktops
- Flexible, anytime, anywhere access
- Support user preferences (BYOD)
Endpoint impact on the benefits of VDI

Combining the security and centralized management of the terminal systems from a bygone era, with the flexibility and performance users expect today, VDI offers an impressive array of benefits. Add to that increased efficiency, reliability and scalability, plus improved overall total cost of ownership (TCO), and it’s easy to understand why VDI appeals to many organizations.

The extent to which an organization will experience these advantages rests on many factors, such as the number of virtual desktops deployed. An often under-appreciated factor is the choice of endpoint to deliver the virtual desktops. Thin, zero and mobile clients offer somewhat differing advantages (see previous page). However, repurposed PC “thick clients” used with VDI can place significant constraints on the system, detracting from or even eliminating key VDI benefits.

Easier maintenance and management

One of the greatest attractions of VDI is the efficient server-terminal structure, which centralizes management functions and frees IT from time-consuming interface with each and every installed PC. Many endpoint manufacturers facilitate this convenience with included device management software for simple, centralized control of an entire thin or zero client network. Zero clients that are hardware optimized for VMware include the Teradici® PCoIP® Management Console. ViewSonic smart clients for Android™ come with Citrix® XenMobile® pre-installed for complete centralized control upon initial activation.

By contrast, when repurposed PCs are used as VDI clients, IT continues to be burdened with the management and maintenance of a "thick" endpoint loaded with local software. Conversion software that offers to assist with this dilemma succeeds to varying degrees, but still results in greater administration requirements than with purpose-built thin or zero clients. Teradici, a recognized industry leader for its VDI-enabling PCoIP technology, makes the following observations:
Open-source software designed to strip the PC and reduce its management footprint requires an administrator to wipe a target PC, replace it with a new operating system then test this configuration across the range of the company’s PC hardware platforms. Next a protocol must be developed for full deployment throughout the company. Commercially-available repurposing software typically requires and builds upon the Windows OS. The resulting interface makes it appear that the user is connecting to one system, however there are actually two: the local installed Windows OS and the virtual desktop. This background Windows Operating system from which the legacy PC boots still requires patch management in addition to the management of any anti-virus software locally installed.¹

Additional potential management tasks include hard drive maintenance and network driver updates. A final factor of note is that purpose-built thin and zero client devices are easier to patch thanks to patch bundles that are typically much smaller than the bulky updates required for conventional PC-based operating systems.

**Improved security**

VDI’s centralized structure dramatically reduces an organization’s security concerns. Data accessed via the virtual desktops is safely housed in the data center and can be easily restored in the event of endpoint loss, theft or failure. Data is similarly protected from the threat of viruses and malware. In addition, locked-down thin and zero clients prevent users from downloading unauthorized and potentially harmful content.

To achieve some measure of the enhanced security benefits offered by VDI when using repurposed PCs, it is critical that the PCs are properly converted into thin clients using high quality software that will deliver a totally stateless device immune to viruses. Improperly implemented, thick client endpoints present the potential for security breaches via their media ports and hard drive. Security concerns are also present if the repurposed machine continues to allow users to install software.

Finally, as noted by Teradici, “Despite the installation of software that facilitates the repurposing process, it is worth noting that, fundamentally, the repurposed PC still represents a similar attack surface area from a hacker’s perspective. This means that in government environments where security is paramount, the repurposed PC does not represent a significant improvement in security standards and requires the same level of ‘hardening’ as a conventional PC.”¹

**Greater reliability**

Personal computers are notoriously prone to mechanical problems and failure. The use of thin or zero clients in their place is a primary reason for the increased reliability offered by a Virtualized Desktop Infrastructure. Not only do thin and zero client endpoints offer more reliable day-to-day functionality, their lifespan is at least twice that of a traditional PC. All of which adds up to a reduction in maintenance requirements, hardware cost, and system downtime – for enhanced worker productivity and an overall improvement in TCO.

**Energy reduction**

When it comes to supporting green initiatives and reducing energy costs, clients that are purpose-built to support VDI are clearly superior to repurposed PCs, which will continue to consume as much power and require the same amount of cooling as when used with a traditional network. While the energy requirements to power specific zero and thin clients will vary to some degree, all will consume around 80% less energy per user than a traditional PC, which adds up to about a $30 savings per year for each user. In larger installations and in warm climates, cooling requirements can also be impacted, with the replacement of PCs with thin/zero clients notably reducing cooling expenses.

**Hardware cost savings**

When purchasing new hardware to support a VDI initiative, thin and zero clients are the logical choices for the reasons discussed in this paper. Not only do these purpose-built clients present a significantly lower initial cost, subsequent refreshes are also less costly than with traditional PCs – another of the selling points making VDI such a popular alternative to the networked PC model.
Some organizations do choose to begin their VDI transition by repurposing a quantity of existing PCs. In these cases the typical scenario is to also replace some PCs with more efficient, secure and reliable thin/zero clients, then transition as budget will allow to a full complement of purpose-built VDI clients.

Enhanced user experience
One of the outstanding features of VDI is that the administrative and bottom-line benefits it delivers can be realized at no cost to the end user experience. In fact, user satisfaction can be significantly enhanced by the greater flexibility offered by VDI. Users can be authorized to access data and applications from any location, at any time, including their own chosen mobile or at-home devices. Branch offices and telecommuting workers are easily supported from a centralized location, with the same computing power, access, and functionality as their coworkers at headquarters.

The use of repurposed PCs can play a role in delivering some of these user benefits, albeit with less ease and flexibility than offered by thin and zero clients. Additionally, the use of thin and zero client endpoints further enhances the work environment with their slim footprint, low operating temperature, and quiet operation, which allow users to enjoy a cooler, less cluttered workspace, with none of the ambient noise introduced by PCs.

Scalability
Once deployed, a virtualized desktop environment can be quickly and easily adapted to an organization’s changing needs. User access can be efficiently modified via the centralized device management software and additional endpoints can be quickly deployed as needed for faster, more cost-effective resource scaling compared to a traditional PC network. Again, while repurposed PCs can support some degree of this enhanced scalability, clients specifically designed to support VDI will do the job more efficiently and cost-effectively.

Reduced TCO
Each of the VDI benefits discussed reduces an organization’s per-user TCO. Whether measurable (such as IT staff time and energy usage), less quantifiable (like worker productivity), or even less obvious still (like gains from IT time redirected from PC maintenance to more critical initiatives), these factors all make a difference. Combined, the resulting impact can be significant.

When considering the reuse of existing PCs to support a VDI implementation, it is important to weigh the immediate cost advantages against the potential lost savings in TCO. As noted previously, for each of the variables influencing TCO, use of repurposed PCs in place of purpose-built thin or zero clients will diminish the impact of the savings.

Summary
An often overlooked factor when evaluating the advantages and costs of VDI, the selection of endpoint clients can have a notable impact on success of the initiative. Thin and zero clients designed to support VDI will deliver the greatest degree of efficiency and cost savings. The use of repurposed PCs can strip away many of the advantages companies seek in moving to a virtualized desktop environment, particularly if the goals include reducing the costs, downtime and management burden associated with PCs.

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