



# Desktop Management Streaming to a Type 1 Hypervisor

## Industry

Cross-industry solution

## Business Challenge

Reduce image count in desktop deployments and maintenance

## Technology Solution

Stream a standard image to a Citrix XenClient\*-enabled desktop or laptop

## Enterprise Hardware Platform

Intel® Core® vPro™ processors and Citrix XenClient



A top priority for many organizations is to centrally and securely manage their desktop environments while providing the best possible user experience. With this goal in mind, businesses around the world are looking to improve the desktop delivery and patching mechanisms and reduce the number of images needed to maintain their fleets of desktop computers. This paper explains one way to meet those goals.

## Solution Blueprint: Desktop Management Streaming to a Type 1 Hypervisor

### SOLUTION OVERVIEW

By initiating operating system and application streaming to a desktop computer enabled with Citrix XenClient\*, we can provide central management and security from the data center. Operating systems and applications are streamed through the network upon turning on the desktop PC. Operating systems and applications are patched and maintained once at the data center site, thus eliminating the requirement for desktops to be left on overnight and avoiding possible misses during patch rollout. All data can be saved at the data center site, thus ensuring the best possible protection data protection.

### SOLUTION ARCHITECTURE

The solution is comprised of a Windows\* infrastructure/domain controller, Citrix Provisioning Server\*, and a Microsoft Application Virtualization\* (App-V\*) or a Citrix XenApp\* server, all located in the data center cloud. At the endpoints are PCs equipped with Intel Core vPro processors and Citrix XenClient software (Figure 1).

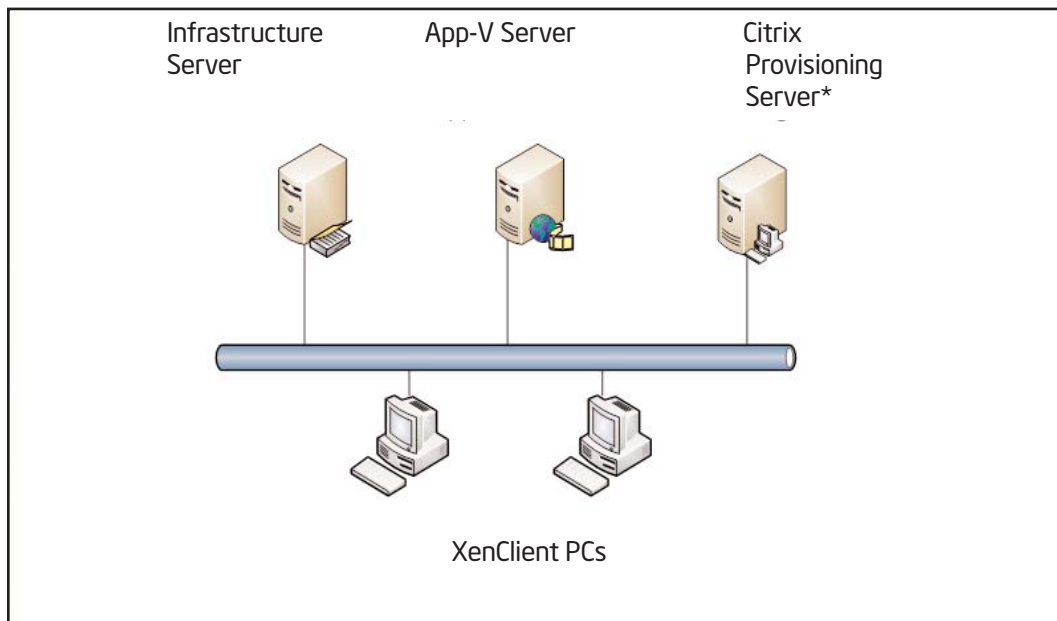


Figure 1. Solution architecture

Citrix XenClient software is installed on each desktop. XenClient is a type 1, high-performance, bare-metal hypervisor, which means that it is installed on the PC before any other software is loaded. It divides up the resources of the machine, enabling multiple operating systems to run side by side in complete isolation. You can create multiple desktops locally by installing each operating system into a new local virtual machine (VM).

In our case, one VM is created on the XenClient desktop; however, the operating system is not locally installed on that VM. Instead, the operating system is streamed from the Citrix Provisioning Server into the VM.

In 2008, Intel performed some tests on OS streaming. Results showed that clients booted very quickly, even during worst-case boot storms. Including domain authentication, boot time averaged about 95 seconds with 19 clients and 160 seconds with 39 clients. Good performance was provided when running the network at 1 GB between the server and the client switch with a single 1-GB server network interface card (NIC). Bandwidth of 100 MB was adequate between the client switch and the PCs. Server utilization remained moderate, even during boot storms when many clients boot simultaneously from the same server. The applications are then streamed to the XenClient device by either a XenApp server or an App-V server.

By using this streaming method (Figure 2), IT departments can centrally manage the desktop image yet provide their end users with the full performance capability of their desktops.

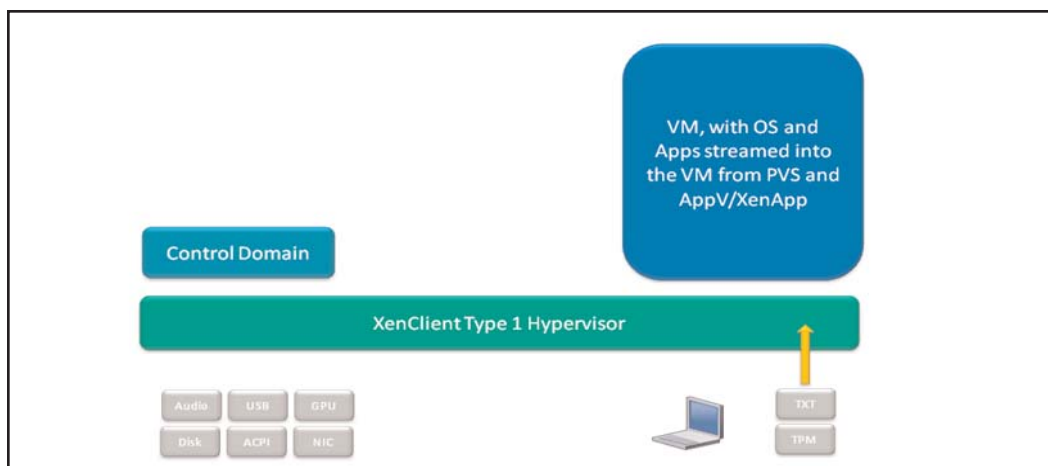


Figure 2. Streaming method

The XenClient software abstracts the hardware so that no matter what hardware you purchase (HP, Dell, Lenovo, NEC, Fujitsu, etc.) you can manage all XenClient-capable PC s with one image. There is no need to create separate images for different hardware vendors or different models of PCs from the same vendor. Image management becomes much simpler.

XenClient can be installed from CD installation media or from a PXE boot process. In some cases the hardware OEM may be able to install XenClient at the factory before machines are shipped.

XenClient is available at no cost from Citrix. Enterprise management and support of XenClient, however, is licensed per user/device with the Enterprise or Platinum editions of XenDesktop. XenClient technology is excluded from XenDesktop with the VDI edition or when XenDesktop is purchased in the concurrent license model.

## End User Experience

With a type 1 hypervisor such as XenClient, all execution of the operating system and applications happens on the PC itself, not on any data center server. Therefore, the end user experience is the same as if the operating system and applications were loaded in the more traditional method, directly onto the PC hardware. XenClient's type 1 hypervisor also takes advantage of Intel® Virtualization Technology (Intel® VT) for Directed I/O (Intel® VT-d). Intel VT-d enables direct access to the graphics hardware for 3D graphics capabilities and provides hardware-based memory partitioning (i.e., protection domains).

## Citrix Provisioning Server

With Citrix Provisioning Server for Desktops\*, software streaming eliminates the need to image each hard drive or to custom configure each machine. Since data no longer has to be stored on the local computer, decommissioning steps, like wiping the hard drive, are no longer necessary. In addition, as the user is forced to move from one set of software or hardware to another, the user's data can seamlessly move from computer to computer, or from one set of software to another, without any complex migration utilities, long file copies, or even a backup program.

On the PVS server, standard image mode gives you the capability for many clients to use one image, reducing the amount of storage needed. In standard image mode, any changes to the operating system that an individual may make are not kept once they logoff. You can, however, create an image in private image mode and keep those changes to the operating system and applications when the user logs off. This may be necessary for certain users in your organization. However, this will add to the amount of storage needed.

Licenses for Citrix Provisioning Server are acquired through either the XenDesktop or XenServer licensing programs, so if you already have XenDesktop or XenServer you may be able to use existing licenses to implement Provisioning Server.

## Additional Benefits for IT Departments

With the centralized nature of Citrix Provisioning Server, operating system upgrades are easier than ever on a XenClient-based endpoint. To upgrade to the next OS, simply make a golden image of that OS and install it on your PVS server. The next time the user logs in, you simply stream the new OS to their computer. An added benefit is that IT departments can purchase their next set of computers with the smallest hard drives available. Only XenClient itself is installed on the local drive, not the OS or applications. A small solid state drive would suffice, thus eliminating a spinning hard drive which could reduce the number of man-hours spent on hardware service calls. Also, should a user somehow corrupt their OS, a simple reboot is all that is needed to reload both the OS and applications from the golden image on the PVS server. This saves time and money for IT departments.

## Intel Intelligent Clients

PCs based on Intel Core vPro processors are the most flexible foundation for deploying a suite of desktop virtualization solutions. Intel vPro technology intelligent clients enable local execution to balance security and manageability with end user productivity and mobility. They also give you energy-efficient performance as well as expanded management with embedded Intel® KVM technology now available on all Intel Core i5 and i7 vPro processors.

## CONCLUSION

Intel Core vPro processor-based systems are the no-compromise solution, no matter how you wish to deploy and manage your desktops.

The combination of Citrix's Provisioning Server, XenClient, and vPro desktops/laptops gives IT shops the best flexibility in managing their fleets of desktops. Besides reducing the number of images that need to be maintained, it also delivers, locally, the performance end users demand.

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