

# HP Virtual Desktop Infrastructure with VMware

Bring the benefits of industry-standard  
servers to your desktop environment.



## Are you meeting your desktop management challenges?

If you're part of an IT organization that serves hundreds or thousands of employees, the desktop environment creates huge challenges. For starters, there's the cost of ownership. While most desktop devices are inexpensive to buy, they are costly to own. Gartner estimates that an end-user desktop might cost you up to \$5,386 per user per year to own and operate.<sup>1</sup>

What's driving up the costs? For one, you have the labor-intensive management and technical support. Too often, valuable system administrators end up spending time on routine tasks like password resets. Management time is also lost to the inefficiencies associated with vulnerability and patch management for a mix of PC images. When you have products from multiple PC vendors, multiple models from the same vendor and a variety of different access devices, you face expensive support and a range of refresh cycles.

Then there are the formidable security and data protection issues. It's hard to protect hundreds or thousands of client devices and the sensitive information on them. From data backup to virus containment, device theft to hacking attempts, the end user is the focus of much of today's data loss. Leaving end users as administrators is a risky proposition. In some cases, end users can install unlicensed software creating both audit and security risks.

Finally, you have significant power and cooling costs that come with each PC. Given issues like these, at times you might have thought, "There must be a better way to

run a desktop environment." Now there is. It's called HP Virtual Desktop Infrastructure (VDI) with VMware.

HP VDI provides a centralized approach to managing your desktop environment and protecting the information within it. It brings the far-reaching benefits of industry-standard servers and shared storage to your desktop environment, while delivering a full virtual PC experience.

### Move ahead with HP Virtual Desktop Infrastructure.

HP Virtual Desktop Infrastructure with VMware allows your organization to consolidate many physical desktops onto a single server or a cluster of servers with shared storage. You can then centrally host and manage your desktop environment from within your data center or another robust and reliable location with advanced security features.

With your desktop virtualization solution in place, you can increase resource utilization and enhance the security, availability and protection of the data you now hold on client systems. HP VDI with VMware also helps you increase the manageability, efficiency and reliability of your desktop environment. These are just some of the benefits you can realize when you bring server-class hardware, VMware virtualization software and shared storage to your desktop environment.

Many organizations, from midsize companies to large enterprises, have put VMware virtualization to work to increase resource utilization, consolidate systems and enhance business agility. Drawing on these successes, organizations are now turning to desktop virtualization to enable the same types of efficiencies gained with server virtualization.





## What goes into HP VDI? Here are the key solution components.

HP simplifies desktop virtualization by bringing together all the components you need for an end-to-end desktop virtualization solution. The HP VDI solution is composed of several hardware and software building blocks—including servers, storage, VMware virtualization software, management tools and access devices—along with professional services to design, integrate, deploy and support your solution.

Specific solution components include:

### HP ProLiant and BladeSystem servers

The high-availability design of HP ProLiant and HP BladeSystem servers means virtual desktops use the server's hot-plug redundant power supplies and fans, with access to either Smart Array RAID 5 local storage or a storage area network (SAN). These industry-standard servers offer a variety of memory DIMM and input/output (I/O) slot expansion options.

### HP StorageWorks storage

HP StorageWorks SAN solutions deliver flexible, open, standards-based storage infrastructure to enhance the efficiency and manageability of your desktop virtualization solution. HP StorageWorks network-attached storage (NAS) solutions, in turn, deliver low per-user cost for highly available, reliable, end-user data storage.

### Core software

- **Virtualization:** VMware's Virtual Infrastructure software is at the center of HP VDI. VMware ESX, installed on the server, hosts the virtual machines that support each virtual PC. Virtual machines run your PC desktop operating system and applications seamlessly. Your SAN hosts your system and application files.

- **Connection broker:** HP Session Allocation Manager—this connection broker tool manages the assignment of end-user connections to desktop sessions running in virtual machines and provides an auto-configuration process of new virtual machines as they are created. Session Allocation Manager supports follow-me roaming and persistence of user connections to both static and dynamically allocated computing resources. The HP VDI solution also works well with third-party connection broker software such as VMware's Virtual Desktop Manager, Provision Networks and Citrix Desktop Server.

### Management tools

The HP VDI solution provides the tools you need to more easily deploy and manage both virtual and physical resources. The solution leverages:

- **HP Systems Insight Manager—HP SIM** is the foundation for unified infrastructure management within your data center. This server management tool with proven cost savings results, comes free with HP ProLiant and HP BladeSystem servers, and provides a centralized management console that simplifies and consolidates infrastructure management. According to a recent white paper by IDC based on the results from in-depth surveys of 12 companies, the use of HP SIM software has resulted in average total savings of \$35,533 per 100 users over three years on a normalized basis. The payback period averaged a short four months, and the ROI averaged 468 percent.<sup>2</sup>

### Business-driven benefits

HP VDI with VMware can help your organization move beyond traditional approaches to the desktop environment. With HP VDI, you can:

- Bring the benefits of high availability to the desktop environment
- Enable efficient desktop configuration and management through centralized resources, thereby speeding up deployment and reducing labor
- Strengthen security by managing applications and data centrally while maintaining user isolation
- Gain more value from existing infrastructure investments by leveraging industry-standard hardware, management tools and virtualization capabilities
- Improve power and cooling costs through the use of HP server-based power management tools and HP thin clients

- **HP ProLiant Essentials Rapid Deployment Pack (RDP)**—RDP is one of the ProLiant Essentials plug-ins that works with HP SIM. Using a simple drag-and-drop graphic interface, Rapid Deployment Pack allows you to deploy, configure and license VMware ESX hosts in minutes.
- **VMware VirtualCenter**—VirtualCenter lets you rapidly provision virtual machines and monitor performance of physical servers and virtual machines. It also intelligently optimizes resources, enables high availability to all applications in virtual machines and makes your IT environment more responsive with virtualization-based distributed services such as VMware DRS, VMware High Availability (HA) and VMware VMotion.
- **HP Configuration Management (CM) Patch Manager software**—This software eliminates known software vulnerabilities by automating the patch management process—including acquisition, impact analysis, pilot testing, discovery, assessment, deployment, maintenance and compliance assurance—verifying that devices are always configured correctly. Used in a VDI environment, HP CM Patch Manager maintains the operating system (OS) and applications within virtual machines. Using this policy-based software, IT managers can accelerate the correct configuration of their software infrastructure and optimize the security and stability of managed systems.

### **HP Thin Clients**

HP Thin Clients are ideal for use in a virtual desktop environment. These small-form-factor, stateless devices help you cut power consumption, reduce support costs and increase security while potentially extending the replacement cycle for end-user computing devices. CPUs, memory and hard disks are housed on servers and storage resources in your data center—not on the desktop. This makes it much more difficult for end users to lose or remove confidential data or to introduce new software into the system.

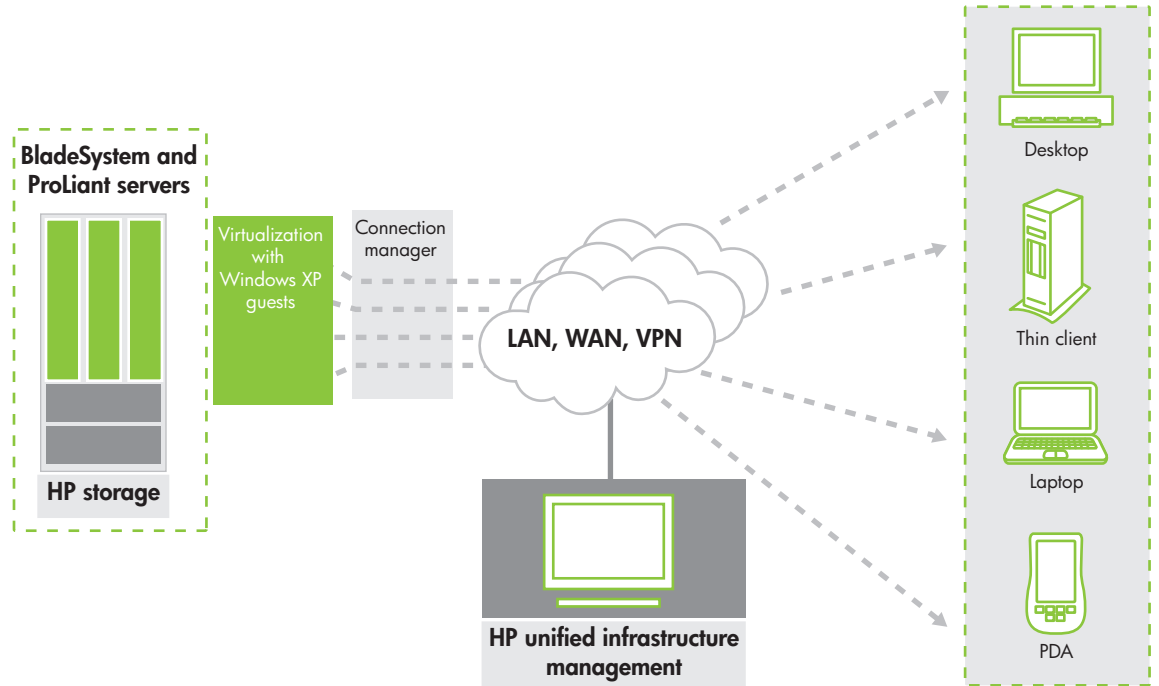
### **HP Pre-Configuration Services**

To accelerate deployment, we can make your HP ProLiant and Blade System servers “virtualization ready” using HP Factory Express image installation. Factory Express services range from installation of the system image to configuration and integration of a complex solution.

HP Factory Express services can include guest OS desktop licenses, whether they were purchased from HP or from an approved software vendor. With the large number of desktop images that can be run on an HP server, Factory Express image installation can be a significant time saver.

### HP VDI with VMware architecture.

The HP VDI architecture brings together a connection broker, thin clients, servers, shared storage, virtualization software and management software.



## How do you build a desktop virtualization solution? Follow these steps.

Here is a brief summary of how the individual VDI components come together to form a complete HP Virtual Desktop Infrastructure with VMware solution.

HP VDI starts with an assessment of your VDI end-user requirements and existing infrastructure. Once known, you can configure your HP ProLiant and BladeSystem servers to provide a range of memory and I/O configurations to suit your architectural and load requirements.

1. If you have a multi-server VDI environment, we highly recommend that you connect the servers to an HP SAN. The use of a SAN allows the virtual desktops to be stored and backed up centrally, with access from any server attached to the SAN. Disaster recovery and live migration capabilities also require a SAN infrastructure.
2. VMware virtualization software is installed on the servers to provide a many-to-one desktop-to-server ratio. The virtual desktops are hosted on storage devices or the servers themselves. The virtual desktops run standard desktop operating systems, such as Microsoft®.
3. Many organizations choose to incorporate a connection broker as part of their VDI solution. The connection broker helps connect the desktop user to the appropriate virtual machine. It initiates and tracks connections between end users and resources based on policies that you set. In addition, it offers enhanced functionality, such as load balancing and user verification against Active Directory.  
A remote protocol is used to allow the client devices in the desktop environment and the servers in the data center to interface over the network. Protocol options include Microsoft Remote Desktop Protocol (RDP), Citrix ICA and HP Remote Graphics Software (RGS). HP RGS uses the data compression capabilities of a remote client software component to enhance the performance of virtual desktops, and is desirable when using intense graphics applications on the network.
4. Consult your HP representative to determine the best solution for your needs.
5. Various client devices can be used in local and remote offices to complete the solution. HP Thin Clients are ideal access devices for your virtual desktop environment. You can also configure re-provisioned desktops, notebook computers and even handhelds devices to access virtual desktops.

## Here are some of the best practices for desktop virtualization.

So what does it take to gain a high-performance virtual desktop infrastructure? Here is a look at some of the best practices and technologies for desktop virtualization. In our experience, these are all important points to consider when building a virtual desktop environment.

### **Sizing considerations**

A good place to start is with five to eight users per core. The actual count will depend on many factors, including the amount of installed memory, user workloads, the storage architecture and more.

### **Storage and backup**

Avoid I/O bottlenecks by dividing storage traffic across multiple controllers. To enhance security, review data and user device lockdown policies to allow users to view data but not remove or copy data to external storage devices.

Use low-cost NAS solutions to store user data while maintaining availability and reliability for VMs on a shared SAN from HP. Back up file shares with user data, but leave the VMs alone. This optimizes the use of storage space while prioritizing data for backup.

### **Networking and protocols**

Remember that network sizing depends on the remote protocol used, printing activities and user device redirection. In making network sizing decisions, keep in mind that low network latency is critical—low latency means better performance for end users. Network latency should be 150 milliseconds or less.

With the HP VDI solution, you have multiple choices for your connection protocol. These protocols govern communications between the thin clients in the virtual

desktop environment and the servers on the back end. The protocol you choose may have an effect on the network bandwidth required for your VDI solution.

### **Memory**

Memory is a key consideration in choosing your virtualization platform. Look to achieve a large memory footprint by using less expensive DIMMs across a large number of DIMM slots within the server. In addition, you can safely over-commit memory using VMware virtualization technology and HP ProLiant servers. You won't need as much memory per virtual desktop, because the VMware memory management capabilities provide greater memory efficiency than physical desktops.

### **Operations**

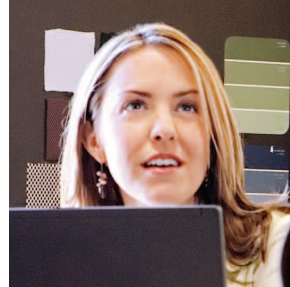
Plan for changes in your help-desk training competencies. Technicians may no longer need to be dispatched to the end-user site, but your help-desk staff may require additional troubleshooting knowledge.

### **Management tools**

The use of a connection broker in a VDI architecture helps with load balancing and virtual desktop administration. In addition, the connection broker provides a central management tool for the system administrator to access virtual machine status and resource pool statistics.

### **Design and planning**

We recommend that you work with an HP reseller or HP professional to develop a proof of concept for your VDI environment. This step gives you the chance to see your solution in action in a test setting and to optimize the architecture for your particular user requirements prior to adding large numbers of users.



## HP Services can help you bring it all together.

HP Services can help you transition smoothly to a virtual desktop infrastructure—without interrupting your usual program and business activity or over-extending your in-house IT support staff. Our vast portfolio of services allows you to use HP expertise as needed, tailoring it to your specific requirements.

Consider using HP Services to assist you with the major phases of implementing your HP Virtual Desktop Infrastructure. Our professionals can help you with IT service and desktop management, process and solution design, deployment either through Factory Express or onsite custom solution delivery, migration and ongoing integrated support.

HP Services can deliver:

- Access to highly qualified experts who can cover all facets of your client, software, server, network and storage infrastructure support needs, with a deep knowledge of multi-vendor hardware and software environments—not just HP technologies.
- HP Care Packs for a range of installation and startup and support services, available either at fixed prices or via a customized statement of work.
- Comprehensive solution design, migration, optimization and support services tailored to your virtualized environment needs.
- HP Education Services provide for your education needs—embracing the requirements of end users, system administrators and support personnel. Our online and instructor-led courses build both core and advanced skill sets and can help you improve system performance and availability.

- In addition, HP Financial Services provides innovative financing and financial asset management programs to help you cost-effectively acquire, manage and ultimately retire your HP solutions, including HP Virtual Desktop Infrastructure.

## Ready to learn more?

To take a more in-depth look at HP Virtual Desktop Infrastructure and learn what it can do for your organization, visit [www.hp.com/go/vdi](http://www.hp.com/go/vdi). Among other resources, this site offers a downloadable white paper that provides insights into the configuration and sizing of your virtual desktop environment.

To find out more about desktop virtualization assistance from the HP Services organization, visit [www.hp.com/go/service](http://www.hp.com/go/service).

To learn how HP Financial Services can help your organization move forward with your desktop virtualization initiative, visit [www.hp.com/go/hpfinancialservices](http://www.hp.com/go/hpfinancialservices).

Or to discuss your desktop needs and goals, and how HP can help you meet them, contact your HP representative.

<sup>1</sup>“TCO Comparison of PCs With Server-Based Computing,” June 15, 2006, Gartner Research.

<sup>2</sup>“Gaining Business Value and ROI with HP Systems Insight Manager,” IDC white paper, May 2007.



To learn more, visit [www.hp.com/go/vmware](http://www.hp.com/go/vmware)

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