

Microsoft Virtual Desktop Infrastructure (VDI) FAQ

Q1: What is VDI?

A1: Virtual Desktop Infrastructure (VDI) is a centralized desktop delivery solution that enables organizations to store and execute desktop workloads (OS, apps, data) on virtual machines in the datacenter, and presents the UI via a remote desktop protocol (such as RDP) to user devices. VDI is not an isolated architecture, but rather part of an enterprise's cohesive, holistic virtualization strategy across their IT infrastructure; as such, it supports Microsoft's vision of Dynamic IT.

Q2: How does VDI work?

A2: With VDI, client operating systems are decoupled from the client devices (such as desktops, laptops and thin clients), and are run as virtual machines on servers— Users are able to interact with these virtual desktops through a remoting protocol such as Microsoft's RDP (Remote Desktop Protocol). All execution of desktop workloads happens on the server, while the UI is presented via RDP to the user devices, thereby enabling users to have a rich desktop experience. In a VDI deployment, users can be mapped either to a static, or "persistent" virtual desktop, or a dynamic ("non-persistent") virtual desktop. In static mode, there is a one-to-one mapping of VMs to users, i.e., each user gets a unique VM. The more users you have, the more VMs you need. Since VMs are stored on a SAN or NAS and execute on the server, larger number of VMs lead to larger storage requirements from the SAN or NAS. In a dynamic architecture, there is only one master image of the desktop stored in the SAN/NAS. All user data (personalization, profile, applications etc) is stored separately from the desktop. When a user logs in and requests a desktop, a VM that is "cloned" from the master image is combined with his personal data and applications, , using technologies such as Windows vista Roaming profiles and Microsoft® Application Virtualization, and is dynamically delivered to the user device.

Q3: What are the business benefits of VDI?

A3: VDI is just one of the many options available for organizations to optimize their desktops. As such, it mainly benefits non-mobile workers that have sophisticated IT departments in highly regulated industries. To such organizations, the main benefits of VDI include:

- 1) **Desktop location independence:** VDI enables "hot-desking" scenarios, wherein users will be able to access their personalized desktop from any machine within the organization. This is especially useful for non-stationary workers, such as doctors or factory floor workers, that need access to data throughout their place of work. VDI also enables organizations to have their workers access their corporate desktops from home computers, without the need to purchase expensive laptops for home use.
- 2) **Centralized Desktop Management:** Since all desktops and data are stored centrally on servers within the datacenter, IT is now closer to user desktops. This translates to reduced travel to user locations for standard support requests. Also, in a dynamic VDI environment, it is easier to manage and maintain the full lifecycle for the users' desktop environment, due to the virtual desktops being easily

accessible at a central location. Desktops and applications can be provisioned, updated, upgraded and eventually decommissioned in a much quicker and more efficient way.

- 3) **Business Continuity:** Since desktops are decoupled from the user device in a VDI scenario, the impact of device loss or malfunction is highly reduced. The desktops and data never leave the data center, and hence is not affected when a user loses their laptop. Also, in case a user changes their device, they can easily access their personalized desktop in a matter of minutes, as opposed to having IT setup their new desktop for them on the new client device.

Q4: What are the limitations of VDI in general?

A4: Although VDI has some strong benefits, it does have the following shortcomings:

- 1) **Cost:** VDI requires an upfront investment in server and storage hardware to be able to store and execute all the VMs. In addition to this, they will need to purchase additional software to manage this virtual desktop environment. Moving desktops into a virtual environment does not eliminate licenses or IT management costs, and hence it is difficult to prove reduced TCO with VDI in many cases. However, with careful planning, VDI can be the best solution for specific scenarios, such as contract / offsite workers, and access from home.
- 2) **Infrastructure and Bandwidth intensive:** VDI requires that users have constant network connectivity to be able to access their desktops. In certain use cases, large amounts of data may be sent between the user's devices and the servers that host the desktops, which puts an additional load on the network. Hence, IT needs to ensure high availability of the network, as well as ensure that their networks are able to support the high demands being put on them from VDI.
- 3) **User experience:** Although vast improvements have been made to ensure a good user experience, a rich client will always provide a superior user experience to VDI. Audio and video experience on a remote desktop may not be as rich as a PC, and USB support is limited on remote desktops. Also, since remote desktop experience is highly dependent on the network, lack of network connectivity means users get no desktops, and hence no experience.

Q5: How does VDI fit into Microsoft's Windows Optimized Desktop story? OR

What is Microsoft's position on VDI?

A5: VDI is just one of the many technologies available to organizations to optimize their desktops, and Microsoft is committed to helping our clients choose the best offering for their needs. Microsoft's Windows® Optimized Desktop solutions, a part of our Dynamic IT vision, deliver a full spectrum of client computing options including different virtualization technologies, such as user state virtualization, application virtualization, presentation virtualization and machine virtualization technologies. Both VDI and Terminal Services are core components of this technology, and satisfy specific computing requirements and scenarios. Microsoft will work with our customers to help them decide which technology suits their current business needs.

Q6: What is Microsoft's current VDI offering?

A6: Microsoft VDI is a carefully-matched combination of Virtualization Technology and Licensing. It offers the best combination of performance and price, and includes the following features:

- 1) Scalable, Stable and high performance hypervisor that hosts the virtual desktops. Hyper-V™ server is a no-cost option that's offers the best price/performance combination, while Windows Server® 2008 with Hyper-V is an advanced option for those enterprises that want advanced features like Quick Migration, clustering, etc.
- 2) An integrated management suite that allows IT to manage physical, virtual and session based desktops from a single console. Microsoft's superior management capability also allows for managing VMware infrastructure. Systems Center Virtual Machine Manager 2008 is part of Systems Center, which is a complete management suite for both physical and virtual infrastructure.
- 3) Application virtualization technology enables dynamic delivery of applications to the user's virtual desktop instead of installing applications as part of the virtual desktop image. This helps reduce the memory footprint of the virtual desktops, as well as improves application management. Depending on whether the application is executed locally or remotely, customers can either deploy Microsoft Application Virtualization or Microsoft Terminal Services RemoteApp.
- 4) A connection broker manages the connections between a user's device and the remote desktops that are running on the server. It also helps dynamically provision remote desktops, by combining a pristine golden desktop image with a user's profile and personal settings at runtime, and delivering a personalized desktop to the end user. Citrix XenDesktop delivers this functionality, and adds value to Microsoft's VDI technology.
- 5) In order to provide an effective licensing mechanism to enable customers to license copies of Windows Vista running on servers, Microsoft has created Windows Vista® Enterprise Centralized Desktop or Windows Vista Enterprise Centralized Desktop. This is a subscription based license, and comes in two flavors:
 - a. Windows Vista Enterprise Centralized Desktop for SA, for customers that have client devices that are running copies of Microsoft Windows already covered under Software Assurance.
 - b. Windows Vista Enterprise Centralized Desktop, for customers that have client devices that are not covered under Software Assurance.

Q7: Why should customers use Microsoft VDI?

A7: Microsoft has been providing desktop solutions for well over a decade. We have a comprehensive set of technologies that helps customers optimize their desktop, with VDI just one of the many strategies we offer. The advantages of Microsoft's VDI offering include:

- 1) Comprehensive and Cost effective: The Microsoft solution stack is fairly comprehensive, consisting of various components such as server virtualization with Hyper-V, management using SCVMM, Application virtualization using App-V or TS Remote app, and a third party connection broker such as Citrix XenDesktop. This solution stack compares very well with the competition, and is effectively able to deliver a full-featured VDI experience. The pricing for the Microsoft VDI solution is also very

- cost effective, and as of public data available to us on Dec 5, 2008, our offering costs roughly a third less than similar offerings by VMWare.
- 2) **Integrated Management:** With SCVMM as part of the comprehensive Systems Centre suite, IT pros can now control both physical and virtual infrastructure from a single console, including session-based desktops. SCVMM can also integrate with non-Microsoft infrastructure, such as VMWare, thereby enabling single console management across multiple vendors. This is a tremendous advantage for IT departments, looking to optimize their management efforts across their physical and virtual environments, using familiar technology. Also, since most of the technology maintains familiar windows based technology, existing investments in Microsoft infrastructure can be leveraged.
 - 3) **The Best Remote User experience:** Microsoft's VDI solution allows users to have extremely flexible access to their desktops, since all the need is a client device that supports the RDP protocol. The combination of Microsoft and Citrix technology is the most proven and widely used in the marketplace, and hence Microsoft VDI provides users with a rich remote desktop experience. Microsoft continues to improve the user experience, with improved video, bidirectional audio and USB support expected to be offered in future versions of the technology. The Calista acquisition promises to improve the user's multimedia experience even further. .

Q8: Does Microsoft VDI help reduce the storage requirements for virtual desktops on my servers?

A8: Yes. Using Microsoft VDI, users can be mapped either to a static, or "persistent" virtual desktop, or a dynamic ("non-persistent") virtual desktop.

In static mode, there is a one-to-one mapping of VMs to users, i.e., each user gets a unique VM. The more users you have, the more VMs you need. Since VMs are stored on a SAN or NAS and execute on the server, larger number of VMs lead to larger storage requirements from the SAN or NAS.

In a dynamic architecture there is only one master image of the desktop stored in the SAN/NAS. All user data (personalization, profile, applications etc) is stored separately from the desktop. When a user logs in and requests a desktop, a VM that is "cloned" from the master image is combined with his personal data and applications, using technologies such as Windows Vista Roaming profiles and Microsoft Application Virtualization, and is dynamically delivered to the user device. This delivers a personalized desktop experience, while reducing the number of desktop images that need to be stored.

In both scenarios, application virtualization (using Microsoft Application Virtualization or Terminal Services) also reduces the memory footprint of desktop images.

Windows Vista Enterprise Centralized Desktop FAQ

Q1: What is Windows Vista Enterprise Centralized Desktop?

A1: Windows Vista Enterprise Centralized Desktop, a part of the Windows Vista Enterprise family, is a subscription based license for licensing copies of Windows Vista on centralized desktops for VDI. This is a device based license, i.e., the total number of **Windows Vista Enterprise Centralized Desktop** licenses required by an organization is equal to the total number of client devices that will access desktop VMs on the server. There are currently two flavors for Windows Vista Enterprise Centralized Desktop:

- 1) **Windows Vista Enterprise Centralized Desktop for SA:** This is recommended for customers that have PCs running Windows and covered under Software Assurance.
- 2) **Windows Vista Enterprise Centralized Desktop :** this is recommended for customers that have client devices (Windows or non-Windows, including thin clients) that are NOT covered under Software Assurance.

Q2: IS only required for Microsoft VDI?

A2: Windows Vista Enterprise Centralized Desktop is the Microsoft licensing for running Windows VM on any VDI environments including VMware, Citrix and other VDI infrastructure.

Q3: Why should I purchase Windows Vista Enterprise Centralized Desktop? Can't I leverage the existing Windows Vista licenses on my PC?

A3: An organization may already have client devices running licensed copies of Windows Vista. However, if these clients are used to access virtual copies of Windows Vista running on servers, a separate Windows Vista Enterprise Centralized Desktop license is required. This has been done to ensure that virtual VMs are licensed independent of the type of device that is used to access them. This means that customers can now extend the life of older hardware, by using them to access virtual Windows Vista copies, or use thin clients running OSes such as Windows Fundamentals for Legacy PCs. Also, the Windows Vista Enterprise Centralized Desktop license allows organizations to create as many VMs as they want, but license only those devices that actually access these VMs. Each client device can access up to 4 copies of Windows Vista using the same Windows Vista Enterprise Centralized Desktop subscription. This proves highly cost effective in scenarios where users need to work on multiple desktops, and traditionally had to license a separate copy of Windows per desktop.

Q4: How many virtual machines can I run and access concurrently from a covered single access device?

A4: Using a single Windows Vista Enterprise Centralized Desktop license, you can remotely access up to four (4) virtual machines concurrently on a single access device per user at a time.

Q5: Can I load balance multiple virtual machines across servers?

A5: Yes. You can install multiple virtual machines across any number of server hardware, as long as these virtual machines are only accessed and used by Windows Vista Enterprise Centralized Desktop licensed access devices.

Q6: If I want to purchase Windows Vista Enterprise Centralized Desktop under my EA, am I required to purchase it for all of my desktops?

A6: No. Customers can elect to purchase Windows Vista Enterprise Centralized Desktop for a portion of their desktops and are not required to purchase it enterprise-wide.

Q7: Am I permitted to locally run any of the virtual machine instances on my local PC?

A7: Yes. Windows Vista Enterprise includes the rights to run 4 VMs locally. The Windows Vista Enterprise Centralized Desktop rights are additive to the Windows Vista Enterprise rights.

Q8: Does the subscription entitle me to the upgrade of the latest Windows operating system?

A8: Yes, Windows Vista Enterprise Centralized Desktop SKU comes with software assurance benefits, which include the access to the latest version of the operating system.

Q9: Can I use Windows XP or Windows 2000 in virtual machines?

A9: Yes. Consistent with the downgrade rights provided in your volume licensing agreements, Windows Vista Enterprise Centralized Desktop licenses allow customers to install Windows Vista Enterprise, Windows Vista Business or any prior version operating systems such as Windows XP Pro or Windows 2000 Pro.