

## Client Virtualization: Not a One-Size-Fits-All Approach

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*For many organizations, client virtualization technology can be a means of reducing the total cost of ownership (TCO) of PCs, improving data security, and streamlining the processes associated with desktop management. In addition, client virtualization often leads to better business agility.*

*To achieve these benefits, organizations can implement a number of client virtualization technologies. IDC categorizes client virtualization into four areas: application virtualization, centralized virtual desktop (sometimes referred to in the industry as virtual desktop infrastructure or VDI), user session virtualization (remote desktop or terminal service), and distributed virtual desktop. Additionally, IDC uses the term client virtualization to describe all technologies associated with virtualizing the end-user computing experience, while the term desktop virtualization applies specifically to technologies that virtualize only the end-user desktops. For example, application virtualization is a client virtualization technology, but not a desktop virtualization technology.*

*IDC expects to see significant production deployments of centralized virtual desktops in 2010 and a continued strong adoption ramp through our forecast period (2010–2014).*

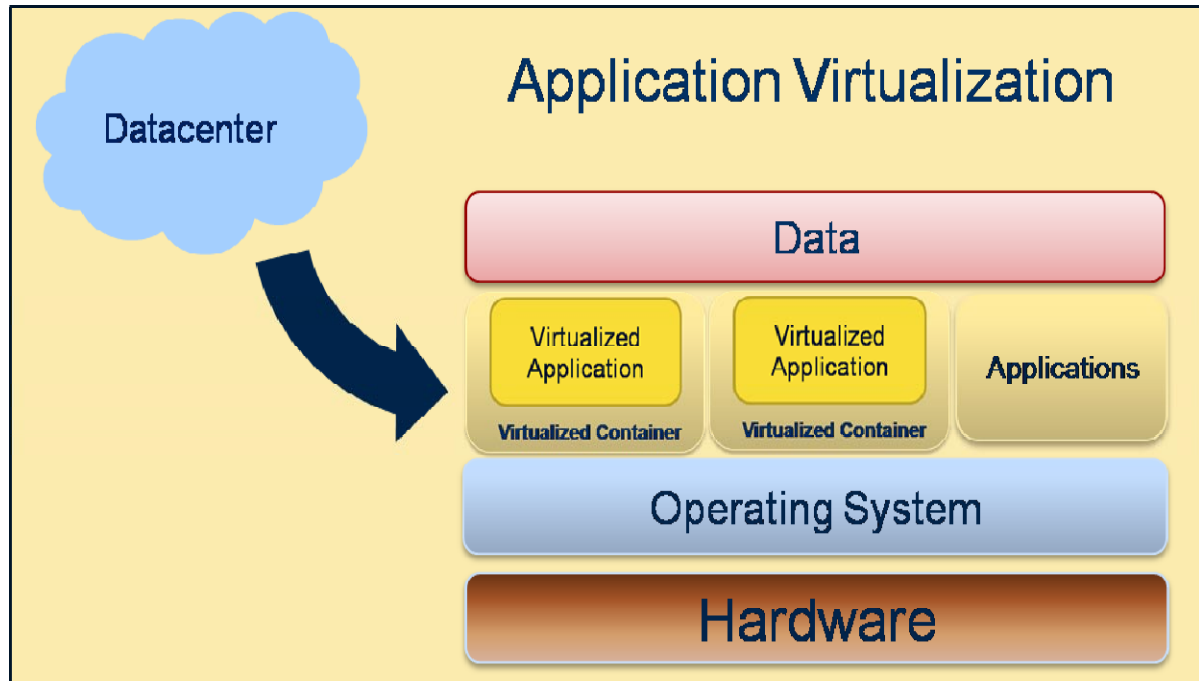
*This Technology Spotlight discusses the benefits of client virtualization and explores the role that Microsoft plays in this important market.*

### Client Virtualization: An Overview

#### **Application Virtualization**

Application virtualization is software technology that detaches an application from the underlying operating system (see Figure 1). A virtualized application does not need to be installed in the traditional sense, but it can be executed just as a natively installed application is executed. The environment that encapsulates the virtualized application is typically called a sandbox or virtualized container, the function of which is to fool the enclosed application into believing that it is interfacing directly with the operating system and all the resources. The virtualized applications can be either executed locally, just like any installed programs, or streamed from the datacenter. Application virtualization is fundamentally different from other client virtualization technologies that virtualize the hardware, but the use cases for application virtualization can be extremely effective nonetheless.

Figure 1



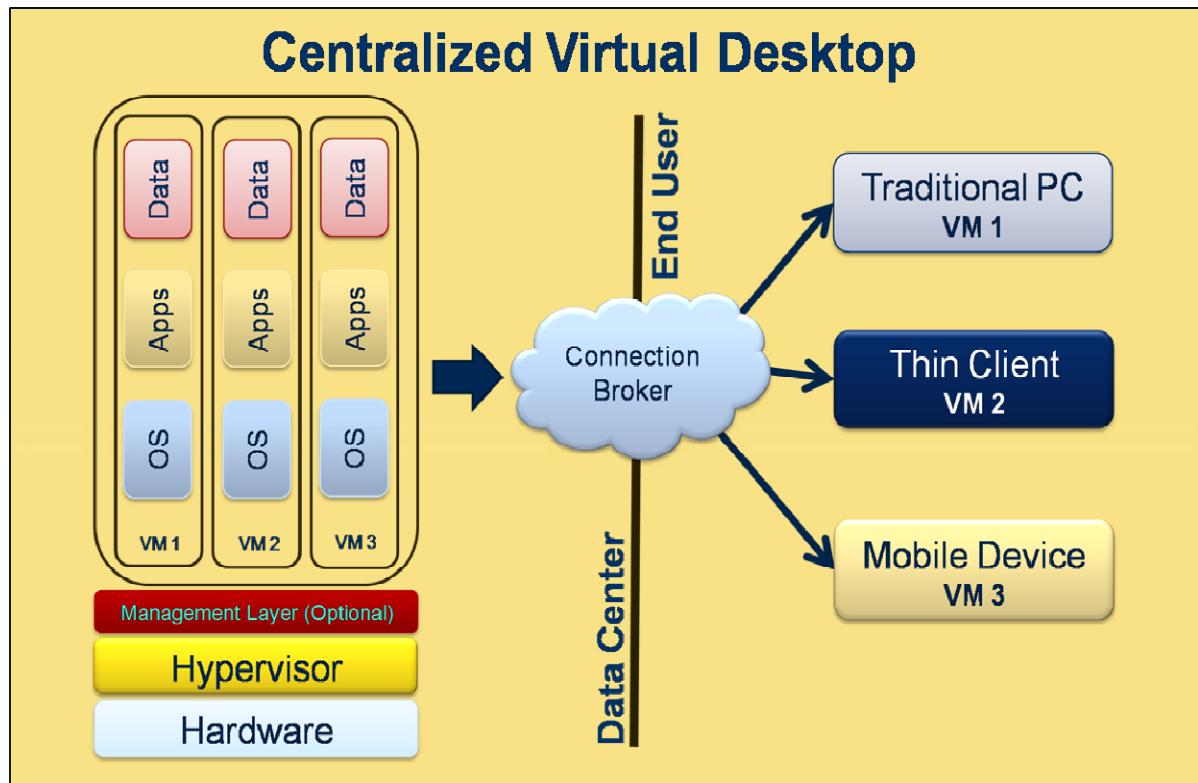
Source: IDC, 2010

### **Desktop Virtualization**

Desktop virtualization uses virtual machine (VM) software (hypervisor) to decouple a client environment (including operating system, application, and data) from its host hardware and to isolate the client environment from other software running aboard a device. There are two ways to deploy desktop virtualizations: server hosted (centralized virtual desktop) or local hosted (distributed virtual desktop).

- **Centralized virtual desktop (CVD) — server hosted.** Centralized virtual desktop (see Figure 2) is a form of server-based computing. Desktop virtualization software is used to host multiple unique and isolated client environments aboard a single server or group of servers. CVD sessions are delivered to end users' devices via the network and require local desktop hardware capable of rendering the session. (The industry commonly uses the broad term VDI to describe what IDC defines as a CVD installation, although VDI usually is interpreted to include a superset of the technologies that IDC includes under the definition of CVD.)

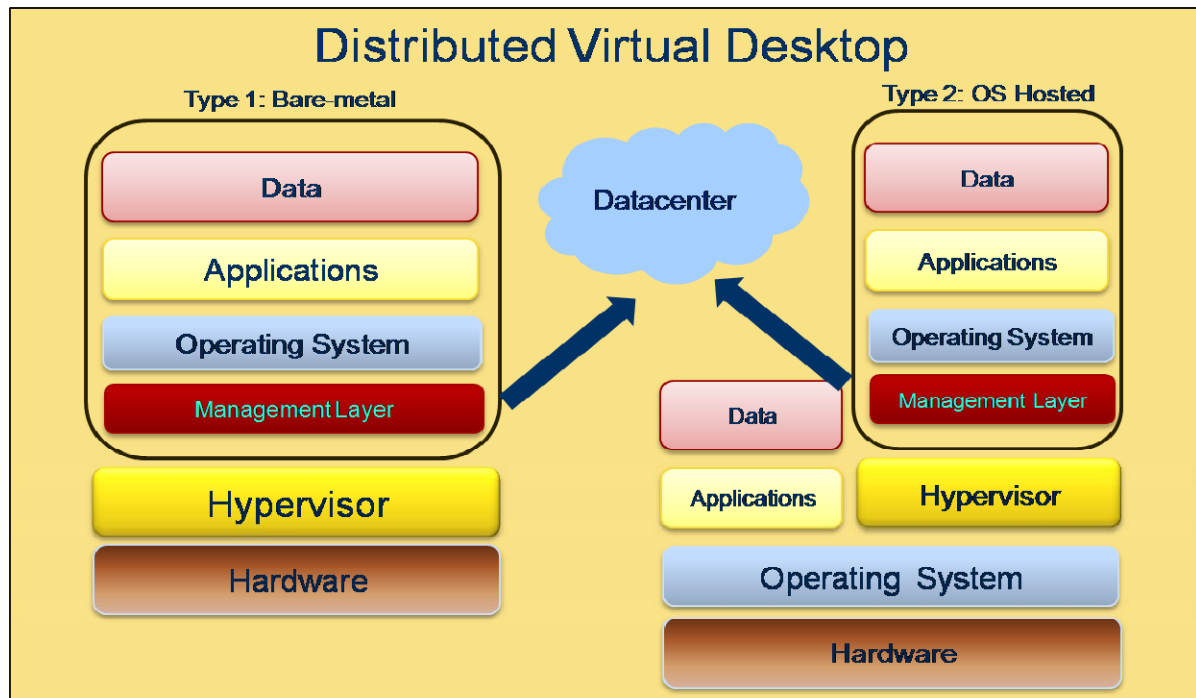
Figure 2



Source: IDC, 2010

- **Distributed virtual desktop (DVD) — local hosted.** Distributed virtual desktop (see Figure 3) is a type of desktop virtualization that hosts a client environment in an isolated manner aboard a distributed client device such as a laptop.

**Figure 3**



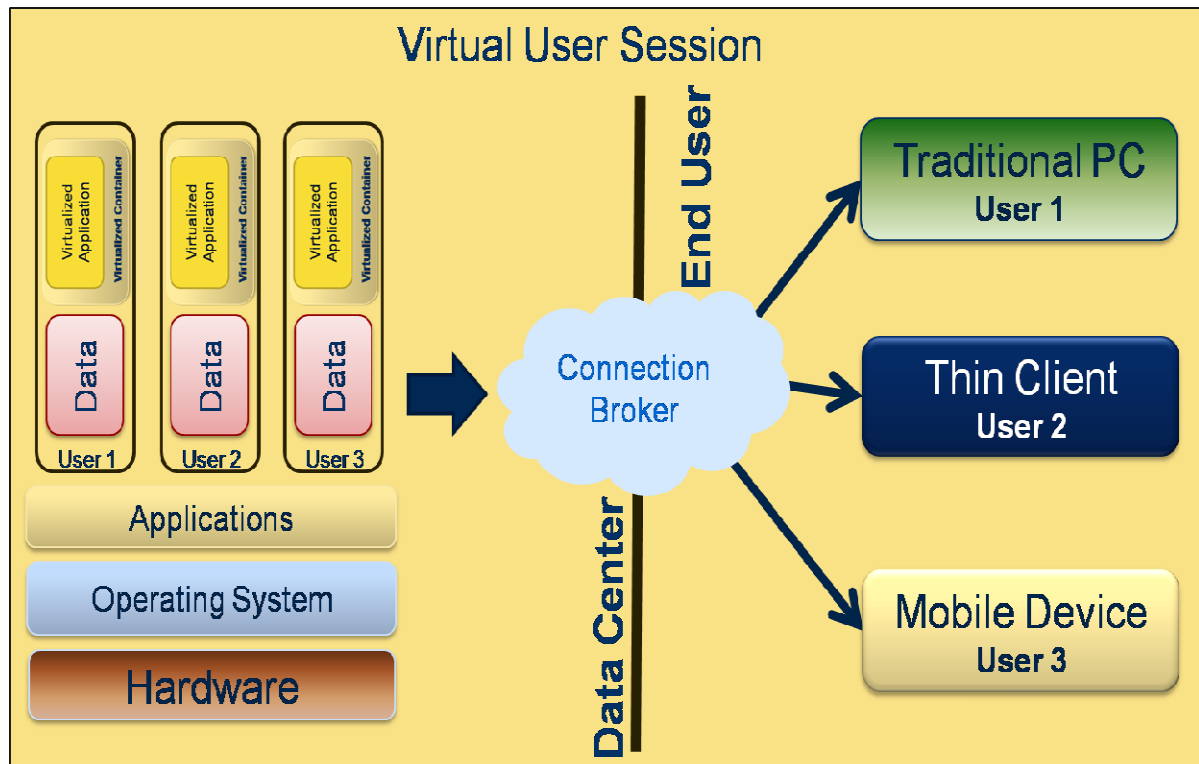
Source: IDC, 2010

There are two types of virtualization software (hypervisors) associated with DVD technologies: type 1 and type 2 hypervisors. In a type 1 hypervisor, the hypervisor is installed onto the hardware level (bare metal), and the virtual desktop can be delivered at near native speed. In a type 2 hypervisor configuration, the hypervisor software is installed in a hosted environment, where the host operating system remains in control of the underlying hardware. The virtual desktop is then delivered in a similar way as with a type 1 hypervisor, but the inclusion of the host operating system in the stack leads to some level of incremental overhead that can potentially reduce performance. Currently, the type 2 distributed virtual desktop is the only solution available in the industry. Several vendors are developing type 1 hypervisors to support DVD configurations, but none have come to market yet.

### ***Virtual User Session (VUS) Software***

Virtual user session software (see Figure 4) is another form of server-based computing. Unlike CVD, where each user has a unique operating system instantiation, VUS software creates a shared environment where each user gets access to an instantiation of an application, but there is only a single operating system in use. This software allows each user session to be interacted with simultaneously, yet individually. The virtual user sessions are delivered to end users' devices via the network and, like CVD solutions, require desktop hardware capable of rendering the image of the environment that is running remotely.

**Figure 4**



Source: IDC, 2010

## Product Portfolio

Over the past few years, Microsoft has been both developing and acquiring technologies that enhance and expand its client virtualization offerings. Through this time, the company put together a comprehensive suite of solutions, which have now been reintroduced to the market as an integrated and cohesive set of solutions.

In parallel with that reintroduction, Microsoft dramatically shifted its public position regarding client virtualization and made its VDI Suite product the core component of its new marketing drive. Along with the VDI Suite, Microsoft has made available other client virtualization technologies individually, including App-V (application virtualization), MED-V (DVD), and Microsoft Windows Server 2008 R2 Remote Desktop Services (RDS) (VUS).

Microsoft's client virtualization strategy is one of centralized/decentralized management, in that each technology can work together or can be deployed separately. The components of Microsoft's client virtualization technology offerings include the following:

### **Microsoft Application Virtualization (App-V)**

App-V is Microsoft's application virtualization product, a solution that essentially removes the need to locally install or update provisioned applications. Instead, only an App-V agent needs to be installed on the client desktop (which can be either physical or virtual). The application itself permanently resides on the server, which can be either streamed to the client or cached locally on the client side

for disconnected execution. Individual App-V applications are encapsulated in their own virtualized containers that are isolated from the baseline operating system and from each other. However, administrators can associate App-V applications with different file types, applications, and even other App-V applications.

Existing Windows applications can be packaged (or sequenced) into a virtual application through Microsoft App-V Sequencer. Updates to existing App-V applications can be accomplished on a one-to-many basis. Delivery of App-V applications can range from simple solutions such as provisioning on physical media to managed solutions that integrate with existing network infrastructure and Active Directory for more granular control.

In the latest version of App-V, version 4.6, Microsoft has implemented several new features to further drive the applicability of App-V. First, Microsoft introduced shared-cache mode, which shares one App-V application with many users. This is especially important in a centralized virtual desktop (VDI) environment to drive low storage requirements and, thus, storage costs. Shared-cache mode can also preload App-V applications, thus minimizing I/O overhead. Additionally, App-V 4.6 has the ability to virtualize 64-bit applications, which can improve resource utilization under Windows 7 64-bit, both physical and virtual.

App-V can utilize either its own management console or the System Center Configuration Manager (SCCM) console to monitor application usage, control access, and provision of virtualized applications. With those management solutions, administrators have the ability to allow/disallow App-V to run in local cache mode, set App-V expiration dates, create control schemes based on policy or Active Directory grouping, and enforce license compliance. Additionally, policies can be applied either centrally to all applications or on a per-user basis.

Microsoft App-V is available as a component of the Microsoft Desktop Optimization Pack (MDOP), which is available for customers as an optional subscription via Windows Client SA (software assurance) or via the Windows Server 2008 RDS CAL or as a part of the Microsoft VDI Suite.

### ***Microsoft Enterprise Desktop Virtualization (MED-V)***

Microsoft's MED-V falls under IDC's definition of DVD technology. At the heart of MED-V is the ability to deploy Windows XP aboard a type 2 hypervisor running on top of an existing Windows Vista or Windows 7 installation. MED-V enables deployment and management of customizable Microsoft Virtual PC Virtual Desktops (and is closely related to the Windows XP Mode technology available to all Windows 7 Professional users). Enterprise IT professionals can utilize MED-V's centralized management to create, provision, and manage customized Windows XP and Windows 2000 virtual machines. They can also update the VMs, implement policies, and expire VMs with the centralized MED-V management console.

MED-V has the same availability as App-V. For individual users, Windows XP Mode is included as a free feature associated with Windows 7 Professional and Windows 7 Ultimate. However, while Windows XP Mode offers the core DVD features of MED-V, it does not include the management console and therefore is not well suited for enterprisewide deployments.

### ***Microsoft Windows Server 2008 R2 Remote Desktop Services***

Microsoft Windows Server 2008 R2 RDS, formerly known as Terminal Services, is an established and mature session virtualization technology to stream applications and remote desktops over the network. (RDS falls under IDC's definition of a VUS technology.) It is also Microsoft's most widely deployed client virtualization technology, having been introduced in Windows NT 4.0 Terminal Server Edition in 1998.

Traditional RDS consists of one native operating system per physical server, hosting multiple user sessions, and multiple application instantiations, delivering a remote workspace to an end point (desktop, laptop, thin client, mobile device) that can support the Remote Desktop Protocol (RDP). Application execution is handled on the server side, with a replication of the user session streamed to the end point.

Microsoft has implemented an App-V solution for RDS, which is designed to help organizations realize additional benefits from RDS. Mission-critical applications in existing RDS implementations tend to be installed on separate servers in an attempt to minimize conflicts. This practice has led to server sprawl within the RDS farms, where potential user counts may be high but actual utilization is low. App-V for RDS can eliminate the server sprawl problem by virtualizing applications and consolidating them onto fewer servers, reducing server costs and removing isolation among servers.

RemoteApp is another feature of RDS, where a remote desktop session connects directly to a specific application rather than the entire desktop. RemoteApp can be packaged as either a remote desktop session link or a Windows installer file (MSI), where authentication schemes can be applied. Because RemoteApp is more or less a connection manager for application streaming, it is designed to work together with App-V for RDS to further improve application management in RDS.

Windows Server 2008 R2 Remote Desktop Services is available either through the Windows Server 2008 RDS CAL or as a part of the Microsoft VDI Premium Suite.

### ***Microsoft VDI Suite***

Microsoft VDI Suite is a collection of Microsoft products (Hyper-V, MDOP, System Center Virtual Machine Manager, and VDI-specific rights to System Center Operations Manager, SCCM, and RDS) that enables the creation, provision, and management of virtual machines, as well as deployment and management of all other Microsoft client virtualization technologies. Microsoft VDI Suite is intended to simplify the acquisition process for customers and create a much-needed family branding for its numerous discrete client virtualization products.

Microsoft's VDI solution utilizes the Hyper-V hypervisor to create fully isolated virtual machines in the datacenter. The virtual machine is provisioned to end users leveraging RDP. The end-user device can be any device, including desktops, laptops, thin clients, or mobile devices, that can support RDP. While the end-user delivery of virtual machines sounds similar to Microsoft's RDS, the underlying technology and usage are quite different. In the virtual machine environment, the end user is given a dedicated operating system, where he/she can potentially possess rights to install and remove applications, configure the desktop, and make other changes to environmental settings — much like the experience associated with a local desktop copy of Windows. By contrast, RDS creates a session within an operating system for users, and the users always have limited use rights within the session.

Microsoft offers two versions of the VDI Suite: Standard and Premium. The Standard version of the VDI Suite gives administrators the ability to create, manage, and provision virtual machines and utilize MDOP technologies such as App-V and MED-V. The Premium version of the VDI Suite allows administrators to create and manage virtual user sessions via RDS on top of everything from VDI Suite Standard. Virtual user sessions are comparatively simpler and cheaper to deploy and to manage, and it's a good enough solution in terms of scalability and manageability for certain user segments. Therefore, having the ability to create and manage both virtual machines and virtual user sessions is strategically important for organizations with diverse user groups.

## Challenges

Microsoft traditionally has taken a position that was interpreted by the industry as anti-client virtualization and protectionist toward Microsoft's traditional rich client business. In the early days of client virtualization, Microsoft's approach may have accomplished those objectives, but in more recent years, this positioning has hurt Microsoft and increasingly caused the company to be seen as a nonfactor in the rapidly growing client virtualization market — despite having the most comprehensive virtualization solution of any of the major players.

Microsoft faces a myriad of competitors — some niche solution providers that are focused on only a small subset of the overall client virtualization market and others that have both a relatively comprehensive portfolio of products and the marketing muscle and financial resources to continue to threaten Microsoft in this market segment.

## Conclusion

The major benefits of client virtualization — reduced long-term TCO for end-user computing, better security, and improved desktop management — will certainly appeal to many organizations. However, when it comes to client virtualization, no two organizations have the same requirements. In many situations, companies have to build up their own client virtualization solutions with multiple vendors and multiple technologies.

IDC believes that organizations looking to virtualize their client environments should carefully analyze their own organizational needs and develop a specific client virtualization strategy.

Microsoft's repositioning and strong endorsement of client virtualization in 1Q10 were the first steps of the company's remediation efforts in the client virtualization market. It is the opinion of IDC that Microsoft needs to continue to work at fundamentally changing customer perception of its virtualization positioning so that existing customers and potential customers see Microsoft as a serious contender in the client virtualization market.

Microsoft has recently embarked on a marketing campaign designed to educate customers about its client virtualization technologies and would benefit from creating use cases for different industry verticals, developing ROI modeling for various deployment scenarios, and developing comarketing campaigns with its partners.

Microsoft has the broadest portfolio of client virtualization solutions of any single vendor in the industry, so if the company can prove to customers that it is in fact serious about servicing this market segment, there is considerable potential upside for Microsoft and the industry overall.

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