

INDUSTRY DEVELOPMENTS AND MODELS

Virtualized Client Computing: A Taxonomy

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IDC OPINION

Recently, an expanding range of virtualization software and delivery technologies has been promising to enable a new desktop computing model, referred to by IDC as virtualized client computing (VCC), with the potential to address many of the limitations associated with distributed desktop computing. IDC defines VCC as a desktop computing model that leverages a range of virtualization software and delivery technologies in order to improve upon the limitations associated with a distributed desktop environment.

The virtualization software that enables virtualized client computing includes:

- ☒ **Application virtualization software.** Encapsulates and isolates an application from its underlying host operating system as well as other local applications running within a client environment.
- ☒ **Desktop virtualization software.** Uses virtual machine software (VMS) to decouple a client environment (including operating system, application, and data) from its host hardware and isolate it from other software running aboard a device.
- ☒ **Virtual user session software.** Runs on servers and creates multiple user sessions within an individual operating system that can be interacted with simultaneously.

Adoption of virtualization software technologies often requires, or is improved upon by, the use of specific delivery models. Two primary models used within virtualized client computing leverage a collection of protocols and proprietary software in order to transmit data between a client and server.

- ☒ **Remote Streaming.** Enables the delivery of executable blocks of data from a server to a distributed device.
- ☒ **Remote Interaction.** Enables the delivery of I/O operations between a client device and a server.

IN THIS STUDY

This study represents a high-level overview of the technologies that enable virtualized client computing.

SITUATION OVERVIEW

The current distributed desktop environment is one of the greatest hindrances for organizations looking to deliver IT resources to users in a manner that is both effective and efficient. In particular, a distributed desktop environment is largely associated with the following limitations:

- ☒ **Security.** Sensitive information is being stored within the IT environment at an exponential rate. In a distributed desktop environment, this sensitive data often must be stored locally, thus producing a significant security concern.
- ☒ **Fault tolerance.** Traditionally distributed PCs are susceptible to hardware and software issues, including device failures, viruses, and application conflicts, to name a few. These vulnerabilities cause countless hours of computer downtime, lost productivity, and therefore significant financial cost.
- ☒ **Manageability.** Because of their distributed nature, PCs (including desktops and notebooks) can be difficult to manage. These distributed and largely autonomous devices require a steady diet of patches, updates, and other necessary maintenance that can be difficult to perform on devices not permanently connected to the network from which they are typically delivered.
- ☒ **Support.** The physical distribution of IT assets makes it increasingly difficult for break/fix operations. As the desktop environment expands, the complications increase.
- ☒ **Scalability.** With the changing pace of business, organizations are increasingly being challenged to quickly scale out their desktop environments, particularly in response to mergers, acquisitions, and other business activities. This can be increasingly difficult for organizations that must distribute physical computing assets.
- ☒ **Regulatory compliance.** By its very nature, distributed desktop computing is making compliance to a growing range of government security regulations increasingly difficult.
- ☒ **Power consumption.** Organizations are becoming increasingly aware of the cost associated with powering their IT assets, particularly when utilization rates of those devices are similarly compared.
- ☒ **Resource utilization.** As with servers, the utilization rates of PCs are alarmingly low and represent wasted capital expenditures.

- ☒ **Disaster recovery.** Because of the distributed nature of data within a traditional desktop environment, recovering data lost because of local device failures can be very challenging.

Organizations have largely accepted the limitations associated with traditional distributed desktops because there has been a limited range of viable alternatives. However, a new computing model referred to by IDC as virtualized client computing (VCC) changes the way in which desktop resources are made available to end users, and as a result, is promising to improve upon many of the aforementioned limitations associated with traditional desktop computing.

IDC defines VCC as a desktop computing model that leverages a range of virtualization software technologies in order to improve upon the limitations associated with a distributed desktop environment. The group of technologies that enable VCC can be broken down into two major types:

- ☒ Virtualization software
- ☒ Delivery technologies

Often, organizations (and even individual solutions) will use a combination of virtualization software and delivery technologies in order to provide IT resources to end users.

Enabling Virtualized Client Computing via Virtualization Software

There are a wide range of products and approaches to enable a VCC model through the use of virtualization software. These products can be collectively broken down into three major categories:

- ☒ Application virtualization software
- ☒ Desktop virtualization software
- ☒ Virtual user session software

Organizations can use these technologies individually or collectively in order to deliver IT resources to users.

Application Virtualization Software

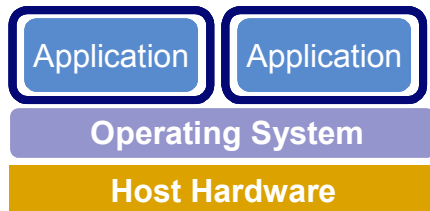
Application virtualization software encapsulates and isolates an application from its underlying host operating system, as well as from other local applications running within a client environment (See figure 1). Representative vendors and products include the following:

- ☒ Citrix Presentation Server (version 4.5+)
- ☒ Altiris Software Virtualization Suite
- ☒ Thinstall
- ☒ Microsoft SoftGrid

- ☒ Trigence AE
- ☒ Endeavors

FIGURE 1

Application Virtualization



Source: IDC, 2007

Desktop Virtualization Software

Desktop virtualization software uses virtual machine software (VMS) to decouple a client environment (including operating system, application, and data) from its host hardware and isolate it from other software running aboard a device (see Figure 2). It also includes software designed to manage these newly liberated virtual clients. Desktop virtualization software can be deployed in two distinct ways:

- ☒ **Server-hosted desktop virtualization.** In this use case, which 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. Interaction with these remote virtual desktops is performed through the use of a remote interaction delivery model.
- ☒ **Client-hosted desktop virtualization.** In this use case, desktop virtualization software is used to host a client environment (including operating system, application, and data) in an isolated manner aboard a distributed client device.

Each of these two use cases of desktop virtualization has its own unique advantages and disadvantages, and IDC expects that in the future organizations will apply desktop virtualization in both ways in order to enable the heterogeneous needs of a diverse user constituency

Representative server-hosted desktop virtualization software vendors and products include the following:

- ☒ VMware VDI
- ☒ Virtual Iron VDI
- ☒ Citrix XenDesktop

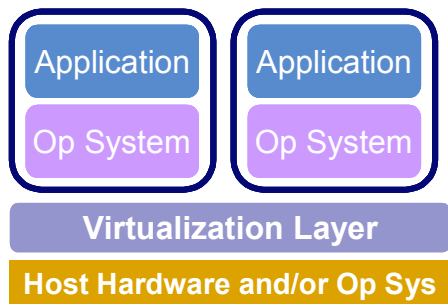
- ☒ Qumranet Solid ICE

Representative client-hosted desktop virtualization software vendors and products include the following:

- ☒ VMware ACE, Player, Workstation, and Fusion
- ☒ SWsoft Parallels
- ☒ Kidaro Managed Workspace
- ☒ Sentillion

FIGURE 2

Desktop Virtualization Software



Source: IDC, 2007

Virtual User Session Software

Virtual user session software runs on servers and creates multiple user sessions within an individual operating system, which can be interacted with simultaneously. Interaction with these virtual user sessions is performed through the use of a remote interaction delivery model. Representative vendors and products include the following:

- ☒ Citrix Presentation Server
- ☒ Microsoft Terminal Services
- ☒ Sun Secure Global Desktop Software

Delivery Models That Enable Virtualized Client Computing

Adoption of virtual client computing via the above virtualization software often requires, or is facilitated by, the use of specific delivery models. These models leverage a collection of protocols and proprietary software and can be broken into two major categories: remote streaming and remote interaction.

Remote Streaming

Remote streaming involves the delivery of executable blocks of data from a server to a distributed device, via a collection of specific (and sometimes proprietary) protocols and/or software. Remote streaming is used as a delivery model in the following representative products:

- ☒ Microsoft SoftGrid
- ☒ Citrix Presentation Server (version 4.5+)
- ☒ Endeavors AppExpress
- ☒ AppStream
- ☒ Citrix Provisioning Server

Remote Interaction

Remote interaction involves the delivery of I/O operations between a client device and a server via a collection of specific (and sometimes proprietary) protocols and software. Remote interaction is used as a delivery model in the following representative products:

- ☒ VMware VDI
- ☒ Citrix XenDesktop
- ☒ Qumranet Solid ICE
- ☒ Virtual Iron VDI
- ☒ Citrix Presentation Server
- ☒ Microsoft Terminal Services
- ☒ HP Consolidated Client Infrastructure
- ☒ ClearCube Blade PCs

FUTURE OUTLOOK

End users are showing a growing interest in the concept of virtualized client computing, and IDC expects to see continued growth in the number of end users piloting and moving toward this type of model.

However, the road to adoption will not be smooth as organizations deal with cultural, technical, and licensing issues in the process of changing their delivery of technology resources to end users. Additionally, users are finding themselves challenged with understanding these emerging technologies.

ESSENTIAL GUIDANCE

It is essential that vendors providing the technology that enables VCC (or considering entering this market) understand the benefits and limitations associated with each VCC technology, as these characteristics are what will affect adoption patterns and revenue opportunities.

It is also essential that organizations begin to "speak the same language" in terms of the terminology that describes the collective technologies that enable VCC, in order to avoid customer confusion.

LEARN MORE

Related Research

- ☒ *Citrix Acquires XenSource* (IDC #208371, August 2007)
- ☒ *VMware's IPO a Success: Customers Asking "What's Next"* (IDC #208317, August 2007)
- ☒ *HP Buys Neoware, Extends Thin-Client Reach* (IDC #207994, July 2007)
- ☒ *Virtualization: Why No "Desktop Consolidation"?* (IDC #205972, April 2007)
- ☒ *Worldwide Virtual User Interface Software 2006–2010 Forecast* (IDC #204812, December 2006)
- ☒ *Worldwide Virtual User Interface Software 2005 Vendor Shares* (IDC #204814, December 2006)
- ☒ *Utility Computing: A Current Analysis of the Evolution* (IDC #204838, December 2006)

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