

Navigating the Virtual Desktop Continuum

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Contents

- Abstract.....2
- Introduction3
- Understanding Your Users and Their Needs: The Virtual Desktop Continuum.....4
 - Applying the Virtual Desktop Continuum to Virtualization Planning5
- Virtualization Options6
 - Available Virtualization Technologies6
 - Matching Technologies to Users.....7
- Evaluating Vendors8
 - Coverage for All User Types.....8
 - Platform Independence.....8
 - Management Simplicity.....8
 - User Flexibility9
 - Cost Effectiveness9
 - Expense Comparison Summary9
 - Sample Scenario.....10
- The Quest Solution12
 - A Single Solution Set for All Your Users12
 - Quest's Free Assessment Tool.....12
- Conclusion13
- Appendix14
 - Terminal Server: Annual Costs per Device.....14
 - Hosted VDI: Annual Costs per Device14
 - Local VDI: Annual Costs per Device.....15
 - Physical PC: Annual Costs per Device16

Abstract

Your organization's workforce is diverse: some users work exclusively in the office, others are continually mobile, and many fall somewhere in between. This white paper explains how to choose a blend of desktop virtualization technologies that will best serve all of your users, with comparisons of the features and costs of the solutions from the three major vendors: Quest Software, Citrix and VMware.

Introduction

Not all employees have the same desktop and application requirements. Some require access to many applications to perform multi-faceted roles that change depending on the day; others may only need access to a subset of critical applications to perform more specific, repetitive tasks. Some employees require mobile computing, and some need huge amounts of computing power to run test analyses or crunch statistics. Because most organizations today have a diverse workforce with varying workspace needs, no single desktop virtualization technology can be a “best fit” for your entire workforce.

This paper will help you provide your diverse and evolving workforce with the virtual desktops and applications they need, when they need them, using a dynamic mix of desktop virtualization technologies, without over-delivering and over-paying. Your users will be happy and you will enjoy faster ROI and lower TCO. Interested? Read on.

Understanding Your Users and Their Needs: The Virtual Desktop Continuum

The virtual desktop continuum describes the various types of users found in most organizations, from those who work only in the office to those who are fully mobile:

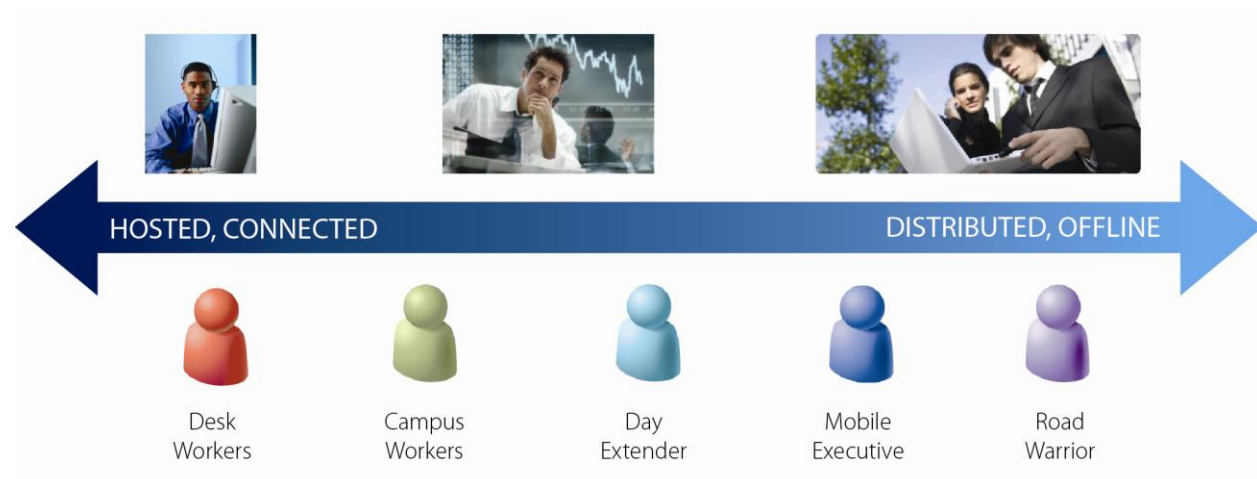


Figure 1. The virtual desktop continuum: users have different characteristics and different needs

The needs of these users differ considerably:

Worker Type	Description	Connectivity	Typical Equipment Used Today
Desk Worker	Inside the “four walls”; no roaming workspace required	Fully connected to the corporate domain at all working times	Desktop system
Campus Worker	Inside the corporate campus, but roams between meeting locations	Fully connected to the corporate domain at all working times	Laptop or other mobile system
Day Extender	Works from both home and office	Mostly connected to the corporate domain during working times	Laptop or other mobile system
Mobile Executive	Inside and outside the corporate domain—floats between branch offices and customer sites, hotels, airports, etc.	Intermittently connected during work	Laptop or other mobile system
Road Warrior	Mostly outside the corporate domain; nearly 100% “in the field” during work	Rarely connected except to synchronize	Laptop or other mobile system

Applying the Virtual Desktop Continuum to Virtualization Planning

Considering the virtual desktop continuum as you plan your desktop virtualization project can save you time, money, and stress by helping you better align technologies to your users' needs. You will most likely need to implement several different desktop virtualization technologies. If you try to force all of your diverse users to adopt the same desktop virtualization technology, you will likely:

- Over-deliver or under-deliver functionality
- Pay more than you should because different desktop virtualization technologies have different acquisition and deployment costs
- Be limited by the capabilities of specific virtual desktop technologies

Choosing the best technology for each type of user optimizes your IT dollar, delivers the right technology for users to do their jobs (no more, no less), and provides a path for growth in the future.

Virtualization Options

Available Virtualization Technologies

The following virtualization technologies are available to help you meet the needs of your diverse workforce:

Virtualization Technology	Advantages	Disadvantages
Hosted Virtual Desktop Infrastructure (VDI) – Hosted virtual desktops and applications accessed via a network/Internet connection	<ul style="list-style-type: none"> • Centralized management • Easier provisioning than physical PCs • Strong security • Data stays in datacenter • Allows for desktop personalization 	<ul style="list-style-type: none"> • No Internet means no desktop or applications • Expensive relative to other desktop virtualization techniques • User experience is limited by network quality
Local VDI – Virtual desktop images are created centrally and synchronized onto PCs and Macs when network connection is available	<ul style="list-style-type: none"> • Centralized management • Better user experience than hosted solutions (VDI and TS) • Desktop and applications work without network connection • Allow users to “bring your own computer” (BYOC) - including Macs 	<ul style="list-style-type: none"> • Requires user to own a powerful PC or Mac – no support for thin devices • Data is replicated to end points (protected and encrypted)
Terminal Server (TS) / RD Session Host – Hosted virtual desktops and applications accessed via a network/Internet connection	<ul style="list-style-type: none"> • Centralized management • Lower cost vs. hosted VDI • Strong security • Data stays in datacenter • Ideal for task workers 	<ul style="list-style-type: none"> • No Internet means no desktop or applications • Limited user personalization • User experience is limited by network quality
Application Virtualization -- Applications are encapsulated from the underlying operating system and become more portable and manageable	<ul style="list-style-type: none"> • Quicker and easier to deploy applications to physical and virtual desktops • Overcomes some application compatibility issues 	<ul style="list-style-type: none"> • Takes time to prepare each application • Not all applications can be virtualized
















Matching Technologies to Users




Which virtualization options best match the needs of your users? The chart below provides recommendations for delivering desktops and applications to users across the entire virtual desktop continuum:

Worker Type	Datacenter-Hosted Desktops		Distributed Desktops
	VDI	Session Host (Terminal Server)	Local VDI / Client-Side Virtualization
Desk Worker	●	●	
Campus Worker	●	●	
Day Extender	●	●	●
Mobile Executive			●
Road Warrior			●

Evaluating Vendors

The virtualization vendor you choose should offer all the virtualization technologies you need to support your users, but other criteria are important as well. Be sure to consider all of the following:

	Quest	Citrix	VMware
Coverage for all user types	 Support all users - connected or not	 Weak mobile users support	 No task user & weak mobile user support
Platform Independence	 Agnostic - Use ESX, Hyper-V, etc	 Push <u>XenServer</u>	 Only run on ESX
Management Simplicity	 2 consoles for all user types	 5+ consoles for limited user types	 VDI only, expensive for all users
Cost Effectiveness	 Cost effectively meet all user types	 25%-40% more expensive	 25%-40% more expensive
User Flexibility	 Give users what they want when they want it	 No Mac or "BYOC" laptops	 No Mac or "BYOC" laptops

 = Full Support  = Partial Support  = No/Poor Support

Coverage for All User Types

VMware offers hosted VDI for everyone, but their local VDI offering is weak and they have no Terminal Server support (which is a cheaper alternative to VDI for some users).

Citrix offers hosted and local VDI, Terminal Server support, application streaming, and physical PC support, but their local VDI is weak.

Quest offers better coverage than Citrix for significantly less cost, as detailed below in the section *Cost Effectiveness*.

Platform Independence

Citrix offers a choice of hosted VDI hypervisor, but tends to push their XenServer platform.

VMware offers no hypervisor choice and runs only on VMware’s ESX/vSphere.

Quest offers customers a choice among VMware, Microsoft, and Parallels hypervisors, and does NOT own or push a particular platform.

Management Simplicity

Citrix employs multiple consoles for managing the environment, which means administrators must pop in and out of various consoles daily simply to do their jobs.

VMware has fewer consoles, but as noted above, they offer only VDI, which limits the types of users they can effectively serve.

Quest provides two consoles for the management of hosted VDI, local VDI, Terminal Server, application streaming, and blade PCs. Quest also automates tasks and provides wizards to walk administrators through more complex configurations and processes.

User Flexibility

Both VMware and Citrix struggle to be flexible enough to truly allow end users to choose devices while maintaining a secure and contained computing environment.

Quest supports Macs for both hosted and local VDI. And Quest enables organizations to securely allow users to “bring your own computer” (BYOC) to work and easily blend work and personal desktops without fear of compromising either. In addition, Quest also offers choices in:

- **VDI hypervisor** – VMware ESX/vSphere, Microsoft Hyper-V, and Parallels Virtuozzo Containers
- **Storage management** – VMware linked clones, Microsoft differencing disks, and NetApp FlexClone
- **Display protocols** – Choose among Quest EOP (Experience Optimized Protocol) or EOP Xstream and Microsoft’s RemoteFX and Remote Desktop Protocol (RDP) to match user requirements
- **Access devices** – Support Macs, iPads, Netbooks, smart phones, thin clients, repurposed PCs, and Linux and Java devices from all major providers

Cost Effectiveness

Expense Comparison Summary

The chart below summarizes the capital expenses per user among the three major vendors for desktop virtualization.¹

Annual per device costs	Task Workers (Terminal Server)	Full Desktop Users (Hosted VDI)	Mobile Desktop Users (Local VDI)
Quest vWorkspace	Enhanced Terminal Server/Session Host \$483	VDI with hypervisor choice \$772	Fully distributed virtualization \$589*
VMware View	VDI on vSphere \$892	VDI on vSphere \$892	VDI on vSphere with local mode \$851*
Citrix XenDesktop	Enhanced Terminal Server/Session Host \$559	VDI on XenServer \$901	VDI synchronized with XenClient \$841*

Physical PC, traditional management: **\$1,095**

¹ There are no known studies on operational expenses for local VDI, so only capital expenses are considered here. For a full understanding of the cost breakdown, see [Appendix 1](#).

Sample Scenario

Let's apply these costs to a 1,000-user scenario that breaks down as follows:

Type of Worker	Number	Virtualization Technologies
Desk worker	150 (15%)	50% hosted VDI and 50% Terminal Server
Campus worker	250 (25%)	50% hosted VDI and 50% Terminal Server
Day extenders	200 (20%)	50% hosted VDI and 50% local VDI
Mobile executives	150 (15%)	100% local VDI
Road warrior	250 (25%)	100% local VDI

Now let's see how this scenario plays out for each of the three major vendors.

VMware View including Local Mode

VMware offers only hosted and local VDI, with no Terminal Server support. The following table shows the resulting costs for our sample scenario:

Type of Worker	Hosted VDI Costs	Terminal Server Costs	Local VDI Costs	Total
Desk worker	150 x \$892 = \$133,800	No support		\$133,800
Campus worker	250 x \$892 = \$223,000	No support		\$223,000
Day extender	100 x \$892 = \$89,200	No support	100 x \$851 = \$85,100	\$174,300
Mobile executive		No support	150 x \$851 = \$127,650	\$127,650
Road warrior		No support	250 x \$851 = \$212,750	\$212,750
Total	\$446,000	\$0	\$425,500	\$871,500

Citrix XenDesktop and XenClient

Citrix offers coverage for all user types, but charges a premium price to get there:

Type of Worker	Hosted VDI Costs	Terminal Server Costs	Local VDI Costs	Total
Desk worker	75 x \$901 = \$67,575	75 x \$559 = \$41,925		\$109,500
Campus worker	125 x \$901 = \$112,625	125 x \$559 = \$69,875		\$182,500
Day extender	100 x \$901 = \$90,100		100 x \$841 = \$84,100	\$174,200
Mobile executive			150 x \$841 = \$126,150	\$126,150
Road warrior			250 x \$841 = \$210,250	\$210,250
Total	\$270,300	\$111,800	\$420,500	\$802,600

Quest vWorkspace and vWorkspace – MokaFive Suite

Quest offers coverage for all user types—at a reasonable cost:

Type of Worker	Hosted VDI Costs	Terminal Server Costs	Local VDI Costs	Total
Desk Worker	75 x \$772 = \$57,900	75 x \$483 = \$36,225		\$94,125
Campus Worker	125 x \$772 = \$96,500	125 x \$483 = \$60,375		\$156,875
Day Extender	100 x \$772 = \$77,200		100 x \$589 = \$58,900	\$136,100
Mobile Executive			150 x \$589 = \$88,350	\$88,350
Road Warrior			250 x \$589 = \$147,250	\$147,250
Total	\$231,600	\$96,600	\$294,500	\$622,700

Scenario Recap

VMware is the most expensive option for our scenario, at \$871,500. This is \$68,000 more expensive than Citrix and \$248,800 more expensive than Quest. Offering only hosted and local VDI drives up VMware's costs. As well, the Citrix deployment costs \$179,900 more than Quest. And remember, these figures are for only 1,000 desktops; the cost differences increase with the number of desktops in your virtualization project. Another interesting note is that all desktop virtualization technologies are more cost-effective than the \$1,095/per desktop it costs to manage a physical desktop today.

The Quest Solution

A Single Solution Set for All Your Users

Quest offers management of hosted VDI, local VDI, and Terminal Server—as well as blade PCs and application streaming—in a single solution set for all things desktop virtualization:



With Quest Software, you can grow into an extensible desktop virtualization solution that allows a change of direction without a costly rip-and-replace expense. Our goal is to provide you a true “one-stop shop.” Whether you choose to implement multiple desktop virtualization techniques now or build to it over time, Quest gives you the flexibility that others cannot, at a lower cost.

Quest’s Free Assessment Tool

Understanding the needs and usage patterns of your users is the first step in selecting the appropriate desktop virtualization technologies for your organization. To help with this critical step, Quest has purchased Liquidware Labs’ popular assessment technology and made it freely available at www.quest.com/Assessing.

The assessment tool will help you determine which virtualization technologies will best serve the needs of your users. It will also discover which applications are used by whom and how often, so you can assess your desktop, network, datacenter, and storage needs before planning your virtualization strategy.

There are no restrictions on functionality and the tool can be used on an unlimited number of users. Give it a try today for free!

Quest® VDI Assessment



www.quest.com/Assessing

Conclusion

Quest is about choice and flexibility. With Quest you can:

- Embark on a “Work from Home” initiative, and have choices among the ways to deliver a virtual workspace
- Allow users to securely “BYOC” and reduce hardware costs
- Authorize users to use Macs, iPads, Netbooks, smart phones, thin clients, repurposed PCs, and Linux and Java devices within the traditional corporate “four walls”
- Mix and match virtualization technologies and techniques to best meet your needs in a cost effective way
- Change platforms without changing your management software
- Manage a large network of diverse users from a central console
- Automate tasks and use wizards to decrease administration burden
- Quickly deploy Windows 7 to virtual desktops, regardless of device age

Quest is **unifying** desktop virtualization, providing ONE solution that simply does more! Find out how you can get started at www.Quest.com/vWorkspace.

Appendix

Terminal Server: Annual Costs per Device

Expense	Quest vWorkspace	Citrix XenApp
End-user hardware	Thin client: \$67 Repurposed PC: \$0	Thin client: \$67 Repurposed PC: \$0
Server hardware	Gartner: \$45	Gartner: \$45
SAN storage for VMs	N/A	N/A
Microsoft licensing	RDS-CAL/VDI Suite: \$53 WS 2008 R2: \$20	RDS-CAL/VDI Suite: \$53 WS 2008 R2: \$20
Virtual desktop management software	Quest: \$69 per device, including support	Citrix: \$120 per device, including support
Average of best & worst cases	CapEx \$220	CapEx \$271
IT operations	Gartner: \$263 when using third-party tools; Connector for Zero PC = \$0 for maintenance of repurposed PC	Gartner: \$263 when using third-party tools; maintenance of repurposed PC: \$50
Average of best & worst cases	OpEx \$263	OpEx \$288
Total	\$483	\$559

Hosted VDI: Annual Costs per Device

Expense	Quest vWorkspace	VMware View	Citrix XenDesktop
End-user hardware	Thin client: \$67 Repurposed PC: \$0	Thin client: \$67 Repurposed PC: \$0	Thin client: \$67 Repurposed PC: \$0
Virtual desktop servers	Gartner: \$122 IDC: \$60	Gartner: \$169 IDC: \$83	Gartner: \$164 IDC: \$81
NAS storage for VMs	Gartner: \$131	Gartner: \$131	Gartner: \$131

	IDC: \$23	IDC: \$23	IDC: \$23
Microsoft licensing	VDA (non-SA): \$100 SA: \$55	VDA (non-SA): \$100 SA: \$55	VDA (non-SA): \$100 SA: \$55
Hypervisor + VM mgmt (over 3 years inc support)	Hyper-V + VDI Suite: \$21	Included with View	XenServer: free (50%) VMware: \$100 (40%) Hyper-V: \$21
Virtual desktop management software	\$69 per device, including support	View Premier: \$150 per concurrent user (over 3 years, including support)	XenDesktop: \$120 per device, including support
Average of best & worst cases	CapEx \$369	CapEx \$464	CapEx \$473
IT operations	Gartner: \$414; IDC: \$391 Connector for Zero PC = \$0 for maintenance of repurposed PC	Gartner: \$414 IDC: \$391 Maintenance of repurposed PC if not using a thin client: \$50	Gartner: \$414 IDC: \$391 Maintenance of repurposed PC if not using a thin client: \$50
Average of best & worst cases	OpEx \$403	OpEx \$428	OpEx \$428
Total	\$772	\$892	\$901

Local VDI: Annual Costs per Device

Expense	Quest vWorkspace – <i>MokaFive Suite</i>	VMware View (Local Mode)	Citrix Client
End user hardware	Laptop: \$400	Laptop: \$400	Laptop: \$400
Virtual desktop servers	\$0	Gartner: \$169 IDC: \$83	Gartner: \$169 IDC: \$83
SAN storage for VMs	\$0	Gartner: \$131 IDC: \$23	Gartner: \$131 IDC: \$23

Microsoft licensing (per annum)	VDA (non-SA): \$100 SA: \$55	VDA (non-SA): \$100 SA: \$55	VDA (non-SA): \$100 SA: \$55
Hypervisor	\$0 - \$40	Included with View	XenServer: Free (50%) vSphere: \$100 Hyper-V: \$20
Virtual desktop management software	\$69 per device, inc support	View Premier: \$150 per concurrent user (over 3 years including support)	XenDesktop: \$120 per device, including support
Offline Sync/Distribution/Management Server	One server can handle 5,000 users: \$2.50	1 transfer server per 60 operations: \$20	XenClient Synchronizer: \$10
Average of best & worst cases	CapEx \$589	CapEx \$851	CapEx \$841

Physical PC: Annual Costs per Device

Expense	Physical Desktop
End user hardware	Gartner: \$342 IDC: \$339
Microsoft licensing	\$100 (EA)
Average of best & worst cases	CapEx \$441
IT Operations	Gartner: \$438-\$690 IDC: \$870
Average of best & worst cases	OpEx \$654
Total	\$1,095

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Quest Support is available to customers who have a trial version of a Quest product or who have purchased a commercial version and have a valid maintenance contract.

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