

Top five considerations for simplifying virtual desktops

Executive summary

Companies have come to realize that they can increase employee productivity through programs such as Bring Your Own (BYO), mobile anytime anywhere any device access, and work shifting while streamlining operational costs by using desktop virtualization. Virtual Desktop Infrastructure (VDI) can free end users from the tethers of their desktop computers and enable them to access corporate desktops anytime from any device, including tablets and mobile phones. The result is a more agile, responsive and secure computing environment that scales quickly, creating real market advantages in today's fast-paced business world.

As enterprises adopt VDI and increase business agility while reducing support costs, other businesses want to do the same—but face tight resource and budget constraints. Many VDI solutions are designed for enterprises and are an extension to server virtualization, requiring the same type of datacenter setup, along with expert IT resources. While companies can amortize the costs for such a footprint, this approach requires a high upfront investment, and if the number of virtual desktops is low or phased in gradually, it can take a long time for a business to generate a return on investment (ROI). For both these reasons, traditional ways of delivering VDI simply don't work outside the enterprise.

In this white paper, we examine the top five VDI considerations for businesses looking to simplify VDI and compare two approaches to implementing VDI: the traditional enterprise VDI architecture and VDI-in-a-Box™ with a shared-nothing architecture.

Top five considerations for businesses looking to simplify virtual desktops

1. Cost

No matter what size your organization, make sure you factor in both the hard and soft (direct and indirect) costs associated with VDI implementation in order to come up with an accurate total project cost. In particular, consider the following:

Infrastructure costs for production use with high availability. You cannot afford to take chances with the availability of your VDI desktops. After all, VDI is supposed to improve agility, mobility and efficiency—not leave large numbers of users at the mercy of a single point of failure. Make sure you extrapolate beyond the pilot deployment to assess the costs associated with deploying a VDI that can support high availability and scale on demand in a production environment. Assess upfront the total cost of the physical servers, shared storage such as a storage area network (SAN), load balancers, connection brokers, management and provisioning servers and any other infrastructure needed for your production deployment.

Upfront costs. You probably want to start small and grow incrementally. Traditional VDI solutions are not cost-effective on a small scale because they require a large fixed upfront investment which can only be cost effective for several hundreds of desktops. Consider both the ultimate size of your planned deployment and whether it will take place in phases. Many companies refresh desktops when PCs break or become obsolete, and have pre-allocated budget for this. If you plan to re-purpose such budgets to start your VDI deployment, check that the upfront investment required by the VDI solution you're considering fits within your budget constraints.

Cost of resources. Estimate the cost of the expertise needed to deploy and manage the VDI solution. Does your team have expertise in desktop and Windows® administration, storage and SAN, virtualization management and high-end networking? Would you rather have a Windows/desktop administrator set up and manage virtual desktops without significant re-training on other components and technologies?

2. Simplicity

Traditional desktop virtualization deployments require enterprise resources and expertise, and typically take weeks to months to complete.

This can be a challenge for non-enterprises that are looking for implementation times in hours or days.

Calculate the complexity of the proposed VDI solution carefully, looking past the proof of concept to the time and resources it will take to roll out virtual desktops in production. As you evaluate the number of hardware and software components the solution will require, bear in mind that as the number of components in a solution increases, the longer it will take to diagnose and debug any issues that arise. The more complex a solution, the greater its number of potential failure points, which decreases overall reliability. Notice, too, the number of editions (trims) of VDI solution that your vendor offers and which one you'd need for production-quality, highly available virtual desktops.

As you size up each component, consider the resources that it might require, and investigate whether you'd need new staff with a specialized skillset to install and manage it. You might also find you'd need a separate crew to manage the whole solution.

Thus, do focus on just how simple is the VDI solution under consideration. Most companies do not have wherewithal to handle a complex VDI solution.

3. Scalability and high availability

Plan from the outset how you can scale the solution over time. If the solution relies on shared storage, scaling may create bottlenecks such as "boot storms" that you can only overcome by expensive over-provisioning with high-speed interconnects and higher-end SANs. Look instead for a solution that can scale in cost-effective steps to match your needs. Enterprises are used to overprovisioning costs, but if you are not, consider the budget impact of scalability-related overprovisioning.

Not all VDI solutions provide high availability (HA) out of the box, and if HA is not built in, you will need to re-architect your implementation as you scale to ensure redundancy. Traditional VDI architectures require you to set up redundant connection brokers, management servers, clustered SQL databases and high-speed interconnects to deliver HA. For non-enterprises, the simplest and most predictable approach is a VDI solution that has HA built-in.

4. End-user experience

To help ensure your users are happy with their virtual desktops, take the time to first understand their workloads and evaluate how a particular solution will fit their needs. Factor in the networks they might connect from and check whether the protocol is mature and can support various end-point devices such as tablets and mobile phones and the printers, peripherals that your organization uses. Different VDI solutions rely on different protocols to stream virtual desktops to users, and these vary in their support for multimedia redirection, USB and peripheral devices, graphics and WANs. Not all have the ability to adapt dynamically to network and end-point conditions.

5. Openness of architecture

In evaluating VDI solutions, consider whether they are open enough to offer you options and hence flexibility in protocols and virtualization technologies. Are you required to adopt virtualization technology from one single vendor in order to deploy a particular VDI solution? Proprietary architectures could require you to spend time and money retraining your staff in the new technologies. Beware of vendor lock-in, which can lead to your paying more over time. VDI solutions with open architecture will easily blend into your infrastructure thereby removing any technology learning curve and expense associated with that.

With these 5 key considerations in mind, let us take a look at the shared-nothing VDI solution – Citrix® VDI-in-a-Box and compare it with the traditional enterprise VDI approach of VMware View™.

Citrix VDI-in-a-Box: a shared-nothing VDI solution purpose-built to deliver simple, affordable virtual desktops

Citrix VDI-in-a-Box is an all-in-one VDI software appliance designed to be simple and affordable. It enables Windows® administrators to deliver centrally managed virtual desktops to any user, anytime, on any device, for less than the cost of new PCs. VDI-in-a-Box uses a shared-nothing architecture that eliminates more than 60 percent of traditional VDI infrastructure costs including management servers, clustered SQL databases and shared storage (storage area networks, or SANs). The VDI-in-a-Box software appliance integrates connection brokering, desktop provisioning, load balancing and user profile management and runs on inexpensive off-the-shelf servers with direct-attached storage (DAS). With this approach, you

can connect servers to form a highly available grid, which you can easily scale up by adding more servers. The grid automatically balances loads and delivers high availability. VDI-in-a-Box has been purpose-built to simplify and streamline virtual desktops, so that you get a production-quality solution with built-in high availability for less than the cost of PCs.

- **VDI-in-a-Box eliminates management overhead**

The picture below compares a production deployment setup using traditional VDI with VDI-in-a-Box. A traditional VDI deployment includes a pair each of load balancers and connection brokers to manage the desktop sessions and ensure high availability and servers to provision and manage the desktops. VDI-in-a-Box consolidates all this functionality into its virtual software appliance, building in connection brokering, load balancing, high availability; desktop provisioning and management. This radically simplifies the setup and management and lowers costs.

- **VDI-in-a-Box delivers high availability without shared storage**

Traditional VDI solutions require shared storage, typically a SAN with high-speed interconnects, to deliver high availability in production settings. This is expensive. VDI-in-a-Box eliminates this requirement and provides high availability and scaling using inexpensive DAS. You can run VDI-in-a-Box on two or more servers and the grid automatically balances loads and ensures redundancy.

- **VDI-in-a-Box does not require organizational or cultural change**

The intuitive management interface abstracts virtualization details so desktop IT staff can set up and manage the solution without additional datacenter expertise. Traditional VDI requires collaboration across storage, server, and desktop IT teams.

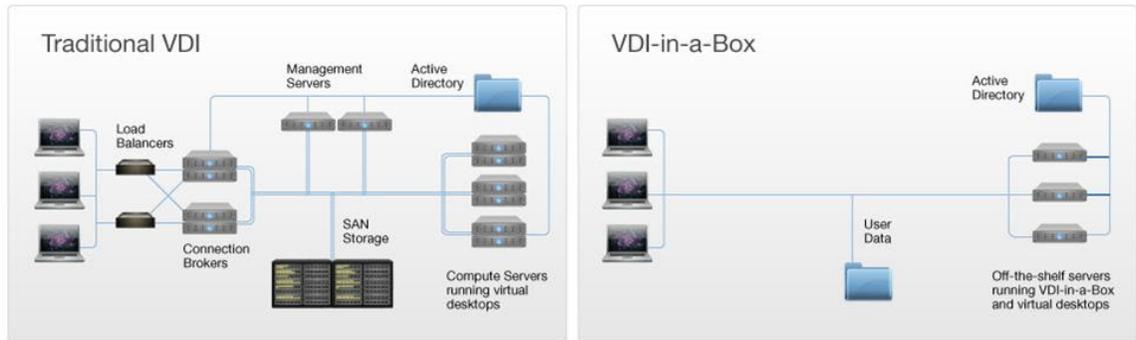
- **With VDI-in-a-Box, you can start small and deploy in phases using current budgets**

VDI-in-a-Box runs on inexpensive commodity servers and you can start with one or two servers and scale the deployment as needs grow. Since the upfront investment is minimal, you can use VDI-in-a-Box to prove that this solution works and then scale incrementally.

- **VDI-in-a-Box has no centralized bottlenecks that cause “boot storms” and other scaling issues in traditional VDI**

By eliminating centralized bottlenecks such as separate connection servers, management servers and shared storage pools, the VDI-in-a-Box grid architecture avoids issues such as “boot storms” that slow down traditional VDI architectures.

Next, let us compare the shared-nothing model of Citrix VDI-in-a-Box with a shared-VDI model such as VMware View.



Comparison: Citrix VDI-in-a-Box versus VMware View – a shared-resources VDI solution

Component Cost

Shared-nothing VDI is ideal especially for customers needing a simple virtual desktop solution such as Small and Medium Businesses (SMBs), educational institutions, state and local government, and departments of enterprises. These customers are looking for easy, cost-effective solutions that deliver demonstrable short-term ROI. The table below compares the costs of deploying traditional VDI with VMware View versus next-generation shared nothing VDI with Citrix VDI-in-a-Box. Access via repurposed PCs is assumed in both cases.

VDI-in-a-Box costs less than 1/3 to deploy than View

For 100 Desktops		VMware View	Citrix VDI-in-a-box™
Infrastructure	Servers:		
	• Compute servers	\$22,500	\$15,000
	• Management server	\$30,000	-
	• Storage w/ interconnect	\$35,000	-
	Total Hardware:	\$87,500	\$15,000
VDI	Software:		
	• MS Server OS	\$10,560	-
	• MS VDA	\$10,000	\$10,000
	Total Software:	\$20,560	\$10,000
TOTAL INFRASTRUCTURE COST		\$108,060	\$25,000
VDI software		\$25,000	\$16,000
TOTAL SOLUTION COST		\$132,060	\$41,000
TOTAL / DESKTOP		\$1,321	\$410

Notes on the table above

1. VMware View runs its management servers on Windows server OS and hence you see additional line items for Management server and MS Server OS. This is an additional component compared to Citrix VDI-in-a-Box.
2. Even if VMware View (VDI software) were offered at no charge, Citrix VDI-in-a-Box would still be cost effective because infrastructure accounts for the bulk of the cost of VMware VDI.
3. This comparison does not include the hardware, software and manpower cost associated with clustered SQL that VMware View requires.

How the two VDI solutions stack up against the top five business considerations

	Traditional shared-resource VDI (VMware View)	Shared-nothing VDI (Citrix VDI-in-a-Box)
Cost	<p>Traditional VDI solution needs management and provisioning servers, load balancers, connection brokers, shared SAN storage and specialty interconnects to deliver enterprise-grade virtual desktops. This requires significant upfront investment. Most organizations will need to deploy up to several hundred desktops before they'll start to realize ROI.</p> <p>See the various editions of VMware View 5 in Appendix C. Chances are high that you would need the higher priced Premier product to get all the features that are required to provide your end users highly available desktops.</p> <p>Take a look at Appendix A and the component cost table above to better understand the upfront cost of deploying VMware View.</p> <p>Based on the table above, total cost per virtual desktop comes to \$1321 when you deploy a minimum of 100 virtual desktops</p>	<p>The all-in-one design of Citrix-VDI-in-a-Box eliminates more than 60% of VDI costs by cutting out the need for separate connection brokers, provisioning servers, load balancers, or shared storage for high-availability.</p> <p>Citrix VDI-in-a-Box runs on off-the-shelf servers and can fit within an existing PC refresh budget. VDI-in-a-Box generates ROI with as few as 25 desktops.</p> <p>Citrix VDI-in-a-Box enables you to deploy virtual desktops for less than the cost of PCs.</p> <p>You can start as small as 25 virtual desktops and get each virtual desktop for less than the cost of a PC.</p> <p>The minimum quantity of VDI-in-a-Box licenses is a 10-pack.</p>
Simplicity	<p>Traditional VDI has an extensive footprint. You need specialized expertise in storage and servers to deploy and manage these solutions. Do not underestimate the complexity of VMware View architecture, particularly when used in a production environment. You'll need many servers to host a bevy of management servers, provisioning servers, connection brokers and specialized software such as the "Composer" which provides storage optimization through the use of linked clones. In addition to these servers, you'll also need shared storage (SAN) and specialty interconnects.</p> <p>In order to manage these software and hardware components, you would need administrators specializing in storage, networking and virtualization to collaborate.</p> <p>Take a look at various components you would need to configure in order to produce the first virtual desktop with VMware View 5 in Appendix B. Be sure to verify which features are built-in versus which features require custom deployment configuration.</p> <p>See the VMware View 5 architecture diagram in Appendix D and compare it to that of Citrix VDI-in-a-Box.</p> <p>Now, think about amount of time it would take to get the whole VDI solution up and running.</p>	<p>Purpose-built to deliver simple, affordable virtual desktops, VDI-in-a-Box bundles dynamic desktop provisioning, load balancing, high-availability, user management and desktop management into a single virtual appliance.</p> <p>To deliver the first virtual desktop, all your Windows administrator needs to do is install the VDI-in-a-Box virtual appliance on an off-the-shelf server.</p> <p>VDI-in-a-Box uses inexpensive and easy-to-manage DAS instead of expensive SAN.</p> <p>Users connect via Citrix Receiver, a browser session or a small Java client. Existing Ethernet is sufficient for a new deployment.</p> <p>Take a look at Appendix D to compare and contrast these architectures and to appreciate the simplicity of Citrix VDI-in-a-Box.</p> <p>With Citrix VDI-in-a-Box, you can deliver the first production-ready virtual desktop in less than an hour.</p>
Scalability and high availability	<p>VMware View meets scalability and high availability requirements but at a price: upfront investment in a plethora of hardware components such as expensive shared storage (SAN), connection brokers, load balancers, clustered SQL databases and software licenses.</p>	<p>Citrix VDI-in-a-Box meets scalability needs at an affordable price. VDI-in-a-Box is ideal for phased deployments, with no rip-and-replace required. As you add more desktop host servers to scale up, you will not encounter centralized bottlenecks.</p> <p>High availability is built into Citrix VDI-in-a-Box at no extra cost. You don't need extra hardware, software or expensive shared storage (SAN). Citrix VDI-in-a-Box uses direct-attached storage.</p>

<p>End-user experience</p>	<p>VMware View offers good end-user experience, though it's not as vibrant as the one offered by Citrix HDX. However, the upfront capital expense of implementing VMware View may be more than you can afford.</p>	<p>Leveraging Citrix HDX technology, Citrix VDI-in-a-Box offers a consistent high-definition experience with performance and access fine-tuned for network connection and device capabilities and each desktop customized to user preferences and profiles.</p> <p>VDI-in-a-Box enables access to virtual desktops anytime, anywhere, on any device including Windows PCs, Mac®, smartphone and tablet platforms such as Apple®, Android™, HP and RIM®.</p>
<p>Open architecture</p>	<p>VMware View Supports just one hypervisor: vSphere.</p>	<p>With Citrix VDI-in-a-Box, you can choose from XenServer®, Hyper-V, or vSphere. VDI-in-a-Box will work with the virtualization technology you already have in place.</p>

Appendix A: VMware View 5 Upfront Licensing cost

URL: <http://www.VMware.com/files/pdf/view/VMware-View-FAQ-Pricing-Licensing-and-Support.pdf>

Per VMware Pricing FAQ, Starter pack is a minimum of 100 desktops. View Premier is required for production-level functionality and is priced at \$250/desktop. This puts the minimum investment in VDI software alone at \$25,000.

Q: Are there any prerequisites or minimums for purchasing any of the VMware View SKUs?

A: VMware View bundles contain all the required components to run an end-to-end View deployment (see table above). View bundles can be purchased in quantities of 10 or 100 users.

At initial purchase, a Starter Kit or 100 pack is required before buying additional users in 10 packs because the vCenter Server component is tied to the Starter Kit or 100 pack.

	View Enterprise	View Enterprise Add-on	View Premier	View Premier Add-on	View Premier Upgrade
vSphere Desktop	✓		✓		
vCenter Server Standard Desktop	✓		✓		
View Manager	✓	✓	✓	✓	
View Composer			✓	✓	✓
Local Mode			✓	✓	✓
vShield Endpoint			✓	✓	✓
ThinApp			✓	✓	✓
Persona Management			✓	✓	✓
Pricing (Per Concurrent Connection)	\$150	\$90	\$250	\$190	\$100

	View Enterprise Add-on to Enterprise Bundle Upgrade	View Premier Add-on to Premier Bundle Upgrade	ThinApp Promo to View Premier Starter Kit Upgrade	ThinApp Suite to View Premier 100 Pack Upgrade	ThinApp Client to View Premier "Single Pack" Add-on	vSphere Desktop
vSphere Desktop	✓	✓	✓	✓		✓
vCenter Server Standard Desktop	✓	✓	✓	✓		
View Manager			✓	✓		
View Composer			✓	✓	✓	
Local Mode			✓	✓	✓	
vShield Endpoint			✓	✓	✓	
ThinApp			✓	✓	✓	
Persona Management		✓	✓	✓	✓	
Pricing (Per Concurrent Connection)	\$110	\$110	\$40	\$200	\$110	\$65

Appendix B: VMware View 5 components

URL: <http://www.VMware.com/files/pdf/view/VMware-View-Datasheet.pdf>

What's included in VMware View

VMware vSphere Desktop

Designed specifically for desktops, this edition of VMware vSphere® provides a highly scalable, reliable and robust platform for running virtual desktops and applications, with built-in business continuity and disaster recovery capabilities to protect desktop data and availability without the cost and complexity of traditional solutions.

VMware vCenter for Server or Desktops

This edition of VMware vCenter™ Server is the central management hub for VMware vSphere and gives you complete control and visibility over clusters, hosts, virtual machines, storage, networking and other critical elements of your virtual infrastructure.

VMware View Manager

View Manager allows IT administrators to centrally manage thousands of virtual desktops from a single console to streamline the management, provisioning and deployment of virtual desktops. In addition, end-users connect through the View Manager to securely and easily access VMware View virtual desktops.

VMware ThinApp

VMware ThinApp™ is an agentless application virtualization solution that streamlines application delivery while eliminating conflicts. As part of the VMware View, ThinApp simplifies repetitive administrative tasks and reduces storage needs for virtual desktops by maintaining applications independently from the underlying OS.

VMware View Persona Management

Persona Management dynamically associates the user persona to stateless floating desktops. Administrators can easily deploy pools of lower cost stateless, floating desktops and allow users to maintain their designated settings between sessions.

VMware Composer

VMware View Composer lets customers easily manage pools of "like" desktops by creating gold master images that share a common virtual disk. All cloned desktops linked to a master image can be patched or updated through VMware View Manager by simply updating the master image, without affecting users' settings, data or applications.

VMware View Client

Enables access to centrally hosted virtual desktops from Windows PCs, Macs, thin clients zero clients, iPads and Android-based clients. View Client with Local Mode allows access to virtual desktops running on a local Windows based endpoint regardless of network availability.

VMware vShield Endpoint

Offloads and centralizes antivirus and anti-malware (AV) solutions, eliminating agent sprawl and AV storm issues while minimizing the risk of malware infection and simplifying AV administration in virtualized environments.

Appendix C: VMware View 5 Editions

URL: <http://www.VMware.com/files/pdf/view/VMware-View-Datasheet.pdf>

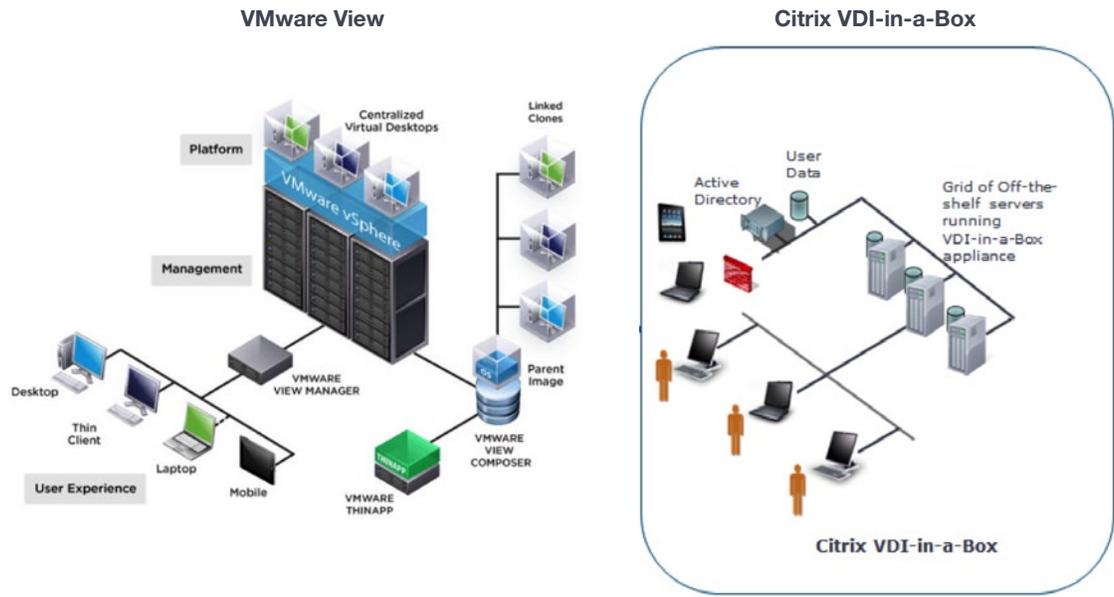
How to Buy

VMware View is available in two primary editions: VMware View Premier, and VMware View Enterprise.

VMWARE VIEW 5 EDITIONS		PREMIER	ENTERPRISE
VMware vSphere Desktop	Provides the best platform for building cloud infrastructures	X	X
VMware vCenter Server for Desktops	Delivers highly scalable management for VMware vSphere	X	X
VMware View Manager	Centralizes control over desktops, applications user data and settings	X	X
VMware View Persona Management	Centrally manage user persona	X	
VMware View Composer	Simplify image management and reduce storage needs using VMware Linked Clones	X	
VMware vShield Endpoint	Offloads AV processing, centralizes and simplifies AV deployment and management	X	
VMware ThinApp	Simplifies application management and assignment	X	
VMware View Client with Local Mode	Ensures online and offline user access to virtual desktops	X	

Appendix D: Architecture comparison: View versus VDI-in-a-Box

URL: <http://www.VMware.com/products/view/features.html>



Learn more

For more on how Citrix VDI-in-a-Box can help you deploy VDI quickly and easily go to <http://www.citrix.com/vdi-in-a-box/try-it>



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Fort Lauderdale, FL, USA

India Development Center
Bangalore, India

Latin America Headquarters
Coral Gables, FL, USA

Silicon Valley Headquarters
Santa Clara, CA, USA

Online Division Headquarters
Santa Barbara, CA, USA

UK Development Center
Chalfont, United Kingdom

EMEA Headquarters
Schaffhausen, Switzerland

Pacific Headquarters
Hong Kong, China

About Citrix

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