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# VMware View 5 Desktop Virtualization Solutions

A complete guide to planning and designing solutions based on VMware View 5

Foreword by  
*Simon Bramfitt, Founder, Entelechy Associates*

**Jason Langone**

**Andre Leibovici**

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**Jason Langone**

**Andre Leibovici**



BIRMINGHAM - MUMBAI

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First published: June 2012

Production Reference: 1010612

Published by Packt Publishing Ltd.  
Livery Place  
35 Livery Street  
Birmingham B3 2PB, UK.

ISBN 978-1-84968-112-4

[www.packtpub.com](http://www.packtpub.com)

Cover Image by Sandeep Babu ([sandyjb@gmail.com](mailto:sandyjb@gmail.com))

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# Foreword

On August 12, 1981, IBM released the IBM Personal Computer. It was a transformative event; the one that in time would far exceed even the most optimistic projections of its future potential. It changed forever how the computer would be viewed, making it truly "Personal".

Much has changed since that day; many of these changes are immediately visible. The computer's user interface has transformed beyond all recognition, from the blocky text of the DOS command prompt to rich windowed interfaces driven by a mouse or touchpad. PCs are faster, smaller, and cheaper than ever before and are capable of doing things that were beyond the imagination of all but the most far reaching science-fiction authors. Other changes are more subtle; the PC is now both ubiquitous and ever-connected. Its transformation in size and appearance has seen it acquire new names to better describe its new form. Becoming the Portable PC first and later the laptop and netbook, and most recently the tablet and smartphone; hiding its nature in ever smaller packages with new interfaces designed to be controlled by gestures and voice. As a result, some would even have it that we are entering a post-PC era.

It is perhaps too soon to say that we have left the PC behind. For all these changes, one thing remains unaltered – today's personal computing experience is still centered on the device. Applications are for the most part installed locally and the decision to walk from device to device or carry one from place to place is based more on the device's size than the user's need for mobility. Either way, the only method to ensure that it is possible to provide service is to rigorously enforce standardization, making sure every PC has all the applications preinstalled on the off chance that someone will need them. This model has worked, after a fashion, almost unchanged for the last 31 years, but of late it is starting to show its age. Now, we need to consider a world shaped by new, deeply destabilizing forces.

The launch of the Apple iPad in 2010 brought with it "Bring Your Own Device" programs and was the stimulus that pushed the "Consumerization of IT" into the limelight, sending shockwaves through what was until recently a smooth running, well-understood service. We are rapidly entering a world where an IT administrator doesn't know from one day to the next how many users he has to support or even where in the world they might be located. Where managing user experience does not mean providing a standard suite of applications across 10,000 identical PCs, each running identically configured copies of Windows, but supporting and insuring a comprehensive user experience (not just the user profile and home directory, but the user's entire working environment, their data, and applications) and making it available in its entirety at any place, any time, and on any device. Welcome to desktop virtualization.

Desktop virtualization is a deceptive term; everybody understands that at its core, server virtualization is all about being able to consolidate server workloads onto fewer physical servers. Desktop virtualization is more subtle and far reaching. It's not about consolidating desktop workloads into fewer physical servers, although, frequently this is part of the picture. Rather, it's about being able to orchestrate the creation of personalized working environments (that is, applications, data, and user profile) and enabling access to them in the manner most appropriate to each individual user's computing and communications environment while at the same time ensuring full compliance with organizational governance, risk, and compliance policies.

**Simon Bramfitt**

Founder

Entelechy Associates

# About the Authors

**Jason Langone** (@langonej) has been involved in VMware solutions for over seven years and has designed and implemented solutions around the world. Langone has a long history of designing VMware-based tools (for example, V-Moses and ESX Recovery Center), as well as designing robust solutions for enterprise customers. Langone spoke at VMWorld 2006 and won a VMware Vanguard Award in 2007 for Best DR Solution. He is a **VMware Certified Design Expert (VCDX)**, a VMware vExpert, and a **VMware Certified Professional (VCP)**. In addition, Langone has been involved in some of the largest VDI deployments from the Middle East to deployable solutions in the US.

Langone maintains a blog dedicated to virtualization and cloud computing at [www.ThinkVIRT.com](http://www.ThinkVIRT.com).

---

I'd like to acknowledge the following individuals whom I have had the pleasure of working with or who contributed to this book by proofreading, editing, mentoring, commenting, and discussing its content. In no particular order, they are Dwayne Lessner (@dlink7), Simon Bramfitt (@simonbramfitt), Elvedin Trnjanin (@etrnjanin), Andy Murphy (@amurph182), Jordan Harding, Pam Takahama, Tyler Rohrer (@t\_rex\_vdi), Steve Kaplan (@roidude), and the SPSS team at VMware Federal.

I'd also thank VMware for being the catalyst to many great professional relationships and friendships over the last seven years.

---



**Andre Leibovici** (@andreleibovici) is a leading expert in the current area of virtualization and End User Computing and maintains an award-winning and world-recognized blog. For the last 10 years, his passion and dedication around virtualization and End User Computing has helped many organizations while working for VMware Professional Services, EMC Virtualization Team (vSpecialists), and through creating professional blogging resources. His expertise is backed by more than 20 years industry experience managing IT infrastructures for large organizations.

Andre's blog <http://myvirtualcloud.net> is recognized as one of the industry leading technical VDI blogs with more than 1.5 million views every month. Based on his field experience, he developed a number of free tools to help beginners and advanced architects to appropriately size and architect VDI solutions. Those tools include the VMware View Online Calculator, the XenDesktop Online Calculator, and the Display Protocol Online Calculator.

His passion for End User Computing led him to find the APAC Virtualization Podcast and speak at conferences such as the Brazil vForum 2011, Las Vegas VMworld 2011, and the Sydney vForum 2010. Due to his creativity and accomplishments, he received the VMware Virtual Desktop Ingenuity Award 2009 and was recognized as vExpert recipient award for two consecutive years.

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*I would like to thank the support of my beautiful wife and daughter, Whitney and Liliana,  
without whom this book would never have been finished.*

*-Jason Langone*

*For my dear and loving wife Rebecca  
...and to Jason Langone, for allowing me to be part of his adventure.*

*-Andre Leibovici*



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# Preface

*VMware View 5 Desktop Virtualization Solutions* is meant as a guide for architects, solution providers, consultants, engineers, and anyone planning to design and implement a solution based on VMware View 5. It will refer to real-world scenarios as they are likely the best teaching examples. It will explain the settings and configurations needed to have a successful solution as well as the reason behind the decisions.

This book is not meant to replace the official administration or installation guides for VMware View published by the great people at VMware. The administration and installation guides are used during the installation and implementation of the solution. The material in this book should be used during the design phase, which is before an implementation is underway.

## The driving factors of VDI

Many agencies and organizations are looking at how to deliver desktops as a managed service while increasing end-point security and decreasing associated costs. Popular reasons to implement a VMware View solution include:

- **Security:** VDI removes sensitive data from the end device and improves the ability to manage, secure, patch, and audit large numbers of desktop resources.
- **Windows 7 migrations:** Organizations looking to migrate to Windows 7 are looking at VDI to ease the transition.
- **Technology/Hardware refresh:** The daunting task of replacing outdated PCs during a hardware refresh can incur significant operational costs and reduce productivity. This is an opportunistic time to migrate users to a VDI solution; in addition, existing PCs could be repurposed as thin or thick clients, extending their usable life.

- **Energy reduction:** Some VDI solutions can consume significantly less energy through the use of zero/thin clients and tailored hardware on the backend.
- **Device independence:** VDI can remove the limitations of maintaining a stringent, "Acceptable Client List" for an organization (for example, Dell Latitude 5400S and Mac Books only) and instead allow the end user community to use their preferred device that ultimately connects back into a managed VDI. As long as the device has a support View Client, it is permitted for use within the organization. This is often called, **Bring Your Own Device (BYOD)**.
- **Remote connectivity in times of crisis:** Whether it's H1N1, an erupting volcano, mega-blizzard, or a swarm of locusts, VDI can allow workers to still work when they can't physically get to their work area.

No matter the driving reason, VDI is a technology that has gained a lot of traction across many verticals all over the world. It's also likely that many server virtualization architects will be asked to include a VDI as part of their overall virtualized datacenter solution.

## What this book covers

*Chapter 1, Components of VMware View*, covers the core concepts of VDI as well as the core concepts of the VMware View platform. This chapter also covers VMware vSphere components as they are related to a VMware View solution.

*Chapter 2, Solution Methodology*, covers a defined methodology, including assessment, use case definition, a VDI hierarchy to establish a common framework of solution design.

*Chapter 3, Persistent or Non-Persistent vDesktops*, explains one of the most important design points of a VDI solution, desktop persistency. It also provides guidance on making the decision as well as benefits and drawbacks to each approach.

*Chapter 4, End Devices*, discusses the various end points that can be used to connect into a VMware View VDI. It also provides guidance on selecting the appropriate devices based on the environment and organizational requirements.

*Chapter 5, The PCoIP Protocol*, explains the protocol behind VMware View, Teradici's PCoIP. It also covers performance tuning, the APEX offload card, and best practices around implementing a solution with PCoIP.

*Chapter 6, Sizing the VDI*, focuses on sizing the core components of a VMware View solution, including Connection Servers and VMware vCenter Servers. It also discusses designing the solutions with VMware vSphere maximums in mind.

*Chapter 7, Redundancy*, focuses on building a robust and resilient VDI solution. It also explains how full redundancy can be designed and delivered, as well as design considerations and overall environmental impact.

*Chapter 8, Sizing the Storage*, focuses on one of the most complex components of VDI design, the underlying storage environment. It also covers both high-level and in-depth technical considerations, and design aspects of the storage system supporting the VDI.

*Chapter 9, Security*, focuses on hardening of the VDI as well as robust authentication mechanisms. It also discusses security considerations for specific environments, such as government agencies.

*Chapter 10, Migrating from Physical Desktops to Virtual Desktops*, discusses techniques to successfully migrate a user base from a physical desktop to a virtual desktop. It also focuses on user persona management and abstraction.

*Chapter 11, Backing Up the VMware View Infrastructure*, focuses on scheduling proper backups of a VMware View environment.

*Chapter 12, VMware View 5.1*, discusses the new capabilities in VMware View 5.1 along with **Content-Based Read Cache (CBRC)** and additional product highlights.

*Appendix, Additional Tools*, provides additional tools, online references, and suggested Twitter personalities that may prove helpful in designing a VDI solution.

## What you need for this book

As this book is technical in nature, the reader needs to have a basic understanding of the following concepts:

- VMware vSphere
  - Hypervisor basics
  - vMotion
  - Cluster capabilities such as HA, DRS, and DPM



- Active Directory
  - Types of authentication
  - Encryption with certificates
  - Group policy objects
  - Folder redirection
  - Roaming profiles
  - DNS
- Virtual machine basics
  - VMX and VMDK files
  - Snapshots
  - VMware tools
- Networking
  - VLANs
  - DHCP
  - Port types
  - Routing
  - LAN and WAN basics

## Who this book is for


The typical readers of this book would have a sound understanding of VMware vSphere fundamentals and would have been involved in the installation or administration of a VMware environment for more than two years.


## Conventions

In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.

Code words in text are shown as follows: "Configure the ODBC connection and use <vCenter Server>/SQLEXP\_VIM for the connection string. Replace <vCenter Server> with the appropriate information for your environment."

New terms and important words are shown in bold. Words that you see on the screen, in menus or dialog boxes for example, appear in the text like this: "This information can be found by opening the **Properties** tab from within **Device Manager** with the applicable device highlighted."

 Warnings or important notes appear in a box like this.

 Tips and tricks appear like this.

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# 1

## Components of VMware View

**Virtualization**, the technology of abstracting the operating systems from the underlying physical server components, has become a cornerstone of the data center architecture. Virtualization allows organizations to run not just one operating system per physical server in the data center, but tens, dozens, or even hundreds, on a single physical server. The benefits of virtualization are many, including a reduction in hardware, power, and cooling costs. In addition, virtualization allows for new techniques of distribution and resilience to be applied, such as **VMware Distributed Resource Scheduler (DRS)** and **VMware High Availability (HA)**. Server virtualization, the virtualization of server operating systems on server hardware, is now a mainstream technology, which is readily accepted, adopted, and implemented in organizations across the world.

**Virtual Desktop Infrastructure (VDI)**, the virtualization of desktop operating systems on server hardware, is another story.

The reason for the slower adoption of the virtual desktops was originally due to many factors, including an immature technology, lack of general understanding of a comprehensive solution, a proven delivery methodology, and a clear understanding of the success criteria of a given virtual desktop project.

Today, many of these hurdles have been removed. The supporting technologies from communication protocols to computing density, platform stability, and desirable end devices, now exist. Design methodologies have been built by some of the largest integrators in the world; yet virtual desktop projects continue to fail, falter, or stall.

This book will provide the architect, the engineer, the project manager, the freelance consultant, or the contractor, with a proven blueprint for success. More importantly, this book will teach the key success criteria to measure the most important design considerations to make and how to tip the probability of the project's success and sign-off in your favor.

Before these concepts can be covered in depth, it is important to understand the components of a **virtual desktop (vDesktop)** solution. The technology in this book focuses on VMware View, which is a market leader in VDI. While some concepts in this book apply specifically to VMware View-based solutions, many of the topics will help a VDI architect of any technology plan and build for success.

## Core components of VMware View

This book assumes a familiarity with server virtualization, more specifically, VMware vSphere (sometimes referred to as ESX by industry graybeards). Therefore, this chapter will focus on:

- The VMware vCenter Server
- The types of View Connection Server
- Agent and client software

### vCenter Server

VMware vCenter is a required component of a VMware View solution. This is because the View Connection Server interacts with the underlying **Virtual Infrastructure (VI)** through vCenter Web Service (typically over port 443). vCenter is also responsible for the complementary components of a VMware View solution provided by the underlying VMware vSphere, including VMotion and DRS (used to balance the virtual desktop load on the physical hosts). When an end customer purchases VMware View bundles, VMware vCenter is automatically included and does not need to be purchased via a separate **Stock Keeping Unit (SKU)**. In the environments leveraging vSphere for server virtualization, vCenter Server is likely to already exist. To ensure a level set on the capabilities that VMware vCenter Server provides, the key terminologies are listed as follows:

- **VMotion**: It is the ability to live migrate a running virtual machine from one physical server to another with no downtime.
- **DRS**: It is the vCenter Server capability that balances virtual machines across physical servers participating in the same vCenter Server cluster.
- **Cluster**: It is a collection of physical servers that have access to the same networks and shared storage. The physical servers participating in a vCenter cluster have their resources (for example, CPU, memory, and so on) logically pooled for virtual machine consumption.