

Making Everything Easier!<sup>TM</sup>

VMware Special Edition

# Data Center Modernization FOR **DUMMIES**<sup>®</sup>

A Wiley Brand

## Learn to:

- Adopt a software-defined approach for cloud provider agility
- Accelerate development of traditional and cloud-native applications
- Get on the path to an agile data center that extends to public cloud

Brought to you by

**vmware**<sup>®</sup>

**Theresa Villatore-Silva**

Sr. Solutions Product Marketing Manager



## About VMware

VMware, a global leader in cloud infrastructure and business mobility, helps customers realize possibilities by accelerating their digital transformation journeys. With VMware solutions, organizations are improving business agility by modernizing data centers and integrating public clouds, driving innovation with modern apps, creating exceptional experiences by empowering the digital workspace, and safeguarding customer trust by transforming security. With 2016 revenue of \$7.09 billion, VMware is headquartered in Palo Alto, California, and has more than 500,000 customers and 75,000 partners worldwide.

To learn more, visit: [www.vmware.com/go/modernize](http://www.vmware.com/go/modernize)

# *Data Center Modernization*

FOR  
**DUMMIES**<sup>®</sup>

A Wiley Brand

**VMware Special Edition**

# *Data Center Modernization*

FOR  
**DUMMIES**<sup>®</sup>  
A Wiley Brand

**VMware Special Edition**

**by Theresa Villatore-Silva**

*Sr. Solutions Product Marketing Manager*

FOR  
**DUMMIES**<sup>®</sup>  
A Wiley Brand

## **Data Center Modernization For Dummies®, VMware Special Edition**

Published by  
**John Wiley & Sons, Inc.**  
111 River St.  
Hoboken, NJ 07030-5774  
[www.wiley.com](http://www.wiley.com)

Copyright © 2018 by John Wiley & Sons, Inc., Hoboken, New Jersey

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the Publisher. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

**Trademarks:** Wiley, For Dummies, the Dummies Man logo, The Dummies Way, Dummies.com, Making Everything Easier, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates in the United States and other countries, and may not be used without written permission. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc., is not associated with any product or vendor mentioned in this book.

**LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.**

ISBN 978-1-119-49139-2 (pbk); ISBN 978-1-119-49138-5 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

For general information on our other products and services, or how to create a custom *For Dummies* book for your business or organization, please contact our Business Development Department in the U.S. at 877-409-4177, contact [info@dummies.biz](mailto:info@dummies.biz), or visit [www.wiley.com/go/custompub](http://www.wiley.com/go/custompub). For information about licensing the *For Dummies* brand for products or services, contact [BrandedRights&Licenses@Wiley.com](mailto:BrandedRights&Licenses@Wiley.com).

## **Publisher's Acknowledgments**

Some of the people who helped bring this book to market include the following:

**Development Editor:** Elizabeth Kuball

**Copy Editor:** Elizabeth Kuball

**Acquisitions Editor:** Katie Mohr

**Editorial Manager:** Rev Mengle

**Business Development Representative:**

Karen Hattan

**Production Editor:** Siddique Shaik

**Special Help:** Faithe Wempen

# Table of Contents

---

<b>Introduction .....</b>	<b>1</b>
About This Book .....	2
Foolish Assumptions .....	2
Icons Used in This Book.....	3
Where to Go from Here .....	3
<b>Chapter 1: The Rise of the Digital Economy — And What It Means for Your Data Center.....</b>	<b>5</b>
The Digital Economy and the Data Center.....	5
An Engine for Powering Business Growth .....	6
The Trouble with Traditional Data Centers .....	7
The Status Quo Must Go .....	8
<b>Chapter 2: The Modern Data Center.....</b>	<b>11</b>
Key Attributes of a Modern Data Center.....	11
New “Table Stakes” for IT .....	12
The Route to the Modern Data Center .....	13
<b>Chapter 3: Modernizing the Infrastructure .....</b>	<b>15</b>
Modern Infrastructure Defined .....	15
Determining the Best Approach for Your Requirements ...	16
The engineered approach.....	16
The build-it-yourself approach .....	18
Intelligent Operations Management .....	22
Business and IT Benefits .....	23
<b>Chapter 4: Delivering Automation .....</b>	<b>25</b>
Speeding Application Deployment .....	25
Virtualizing the Network .....	26
Automating Provisioning .....	26
Drawing on the Power of Two .....	27
Looking at the Business and IT Benefits .....	28

<b>Chapter 5: Extending to the Public Cloud to Get the Best of Both Worlds . . . . .</b>	<b>31</b>
Why You Need a Modern Data Center That Extends to Public Cloud.....	31
The Importance of a Software-Defined Foundation.....	32
The Benefits of a Consistent Environment.....	33
Business and IT Benefits .....	34
<b>Chapter 6: Key Takeaways . . . . .</b>	<b>35</b>
Recapping the Top Benefits of a Modern Data Center.....	35
Finding the Route Forward .....	36
Putting Experts on Your Team.....	37
<b>Chapter 7: Ten Sources of More Information. . . . .</b>	<b>39</b>

# Introduction

---

Welcome to *Data Center Modernization For Dummies*, your guide to creating a modern data center with all the right stuff for the digital economy.

So, why do you need to modernize your data center? It all begins with the digital transformation that is sweeping the planet — and disrupting businesses at a fundamental level. In every industry, companies are under pressure to interact with their customers in new ways, through new channels, and to delight them with new personalized experiences.

At the same time, the pace of business is moving at mind-boggling speeds. It's crazy and chaotic out there — like the first movie in *The Fast and the Furious* series, only with the drivers in C-suites instead of hyped-up street cars. To win this race, your IT organization needs to hit the accelerator — and help your business units bring new products and services to market at drag-racing speeds.

Of course, you can't do this with yesterday's approaches to IT infrastructure, even those that are time tested and widely used. To help your business stay competitive, your IT organization needs a modern data center that can provide the agility, security, and scalability required to drive innovation and growth in the digital era.

So, how do you get there? The first step is to get closely acquainted with the concepts explored in this book. Drawing on VMware's experiences in IT shops around the world, this book provides tips, insights, and advice for modernizing your data center to accelerate digital transformation.

## About This Book

Don't let the compact size fool you. This book is loaded with information that can help you understand and capitalize on the latest ideas and technologies to build a fully virtualized, highly automated, software-defined data center (SDDC) that is ready for the challenges of the digital economy.

In plain and simple language, this guide walks through the three key initiatives that lead to the modern data center:

- ✓ Modernizing the infrastructure
- ✓ Delivering automation
- ✓ Extending to public cloud

## Foolish Assumptions

In writing this book, I've gone out on a limb and made the following assumptions about you:

- ✓ You're an IT practitioner who is familiar with common terms in IT shops.
- ✓ You're concerned about managing both traditional and cloud-native applications across public and private clouds.
- ✓ You're not content with the status quo — you want to approach IT in new ways to empower the digital business.
- ✓ You're eager to transform your own admin role to a new DevOps role like a platform administrator or infrastructure developer.
- ✓ You're going to love the capabilities of a modern data center.

# Icons Used in This Book

To make it easy to navigate to the most useful information, these icons highlight key text:



Take careful note of these key takeaway points.



Read these optional passages if you crave a more technical explanation.



Follow the target for tips that can save you time and effort.



Watch out for these potential pitfalls on the road ahead.

## Where to Go from Here

The book is written as a reference guide, so you can read it from cover to cover or jump straight to the topics you're most interested in. Whichever way you choose, you can't go wrong. Both paths lead to the same outcome — a better understanding of the characteristics of a modern data center and the steps and technologies you need to move forward.

## Chapter 1

---

# The Rise of the Digital Economy — And What It Means for Your Data Center

---

### *In This Chapter*

- ▶ Highlighting the new digital economy
  - ▶ Presenting IT as a strategic partner to the business
  - ▶ Exploring the need to modernize the data center
- 

**B**usiness models are rapidly changing in the digital economy, putting new requirements on IT — and this shift has big implications for your data center. As the core engine for delivering IT services and enabling digital transformation, the data center now needs to become far more agile and responsive than it has ever been before. This chapter covers the new digital economy and what it means for your data center.

## *The Digital Economy and the Data Center*

The digital economy is no longer a trend. It's the new reality. Today we all live and work in the digital economy. In this new world, companies need to put digital technologies to work to deliver on the ever-increasing service expectations of digitally empowered customers and employees.

Consider this prediction from IDC: By 2020, 60 percent of CIOs will implement an IT business model and culture that shifts focus from IT projects to digitally oriented products.

Digital technologies enable your company to engage with your customers in more personal and timely ways and to dazzle them with superior experiences. This is a lot more than user-friendly websites and mobile apps. Customer expectations now go beyond ease of use. Today's digitally savvy customers expect the companies they do business with to deliver proactive experiences that simplify and enrich their lives.

## *An Engine for Powering Business Growth*

The rise of the digital economy is driving rapid and fundamental changes in businesses and their operating models — and this has huge implications for your IT organization. In this new era, the ability to bring new applications and services to market at lightning-fast speeds is a key to business success and competitive advantage.

In this fast-paced, highly competitive market environment, IT is the engine for powering business growth. This means that your IT organization now must partner with business stakeholders to meet new mandates, like these:

- ✓ Sparking business innovation
- ✓ Bringing new apps to market in tight time windows
- ✓ Delivering engaging and superior customer experiences — consistently and securely

This new role in the enterprise raises the stakes for your IT organization. To meet the expectations of business units and their customers, IT must be able to quickly deploy and scale infrastructure and applications.

Here's the good news: People in IT are starting to focus on this need. In a survey of the VMware customer community,

43 percent of IT professionals cited the need to support business stakeholders with faster, on-demand delivery of infrastructure and applications.

And here's the bad news: This is where things get harder. In the typical IT shop, on-demand delivery of infrastructure and applications is more of a dream than a capability — because of the problems inherent in traditional approaches to the data center.

## *The Trouble with Traditional Data Centers*

Anyone who has spent much time in IT knows that traditional data centers have plenty of issues that can limit IT agility and stall digital transformation. The problems with traditional, hardware-centric data centers begin at a foundational level. The typical data center architecture is based on siloed infrastructure layers and purpose-built hardware, none of which is easy to change. And then to throw another roadblock in the route to IT agility, this rigid infrastructure is often managed through fragmented and inefficient manual processes.

At a more specific level, here are some of the common challenges that IT teams deal with daily:

- ✓ Improving agility in operationally complex, mixed environments with siloed infrastructure and fragmented management tools and processes
- ✓ Relying heavily on outdated management approaches and error-prone manual processes
- ✓ Connecting legacy and modern applications across on-premises data centers, clouds, and devices while ensuring security, compliance, and availability in a consistent architecture
- ✓ Working with flat or shrinking IT budgets and traditional infrastructure that is expensive to purchase, costly to maintain, and difficult to scale

- ✓ Supporting the latest technology — such as modern applications, containers, and cloud — while leveraging existing investments and avoiding vendor lock-in

The combination of these challenges makes it difficult to support the demands of an enterprise that competes in today's digital economy.

Of course, this isn't just about external customers. Internal line-of-business users and software developers also require convenient, "consumer-ready" access to the IT services and resources they need to drive the business forward.



If your in-house IT teams can't provide on-demand access to IT resources, your internal stakeholders are likely to bypass IT and use public cloud solutions. Although these "shadow IT" initiatives may be quick, easy, and cheap to set up, they can introduce some serious compliance, data security, and management risks — and can get costlier over time. This underscores the need to think about technology in terms of business priorities and use a modern data center to help your business achieve its goals. You need to shift your perspective of IT from a support function to a proactive service provider and strategic partner.

## *The Status Quo Must Go*



Here's the bottom line: The status quo must go. To stay relevant, IT must change by adopting new, software-defined approaches to the data center that support a multi-cloud environment across private and public cloud systems. These more fluid approaches to the data center help IT pros accelerate the development and delivery of applications that keep the business at the top of its game.

This goal is clearly on the radar of many IT leaders. For example:

- ✓ A Gartner study found that by 2023, the programmatic capabilities of software-defined infrastructure will be considered a requirement for 85 percent of the largest global enterprises, up from 40 percent today.
- ✓ Gartner predicts that by 2020, 90 percent of organizations will adopt hybrid infrastructure management capabilities.

IT teams also need to provide options to enable their line-of-business clients and developers to use both private and public cloud resources. These options must be convenient, fast, and cost-effective while allowing IT to maintain a hybrid environment with visibility, security, and governance over company data and applications.

So, how do you get there? This is where the modern data center enters the picture. With a modern data center, your IT organization can overcome the pitfalls on the road to digital transformation and deliver the agility, speed, and innovation required for success in the digital economy, across both private and public clouds.

## **Chapter 2**

---

# **The Modern Data Center**

---

### ***In This Chapter***

- ▶ Defining the modern data center
  - ▶ Listing key data center attributes
  - ▶ Highlighting the new “table stakes” for IT
- 

**D**espite all the enthusiasm for moving applications to the cloud, corporate data centers are neither dead nor dying. In fact, first-class data centers remain one of the keys to competitive advantage. There is tremendous value in keeping some applications and services running on-premises, even while moving others to the cloud. But even the best data center needs to change and evolve. This chapter explores the characteristics of a modern data center.

## ***Key Attributes of a Modern Data Center***

A modern data center is designed to enable the agile, service-oriented IT models that are essential for success in the digital economy. A modern data center:

- ✓ Is software-defined, highly virtualized, highly automated, and ready to scale up, down, and/or out as required
- ✓ Provides a consistent operational model for faster and more efficient infrastructure and application delivery and management

- ✓ Gives you the ability to seamlessly extend your reach across private and public clouds, and manage those resources and costs as one
- ✓ Supports cloud-native apps, container technologies, and microservices-based architectures to drive faster innovation and enable rapidly changing systems at scale
- ✓ Has built-in security to help you protect data, applications, and infrastructure and meet your compliance requirements

## New “Table Stakes” for IT

A modern data center trades yesterday’s rigid architectures for highly dynamic, agile, available, and programmatic compute, network, storage, and security services with unified management. These attributes of the modern data center enable your IT organization to respond quickly to the dynamic needs of the business.

IT responsiveness is rooted in a modern infrastructure that abstracts traditional infrastructure silos into a cohesive virtualized, software-defined environment that supports both legacy and cloud-native applications and seamlessly extends across private and public clouds — and one that can deliver infrastructure as code to application developers for even faster provisioning and production deployment.

These characteristics are no longer simply a business advantage. They’re now “table stakes” for IT in a company that wants to compete successfully in the digital economy.



I’ve boiled these thoughts down to a simple checklist. A modern data center is

- ✓ Software defined
- ✓ Elastically scalable
- ✓ Automated across the management life cycle
- ✓ Secure and compliant

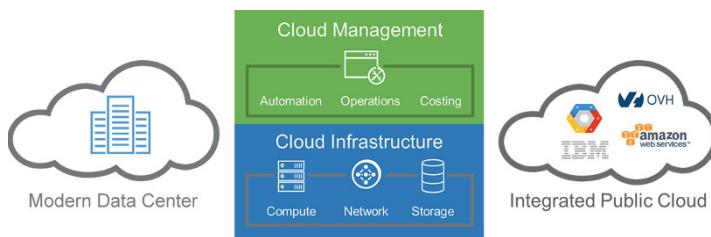
- ✓ Extensible to the public cloud
- ✓ Ready for traditional and cloud-native applications
- ✓ Capable of delivering infrastructure as code

## The Route to the Modern Data Center

This book explores three key IT initiatives that lead to the modern data center:

- ✓ **Modernizing the infrastructure** to enable rapid development, deployment, unified management, and the ability to securely scale horizontally and vertically, and evolve while using existing skills, tools, and systems
- ✓ **Delivering automation** that helps you rapidly configure, provision, deploy, test, update, and decommission infrastructure and applications (cloud-native, web-scale, or open API-based)
- ✓ **Extending to public cloud** to run, manage, connect, and secure your applications across private and public clouds with consistent infrastructure and management

These initiatives, summarized in Figure 2-1, help you realize the power of a software-defined data center that extends to public cloud and offers unmatched hybrid cloud capabilities. They're enabled by VMware solutions that offer a holistic, integrated approach to data center modernization.



**Figure 2-1:** The foundation for the modern data center is a unified software-defined platform that extends to public cloud.

# **Chapter 3**

---

# **Modernizing the Infrastructure**

## ***In This Chapter***

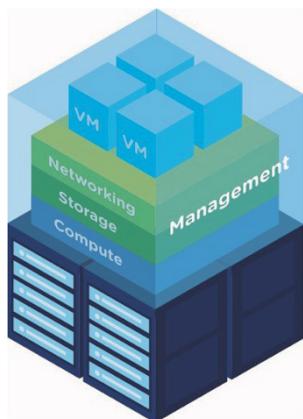
- ▶ Defining the modern infrastructure
- ▶ Determining the best pathway to modernization
- ▶ Exploring the foundational technologies

**A** modern data center starts with a modern infrastructure. This chapter defines the key components of a modern, software-defined infrastructure and explains how you can determine the best approach for modernization.

## ***Modern Infrastructure Defined***

A modern infrastructure is based on a software-defined, hyper-converged architecture that spans compute, storage, networking, and security with unified management (see Figure 3-1). This architecture enables an enterprise-ready, high-performance data center that is

- ✓ More flexible, because it's hardware-independent
- ✓ More agile, because it's highly programmable
- ✓ More cost effective, because it's scalable and based on commodity hardware
- ✓ More secure, because network and security policies are attached to individual workloads



**Figure 3-1:** A hyper-converged, software-defined infrastructure.

## Determining the Best Approach for Your Requirements

One of the keys to a modern infrastructure is the virtualization of compute, storage, and network hardware, which creates software representations of the underlying physical resources. Add life-cycle management to simplify and streamline IT operations with fully automated management of infrastructure and applications. VMware offers two routes to this highly virtualized software-defined data center:

- ✓ An engineered, pre-integrated solution
- ✓ A build-it-yourself approach using proven virtualization, hyper-converged, and management technologies

With either approach, you can realize the benefits of a unified software-defined infrastructure platform. The following sections cover both approaches.

### *The engineered approach*

For an engineered, pre-integrated software stack, VMware offers VMware Cloud Foundation, an integrated hybrid cloud platform that can be consumed flexibly on-premises or run as a service in the public cloud. Cloud Foundation provides a

complete set of software-defined services for compute, storage, networking and security, and cloud management to run enterprise apps — traditional or containerized — in private or public cloud environments. Cloud Foundation drastically simplifies the hybrid cloud model by delivering a single integrated solution that is easy to operate, thanks to built-in automated life-cycle management. With integrated cloud management capabilities, the end result is a hybrid cloud platform that can span private and public cloud environments offering a consistent operational model based on well-known vSphere tools and processes, and the freedom to run applications anywhere without the complexity of application rewriting.

VMware Cloud Foundation delivers the following:

- ✓ **Integrated stack:** Engineered integration into a single solution of the entire software-defined stack with guaranteed interoperability. No more dealing with complex interoperability matrixes.
- ✓ **Standardized architecture:** Cloud Foundation automatically deploys a standardized, scalable architecture that is based on a VMware Validated Design. This level of automation enables quick, repeatable deployments while eliminating the operational cost of engineering the environment with in-house skill sets and reducing the inherent risk of manual misconfigurations.
- ✓ **Automated life-cycle management:** Cloud Foundation includes unique life-cycle management services that automate Day 0 to Day 2 operations of administering the cloud environment, from bringing up into a standardized architecture, to configuring and provisioning of infrastructure resources in a modular, cloud-like operational manner, to patching/upgrading of the software stack.

You can flexibly deploy VMware Cloud Foundation on-premises across multiple prequalified vSAN Ready Nodes and ready systems, including products from Dell EMC, Cisco, HPE, QCT, Fujitsu, and HDS. Or you can run VMware Cloud Foundation as a service from VMware Cloud on Amazon Web Services (AWS) and select VMware partners, including IBM Cloud, Rackspace, OVH, and CenturyLink.



## ***The build-it-yourself approach***

For a build-it-yourself approach, VMware enables you to evolve to a hyper-converged, software-defined infrastructure using the latest versions of technologies for server, storage, and network virtualization, with the addition of intelligent operations management. This approach is based on the same leading technologies that are in VMware Cloud Foundation, but you choose when to deploy which technologies at your own pace.

Let's take a closer look at the individual technologies.

### ***Server virtualization***

Server virtualization enables your IT team to partition and run multiple virtual machines (VMs) on top of a single physical server. Each VM hosted on the physical server has its own operating system and application running inside — which means you can run multiple operating systems on one physical machine.

VMware enables server virtualization with VMware vSphere, the industry-leading virtualization platform. With vSphere you can run, manage, connect, and secure applications in a common operating environment, across clouds and devices. vSphere delivers the following:

- ✓ Simplified and streamlined operations with an easy-to-use client interface
- ✓ Comprehensive built-in security for protecting data, infrastructure, and access
- ✓ A universal application platform for running any application, anywhere
- ✓ Proactive data center management to ensure application performance and availability, with predictive analytics and intelligent operations

If your developers are exploring or running container-based applications, rest assured that vSphere can handle those as well. Simple and lightweight, containers help developers create cloud-native applications in less time while enabling the portability of apps across different operating systems and clouds. Container technologies give developers the tools and

freedom to innovate without worrying about where an app is going to run and what it's going to run on.

With vSphere Integrated Containers, you can run and manage these new workloads alongside your more traditional VMs — using the same tools, interfaces, and management processes you know and love. No need to buy anything new, get recertified, or worry about integrating new tools or technologies. It just works.

Most likely, you have virtualized some or all the servers in your compute environment. If so, you're already experiencing the benefits of virtualized systems — including higher utilization, improved availability, and better resource management. So, give yourself a pat on the back for that step forward. However, if you're using an older version of the virtualization platform, you're missing out on the latest innovations that power digital transformation. So, first, upgrade to the latest version of vSphere to take advantage of new enhanced capabilities.



Using vSphere with Operations Management, your IT admins can enjoy full control over performance, capacity, and configuration of your vSphere deployments, with predictive analytics driving proactive action and policy-based automation. vSphere with Operations Management enables you to balance workloads, avoid contention, and proactively detect and remediate issues and anomalies — before end users are affected.

But why stop there? If you haven't virtualized storage, now is the time to take that next step.

### ***Storage virtualization***

Storage virtualization brings to data storage the simplicity, efficiency, and cost savings that server virtualization brings to compute. It makes things a lot simpler for your IT admins and storage pros — and it makes your data center nimbler.

VMware vSAN, the only vSphere-native software-defined storage platform, enables you to seamlessly extend virtualization to storage, creating a hyper-converged solution that simply works with your existing tools, skill sets, software solutions, and hardware platforms.

VMware vSAN pools server-attached storage devices to create a highly resilient shared datastore suitable for any virtualized workload, from business-critical applications to next-generation apps. vSAN helps your organization evolve to hyper-converged infrastructure (HCI) while providing an agile solution ready for future hardware, cloud, and application changes. vSAN delivers the following:

- ✓ Consistent and agile storage that supports different server platforms, form factors, and cloud providers to easily adjust to the demands of different workloads
- ✓ Advanced storage features, including deduplication, compression, and erasure coding (RAID 5/6)
- ✓ Distributed architecture that provides robust data protection and allows for grow-as-you-go, nondisruptive scaling from 2 to 64 hosts per cluster
- ✓ The industry's first native HCI security solution with data-at-rest encryption



In a software-defined storage environment, software abstracts the underlying physical storage through a virtual data plane. This process makes the VM and, thus, the application the fundamental unit of storage provisioning and management. By creating a flexible separation between applications and available resources, the hypervisor can balance all the resources an application needs.



Many organizations are modernizing their environments by replacing traditional, siloed compute, storage, and networking infrastructure with hyper-converged infrastructure. HCI transforms industry-standard x86 servers with direct-attached storage into cost-effective, scalable building blocks with software-defined compute and storage, which can all be seamlessly extended with virtual networking.

### ***Network virtualization***

When your server and storage resources are virtualized, you can move on to the final step in data center virtualization: the network layer. People often ignore the network when they talk about virtualization, but you can't get to a completely virtualized, highly automated, SDDC without network virtualization.

In a VMware customer survey, nearly 70 percent of participants indicated that they've virtualized more than 75 percent of their compute environment. That's the good news. But in the same survey, only 12 percent reported that they have fully virtualized their network environments. That's the not-so-good news — because that means many companies are missing out on the benefits of a fully virtualized, software-defined environment.

VMware enables network virtualization with VMware NSX, the leading platform for virtualizing the network layer. NSX enables the creation of entire networks in software and embeds them in the hypervisor layer, abstracted from the underlying physical hardware. Because NSX builds networks in software, you can achieve levels of agility, security, and economics that were previously unreachable with physical networks. You gain the same features and guarantees of a physical network along with the operational benefits of a virtualized environment — like IT flexibility and on-demand provisioning.

NSX delivers the following:

- ✓ Micro-segmentation and granular security delivered to the individual workload
- ✓ Reduced network provisioning time from days to seconds and improved operational efficiency through automation
- ✓ Workload mobility independent of physical network topology within and across data centers
- ✓ Enhanced security and advanced networking services through an ecosystem of leading third-party vendors

For example, with NSX you can produce a virtual network in seconds. When your business needs grow or change, you can programmatically create, move, copy, delete, and restore virtual networks as needed — without reconfiguring the underlying physical hardware or topology.

In a virtualized network, the routing, switching, load balancing, and firewall creation that traditionally occur in the physical infrastructure are decoupled from the infrastructure and abstracted into the data center virtualization layer. All services are then managed in software.



# *Intelligent Operations Management*

One additional step in infrastructure modernization is to tie everything together with unified management for full visibility and control of your IT resources across your on-premises and off-premises environments. That's the case with the cloud management platform VMware vRealize Suite and specifically its vRealize Operations component.

The intelligent operations management capabilities of vRealize Operations help you accelerate decision-making, improve performance and uptime, and maximize utilization with deep operational and business insights. vRealize Operations delivers proactive performance monitoring and troubleshooting and insight into costs. It also offers workload placement, capacity management, and planning across infrastructure and applications for private and public cloud environments. Native integrations with vSphere, vSAN, and NSX, as well as its extensibility to a wide range of third-party solutions, make vRealize Suite the best platform to manage modern infrastructure, enabling you to:

- ✓ Centralize management and run production operations at scale
- ✓ Troubleshoot smarter with unified visibility from applications to infrastructure and actionable insights combining metrics and logs
- ✓ Automate performance management by proactively avoiding contention and automating workload balancing and placement
- ✓ Optimize cost and resource usage through capacity management, reclamation, and rightsizing
- ✓ Correlate operational and cost insights to accelerate cloud planning, forecasting, budgeting and procurement decisions, control costs, and reduce risk
- ✓ Compare cost of deploying workloads in your data center with multiple public clouds to optimize placement decisions

For example, vRealize Operations uses machine learning and predictive analytics to continuously optimize workload placement — from initial placement to automatic ongoing workload balancing — based on policies that reflect business imperatives. Using the power of analytics, you can even avoid resource contention all together with features such as *predictive* Distributed Resource Scheduler (pDRS), enabled by the integration of vRealize Operations and vSphere.

## Business and IT Benefits

Modernizing infrastructure with VMware solutions helps your IT shop do the following:

- ✓ Accelerate business responsiveness with faster deployment, easier operations, and better scalability of hyper-converged infrastructure
- ✓ Evolve infrastructure without risk by extending your existing VMware environments and skill sets to include hyper-converged storage, network virtualization, and automated life-cycle management
- ✓ Prepare for the hybrid cloud era with a solution ready for enterprise and next-gen applications while leveraging common skills and tools across private and public clouds with a consistent architecture
- ✓ Unify data center monitoring and management, including data center performance, real-time analytics, automated workload placement and balancing, and capacity and cost optimization, for better-informed IT decision-making
- ✓ Lower total cost of ownership through server-side economics, on-demand scaling, simpler management, and data center consolidation
- ✓ Build an infrastructure to serve as the platform for even the most critical applications and databases

## A case study: ACI Specialty Benefits

### The challenge

Years ago, ACI Specialty Benefits virtualized its data center with VMware vSphere to increase performance, consolidate hardware, and onboard new customers and acquisitions more efficiently. However, as ACI's footprint grew from 2,000 virtual machines to 15,000 in just eight months, the company needed to further streamline administration, enhance visibility, and reduce costs to support its global growth strategy.

### The solution

To help efficiently manage the challenges created by exponential global growth, ACI Specialty Benefits upgraded its virtual environment with the latest vSphere 6.5 capabilities, including new features to enhance visibility and security, and began using all flash storage provided by VMware vSAN 6.5. ACI also deployed VMware NSX and vRealize Automation to enhance security and automate network and service provisioning.

### The results

With a software-defined approach to the data center, ACI Specialty Benefits

can quickly onboard acquired companies' systems and data, provide end users with superior services and uptime, and easily meet compliance requirements in diverse geographies. It can also more securely and cost-effectively manage a deluge of data from wearable medical devices.

### The business benefits

With its software-defined data center, ACI Specialty Benefits can now:

- ✓ Onboard acquisitions into secure virtual environments in days
- ✓ Provide 99.999 percent uptime, 35 percent better performance, and easier compliance
- ✓ Reduce capital expenditures (CapEx), decreasing data center total cost of ownership (TCO) by 60 percent

Read the full case study at [www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/customers/vmware-aci-specialty-benefits-case-study.pdf](http://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/customers/vmware-aci-specialty-benefits-case-study.pdf).

## Chapter 4

# Delivering Automation

### *In This Chapter*

- ▶ Getting an overview of the need to automate IT
- ▶ Exploring the technologies that make it possible

If you’re experiencing unprecedented demand from your line-of-business and developer end users for faster access to IT resources, you’re not alone. Agility is top of mind for many IT shops. This chapter explores the benefits of using automation to speed the deployment of multi-tier applications, providing improved productivity and efficiencies for IT and faster time to market for the business.

## *Speeding Application Deployment*

Automation is key to achieving the speed and agility required to meet the demand for faster access to IT resources. Automation helps you accelerate IT service delivery by automating the configuration and provisioning of the networking, security, and infrastructure components that support application development.

Participants in a VMware customer survey cited three top drivers for automating IT configuration and provisioning:

- ✓ Sixty-four percent want to standardize repeatable processes.
- ✓ Sixty-three percent seek faster provisioning of IT resources.
- ✓ Sixty-three percent want to reduce manual configurations to eliminate inconsistencies, errors, and rework.



With computer virtualization (see Chapter 3), you gain some level of automation of your IT processes. You can gain even further efficiencies, reduce costs, and improve productivity by automating the end-to-end configuration and provisioning of multi-tier applications.

Automating the provisioning of network and security services is partly enabled by virtualizing the network, and fully realized with the integration of advanced automation tools. These tools include VMware NSX and VMware vRealize Automation. Together these technologies empower IT organizations to deliver on the promise of accelerated service delivery and on-demand application delivery. Each of these products is powerful in its own right; working together as a deeply integrated solution, they provide unmatched capabilities for the automated delivery of networking, security, infrastructure, and application components.

## *Virtualizing the Network*

Chapter 3 covers network virtualization with VMware NSX. NSX reproduces the entire network model in software, enabling any network topology — from simple to complex multilayer networks — to be created and provisioned in seconds. When networking and security services are decoupled from the physical infrastructure and abstracted into the data center virtualization layer, all those labor-intensive, time-consuming, and error-prone tasks can be automated.

## *Automating Provisioning*

The vRealize Automation component of VMware vRealize Suite helps you accelerate the provisioning and delivery of IT services, including network and security services, with the native integration of NSX. With vRealize Automation, you can model infrastructure and application resources as blueprints that embed both automation and policies. This blueprint approach dramatically reduces the time it takes to provision production-ready infrastructure and application components.

In a DevOps model, traditional manual processes are automated to streamline the development process. vRealize Automation enables IT automation by creating and managing

personalized infrastructure, application, and custom IT services (X as a Service [XaaS]). This IT automation helps your developers accelerate the end-to-end delivery and management of infrastructure and applications and deploy IT services rapidly across a multi-vendor, multi-cloud infrastructure.

## Drawing on the Power of Two

When you use the automation capabilities of vRealize Automation in conjunction with NSX, your network and security services are deployed as part of the automated delivery of the application, consistent with its connectivity, security, availability, and performance requirements.

The integration enables automated delivery of network and security services by first defining the service stack in a blueprint (or as code), and then automating the provisioning, configuration, and life cycle of all services using business-aligned policies. You can establish a self-service catalog for your end users, and with approval policies built into vRealize Automation, enforce application deployment standards that determine when end users can deploy those applications.

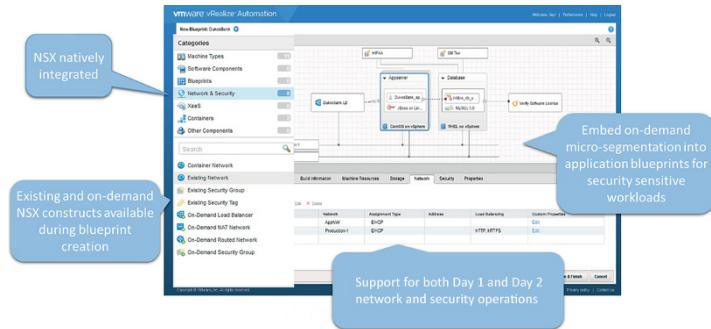
You can also modify network and security services as a Day 2 (post-provisioning) operation throughout the life cycle of an application. The native integration of vRealize Automation and NSX enables you to provision, update, and decommission network and security services in lockstep with your virtualized applications.

The tight integration between vRealize Automation and NSX allows you to embed the logical constructs of NSX all advanced networking and security services directly into vRealize Automation blueprints (see Figure 4-1).



With vRealize Automation, you can automate Day 1 service provisioning and Day 2 operational capabilities across public, private, and hybrid cloud models. Instead of building and delivering infrastructure and application resources individually, you can model them as blueprints that can include services across the complete stack of compute, storage, network, and security resources with embedded automation and policies. When these blueprints are executed, they'll automatically orchestrate the provisioning and life cycle of

all the components. You can streamline the provisioning of production-ready infrastructure and application components from weeks down to minutes, and manage them more easily throughout their life cycles.



**Figure 4-1:** Visually drag and drop, and then dynamically build, networking and security services into the blueprint.

## Looking at the Business and IT Benefits

Automating the configuration and provisioning of infrastructure and application components with VMware automation solutions helps your IT team do the following:

- ✓ Speed up delivery and improve quality of production-ready infrastructure and applications
- ✓ Micro-segment and secure applications easily and consistently, regardless of where they reside in the data center or cloud and throughout their life cycles
- ✓ Free up resources by automating resizing and reclamation of provisioned resources
- ✓ Govern service delivery across both on-premises and public cloud environments
- ✓ Improve workload placement, comparing the cost of private and public cloud alternatives

# A case study: The University of New Mexico

## The challenge

The University of New Mexico (UNM) wanted to enable its central IT organization to act as a service provider for the entire university. With this goal in mind, UNM sought a solution that would allow it to automate IT to speed the provisioning of infrastructure and application delivery, provide departments and researchers with a centralized self-service IT model, and modernize its data center for secure, easy connection to public clouds.

## The solution

UNM deployed VMware vRealize Automation and VMware NSX to build a software-defined data center (SDDC) to automate its environment, scale, and meet the growing needs of its researchers and 100 departments. The natively integrated capabilities of vRealize Automation and NSX enabled UNM to automate service delivery and define networking and security policies for its private cloud.

## The results

The university can now efficiently, securely, and cost-effectively deliver tools for effective learning, teaching,

and administration. With consistent, automated infrastructure provisioning, the risks of compliance breaches or outages caused by human error are much lower, and central IT staff can reduce the tedious manual effort of day-to-day operations and instead focus on more strategic priorities.

## The business benefits

With its modernized data center, UNM:

- ✓ Improved educational opportunities with fast, consistent, secure service delivery
- ✓ Empowered departments and researchers to self-deploy new technology quickly
- ✓ Achieved a threefold service increase and enhanced compliance with the same IT staff

Read the full case study at [www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/casestudy/customers/vmware-university-of-new-mexico-casestudy.pdf](http://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/casestudy/customers/vmware-university-of-new-mexico-casestudy.pdf).

## **Chapter 5**

---

# **Extending to the Public Cloud to Get the Best of Both Worlds**

---

### ***In This Chapter***

- ▶ Getting an overview of IT strategy and the public cloud
  - ▶ Exploring the need for common infrastructure and management
  - ▶ Highlighting the advantages of an integrated public cloud approach
- 

**T**his chapter explores how companies are looking to the cloud for increased agility and explains why modernizing the data center should be part of any cloud strategy.

## ***Why You Need a Modern Data Center That Extends to Public Cloud***

Leveraging public cloud in a hybrid data center environment is now part of most IT strategies and road maps. In a 2017 VMware customer survey, 67 percent of enterprise customers said they foresee an ideal end state in which they rely on multiple clouds.

Organizations are moving in this direction for lots of good reasons, but more than ever, cloud is being adopted to serve the demanding needs of applications. Companies want the

freedom to develop any type of application based on what the business needs. They also want the flexibility to deploy that application to any type of cloud infrastructure, from their private clouds to a range of global public cloud service providers. And, in today's mobile world, delivering these apps to any type of device securely and reliably is standard.

A modern data center gives you the ability to extend your reach to public cloud. You can then create hybrid cloud capabilities for accelerating the delivery of IT services — all through a unified management framework that spans your on-premises and off-premises environments.

## *The Importance of a Software-Defined Foundation*

When you have a modern software-defined data center (SDDC) that can extend to compatible public clouds, you gain a level of flexibility that's not possible in a traditional data center. You can choose the right place to run workloads based on your business and technical requirements while managing on-premises and off-premises resources as one resource pool, with the same tools, technologies, skills, and staff you already have, and with security and compliance.

With private and public clouds built on the foundational elements of vSphere, NSX, and vSAN, this common technology platform provides assurance of full interoperability and workload portability — in other words, applications and tools that work in one will work in any other, and the movement of those workloads between cloud deployments is inherently supported.

For example, VMware Cloud Foundation provides dynamic software-defined infrastructure (compute, storage, networking, and security) to run enterprise applications — traditional or containerized — in private or public cloud environments. It can be consumed flexibly on-premises or as a service in the public cloud (VMware Cloud on AWS, VMware Cloud Foundation on IBM Cloud, VMware Cloud Provider program).



VMware Cloud on Amazon Web Services (AWS) is an on-demand service that enables you to run applications across vSphere-based cloud environments with access to a broad range of AWS services. Powered by VMware Cloud Foundation, this service integrates vSphere, vSAN, and NSX, along with VMware vCenter management, and is optimized to run on dedicated, elastic, bare-metal AWS infrastructure.

## The Benefits of a Consistent Environment

The VMware cloud approach supports the heterogeneity and diversity of multiple cloud platforms and technologies while providing consistency of infrastructure and operations.

*Consistent infrastructure* means consistent compute, storage, networking, and security policies across on-premises/private cloud and public cloud. Having consistency of the underlying infrastructure provides many key benefits, including the following:

- ✓ Standardized support and management
- ✓ Common tools, processes, and skills
- ✓ Compatibility for applications across services
- ✓ Interoperability across clouds (applications and tools will integrate with common deployment methods and policies, such as security)
- ✓ Portability for applications and workloads; where possible, applications and workloads can be moved without changes to run on different cloud infrastructures
- ✓ Globally consistent infrastructure as code to allow the deployment of higher-order services and platforms (such as container orchestration and Platform as a Service [PaaS] environments) on any chosen cloud service



VMware enables this with its core compute (vSphere), storage (vSAN), and networking (NSX) technologies when deployed as an SDDC or as an engineered, integrated software stack with VMware Cloud Foundation.

*Consistent operations* refers to the essential operational and management capabilities across primary areas of focus:

- ✓ **Visibility:** Insights into where workloads are deployed and how these resources are being utilized
- ✓ **Operations:** Ongoing management to ensure health of production workloads and proper resource utilization
- ✓ **Automation:** Intelligent systems to manage the provisioning, capacity, performance, and availability of infrastructure and application environments, delivering increased IT agility
- ✓ **Security:** Consistent security models and policies to reduce risk and vulnerabilities connected to core infrastructure, applications, and devices
- ✓ **Governance:** Clear policies for how resources are utilized, by whom, to optimize cost and help ensure compliance



With a cloud management platform, like vRealize Suite, consistent operations in these areas creates efficiency, simplifies operations and management, and mitigates risks around security, agility, and complexity. Collectively, these capabilities help you properly manage and operate your systems and applications, even across multiple cloud environments.

## Business and IT Benefits

VMware technologies provide a software-defined foundation for your on-premises cloud that enables you to extend to public cloud for increased IT agility, cost reduction, and scale while leveraging existing resources, teams, and skills. Key benefits include the following:

- ✓ Reduces complexity across clouds with a consistent infrastructure based on leading compute, storage, networking, and management technologies
- ✓ Increases flexibility and portability for your applications to run where they run best, on-premises or off-premises
- ✓ Provides consistent and interoperable cloud infrastructure, as well as consistent operations for how infrastructure and applications are managed, deployed, and delivered

# **Chapter 6**

---

# **Key Takeaways**

---

## ***In This Chapter***

- ▶ Recapping the top benefits of a modern data center
  - ▶ Getting started on data center modernization
  - ▶ Working with technology advisers
- 

**T**oday's digital economy is driving rapid and fundamental changes in businesses and their operating models. To support this shift, your IT organization must transform your data center to meet new business and customer expectations. You can't get there any other way. This chapter highlights the top benefits and paths for getting started on modernizing your data center.

## ***Recapping the Top Benefits of a Modern Data Center***

The VMware approach for modernizing the data center is based on a hyper-converged, software-defined architecture and natively integrated compute, storage, and network and security technologies, with automation and management tools. These components work together to enable you to modernize your infrastructure, enable automation, and extend to public cloud.



An innovative, software-defined approach helps your IT organization achieve cloud service provider agility and economics in the data center — and meet the demands of the digital economy.

Here are some of the ways that a modern data center can help your company thrive in the digital era:

- ✓ **Drive business innovation.** Digital transformation is setting up exciting opportunities for businesses and IT organizations. To deliver the agility and innovation your business stakeholders demand, you need to modernize the data center to meet a new set of requirements.
- ✓ **Promote business agility.** With a modern software-defined data center (SDDC) that extends across private and public clouds that is both secure and scalable, you'll be able to meet the speed and agility needs of the business through faster, on-demand delivery of infrastructure and applications.
- ✓ **Unleash efficiency.** With a cost-effective, evolutionary approach to modernizing the data center, you can rapidly unleash the efficiencies your business needs to stay competitive in a digital economy — while continuing to use your existing investments in tools, skills, software, and hardware.

## Finding the Route Forward



Getting started on data center modernization is no different than getting started on any other IT initiative. You approach the project in a stepwise manner, first determining your specific technology and business requirements, exploring the available technologies and products, and then developing a strategy and road map for moving forward.

VMware can help you on your journey to a modern data center with three key IT initiatives:

- ✓ **Modernizing the infrastructure:** As a first step, continue your journey to a hyper-converged, software-defined infrastructure by extending virtualization across compute, storage, and networking, and adding unified management.
- ✓ **Delivering automation:** Build on the automation gained with compute virtualization with a software-defined private cloud that will enable you to fully automate the delivery and ongoing management of production-ready infrastructure.

- ✓ **Extending to public cloud:** Establish an on-premises environment that can easily extend to compatible public clouds, enabling you to run, manage, connect, and secure applications across private and public clouds (cloud-native, web-scale, or open API-based).

## *Putting Experts on Your Team*

When embarking on a new IT initiative, you can fully realize the value of VMware technologies by engaging with VMware Professional Services consultants and solution architects. VMware's strategists will work with your IT leadership team to build a comprehensive, phased plan across people, processes, and technologies that will address your specific business and IT goals.



Overlooking the organizational impact of making technology changes can derail any project. Successful digital transformation requires careful consideration of its effect on your organization and people.

The VMware Professional Services team can help you with issues related to strategy, implementation, operational models, training, and ongoing optimization of a modern, SDDC, following a stepwise process along these lines:

### ✓ Strategize

- Assess your current state.
- Define your target state.
- Develop a phased road map for transformation across people, processes, and technology.

### ✓ Implement

- Design and deploy technology solutions using proven best practices and validated designs.
- Create custom integrations.

**✓ Operationalize**

- Transform operational processes.
- Adjust organizational structures.
- Address internal culture.

**✓ Train**

- Educate and certify team members to increase staff productivity.

**✓ Extend**

- Leverage technical account managers for long-term advocacy and strategic road map alignment.

You can learn more about the capabilities of the VMware Professional Services team at [www.vmware.com/professional-services/modernizing-datacenter.html](http://www.vmware.com/professional-services/modernizing-datacenter.html).

## Chapter 7

# Ten Sources of More Information

### *In This Chapter*

- ▶ Discovering resources packed with insights for modernizing data centers
- ▶ Accessing online product evaluations, labs, videos, and training information

**V**mware offers a wide range of resources to help you explore the technologies and products that enable specific initiatives on your path to the modern data center. Here are some of the resources you can draw on to enrich your perspective:

- ✓ **Next-Gen Virtualization For Dummies:** Learn what next-gen virtualization can do for your data center. See how storage and network virtualization fit into the picture. Explore a path to seamless adoption of hybrid cloud. Go to [www.vmware.com/go/vfd](http://www.vmware.com/go/vfd).
- ✓ **Hyper-Converged Infrastructure For Dummies:** Get a close-up view of hyper-converged infrastructure (HCI). Learn what HCI is all about, how you can get started, and where you'll get the biggest bang for your HCI buck. Go to [www.vmware.com/go/hcid](http://www.vmware.com/go/hcid).
- ✓ **Cloud Management For Dummies:** Find out how to manage the life cycle of a cloud platform, from deployment to maintenance. Explore issues related to managing local and remote services, improving uptime, and containing costs. Go to [www.vmware.com/go/cmd](http://www.vmware.com/go/cmd).

- ✓ **Network Virtualization For Dummies:** Learn how network virtualization works, and why now is the right time to virtualize your network. Explore best practices, tips, and ways to save time. Go to [www.vmware.com/go/nvd](http://www.vmware.com/go/nvd).
- ✓ **Hands-on labs:** Experience VMware products in a virtual lab environment anytime, anywhere. No installation, license, or special hardware is required, and you can get started in just minutes. Go to [www.vmware.com/try-vmware.html](http://www.vmware.com/try-vmware.html).
- ✓ **Evaluation products:** Download evaluation versions of VMware products that can be installed in your own environment and used for a limited time, at no cost. Go to [www.vmware.com/try-vmware.html](http://www.vmware.com/try-vmware.html).
- ✓ **VMware user groups:** Connect to other VMware users. Learn from their experiences and share your own. Enrich your understanding of data center modernization. Go to [www.vmug.com](http://www.vmug.com).
- ✓ **VMware on YouTube:** Subscribe to VMware product channels on YouTube and get a technical view of product features and functions. Go to [www.youtube.com/user/vmwaretv](http://www.youtube.com/user/vmwaretv).
- ✓ **VMware training:** Extend your knowledge and expertise in VMware products. Take your IT modernization skills to a higher level. Go to [www.vmware.com/training](http://www.vmware.com/training).
- ✓ **VMware certification:** Validate your skills in designing, installing, and managing virtualized environments and public, private, and hybrid clouds. Go to <https://mylearn.vmware.com/portals/certification>.

## Notes

## Notes

A woman with blonde hair is shown from the side, pointing her finger at a large, multi-touch screen. The screen displays various data visualizations, including line graphs with multiple data series and a grid of smaller windows showing different types of information. The background is a blurred view of what appears to be a modern office or control room.

IN A CULTURE OF POSSIBILITY

# LIMITS ARE STARTING POINTS.

Learn how VMware  
data center solutions  
improve business agility.  
[vmware.com/go/mdc](http://vmware.com/go/mdc)

**vmware**<sup>®</sup>

REALIZE WHAT'S POSSIBLE.™

## Accelerate your digital transformation

The digital economy is creating new requirements and new opportunities for IT teams. The data center needs to become more agile, responsive, and automated. This quick-to-read book explains the core concepts and components of a data center that supports the digital transformation of your business.

- ***See the big picture — Learn what it means to modernize the data center and the key characteristics that are required***
- ***Understand the software-defined approach — Explore the value of virtualization across compute, storage, and networking, with unified management***
- ***Determine the best path forward — Learn how to evolve your current data center by building on what you have, at your own pace***
- ***Build for next generation — Understand the benefits of a modern data center that supports traditional and cloud-native applications, and can extend to public cloud***

**Theresa Villatore-Silva**, a veteran of the technology industry, specializes in cloud computing, virtualization, hardware, and software. She leads the data center and automation solutions product marketing for VMware.



Open the book and find:

- How to determine the best approach for data center modernization
- Guidance for deploying automation to speed IT services delivery
- Options for a software-defined infrastructure — engineered or building block approach
- How to extend to public cloud with consistent infrastructure and management

Go to [Dummies.com](http://Dummies.com)  
for more!

## **WILEY END USER LICENSE AGREEMENT**

Go to [www.wiley.com/go/eula](http://www.wiley.com/go/eula) to access Wiley's ebook EULA.