



Compliments of Hewlett-Packard

HP Converged Infrastructure

FOR
DUMMIES[®]

Learn:

- How infrastructure convergence shifts IT resources from operations to innovation
- How you can transform IT to keep up with the speed of business
- How a converged infrastructure simplifies your data center
- How you can get started with HP Converged Infrastructure solutions today

Duncan Campbell
Patrick Eitenbichler



HP creates new possibilities for technology to have a meaningful impact on people, businesses, governments, and society. The world's largest technology company, HP brings together a portfolio that spans printing, personal computing, software, services, and IT infrastructure at the convergence of the cloud and connectivity, creating seamless, secure, context-aware experiences for a connected world. More information about HP (NYSE: HPQ) is available at <http://www.hp.com>.

In a world where everything is mobile, connected, interactive, immediate, and fluid, organizations need an IT infrastructure that enables agile and rapid service delivery while driving out costs. That's exactly what is achieved with the HP Converged Infrastructure strategy and approach — enabling organizations to accelerate time to business value.

Learn more at www.hp.com/go/convergedinfrastructure.

***HP Converged
Infrastructure***
FOR
DUMMIES®

***HP Converged
Infrastructure***
FOR
DUMMIES®

**by Duncan Campbell and
Patrick Eitenbichler**



WILEY

John Wiley & Sons, Inc.

These materials are the copyright of John Wiley & Sons, Inc. and any dissemination, distribution, or unauthorized use is strictly prohibited.

HP Converged Infrastructure For Dummies®

Published by
John Wiley & Sons, Inc.
111 River St.
Hoboken, NJ 07030-5774
www.wiley.com

Copyright © 2012 by John Wiley & Sons, Inc., Hoboken, New Jersey

Published 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, the Wiley logo, For Dummies, the Dummies Man logo, A Reference for the Rest of Us!, 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. HP and the HP logo are trademarks of Hewlett-Packard Development Company, L.P. 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.

For general information on our other products and services, please contact our Business Development Department in the U.S. at 317-572-3205. For details on how to create a custom *For Dummies* book for your business or organization, contact info@dummies.biz. For information about licensing the *Dummies* brand for products or services, contact BrandedRights&Licenses@Wiley.com.

ISBN 978-1-118-17163-9 (pbk); ISBN 978-1-118-17196-7 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1



These materials are the copyright of John Wiley & Sons, Inc. and any dissemination, distribution, or unauthorized use is strictly prohibited.

Table of Contents

.....

Introduction..... 1

About This Book	1
About Infrastructure Convergence.....	2
How This Book Is Organized	2
Icons Used in This Book.....	3

Part 1: Understanding Converged Infrastructure ... 5

Chapter 1: The Era of Convergence7

The Evolution of the Data Center in the Changing World ...	8
Examining the Challenges of Instant Technology.....	9
Embracing the Infrastructure Convergence Trend	12

Chapter 2: Things to Know about Infrastructure Convergence13

Infrastructure Convergence Basics	14
Simplifying Shared Services.....	14
It's a Journey	17
Standardization.....	18
Virtualization.....	18
Automation.....	20
Business Value of a Converged Infrastructure.....	21
Infrastructure Convergence and Cloud Computing	23
What to Look For in Your Technology Provider.....	25

Chapter 3: How Convergence Affects You27

Changing Organizational Roles for CEOs and CFOs	27
Changing Organizational Roles for CIOs and CTOs.....	28
Changing Organizational Roles for System Architects and Planning	30
Changing Organizational Roles for IT Directors	30
Changing Organizational Roles for Functional IT areas.....	31

Chapter 4: The Inner Workings of a Converged Infrastructure	33
Taking a Closer Look at Converged Infrastructure	33
Requirements and design principles.....	34
Foundational architecture.....	35
Examining Common Components.....	38
Infrastructure Convergence for Medium-Sized Enterprises	41
Chapter 5: Finding the Right Converged Infrastructure Solution	43
Transform or Evolve through a Portfolio of Flexible Solutions.....	44
Converged Data Centers	46
HP Converged Systems	46
HP VirtualSystem.....	48
HP CloudSystem.....	48
HP AppSystems.....	50
Converged Technologies	51
Server innovation for any workload.....	52
Converged storage designed for cloud, big data, and virtualization	53
Changing the rules of networking.....	54
Advanced software.....	55
Power and cooling.....	56
Chapter 6: How HP Can Help	57
HP Tools and Workshops	57
Reference Architecture Design Guide.....	58
HP Converged Infrastructure Maturity Model	58
Converged Infrastructure Transformation Experience workshop.....	60
Kick-Start Your Cloud Journey with HP	61
HP Services That Help You at Your Own Pace.....	63
Outsourcing Approach.....	63
Financial Services	64
Programs for Customers and Partners	64
HP ExpertONE	65
HP AllianceONE.....	65
HP PartnerONE.....	65
HP ServiceONE.....	66

Part II: The Part of Tens 67**Chapter 7: Eight Reasons You Should Embrace the Era of Convergence. 69**

Accelerate IT for Better Business Results	69
Use Your Budget More Effectively	70
Be Flexible, Secure, and Competitive	70
Simplify, Integrate, and Automate to Minimize Downtime.....	70
Redirect Wasted Energy.....	71
Deal with Big Data.....	71
Deal with Disruption.....	71
Turn Technology into an Advantage.....	71

Chapter 8: Five Ways to Converge with Ease. 73

Don't Rush	73
Leverage Where You Can	73
Don't Forget Other Options	74
Be Informed	74
Look Deeper	74

Appendix A: HP Customer Case Studies..... 75

Continental Airlines	75
IT improvements.....	76
Business benefits	76
McKesson Corporation	77
IT improvements.....	78
Business benefits	78
Steelcase	78
IT improvements	79
Business benefits	79
Gruppo Mediaset.....	80
IT improvements.....	80
Business benefits	81
Hostworks	81
IT improvements.....	82
Business benefits	82

Appendix B: HP Resources 83

Resources on Converged Infrastructure.....	83
Other Important Resources	83

Publisher's Acknowledgments

We're proud of this book and of the people who worked on it. For details on how to create a custom *For Dummies* book for your business or organization, contact info@dummies.biz. For details on licensing the *For Dummies* brand for products or services, contact BrandedRights&Licenses@Wiley.com.

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

Acquisitions, Editorial, and Vertical Websites

Project Editor: Jennifer Bingham

Editorial Manager: Rev Mengle

Business Development Representative:
Karen Hattan

Custom Publishing Project Specialist:
Michael Sullivan

Composition Services

Project Coordinator: Kristie Rees

Layout and Graphics: Carrie A. Cesavice,
Timothy C. Detrick

Proofreader: Susan Moritz

Publishing and Editorial for Technology Dummies

Richard Swadley, Vice President and Executive Group Publisher

Andy Cummings, Vice President and Publisher

Mary Bednarek, Executive Director, Acquisitions

Mary C. Corder, Editorial Director

Publishing and Editorial for Consumer Dummies

Kathleen Nebenhaus, Vice President and Executive Publisher

Composition Services

Debbie Stailey, Director of Composition Services

Business Development

Lisa Coleman, Director, New Market and Brand Development

Introduction

Are you ready to accelerate the value of IT in your business? Would you like to simplify your data center and your IT processes so you can focus on innovating for the future rather than being mired in the past? If so, you've come to the right place.

Everyone in the IT arena understands that the speed and scale of business have been pushing traditional IT to the breaking point. Compounding this pressure are the new challenges CEOs are facing to meet the new wave of customer, partner, and employee expectations due to mobility, social media, and the information explosion. These constituencies are smart, savvy, and connected. They have little patience for businesses that can't respond to their needs right now.

To compete in this instant age, organizations need an IT infrastructure that enables agile and rapid service delivery. They expect their IT organization to deliver applications and services that are fast, always available, scalable, and interoperable while driving down costs. With all the complexity in today's data centers, that's a tough proposition when you consider the new wave of evolving business models and the changing workforce. Things simply have to happen much faster.

About This Book

What's behind the need to adapt represents many of the factors that led HP to introduce the HP Converged Infrastructure strategy over two years ago. It's all about enabling businesses to accelerate their IT to drive better business results across the board.

HP Converged Infrastructure For Dummies provides an introduction to the fine points of infrastructure convergence: the trends, methodologies, and value it can deliver to you, plus a look at how the roles in IT are affected. In addition, the latter

part of this book discusses the different solutions delivered by HP Converged Infrastructure and the various ways HP can help you get started to take advantage of infrastructure convergence — and do so at your own pace and preference.

This book was written with HP.

About Infrastructure Convergence

Before you dive into the book, we want to offer a simplified definition of infrastructure convergence: *Infrastructure convergence* enables organizations to accelerate time to business value. This is achieved by turning today's rigid technology silos into adaptive pools of assets that can be shared by many applications and managed as a service. The result is greater IT speed and agility, the ability to shift more resources from operations to innovation, and better alignment with the growing demands of the business.

How This Book Is Organized

This book is divided into eight chapters and two appendixes. Here's a brief breakdown of what you'll find in each of the chapters:

- ✔ **Chapter 1, The Era of Convergence:** This chapter discusses how the data center and IT in general are evolving to address the new challenges of doing business in today's world.
- ✔ **Chapter 2, Things to Know about Infrastructure Convergence:** This chapter shows you the basics about convergence and shared services, the benefits and business value, how cloud computing fits in, and some considerations when seeking out solutions from technology providers.

- ✔ **Chapter 3, How Convergence Affects You:** In this chapter, we discuss how infrastructure convergence impacts various roles and responsibilities in and around IT.
- ✔ **Chapter 4, The Inner Workings of a Converged Infrastructure:** An explanation of the underlying principles and foundational architecture of how a converged infrastructure works, and how the businesses are affected by the era of convergence.
- ✔ **Chapter 5, Finding the Right Converged Infrastructure Solution:** This chapter explains how to get started down the path of a converged infrastructure with solutions that help you transform fast or evolve at your own pace.
- ✔ **Chapter 6, How HP Can Help:** This chapter presents various tools and workshops that help you move forward quickly, ways to kick-start your cloud journey, and other helpful services and programs.
- ✔ **Chapter 7, Eight Reasons You Should Embrace the Era of Convergence:** Here we list the eight reasons why you should embrace the era of convergence.
- ✔ **Chapter 8, Five Ways to Converge with Ease:** Five ways to make your convergence journey a bit easier.
- ✔ **Appendix A: HP Customer Case Studies**
- ✔ **Appendix B: HP Resources**

Icons Used in This Book

This book uses the following icons to call your attention to information you might find helpful in particular ways.



The information in paragraphs marked by the Remember icon is important. It helps you easily spot the information when you refer to the book later.



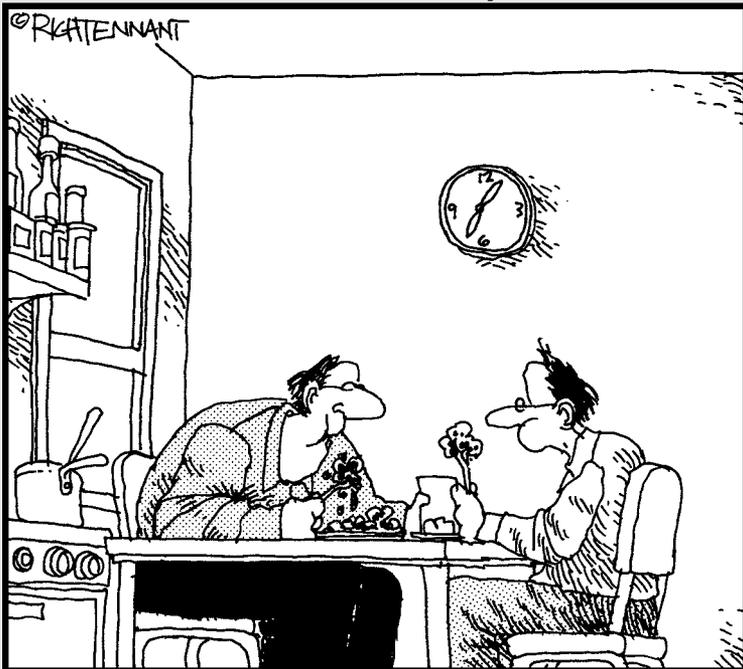
The Tip icon indicates extra-helpful information.

Part I

Understanding Converged Infrastructure

The 5th Wave

By Rich Tennant



“Great goulash, Stan. That reminds me, are you still scripting your own Web page?”

In this part . . .

If you need to find out about the basics of converged infrastructure, this is the part for you. It provides an introduction to the fine points of infrastructure convergence, plus a look at how the roles in IT are affected. In addition, we discuss the different solutions delivered by HP Converged Infrastructure.

Chapter 1

The Era of Convergence

.....

In This Chapter

- ▶ Looking at the evolution of the data center and IT infrastructure
 - ▶ Examining the challenges of ‘Instant Technology’
 - ▶ Embracing the infrastructure convergence trend
-

Leading industry analysts agree that converged technologies will deliver tremendous value and savings — in other words, they feel that the whole is better than the sum of the parts. What’s more, these analysts support the idea that mobile, cloud, and pervasive computing technologies will fundamentally shift the expectations and roles of IT in the enterprise. The role of IT will move from one of managing physical assets to that of being a broker of IT services from inside and outside to satisfy business needs.

Over the past couple of years, technology vendors have started pitching a convergence story; key analysts support the trend and businesses understand they need to embrace the concept. The cost, speed, and efficiency advantages are just all too real. But convergence means you’re being confronted with seemingly endless technology choices and confusing messages. All this makes it difficult to understand how best to get started and with which vendor — and which convergence solution is best aligned to your specific needs. This book will make it easier for you to understand convergence and the ways you can move forward with it quickly and safely.

The Evolution of the Data Center in the Changing World

Historically, to keep pace with the growth of business applications and the terabytes of data businesses use, data center resources were deployed in a silo-like fashion. In other words, one set of resources was dedicated to one particular computing technology, business application, or line of business. These resources supported a single set of requirements and processes and could not easily be optimized or reconfigured to support actual demand. When you apply this siloed approach over and over again, to application after different application, what has been created over the years is a phenomenon called *IT sprawl*.

Until a few years ago, companies could get away with this type of inefficient, high-cost, overprovisioned model and still compete. However, now things have radically changed. The new world is mobile, connected, interactive, immediate, and fluid. The economic climate has changed: The *always overprovisioning* mentality is no longer acceptable. The signs are all around us — cell phones in the billions with more and more of them having full web experiences — which means downloads for mobile applications will grow and grow. The coming decade could see 5 billion people and trillions of devices being connected to the Internet. This type of connectivity will require industries that deliver real-time, immediate services.



In the banking sector, for example, consumers expect to be able to manage their accounts securely — and open new ones — using any mobile device. They want to be able to pay for goods and services from anywhere and at any time.

In the healthcare sector, legislation such as the Health Insurance Portability and Accountability Act (HIPAA) and Health Information Technology for Economic and Clinical Health Act (HITECH) are driving hospitals and healthcare

professionals to digitize and secure patient medical records. And patients want to be able to access their medical histories as easily and securely as they can their bank accounts.

Big data is a new trend that originated from within the open source community. Its main goal is to develop analytic processes that are faster and more scalable than traditional data warehousing in order to extract value from the vast amounts of unstructured data produced daily by web and business users. While development of big data analytics processes has been driven historically by the web, the rapid growth of applications for big data analytics is now taking place in all major vertical industry segments and requires some level of infrastructure convergence.

Plus, social media, *consumerization of IT* (when computing choices are being made by consumers — or end users), and evolving demographics are fundamentally changing how work gets done. Social media alone facilitate instant connections to ideas and collaboration within and outside the enterprise. Social media can quickly provide feedback and involve the customer in the evolution and promotion of the product or service.

Examining the Challenges of Instant Technology

Regardless of the business sector you're in, the world of the *Instant-On Enterprise* is probably placing new challenges and heightened pressure on you. There may be lots of initiatives that the business needs IT to deliver — there always have been. That's not the big problem today. The real problem is that IT is being asked to create those solutions or services in a shortened time frame with the same or even fewer resources.

Unfortunately, most enterprises are dealing with less-than-ideal infrastructures driven by an explosion of information and aging hardware. The fact is, most enterprises are still struggling with

spending too much of their IT resources on operations, fire drills, and activities that just keep the lights on.

As shown in Figure 1-1, the result is that application, server, and storage silos and complexity have propelled most organizations into an IT spending pattern where more than 70 percent of the budget and resources are required for mere maintenance and operations to keep the lights on and less than 30 percent of time and money on innovation and things that'll help the business be more competitive.

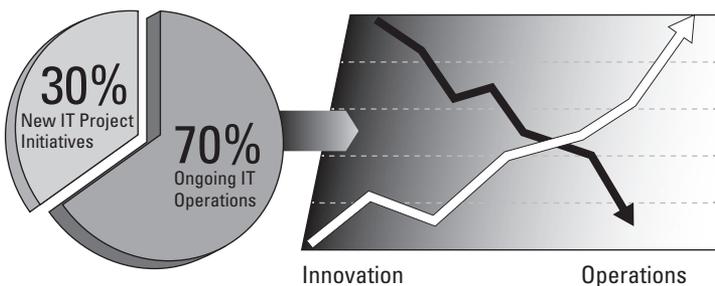


Figure 1-1: IT spending patterns are holding back innovation.

Combine that with the higher costs of energy, limited space and capacity, and fewer resources and you can see why business agility is suffering.

As a result, the gap is widening between what the business demands and what IT can deliver. What you need to do is flip the ratio and close this gap by moving the majority of IT resources to innovation or strategic initiatives.

One reason why IT spends most of its time on operations and maintenance is the complexity involved in provisioning new applications — as shown in Figure 1-2.

The processes for getting things done are cumbersome, time consuming, and unsustainable, requiring many processes, teams, and coordination. For example, you may need to take the following steps for a new finance or HR application:

1. A business need is requested.
2. Planning and approval meetings are held.

3. Assets are located or new systems are ordered if necessary.
4. Set up the servers, storage, and networking.
5. Test and in some cases develop the application.
6. Deploy the application.
7. Load and patch the operating system (OS).
8. Incorporate the virtualization software.
9. Set approvals, test, and pilot.
10. Bring it all online.

So when the business requests a new application or service from IT, it can take weeks or months for the application to be up and running.



The *gotta have it now* mindset is why the role of IT has never been more critical and why infrastructure convergence has gained such huge traction. A converged infrastructure addresses the problem of siloed architectures and IT sprawl by pooling and sharing IT resources. Rather than dedicating a set of resources to a particular computing technology, application, or line of business, converged infrastructures establish a pool of virtualized server, storage, and networking capacity that is shared by multiple applications and lines of business.

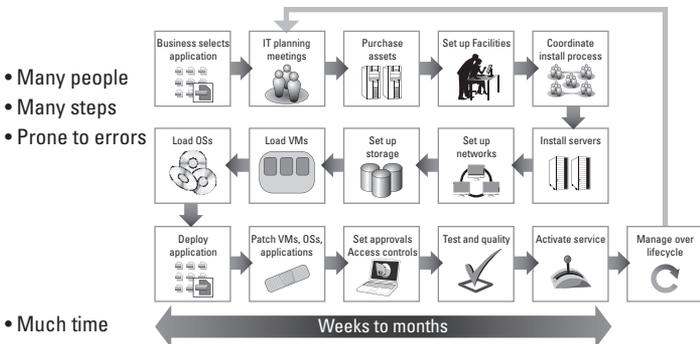


Figure 1-2: The complexities created by siloed IT solutions.

Embracing the Infrastructure Convergence Trend

Infrastructure convergence is regarded as the most optimal approach to simplify and speed IT, lower operations costs, enable more innovation, and drive business agility. But there's more to it. It's not a stretch to believe that tomorrow's leading organizations will be the ones that capitalize on technology rather than become paralyzed by it. These organizations will explore more innovative ways to run the business with better methods to meet changing customer demands. They will interact with customers, constituents, employees, and partners more quickly, and with greater personalization. And they will have the most flexible IT infrastructure that can meet the ever-broadening requirements by the lines of business to transact efficiently, effectively, and securely.

Chapter 2

Things to Know about Infrastructure Convergence

In This Chapter

- ▶ Looking at infrastructure convergence and shared services basics
 - ▶ Starting on a convergence journey
 - ▶ Examining the business value of convergence
 - ▶ Understanding infrastructure convergence and cloud computing
 - ▶ Looking for a technology provider
-

Different IT providers and industry analysts use various terms to describe the concept of a converged infrastructure. This chapter provides a high-level understanding of infrastructure convergence and the effort and actions required to get there. We discuss the benefits it can deliver and the behind-the-scenes principles of convergence, plus give a bit more insight into how cloud computing fits in. We also discuss things to look for in your vendor.



Converged infrastructure is the ideal approach for:

- ✓ Accelerating IT
- ✓ Increasing agility
- ✓ Shifting resources from operations to innovation
- ✓ Enabling cloud computing
- ✓ Consolidating IT systems and processes

- ✓ Protecting mission-critical workloads
- ✓ Upgrading or converging applications
- ✓ Extending virtualization across the data center
- ✓ Improving energy efficiency

Infrastructure Convergence Basics

At the highest level, infrastructure convergence is about accelerating time-to-business value. In other words, you'll be able to get high IT payoffs in a short period of time. Quick payoff is achieved when the IT organization can free up resources trapped in operations and infrastructure and establish a services-oriented IT organization.

This can be accomplished by integrating servers, storage, networking, security, power, cooling, and facilities into shared pools of interoperable resources all managed through a common management platform. Only then can IT accelerate application delivery in a predictable, repeatable manner for any workload. This, in turn, drives new levels of IT and business agility, enables the provisioning of multiple IT services and applications in minutes versus weeks or months, and shifts significantly more IT resources from operations to innovation. It's all about finding a common way to get things done so the IT organization can keep up with fast-changing business demands and keep innovating to enhance competitiveness in the market.

Simplifying Shared Services

Building a shared-services model starts by bringing all server, storage, and networking resources together into a common pool. This approach also brings together integrated management tools, policies, processes, and even people so resources and applications are all managed through one central operating environment in a highly systematic manner. And it brings together security as well as power and cooling management capabilities so systems and facilities work together to extend the life of the data center as shown in Figure 2-1.

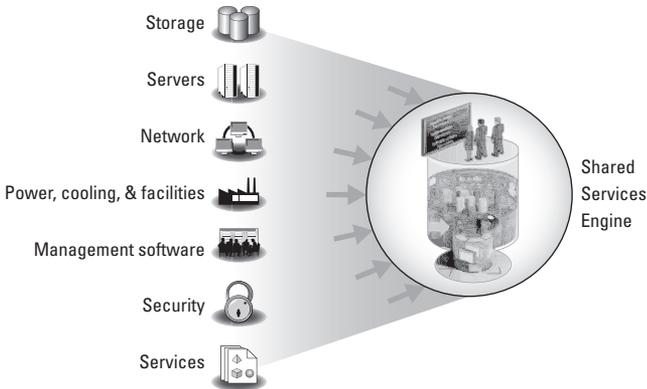


Figure 2-1: A shared services model helps bring your information systems full circle.

When you create this type of converged, service-ready infrastructure, you're able to dynamically, efficiently, and automatically orchestrate and provision elements (compute, storage, networking), and then return these assets back to the resource pool when the services are completed. These modular elements are assembled to handle specific workloads and to be rapidly scalable and optimized for energy-efficiency, high utilization rates, and with built-in availability as shown in Figure 2-2.

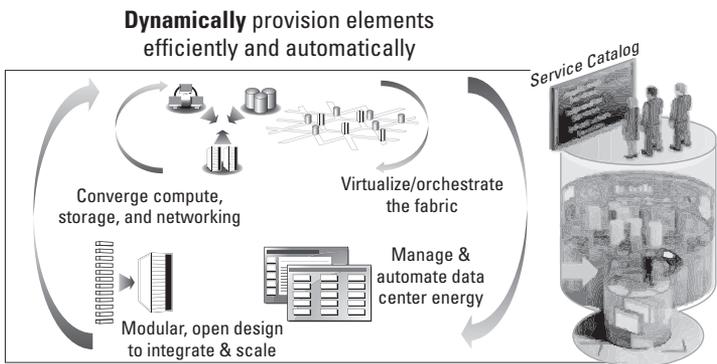


Figure 2-2: A Converged Infrastructure allows for dynamic IT provisioning.

And by enabling common management of these shared resources, you're able to simultaneously control, optimize, and orchestrate all infrastructure elements required to deliver a service — with the ability to instantly respond to changing business demands in a predictable, repeatable way (see Figure 2-3).

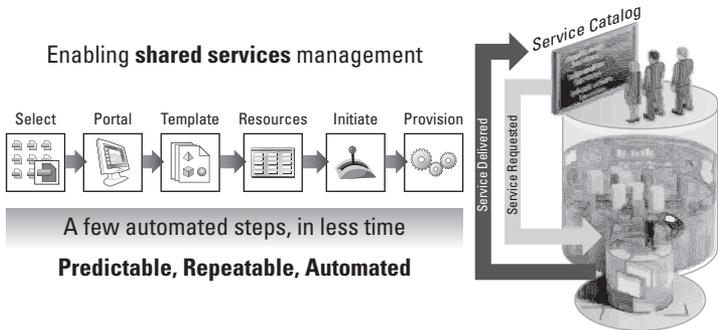


Figure 2-3: Shared services allow for predictable, repeatable, and automated management.

This type of shared services environment breaks down siloed, hierarchical, point-to-point infrastructures into an easily managed, energy-efficient, and reusable set of resources. This is critical in order to extract the most value from your technology, people, and processes. For example:

- ✔ Business growth can be accelerated by efficiently deploying new applications and services, with optimum utilization across servers, storage, networking, and power.
- ✔ On-demand delivery of applications and services can be achieved in minutes, not weeks or months.
- ✔ Employee productivity will go up as human capital is moved from operations to innovation through the use of IT productivity tools (templates) and best practices and by increasing the automation of application, infrastructure, and facility management. This is critically important in today's economy and competitive landscape.

It's a Journey

Gaining the value of infrastructure convergence doesn't mean you need to change your entire IT organization all at once. Every organization has its own starting point and desired destination.

Think of converging your infrastructure as both a journey and a destination across some or all of your data center. And doing so is a journey that you can achieve either by transforming your own IT environment or by leveraging the resources within an outsourcing provider's converged infrastructure.

If you choose to converge on your own (with or without the assistance from your technology provider), you can get there fast by deploying a completely new next-generation data center. You can accelerate certain critical needs by deploying converged systems that are optimized, pretested, and tuned for virtualization or mission-critical applications — or for a new breed of cloud-based applications. You can also choose to deploy a new class of individual server, storage, and/or networking technologies that can build on each other because they're designed for convergence. The important thing is not to wait any longer — get on board with convergence now.

In the early adoption phase of convergence, many organizations start with a more incremental approach and systematically transform the environment. This is particularly true for IT organizations at the compartmentalized stage that experience application, server, and storage silos that can be considered the least flexible and most costly state of IT existence. This stage has too many dedicated project-based technology silos. In this state, applications and infrastructure are moved into the data center and IT professionals manage and operate them one by one. There are few shared assets and little consistency among infrastructure, operating systems, and operating processes. One server is dedicated to one application, which tends to lead to old legacy systems that are very maintenance intensive, costly to operate, and inefficient.



For organizations taking the incremental approach, there are three main steps that can help get you from where you are today to a fully converged infrastructure: standardize, virtualize, and automate.

Standardization

The first step for most organizations is *standardization* in order to increase quality and speed of IT service delivery. Standardization also lowers the cost of operations and creates better, more efficient management. Standardization could include moving to a small number of approved standard configurations implemented in a consistent fashion with consistent management tools. As a result, you gain a more standards-based, modular, and reusable infrastructure.

Consolidation is often a part of the whole standardization process. The various elements of a converged infrastructure have been designed to work together in a consolidated fashion, so redundant components between server, storage, and networking are eliminated. For example, overprovisioning and complex cabling for servers, storage, and networking are no longer necessary. And by having fewer standardized building blocks, business and IT have better alignment right away because it's easier to exploit the benefits of virtualization with management and support across your systems. Components are more easily added or redeployed based on demand for particular applications. Such standardization gives you a whole new level of flexibility and agility.

Virtualization

The second step is *virtualization*. Virtualization enables IT to share physical servers, storage, and networking equipment across data and applications. In virtualization, physical assets become virtual. The infrastructure tends to be pooled and sharable. As a result, virtualization increases asset utilization, drives greater ability to handle periods of peak business demand, encourages faster deployment of new applications, improves service levels, and maximizes reliability and operational efficiency.

This increases the quality of service and begins to make IT more responsive and aligned to the needs of the business. Different types of virtualization include:

- ✔ **Server virtualization** is a way to increase resource utilization by partitioning physical servers into multiple virtual servers with each running its own operating environment and applications. The virtual machine acts like a real computer.
- ✔ **I/O virtualization** to deliver connection capacity and flexibility needed to accommodate the wide range of workloads and applications.
- ✔ **Storage virtualization** not just within an array, but across the entire storage environment to scale up and out, and continually balance performance and capacity.
- ✔ **Network I/O virtualization** and the creation of VLANs with the goal of improving the network efficiency and increasing flexibility to quickly allocate required bandwidth.
- ✔ **Client virtualization** is the practice of hosting a desktop operating system within a virtual machine (VM) running on a centralized server and with the option of supporting thin clients.

Today, several technology providers offer preintegrated converged systems that are architected as foundational building blocks for virtualization, particularly server and storage virtualization. They're designed to minimize unused resources because resources are already virtualization-aware and virtual machine-ready. Virtualization ensures that the system is used at maximum utilization with minimum waste.



You need a management software platform that can manage both virtual and physical servers to work with your installed base and allow you to manage how fast to move into the virtualized world.

Automation

The third step is *automation* to help you run IT-as-a-service and be fully aligned with business requirements. An automated environment accelerates time to value for virtually any IT service. It accelerates service provisioning, responsiveness, agility, disaster recovery, and, ultimately, IT innovation.

In other words, IT can run at the speed of business. The key elements of an automated IT infrastructure include:

- ✔ A self service portal where IT and business users can quickly request and procure IT services
- ✔ A service catalog of infrastructure deployment best practices
- ✔ A resource pool with compute, storage, and networking resources
- ✔ Automated infrastructure provisioning and policies that deliver the service in minutes, not months
- ✔ Capacity planning and management tools to keep the resources and services healthy and optimized

Which step you enter into (standardize, virtualize, automate) will depend on the maturity of your current data center when you start.



Always start with a technology vendor that can offer you an assessment service (often free of charge). This will help you figure out where in your convergence journey you are and help determine practical next steps or even a road map of how to move to your desired state. Another benefit of doing a convergence assessment is that it not only includes technology recommendations but also the management, people, and process requirements. It's a great tool and process to help you make well-informed decisions.

Business Value of a Converged Infrastructure

A converged infrastructure provides both technical and business efficiencies. At the highest level, converged infrastructure solutions enable IT to become an innovation engine for business growth. This is achieved by accelerating IT innovation and responsiveness, managing risks by accelerating security and disaster recovery, and lowering costs by accelerating ROI and sustainability.



There isn't *one* converged infrastructure solution that fits every organization, but every converged infrastructure solution should deliver everything your company requires in order to truly become a service-centric IT organization.

A recent HP-sponsored research study conducted by IDC shows that higher levels of convergence drive greater business value. The information in the survey is based on information about each respondent's throughput and level of convergence and information about its data center total cost, IT labor cost, speed of deployment, and uptime characteristics.

The results indicate a marked correlation between higher levels of convergence and reduced IT costs per unit of workload, faster deployment, and reduced downtime. Figure 2-4 shows how all these factors play out for organizations in each of the convergence levels, with Level 1 being the lowest maturity level and Level 5 being the highest:

- ✓ Level 1: Compartmentalized
- ✓ Level 2: Standardized and consolidated
- ✓ Level 3: Virtualized and optimized
- ✓ Level 4: Automated and service-oriented
- ✓ Level 5: Adaptively sourced

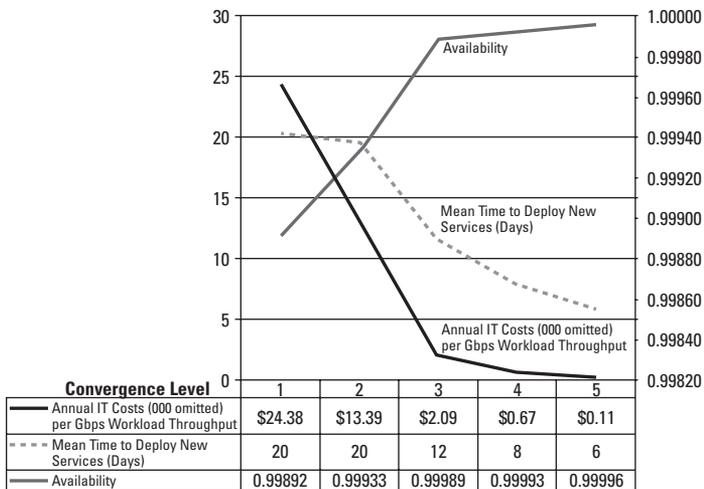


Figure 2-4: Effect of increased convergence levels on it costs, uptime, and speed of deployment.

Some highlights of the results include:

- ✔ **Availability:** As a company's convergence level increased, so did resource availability.
- ✔ **Annual IT cost:** Companies at higher levels of convergence benefited from lower costs per unit of IT workload. For example, organizations at Level 4 convergence reported costs per unit of IT workload almost 60 percent lower than those ranked at Level 3.
- ✔ **Time to deploy new services:** Higher convergence levels also meant a significant increase in the speed to deploy new services — from weeks to days.

These results are impressive and show that a converged infrastructure delivers big-time business value. But there is so much more value that can be attained. Below are a few examples of how convergence accelerates value:

- ✔ **Better asset utilization** through aggressive consolidation, centralization, and integration of servers, storage, and network assets using technologies such as server and storage virtualization.

- ✔ **IT staff efficiency is increased** by reducing administrative costs associated with system, data, and application maintenance and migration.
- ✔ **Agility and IT responsiveness are increased** by breaking down siloed, hierarchical, point-to-point infrastructures into an easily managed, energy-efficient, and reusable set of resources to enable faster, automated provisioning of IT assets and more reliable, timely recovery of data and applications.
- ✔ **Simplification** through automation, cloud, and prepackaged, workload-optimized systems. And better disaster recovery by simplifying multisite failover and reducing downtime to seconds.
- ✔ **Security increased** by fortifying IT through security solutions that are quick to install, update security filters more often, and block more attacks.
- ✔ **Sustainability increased** by knowing actual power usage and delivering the most IT per watt and space.
- ✔ **Return on Investment (ROI) improved** by increasing utilization and data center capacity, leveraging your existing investments, and reducing energy costs.
- ✔ **Costs lowered** by lowering capital expenses resulting from higher utilization, less cabling, fewer network connections, and reducing labor via automated data center management.

Infrastructure Convergence and Cloud Computing

Cloud computing is a way to build, manage, secure, transform, and consume IT that makes private and public resources (such as services, applications, servers, storage, and networks) flexible, dynamic, and available on demand. Many folks define cloud computing as the next stage in the evolution of the Internet to provide everything-as-a-service whenever and wherever you need it, while paying only for what services you consume.

There are three types of clouds:

- ✔ In a **private cloud**, the cloud assets are typically operated solely for a single entity or client and may be located on or off the premises. They may be owned and managed by that entity or a third party.
- ✔ With a **public cloud**, the cloud assets are shared and service is provided to multiple entities on a pay-per-usage basis. All assets are owned and operated by the provider.
- ✔ A **hybrid cloud** is the best of both worlds, combining the security of the private cloud with the convenience and cost-effectiveness of the public version.

Most organizations will have a hybrid IT environment that includes some form of cloud computing as well as traditional IT approaches. This is exactly why infrastructure convergence is so important. A converged infrastructure provides the foundation for all IT requirements including cloud deployments — enabling you to not only identify IT services and applications that should be migrated into cloud environments but also to manage on-premises and cloud resources through one and the same shared services catalog — not to mention the ability to burst from a converged infrastructure to the cloud.



Be cautious when putting together a piecemeal cloud solution. It may lead to lower capital expenditures but create new challenges in order to get these applications to share on-premise resources and applications, create security issues, and lead to increased operational costs.

Business users have been quick to recognize the cloud's advantages in speeding innovation, accelerating business processes, reducing costs, and reducing time to revenue. There is no doubt that cloud computing is hot. Use it to your advantage when and where it makes sense — for instance, start with one application at a time as you get started.

What to Look For in Your Technology Provider

Whether you start with smaller technology projects, deploy the newest converged systems, or embark on a complete transformation, evaluate these areas of your vendor to ensure the safest and fastest path to convergence value based on your unique business objectives and requirements:

- ✔ **Intellectual property (IP):** To create a converged infrastructure, you need to look for vendors with a complete, integrated portfolio of servers, storage, networking, management software, and energy optimization — with purposeful IP designed for convergence from the outset. Whether you deploy individual technologies or converged systems, the important thing to remember is that you want a technology provider that has a best-in-class reputation and support track record across all those areas. You must have confidence that each individual component is sound and strong while being architected to work with all the other components.
- ✔ **Open integration:** Being able to support a heterogeneous environment is critical — whether it be the servers, the network, the storage, the management software, or any other element. Open integration allows you to deploy converged infrastructure solutions the way you need to, whether in your existing environment or for new green-field opportunities. To help, your technology vendor should have broad programs to deliver integrated solutions based on open standards. Each offering should be tightly integrated and pretested and bring together all the key hardware, software, and services components you need. This is especially true as you move parts of your IT environment to the cloud or need to support heterogeneous compute stacks.
- ✔ **Partner ecosystem strength:** Your vendor or partner should have an extensive application development ecosystem (for example, independent software vendors, independent hardware vendors, channel partners, system integrators) because infrastructures don't exist in

vacuums. You make the decision first about the application and then about the best infrastructure on which to deploy it. So it's absolutely critical to work with a technology vendor whose systems have been configured and tested with the specific applications you want to use.

- ✔ **Standards-based:** In addition to trusting the supplier across the entire IT stack, you need to make sure the building blocks themselves are based on industry standards. As a best practice, select a supplier that uses industry-standard components and interfaces (such as application plug-ins). This way, you not only can deploy the components in your existing data center but also more easily and quickly migrate to new components as needed.
- ✔ **Expertise and experience:** Remember, most companies will build out a hybrid converged infrastructure environment that includes a mix of on-premise, outsourced, and cloud solutions. This type of mix requires a vendor that has the proven expertise to consult, design, finance, secure, and build the fabric, including the facility. Because this is a new technology, a broad services portfolio and a track record of success from the supplier will be critical. You're going to want services from the vendor to help you successfully deploy the right solution in the shortest reasonable time.



As converged infrastructure solutions become more prevalent, or as technologies designed for convergence get refreshed, any reputable vendor will provide skills, technical training, and certifications to help the organizations' functional domain experts evolve and succeed. Such programs enable you to gain the skills you need to integrate servers, storage, and networks into open, common platforms — whether you're a technical veteran or a relative newcomer.

Chapter 3

How Convergence Affects You

In This Chapter

- ▶ Examining some organizational roles and responsibilities for C level executives
 - ▶ Looking at roles for other employees
-

How does creating a shared services or converged infrastructure environment affect the various job functions within the business and IT organizations? This chapter goes over that information.

Changing Organizational Roles for CEOs and CFOs

“Constant change is now a business fundamental on which IT must deliver.”

—CEO

“Convergence ROI and TCO are very compelling.”

—CFO

Today’s CEOs must react to the speed of the market while finding optimal ways to create sustainable growth to drive new revenue and profit goals. In a time of massive changes in how goods and services are purchased and received, the new imperative is to align, adapt, and even reinvent the business — on the fly — in order to survive and thrive.

Top concerns for this group

- ✓ Business growth and innovation
- ✓ Business cost management
- ✓ Improved customer satisfaction
- ✓ Quality management
- ✓ Competitive advantage
- ✓ Improved security/risk management
- ✓ Energy and sustainability requirements

At the same time, the CEO and CFO are balancing aggressiveness with predictability and control. IT costs and resources must be kept in line with business costs. Nimble enterprises will achieve this balance by weaving technology into everything they do. The CEO is going to be placing even more pressure on the CIO and IT staff to meet these diverse requirements. IT must become a strategic line item, rather than a budget line item.

Changing Organizational Roles for CIOs and CTOs

"I can inspire greater collaboration among siloed departments."

—CIO

"I need the best technology foundation and approach to align our IT with business demand."

—CTO

CIOs and CTOs are turning to infrastructure convergence to gain value. Together, these functions typically drive IT strategy and strategic technology decisions related to applications

and operations. They also help drive organizational change and alignment across the business. In effect, the CIO is becoming a service broker and possibly the most important role in the organization.

In this role, the CIO must build and maintain a network of trusted partners and suppliers that can be relied on to deliver services at a predictable price and level of performance. Internally, they must build a service delivery channel that offers tangible value to the business by controlling cost, meeting customer satisfaction, and therefore driving incremental revenue and profitability.

One of the CIO's main go-forward decisions when it comes to convergence is to figure out how best to deploy a hybrid delivery model. This model combines IT service delivery from multiple sources — including traditional IT, cloud, outsourcing, and hosted services. This will give the CIO more freedom to select a delivery method that makes the most business sense by matching appropriate costs and capabilities to specific needs. For example, if he or she seeks to leverage public or private cloud services, the CIO will become the lead change agent for both business and IT processes in order to maximize the benefits of cloud technologies and ready the enterprise for accelerated innovation and improved agility. Otherwise, they risk creating silos that introduce cost, complexity, and risk to hybrid environments.

Top concerns for this group

- ✔ The IT environment is delivering optimal performance.
- ✔ Availability requirements are met and disaster recovery measures are in place.
- ✔ Security of customer, company, and partner data amid tighter audit and regulatory demands.
- ✔ How to take advantage of a more integrated environment to control physical and virtual IT sprawl.
- ✔ Deploying the right solutions without having vendor lock-in.
- ✔ Lowering operations costs so more resources can be applied to innovation.

Changing Organizational Roles for System Architects and Planning

“A common, modular architecture gives us unlimited agility and control.”

—System Architect

The System Architect or Strategic Planner typically designs the data center strategy that anticipates future needs while efficiently satisfying short-term requirements. An executive at this level tracks new technologies as they relate to the holistic view of the infrastructure.

Interoperability, architecture, uptime, bandwidth, and agility are top concerns. The System Architect or Strategic Planner is a key change agent to ensure not just that the technology is right but also that the processes, people, and culture are aligned.

With infrastructure convergence, the System Architect or Strategic Planner is struggling with trying to adapt the old, siloed thinking to a new world of business. Technology is developing at a pace much faster than the enterprise’s ability to adopt innovation, which is really the root of the problem. The System Architect plays a key role in rethinking and planning how IT best delivers its services.

Changing Organizational Roles for IT Directors

“I see the ‘promised land’ of everything in the data center managed as one.”

—IT Director

The IT Director is another key player in determining and approving integrated IT solutions (for example, platform shifts from rack to blades and virtualization). The promise of infrastructure convergence makes sense to IT Directors because

they see how it can immediately and effectively enable their broad-scale IT initiatives such as:

- ✓ Data center transformation
- ✓ Consolidation
- ✓ Cloud computing
- ✓ Virtualization
- ✓ Automation
- ✓ Modernization
- ✓ Acquisition

Knowing their current environment is fairly complex, IT Directors understand how a converged infrastructure can provide increased visibility and control. People in this position will be looking for solutions that effectively address their availability, manageability, interoperability, and power and cooling concerns as well as increase staff productivity and create better coordination across siloed departments.

Changing Organizational Roles for Functional IT areas

“Does convergence mean the server team now owns the stack?”

—Server Administrator

“Is my job or my team safe because there is less to manage?”

—Storage Administrator

“Will our network be compromised in any way?”

—Network Administrator

A converged infrastructure means that the individual parts of IT will become more collapsed, creating opportunities for those that embrace convergence to become change agents. However, this is not an immediate change.

Specific positions will face certain issues:

- ✔ **Server Administrators** will be in a prime position to better align IT demand without the burden of constant coordination. They will benefit from new converged infrastructure solutions by simplifying resource provisioning, managing their infrastructure as a holistic unit, and eliminating the cause of server sprawl. Ultimately these folks may take a leadership role in managing or automating the provisioning of the applications and services for both IT and the lines of business.
- ✔ **Network Managers** currently own the core and edge network architecture decisions. They know having a simpler and flatter, yet more flexible, intelligent, and resilient network is the wave of the future. How fast they embrace the solutions available to them in a converged environment will determine their future value.
- ✔ **Storage Managers** coordinate with the Server and Network Managers for deployment of new application infrastructures, but they may perceive storage as part of a converged infrastructure to be a threat to their domain control. Those that take a leadership role can see how virtualized, scalable, and self-optimized storage will be an opportunity to redirect their time to more strategic activities.

Chapter 4

The Inner Workings of a Converged Infrastructure

In This Chapter

- ▶ Looking at requirements and design principles
- ▶ Eying foundational architecture
- ▶ Examining common components
- ▶ Asking whether infrastructure convergence is for the medium-sized business

In this chapter, we discuss infrastructure convergence and the HP Converged Infrastructure as if they were layers of an onion. We talk about the design principles of convergence, the four architectural pillars of the HP Converged Infrastructure approach, and the base reference architecture that describes the technologies that serve as building blocks for convergence.

Taking a Closer Look at Converged Infrastructure

Converged infrastructure solutions enable all resources and processes to be controlled by a shared-services engine that makes the most efficient use of IT, facility, and staff resources. However, every organization has unique and varying requirements, with current investments that need to remain in play.

So whether you start small with technologies designed for convergence or deploy ready-to-go converged systems, the five core design principles and the foundational architectural approach should be part of your solution evaluation.

Requirements and design principles

Regardless of your technology provider, a converged infrastructure incorporates five overarching design principles that are fundamental requirements of convergence. It's these areas that bring the core technologies together in the most optimal manner and make it easier to align your people and processes to gain the full value of convergence. A converged infrastructure is:

- ✔ **Virtualized:** You virtualize all heterogeneous resources: server, storage, networking, I/O, and desktops and clients. Virtualization separates the applications, data, and network connections from the underlying hardware, making it easier and faster to reallocate resources to match the changing needs of individual applications and virtualization software.
- ✔ **Resilient:** You integrate fault tolerant mission-critical technologies and high availability and security policies. Because diverse applications share virtualized resource pools, the infrastructure must have a resilient and highly secure operating environment that automates high-availability policies to meet service level agreements (SLAs) and provides the right level of availability for each business application.
- ✔ **Open:** You build on standard, common architectures and management aligned to your preferred virtual machine platform, operating systems, and applications. This enables your organization to leverage your existing investments as part of the consolidation and convergence process and adopt new technologies incrementally and at your own pace with the required flexibility to run, support, and optimize your applications.
- ✔ **Orchestrated:** You orchestrate the business request with the applications, data, and infrastructure. You define the policies and service levels through automated workflows, provisioning, and change management. This creates an

application-aligned infrastructure that can be scaled up or down based on the needs of each application. Orchestration also provides centralized management of the resource pool, including billing, metering, and chargeback for consumption. For example, orchestration reduces the time and effort for deploying multiple instances of a single application. And as the requirement for more resources or a new application is triggered, automated tools perform tasks that before could only be done by multiple administrators operating on their individual pieces of the physical stack.

- ✔ **Modular:** You build on modular design principles with technologies engineered for convergence. This allows you to integrate new technologies with existing investments without having to start over. This approach also allows you to extend new capabilities and scale capacity over time with common, modular components across the data center — from x86 to the most demanding, mission-critical systems.

Foundational architecture

HP Converged Infrastructure is built on a next-generation IT architecture that creates a common management platform for a shared-services environment. Overall, the architecture provides the blueprint for moving forward in a practical manner — either all at once or incrementally — based on these four pillars that operate together:

- ✔ **HP Virtual Resource Pools** establish a common modular infrastructure of virtualized server, storage, and I/O resources that can be combined, divided, and repurposed to match any application demand quickly and efficiently. For the first time, your business can support a shared-services model with a common pool of adaptive, virtualized resources that can be optimized for all types of enterprise, cloud, and high-performance computing applications. Benefits include:
 - Significantly increases total utilization by freeing and repurposing trapped capacity to support applications.
 - Enables resiliency and flexibility to support applications on interrelated resources.

- Accelerates standardization to drive higher levels of automation and increase productivity.
- Protects your investments through simplified integration with existing systems, upgradability, and scalability to meet future demand.

✓ **HP Data Center Smart Grid** provides intelligent energy management across systems and facilities to optimize and adapt energy use, reclaim trapped facility capacity, and reduce energy costs. The HP Data Center Smart Grid automates the collection and communication of thousands of real-time power and cooling measurements across IT systems and facilities — providing unprecedented insight and control over energy costs and environmental impact. Benefits include:

- Reduces costs for powering and cooling IT systems.
- Improves reliability across IT and facilities.
- Extends the useful lifespan of facilities and other capital investments.
- More effectively addresses asset demand and more efficiently manages the IT and facility resources from a common management platform.

✓ **HP FlexFabric**, part of the HP FlexNetwork portfolio, creates a common, wired-once, virtual I/O network that consolidates Ethernet and storage networks onto a single fabric. This approach enables your organization to establish a high-performance, low-latency network that can dramatically lower network complexity and cost, and easily flex connections and performance to meet changes in workload demand. Benefits include:

- Lowers network complexity and cost.
- Dynamically adapts network protocols and scale capacity to match application demand on the fly.
- Instantly migrates connections as applications move across different resources.
- Gains predictable performance and quality of service governed by security and service-level policies.

✓ **HP Matrix Operating Environment** infrastructure life-cycle management allows you to manage and automate resources — from infrastructure to application. Gains are achieved by unifying all the tools into one command center. This environment is uniquely built from the HP infrastructure, mission-critical, and business service software portfolios to meet the demanding nature of heterogeneous enterprise IT environments across multiple delivery models. Benefits include:

- Provisioning of services in minutes instead of months.
- Optimizing your entire infrastructure more confidently.
- Protecting continuity of services.



A great example of this architecture in action is HP Converged Systems (covered in Chapter 5). These systems bring together all these attributes into pre-integrated, tested, and supported solutions optimized for cloud, virtualization, and next-generation applications — cutting months or even years of planning, procurement, and deployment processes into weeks.

Whether you move forward with infrastructure convergence all at once through Converged Systems, or incrementally, the HP Converged Infrastructure architectural approach enables the greatest level of integration, optimization, automation, security, and simplicity. This is exactly how you can shift resources from operations to innovation and accelerate the value of the IT organization.



You can take advantage of HP Converged Infrastructure solutions with assistance from HP or your preferred HP Partner, or you can start transforming your own operation. In this last case, HP can help you design the infrastructure architecture and provide an implementation plan that will meet your specific and unique converged infrastructure requirements.

Examining Common Components

HP Converged Infrastructure relies on a common set of components, associated with a comprehensive set of service definition, deployment, and management tools. Infrastructure components can be deployed, and redeployed, to meet business needs. These common components can be utilized all, or in part, to create a platform on which to build IT solutions. These components provide a *core* for solution deployments to enhance the maturity and agility level of the entire IT environment.

Doing things in a common way is what enables an agile data center to provision services from pools of resources requested by the users from portals, APIs, or other interfaces. These virtual or physical resource pools include servers, storage, and networking — which are allocated from automation resources over the converged network. These pools of resources will be orchestrated to deliver the services requested via *service catalogs* based on business service level agreements (SLAs).

Depending on the SLA, the required scalability, availability, and local or remote disaster recovery will be enabled. These resources will be monitored at the infrastructure, application, and end-user side. Capacity will be typically available on-demand and elastic to address workload spikes, such as during peak business events. From a functional perspective, Figure 4-1 depicts how these data center operations are addressed by the core elements that form the HP Converged Infrastructure architecture.

To facilitate the implementation and operation of HP Converged Infrastructure, the integrated command center delivered by the HP Matrix Operating Environment provides the self-service infrastructure portal of catalogs for auto-provisioning infrastructure and shared-services applications.



The Converged Infrastructure architecture is interchangeable between HP components and non-HP components as long as they meet the architectural requirements. HP's open, non-proprietary approach reduces costs, improves performance, and improves flexibility for customers as they upgrade their environments and continue on their infrastructure convergence journey.

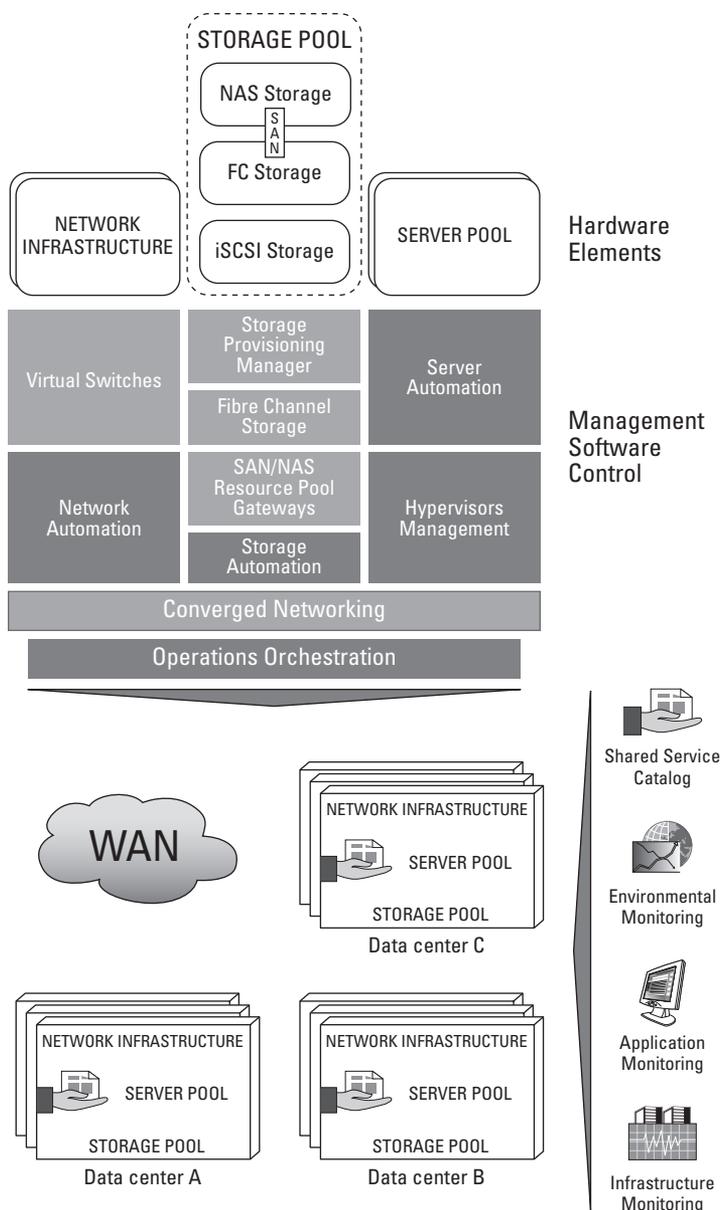


Figure 4-1: The core architecture of an HP Converged Infrastructure.

Sizing and other IT objectives must be considered for the particular solution architecture adapted to meet IT needs and desired maturity level. More specific reference architectures for things like virtualization, cloud, or applications can be found by going to www.hp.com/go/CI-RA. Or, HP can help you build an infrastructure architecture completely designed to maximize your current infrastructure investment and achieve your desired levels of standardization, integration, automation, and virtualization.



A key difference with HP Converged Infrastructure is that it's all built to industry standards. It gives you choices so you can change parts in and out as you like and you don't get locked in. This is a very important part of the HP architecture. It's not about lock-in; it's about building to industry standards and giving customers choices.

HP Converged Infrastructure can be delivered at your own pace and in different ways: on-premises, outsourced, via the cloud, or a hybrid model of all three. The reality is that most enterprises will have a multisourced environment for the foreseeable future. Based on this, the important thing to remember is that no matter where IT services are from, they must be sourced, delivered, and governed in the same way in order to turn IT into a key strategic differentiator for your business.

A converged infrastructure doesn't exist in isolation. It provides infrastructure services for business processes and applications. And it must take part in the existing enterprise management systems. HP Converged Infrastructure is able to link into larger-scale automation flows, into the IT service management processes, and into the tools that ensure availability and performance of business processes and applications. For example:

- ✔ The ability to automate the provisioning of servers, storage, networking, and operating systems can be used by higher-level automation workflows for setting up a whole business application, including user data and code.
- ✔ Take configuration information from the converged infrastructure and use this, events, and performance information to manage the health of business processes and applications.

- ✔ Your converged infrastructure can be controlled by your Service Desk's change management process. And it can feed information up into a Service Manager's "event to resolution" process.
- ✔ Your converged infrastructure configuration can be automatically scanned for compliance, ensuring that it complies with regulations and the enterprise's own compliance standards.

Infrastructure Convergence for Medium-Sized Enterprises

The instant world has no bounds. It affects all businesses in varying degrees, including medium-sized businesses. However, for a medium-sized business, infrastructure convergence could mean the difference between thriving and merely surviving.

Like the larger enterprise, older, less flexible, and more costly infrastructures are absorbing too much of your limited resources including both people and hard dollars. Finding some balance is difficult, especially when you factor in realities like data growth and complexity, business disruptions, communication breakdowns, increased competition, and consolidation and growth initiatives such as potential acquisitions.

As a midsized business, HP solutions can help you evolve to a converged infrastructure at your own pace and preference. Each solution is designed and built to integrate and optimize technologies so you can more efficiently manage your business, protect your business, and better compete and grow — whether that be upgrading your technologies, mitigating risks, consolidating offices, unifying your communications, and/or virtualizing everything including servers, storage, clients, and cloud.

You want to keep your business up and running no matter what: optimizing consolidation and virtualization, simplifying delivery of critical business applications, accelerating analysis and decision making, and allowing your people to work more productively.

Chapter 5

Finding the Right Converged Infrastructure Solution

In This Chapter

- ▶ Working with flexible solutions
 - ▶ Getting to know converged data centers
 - ▶ Examining HP Converged Systems
 - ▶ Looking into converged technologies
-

Think of the HP Converged Infrastructure strategy and portfolio as your GPS for convergence. It can help get you there in the simplest, fastest, and safest manner based on your unique requirements.

You can get there fast and right now with HP Converged Data Centers or Converged Systems, or you can gain convergence value each step of the way through modular, standards-based technology building blocks — designed for convergence — while maintaining optimal protection of your existing investments.

One size simply doesn't fit all. Organizations can take a more comprehensive, *Big Bang transformation* approach or take a more incremental approach to achieve the desired end-state (see Figure 5-1). Plus, you can even combine the two approaches by putting a big-picture plan in place that helps you move forward as opportunities present themselves to make changes within the environment.

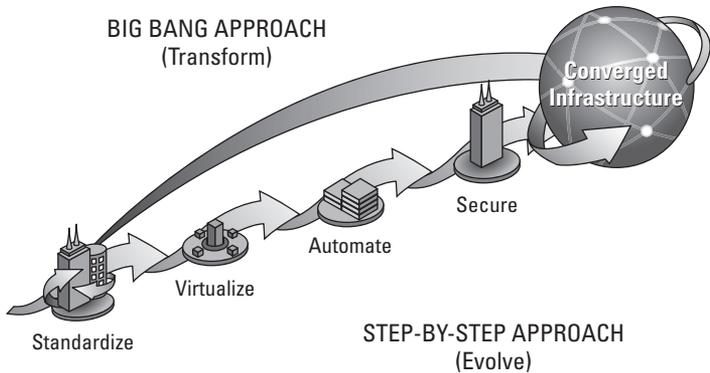


Figure 5-1: The Big Bang versus step-by-step approach to a Converged Infrastructure.

Either way you go, the solutions found in this chapter can be deployed for your preferred delivery model (on-premises, out-sourced, via the cloud, or a hybrid of all three) and deployed at your own pace and preference.

Transform or Evolve through a Portfolio of Flexible Solutions

The HP Converged Infrastructure strategy and portfolio has been designed to help you gain the value of convergence in the simplest, fastest, and safest manner based upon your requirements and preferred delivery model(s). You can deploy:

- ✔ A fully operational next-generation data center delivered quickly through converged or modular data centers.
- ✔ A complete portfolio of converged systems that are prebuilt, pretested, and tuned for virtualization, next-generation applications, and cloud computing.
- ✔ A complete and leading portfolio of modular, standards-based technology building blocks all designed for convergence.

Agility rules

A recent HP survey confirmed the importance of agility and its impact on the success of the enterprise. Representing both private and public sectors, 95 percent of respondents said that agility is important to the success of their organizations. They cited speed — how quickly the organization can implement new technology services — as the number one

benefit. HP also asked executives how important agility would become in the future. Most respondents — 77 percent of CEOs, 64 percent of CFOs, and 72 percent of CIOs — said agility will be critical to success in five years. Sixty-two percent of public sector organizations also believe that agility will drive future success.

Figure 5-2 provides a simple way to evaluate the different converged infrastructure solutions that can be deployed in a manner that protects your existing investments yet allows you to accelerate where and how it makes sense.



HP provides a complete portfolio of Converged Infrastructure services and outsourcing options that hundreds of customers have deployed to accelerate their move forward.

Transform	CONVERGED DATA CENTERS	Expedite deployment and increase efficiency with modular data centers
	CONVERGED SYSTEMS HP VirtualSystem HP CloudSystem AppSystems	Accelerate time-to-application value with pre-integrated, tested, and supported solutions optimized for cloud, virtualization, and next-generation applications
Evolve	CONVERGED TECHNOLOGIES	Common, modular, standards-based technology building blocks designed for convergence

Figure 5-2: The various converged infrastructure options.

Converged Data Centers

Converged Data Centers are in the class of modular data centers (complete, preconfigured data centers shipped and ready to go in comprehensive shipping containers) that expedite deployment and increase efficiency. HP Performance Optimized Datacenters (PODs) are data centers in portable 20- or 40-foot energy efficient containers (www.hp.com/go/pod), which are ideal for customers who need to rapidly scale their data center while reducing capital investments, operational costs, and increasing their data center agility and flexibility. The HP PODs (see Figure 5-3) deliver data center efficiency, reduced capital expenditures, and savings in energy costs as compared to traditional brick and mortar data centers. PODs are an ideal supplement to your existing data center, can be deployed as sole data centers, or are a perfect temporary bridge data center solution depending on your strategy.

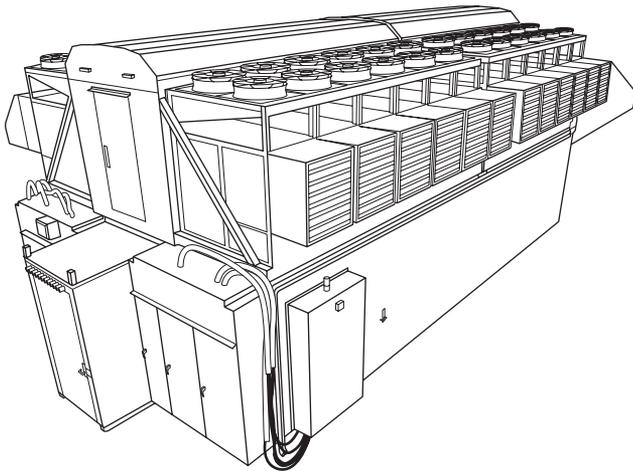


Figure 5-3: The HP PODs.

HP Converged Systems

HP Converged Systems are designed to deliver faster time to application value — and time to business success. They simplify the deployment and optimization of application

environments by integrating hardware, software, and services into turnkey solutions. This converged approach enables your organization to quickly harness the full potential of virtualization, cloud, and next-generation applications, such as business insight and collaboration. It also helps your organization accelerate the consolidation of legacy applications, data, and infrastructure.

As shown in Figure 5-4, the HP Converged Systems portfolio includes three categories of solutions based on a common modular architecture — each designed for today's application needs: HP AppSystems, HP CloudSystem, and HP VirtualSystem.

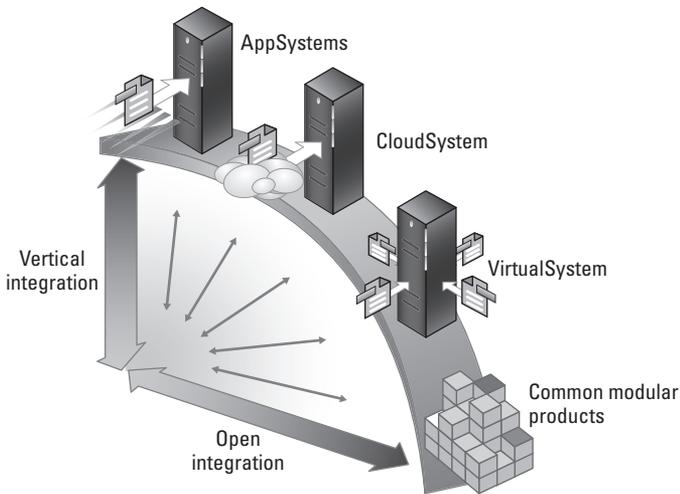


Figure 5-4: HP Converged Systems options.

With the HP Converged Systems portfolio you can address application needs in a common way — whether virtual, in the cloud, or in a dedicated application environment — and eliminate islands of incompatible IT. HP Converged Systems are built on a common architecture, with common management and a common security model, and extended by an industry-standard and open partner ecosystem. Ultimately, it all comes down to supporting your business. Find out more at www.hp.com/go/convergedsystems.

HP VirtualSystem

Virtualization has been widely adopted as the key for breaking down IT silos, increasing flexibility, and optimizing return on investment. But there's a catch: complexity resulting from virtual server sprawl. It's no wonder leading analysts agree that IT decision makers consider reducing virtualization complexity to be one of their key priorities.

The HP VirtualSystem (www.hp.com/go/virtualsystem) helps you simplify data center modernization and application optimization by putting you on the path to virtualized application solutions. It is delivered as a complete, high-performance virtualized system that is pre-integrated — with optimized server, storage, networking, management, and hypervisor resources.

Tailored to the needs of your business, HP VirtualSystem gives you a choice of virtual-machine ecosystems, including Microsoft, VMware, Citrix, and HP Integrity VM. You also have a choice of modular systems for small, midsize, large, and mission-critical deployments — all based on a common architecture, using common management and common security approaches.

HP VirtualSystem helps you eliminate performance bottlenecks with a balanced architecture that's optimized for virtualized applications. It can even reassign capacity to speed up time to results — and help you meet your service-level agreements.



The HP VirtualSystem gives you investment protection and a clear path to the cloud. When your business is ready for the cloud, you're only a simple upgrade away from the HP CloudSystem, which is built on the same hardware architecture.

HP CloudSystem

The industry is moving toward cloud and there are an abundance of cloud solutions in the marketplace. How do you choose which is right for your organization? Today, HP CloudSystem offers a complete, integrated system to build and manage services across public, private, and hybrid clouds. It

combines the HP Converged Infrastructure as the foundation with HP Cloud Service Automation software, providing a ready-to-go cloud platform for enterprises and service providers.

The HP CloudSystem integrates servers, storage, networking, solution support, security, and management to automate the application-to-infrastructure life cycle for hybrid service delivery. As a result, you will speed innovation, accelerate business processes, and reduce time to revenue.



HP CloudSystem's integrated solution enables your organization to build, automate, and orchestrate services across private clouds, public clouds, and traditional IT environments. It also supports third-party technologies (standards-based storage, networking, and virtual machines on non-HP servers) for an open approach to cloud services delivery.

The HP CloudSystem includes three offerings that provide a range of services for all businesses, as well as an avenue for growth and expansion:

- ✔ **HP CloudSystem Matrix:** Provides a private cloud solution that provides infrastructure-as-a-service, as well as basic application deployment, catalog capabilities, and monitoring. HP CloudSystem Matrix is an entry-level offering that allows you to provision infrastructure and applications in minutes, rather than months.
- ✔ **HP CloudSystem Enterprise:** For those looking to deploy private and hybrid cloud environments and the full range of service models including infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and software-as-a-service (SaaS). HP CloudSystem Enterprise provides a single services view of your environment, from private cloud to public clouds to traditional IT, with application-to-infrastructure life cycle management and a catalog tuned for the business user.
- ✔ **HP CloudSystem Service Provider:** This offering is designed for service providers so they can effectively provide public cloud IaaS and SaaS, including aggregation and management of those services. This system also provides Cloud Bursting capabilities that allow your organization to buy capacity for a short-term or unplanned spike in demand.

Each of these offerings is available as a small, medium, or large configuration, and each can be expanded with additional hardware and software from HP, as well as third parties, making HP CloudSystem suitable for virtually any desired variety or scale of cloud services.

No matter where you begin, HP provides you with a clear path to the cloud, a path that makes the most of your existing infrastructure while protecting your previous technology investment. To find out more go to www.hp.com/go/cloudsystem.



HP CloudSystem is the best HP solution if you want to bring your legacy system forward, transform virtual assets into fully automated hybrid cloud environments, and enable an agile set of service delivery capabilities across all IT domains.

HP AppSystems

HP AppSystems (www.hp.com/go/appsystems) are complete, pre-integrated turnkey solutions that are tuned and optimized to deliver maximum performance for a single application or suite of applications. Such optimization helps your IT organization meet demanding SLAs — and keep pace with business needs.

HP AppSystems are built on a common architecture that is designed to integrate seamlessly with your existing environment. These systems bring together your applications with high-performance server, storage, networking, solution support, and hypervisor resources. They also include common management and security approaches. It's everything you need in a single solution.

The AppSystems family includes solutions such as real-time analytics, data warehousing, and collaboration that incorporate top-tier applications from Microsoft, SAP, Vertica, and more. These are all open, configurable systems designed to fit within your current business architecture and applications. No limits, no lock-in — it's all based on open standards. The HP AppSystems portfolio includes solutions for:

- ✔ **Business analytics and reporting:** HP AppSystems for business analytics and reporting help you extract more value from more data types at rapid speed and scale. These solutions can accelerate analysis and decision making. They include HP Vertica Analytics System and HP Business Decision Appliance Optimized for Microsoft SQL Server 2008 R2 and Microsoft SharePoint Server 2010.
- ✔ **Data management:** HP AppSystems for data management help you improve data access, simplify and accelerate data capture, and deliver a single version of the truth for better business decisions. They include HP Enterprise Data Warehouse Appliance Optimized for Microsoft SQL Server 2008 R2 Parallel Data Warehouse, HP Business Data Warehouse Appliance Optimized for Microsoft SQL Server 2008 R2, and HP Database Consolidation Solution Optimized for Microsoft SQL Server 2008 R2.
- ✔ **Collaboration:** HP AppSystems for collaboration help you connect your business to information, customers, partners, and each other to maximize productivity. For example, the HP E5000 Messaging System is prepackaged, tested, and ready for quick deployment.

The portfolio of HP Converged Systems is designed to deliver the fastest time to application value — and time to business success. However, most organizations have made huge investments in their current IT infrastructure. Because of that, they can't scrap everything and start over in order to take advantage of the benefits of infrastructure convergence. This is when an incremental approach with technologies designed for convergence might make more sense.

Converged Technologies

Your company can gain ground on IT sprawl and accelerate application delivery with HP's portfolio of modular, standards-based building blocks — all designed for convergence. These technologies follow industry standards, leadership, openness, and of course, cater happily to customer choice.

Server innovation for any workload

HP BladeSystem — a core Converged Infrastructure building block architected for any workload from client to cloud — is designed to maximize every hour, watt, and dollar. With the HP BladeSystem, you can significantly reduce capital expenses versus traditional infrastructure, double the capacity of your data center without adding power infrastructure, and double productivity of administrators to significantly reduce operating expenses. Plus, with HP Virtual Connect modules and adapters, you gain a simple, flexible way to connect servers to any network. And with HP Insight Control, you can simplify management of your virtual and physical HP servers, storage, and networking together with a single pane of glass, directly from your VMware vCenter or Microsoft System Center management consoles.

Plus, with relentless mission-critical demands, there is no tolerance for downtime. To meet this need, HP delivers infrastructure convergence for mission-critical environments — engineered into every level of the architecture with common components such as:

- ✔ **Common server architecture:** Includes common blade designs and form factors. This means that blades can be interchanged. This includes storage blades as well.
- ✔ **Common enclosures:** The c3000 and the c7000 enclosures are now the common building blocks for all HP ProLiant and HP Integrity servers. Even Superdome 2 is based on the c7000 design with extensions for its high-performance, fault-tolerant fabric along with common fans and power supplies.
- ✔ **Common management:** Key elements here include Insight Control, Onboard Administrator, and iLO3 for systems management — extending to the Matrix Operating Environment with a shared services catalog for private cloud implementations.
- ✔ **Common networking:** The common networking paradigm for all systems, x86 to Superdome, is HP Virtual Connect.

By the numbers:

- ✔ The HP Integrity Superdome 2 provides over 100 always-on resiliency innovations and 4.5 times improved reliability compared to Superdome 1 and 100 percent fault-tolerant data paths.
- ✔ HP Integrity server blades provide 2:1 core count consolidation over older servers, and each core can support up to 20 virtual machines.
- ✔ HP Integrity NonStop systems provide 24x7 application availability and outstanding linear scalability of up to 4,080 nodes in a single system with each node fully contributing to productive processing.

Converged storage designed for cloud, big data, and virtualization

Most unified and monolithic storage deployed today was built for the needs of 20 years ago, before explosive data growth or cloud computing. Legacy storage is too expensive, complex, and isolated for today's requirements. Plus, virtual and cloud environments are unpredictable and demand the highest levels of agility and efficiency. Legacy storage was simply not built for unpredictability.

To fully benefit from virtual and cloud computing, organizations must move to modern converged storage designed for these new requirements. HP Converged Storage enables solutions architected from federated, scale-out storage software delivered on leading ProLiant and BladeSystem hardware and managed with converged storage, server, and networking orchestration. This allows you to scale storage faster, reduce IT service delivery time to minutes, spend significantly less time managing storage, and cut power, cooling, and floor space in half.

By the numbers:

- ✔ HP LeftHand P4000 SANs scale nondisruptively and are deeply integrated with server and virtualization management tools.

- ✔ HP 3PAR Utility Storage for cloud computing cuts capacity overhead by 50 percent and is the choice of seven out of ten leading global service providers.
- ✔ HP X9000 Scale-out NAS solutions for explosive data growth offer 16 PB scale and unified management for bulk and high-performance file workloads with new WORM (Write Once Read Many) and snapshot support.
- ✔ HP StoreOnce deduplication cuts backup requirements with a single, unified architecture from client to the data center.

Changing the rules of networking

HP FlexNetwork spans from the virtualized data center to the virtual workplace for cloud, multimedia, and mobile services with integrated security solutions.

It is an end-to-end networking architecture that solves legacy network challenges by delivering the scale, security, and manageability needed for cloud-based, videocentric, mobile applications.

Legacy networks, built on proprietary technology, were not designed to handle the rapid pace of change of today's enterprise applications. The recent shift to rich-media collaboration, mobile access, and the rapid adoption of cloud services has put unprecedented pressure on legacy enterprise networks. The HP FlexNetwork architecture:

- ✔ Is based on open-standards and is certified to operate in heterogeneous environments.
- ✔ Enables scale in two dimensions: features and performance.
- ✔ Offers a common operating experience to network administrators.
- ✔ Is secured by industry-leading TippingPoint solutions.
- ✔ Delivers agility with advanced 1- and 2-tier architectures and SOA-based network management.

By the numbers:

- ✔ The A12500 switch series provides single-pane-of-glass management with twice the performance and 50 percent less power usage versus comparable offerings.
- ✔ Intelligent Resilient Framework (IRF) is a powerful switch virtualization technology software that allows you to reduce the number of tiers in the network and enhance network availability at a lower cost.
- ✔ HP TippingPoint is a leading global provider of comprehensive network security solutions blocking twice as many attacks versus competitive offerings.

Advanced software

HP Matrix Operating Environment is the common management platform that manages and orchestrates Converged Infrastructure configurations and operation. It provisions and adapts infrastructure on the fly.

The operating environment for each application is defined in a service catalog. Administrators can deploy or change the entire infrastructure for an application in minutes instead of months. Built-in policies automatically initiate high-availability and disaster-recovery configurations when required. Changes not only happen faster, but they are more predictable and repeatable.

Matrix Operating Environment manages servers, storage, network connections, and facilities resources. It unifies the tools for infrastructure life cycle management into one command center. And it makes deployment of new applications easy and quick.

Plus, with HP Insight Control you get a single, integrated management solution for both physical and virtual servers. Insight Control uses a central management console, HP Systems Insight Manager, providing a comprehensive and intuitive interface for running an entire set of infrastructure management tasks. HP Insight Control also offers the flexibility to integrate seamlessly into Microsoft System Center and VMware vCenter environments if your IT environment has already standardized on those management platforms.

Power and cooling

HP Data Center Smart Grid creates an intelligent, energy-aware environment across IT and facilities. This reduces energy use and automates data center energy management. Management tools monitor energy consumption and heat dissipation, so workloads can be balanced across energy zones.

Data Center Smart Grid is a core component of a Converged Infrastructure, enabled by the latest technology from HP. HP ProLiant G6 and G7 servers, for example, have a “sea of sensors” built into the cabinet. They detect when power is being wasted and dynamically adjust components to save power. They also communicate with HP Data Center Smart Grid to alert administrators when changes should be made to power and cooling facilities.

Chapter 6

How HP Can Help

In This Chapter

- ▶ Finding HP tools and workshops that help you move forward with confidence
 - ▶ Getting HP to help kick-start your cloud journey
 - ▶ Finding HP services that help you transform or evolve at your own pace
 - ▶ Examining HP programs for customers and partners
-

One single convergence solution to meet every need doesn't exist. In fact, most enterprises will deploy a mix of solutions to meet their varying needs and requirements. And with the era of convergence forcing everyone to move fast, HP has made sure to also provide a collection of practical ways to help you get started on the right path. The important thing is that whichever method you choose, they are all designed to move you forward on your convergence journey in the safest, fastest, and most practical manner possible.

HP Tools and Workshops

To help you make well-informed decisions, you can leverage HP's Converged Infrastructure Reference Architecture Design Guide and Maturity Model to create custom configurations for your specific needs.

Reference Architecture Design Guide

The HP Converged Infrastructure Reference Architecture Design Guide discusses the data center principles and foundational pillars to build an HP Converged Infrastructure Core Architecture — upon which the various hypervisors and applications get deployed. With this Core Architecture as the foundation, HP Converged Infrastructure Reference Solutions leverage the common, modular infrastructure and describe specific solutions at a functional architecture level. Currently, HP Reference Solutions include architectural blueprints for virtualization, applications (for instance ERP, messaging, collaboration), and cloud.

In addition, HP Converged Infrastructure Reference Configurations (developed by HP Enterprise and Midmarket Solution Architects based on real-life deployments) provide deployable configurations and product mappings that make up the actual solution. Learn more at www.hp.com/go/ci-ra.

HP Converged Infrastructure Maturity Model

If you're uncertain of how best to move forward with the many decisions you have to make around cloud, on-premise, and hybrid solutions, you may want to first understand the current state of your IT environment, look at your goals, and examine your IT organizational structure, roles, and work environments. Once you have a clear picture of the current state, it'll be a lot easier to determine what needs to change in order to effectively manage your new architecture. HP helps enterprises examine these considerations with the HP Converged Infrastructure Maturity Model (CI-MM).



HP CI-MM is an assessment tool and process for large and small enterprises that delivers a step-by-step, customized road map to help you reach your desired Converged Infrastructure state. It all starts with the existing environment and provides a plan that prioritizes IT investments based on your business objectives.

HP facts

HP has over 11,000 Enterprise server, storage, and network engineers; over 4,600 HP AllianceONE partners; 6,000 high-availability experts; 16,000 Microsoft-trained professionals; 5,000 network infrastructure and

voice professionals; an installed base of over 1,000,000 customers; customers in 90 percent+ of the Fortune 100; and available support 24x7, 365 days per year, covering 24 time zones in over 30 languages and 170 countries

The HP CI-MM is led by HP or HP channel partner services professionals and includes gathering and reviewing data about your current IT organization and business goals. HP provides you with:

- ✔ An in-depth analysis of the steps your organization can take to become a converged infrastructure.
- ✔ A half-day workshop to discuss the results and priorities for your IT organization.
- ✔ A pragmatic, action-oriented set of specific recommendations.
- ✔ A high-level, proposed step-by-step suggested road map to help you move toward a converged infrastructure.

HP CI-MM uses a broad set of real-world metrics. These are based on research data from more than 1,500 companies and industry best practices for aligning IT with business goals. The metrics focus on operational efficiency, quality of service, and IT agility. HP evaluates your IT organization's current state across four domains:

- ✔ **Technology and architecture:** HP CI-MM considers both HP and non-HP hardware, software, network, and infrastructure applications. Maturity in this domain ranges from dedicated IT resources to cost-effective, pooled, shared, and automated resources.
- ✔ **Management tools and processes:** HP examines the existing resources you have available to plan, manage, and improve infrastructure service delivery.

- ✔ **Culture and IT staff:** HP measures your IT organizational structure, roles, responsibilities, and work environments.
- ✔ **Demand, supply, and IT governance:** HP measures your business's demand for infrastructure services and how they are delivered by your IT organization.

Across these four domains, CI-MM gathers information that helps HP analyze your infrastructure's current and desired state against five stages of maturity:

- ✔ **Stage 1: Compartmentalized (least mature):** IT is dedicated to individual projects using ad hoc management tools and processes. IT is regarded as a cost center.
- ✔ **Stage 2: Standardized:** Technologies and architectures are standardized, allowing for easier management and lower costs.
- ✔ **Stage 3: Optimized:** Technologies, architectures, and management are virtualized and rationalized across functional IT infrastructure expert teams.
- ✔ **Stage 4: Automated/Service-Oriented:** IT is offered as a service, with tiered service levels supported by service-centric integrated IT processes.
- ✔ **Stage 5: Adaptively sourced infrastructure (most mature):** IT is automated and reallocated based on business process needs. IT is a trusted partner for business innovation.

As you progress through the different stages — from assessing your readiness to implementation and beyond — HP offers consulting, training, and outsourcing services around HP Converged Infrastructure. Find out more about the topic at www.hp.com/go/CIMM.

Converged Infrastructure Transformation Experience workshop

The HP Converged Infrastructure Transformation Experience Workshop is a unique, slide-free, and practical simulated walk-through that highlights benefits and critical success factors

for effective transformation by using a highly visual and interactive process. The workshop takes you through a series of key topics that include today's challenges, your converged infrastructure vision, more about shared resources and connectivity, and other key areas that include energy and sustainability, service management, and security.

This workshop is also great to gain stakeholder buy-in, to begin to build a next-generation infrastructure strategy supporting business's needs, and to give traction to your transformation projects, helping you to:

- ✔ Realize the scope, scale, and all critical success factors using converged infrastructure architecture strategy for your next-generation infrastructure project.
- ✔ Identify quick wins that generate momentum while exploring the data center and IT infrastructure of the future.
- ✔ Gain stakeholder buy-in and give more traction to any existing IT or infrastructure convergence project including consolidation, virtualization, migration, and modernization.
- ✔ Leverage best practices in consolidation, virtualization, automation, and operations.
- ✔ Lay out your next steps in a road map.

Kick-Start Your Cloud Journey with HP

The choice to implement a cloud computing solution is different for every organization. There are many considerations that need to be taken into account such as security, delivery models, cloud services, technologies, and cost in order to provide the best return on investment. To help you, HP has a variety of tools and services at your disposal:

- ✔ **HP Cloud Discovery Workshop:** Demystify and simplify the complex world of cloud with strategies and explanations of the possibilities, risks, and business implications. This workshop helps organizations quickly get stakeholder buy-in and make decisions about cloud opportunities while getting everyone on the same page and to the same level of understanding.

- ✔ **HP CloudStart:** With the HP CloudStart service, you won't have to wait — you can get cloud services for a fixed, affordable price and have them up and running in less than 30 days after HP CloudSystem Matrix installation. As a result, you can:
 - Request a compute service from a number of predefined choices and prices
 - Have the service provisioned immediately from a portal
 - Scale or cancel the service easily
 - Use the service and not worry about security, management, upgrade, and more
 - Receive a regular report on service consumption
- ✔ **HP Cloud Maps:** HP Cloud Maps are predefined templates for popular business applications from leaders like Microsoft, Red Hat, SAS, IBM Software, SAP, and Oracle. Cloud Maps can save weeks of development time to quickly get your key applications up and running in the cloud — which all equates to freeing your IT team for other tasks. Although Cloud Maps provide a high degree of automation, your staff still maintains full control over resource allocations and catalog deployments.
- ✔ **HP Cloud Consulting Services:** Getting the most out of cloud computing isn't always a simple exercise. All services aren't created equal and as such each has its own requirements around performance, security, control, and availability. It requires that you weigh cloud against traditional delivery models and select the best method of service delivery to get what you need, at the right cost and at the right time. HP helps you understand all aspects of the cloud models, align your business and IT teams, develop a tactical road map, and facilitate your progression from traditional models to fast-track cloud implementations with packaged solutions.
- ✔ **Enterprise Cloud Services:** HP Enterprise Cloud Services provide server, storage, network, and security bundles you consume as a service. You pay only for the resources you use — nothing more. You adjust IT capacity as rapidly as your business requires. You run your applications and processes while accessing them over a network that's managed to HP security standards.

HP Services That Help You at Your Own Pace

Beyond the cloud services described in the previous section, HP Services can help you balance IT efficiency, innovation, and modernization as you reconcile the best convergence approach and position your organization to meet market and operational pressures. HP provides the expert knowledge, proven methodologies, comprehensive financing options, and global resources to improve the way you work — starting within your current IT environment to meet today's challenges without lost investment or extensive retooling as you move into the future.

HP Services has more than four decades of experience in managing IT change, which gives them a firm foundation to transform IT environments for the future. They know legacy systems and their complex environments. Plus, HP Services has the framework, processes, and resources to design modernization programs and individual integration projects. They understand how new modernized applications and infrastructures should perform and be managed based on the HP Converged Infrastructure design principles.

Outsourcing Approach

Business growth comes from a relentless focus on customers and business innovation — and IT must do its part. When it comes to the IT infrastructure that makes the business run, that means three things: shifting spending from operations to innovation, enabling agility, and managing risk. HP Infrastructure Technology Outsourcing services help you do just that — shift people costs from operations to more value-added tasks. They bring expertise, automation and a delivery model to drive down costs. They provide flexible, adaptive technology and multiple sourcing options to help you respond to changing business demands. They enable compliance, security, and business continuity to reduce risk. And when you need to move quickly on new initiatives, they back you up with a team of experts and technology partnerships.

HP already helps thousands of clients in more than a hundred countries achieve better business outcomes and deliver more IT value through its comprehensive portfolio of innovative services.

Financial Services

For many organizations, the ability to accelerate and cost-effectively deploy a converged infrastructure should start with a deeper look at financing and leasing options.

HP offers a full portfolio of financial services to accelerate your move to a converged infrastructure safely and cost-effectively. HP Financial Services has helped thousands of businesses quickly transition from existing technology, acquire new solutions, manage those solutions throughout their life cycle, and retire technology at the end of its useful life.



For example, asset recovery services make it easy for you to safely dispose of old, unneeded IT equipment. Buy-back, leasing, and financing can help you expand the reach and impact of your technology budget. You'll benefit from predictable monthly payments; plus, leasing helps minimize the risk associated with disposal of obsolete equipment. And with HP's technology refresh options, the right equipment is within your reach when you need it.

Besides the benefits of better managing your expenses, you're able to better drive green IT benefits and help your business meet its sustainability requirements.

Programs for Customers and Partners

HP offers a cohesive set of programs for its customers and partners to ensure their convergence journey and on-going value is optimized.

HP ExpertONE

As converged infrastructure solutions become more prevalent, and as technologies designed for convergence get refreshed, any reputable technology provider will provide skills, technical training, and certification to help the core functional domain experts evolve and succeed. HP ExpertONE has been built with all this in mind. The program enables you to gain the valuable skills you need to integrate servers, storage, and networks into open, common platforms and build the data center of the future. Whether you're a technical veteran or a relative newcomer, whether your goal is career advancement, career change, or simply a better salary, HP ExpertONE training and certification seeks to offer the best path to help you reach your goal.

HP AllianceONE

For HP partners, the HP AllianceONE Partner Program helps in more ways than ever before: supporting technical development and delivery of solutions across a wide array of specializations including the cloud, business intelligence, management, security, hosting, storage management, networking, and more. ISVs, IHVs, OEMs, service providers, and systems integrators work with HP to deliver innovative solutions that meet real customer needs today and readily evolve to meet the challenges of tomorrow. The HP AllianceONE Program makes it easy by offering joint marketing, development tools, remote testing and technical benefits, partner support agents, and business planning tools.

HP PartnerONE

In the United States, HP PartnerONE is the award-winning flagship partner program through which HP manages various partner resources and offers initiatives for its reseller and distributor partners. HP PartnerONE includes three levels of membership based on partners' levels of participation and engagement with HP:

- ✓ **Business Partner:** Provides basic partner benefits including promotions, HP financing, support, and training.
- ✓ **Preferred Partner:** Includes all the HP Business Partner benefits as well as access to sales rebates and other financial benefits, marketing support, special growth incentives, and more.
- ✓ **Elite Partner (HP Converged Infrastructure Elite):** Includes all the HP Preferred Partner benefits as well as dedicated channel sales support, enhanced HP end-user-focused marketing support, priority leads, partner locator support, strong rebates, and up-front benefits.

HP ServiceONE

HP ServiceONE is a new specialization within the industry-leading HP PartnerONE program that enables partners to significantly expand their technology services portfolio with HP. In addition, partners can take advantage of HP's redesigned metrics and rewards to further increase revenue opportunities and reduce risk.

Part II

The Part of Tens

The 5th Wave

By Rich Tennant



“We’re still working out the kinks in our cloud computing environment.”

In this part . . .

If you want to know some reasons to embrace convergence or how to converge with ease, this is the part for you. We also cover some HP customer case studies and HP Resources in the appendixes.

Chapter 7

Eight Reasons You Should Embrace the Era of Convergence

In This Chapter

- ▶ Moving faster
 - ▶ Using technology wisely
-

The era of convergence is here to stay, like it or not. And honestly, you should like it. It allows you to operate more nimbly and reliably with fewer resources. Who doesn't like that?

Accelerate IT for Better Business Results

Convergence accelerates innovation by shifting IT spending and resources away from operations (through standardization, virtualization, and automation of IT) and doubling your resources focused on innovation. Convergence accelerates ROI by increasing utilization, leveraging your existing investments, and reducing energy costs. And convergence accelerates your path to the cloud whenever you're ready by leveraging the shared services model and self-service catalog of a converged infrastructure to meet the expectation that services will be available anytime, anywhere.

Use Your Budget More Effectively

Siloed, inflexible, and costly architectures caused by IT and application sprawl have forced most of the IT budget to be used for mere maintenance and operations, not on innovation where the business needs it. The gap is widening between what the business demands and what IT can deliver.

Be Flexible, Secure, and Competitive

Only a flexible and agile IT infrastructure can meet the ever-broadening requirements to run businesses efficiently, effectively, and securely. These requirements drive new products and services, productivity enhancements, and new ways to approach customers and citizens. This type of flexibility and agility lets you redeploy resources at will to meet changes in market demand — the difference between missing a major opportunity or leaping ahead of the pack.

Simplify, Integrate, and Automate to Minimize Downtime

A shared-services, converged IT environment can deliver a whole new level of simplicity, integration, and automation for your mission-critical environment. Only then can the infrastructure react in real-time to the changing needs of the business with a simplified disaster recovery process that reduces downtime to seconds.

Redirect Wasted Energy

On average, data centers generate 60 percent more power than they need. What if you could redirect wasted energy to the bottom line and save your business money? And what if you knew your actual power usage so you can deliver the most IT per watt and space?

Deal with Big Data

In 2005, mankind created 150 exabytes of digital data. In 2010, it created eight times more. How will your business turn big data into big profits or big savings or big insight?

Deal with Disruption

Out of extreme market conditions, disruptive business models have emerged, forcing every competitor to find a new way to win and pressuring every organization to find a new way to serve its constituents.

Turn Technology into an Advantage

Tomorrow's leaders will be those organizations that capitalize on technology rather than become paralyzed by it. They will interact with customers, constituents, employees, and partners more quickly, and with greater personalization.

Chapter 8

Five Ways to Converge with Ease

In This Chapter

- ▶ Avoiding the rush
 - ▶ Looking deeper
-

Although a converged infrastructure will ultimately make your life easier, getting there can sometimes be a bit of a challenge. Follow these key steps to get there with ease.

Don't Rush

Sometimes, to be able to go fast begins by starting slow. Take the time to identify the root cause of your innovation gridlock and prioritize your projects that attack the top opportunities first. Take the time to build out your shared services road map, which will help profile the ideal projects and logical starting points.

Leverage Where You Can

Make sure to define projects and leverage processes and best practices that either build upon what you already have or evaluate alternatives for greenfield initiatives where the shared service model best serves the business. Get a quick win and build upon it.

Don't Forget Other Options

Think about creating self-funding projects though financing options that allow transformation within your current budgets. Or take full advantage of proof of concept (POC) programs offered by your technology provider.

Be Informed

Take advantage of assessment tools, digital media, and customer reference information to help you identify best-fit convergence opportunities and a training path to build expertise.

Look Deeper

Use vendors with proven solutions that can help architect solutions you can change quickly and easily — adding new functionality as needed. Make sure today's innovation doesn't become tomorrow's legacy.

Appendix A

HP Customer Case Studies

.....

In This Appendix

- ▶ Continental Airlines
 - ▶ McKesson Corporation
 - ▶ Steelcase
 - ▶ Gruppo Mediaset
 - ▶ Hostworks
-

A converged infrastructure allows you to make the most efficient use of IT, facility, and staff resources, but there isn't one size that fits all. Every organization has unique and varying requirements. To illustrate this point, in this appendix we have provided a few customer examples to highlight both customers that have gained convergence value through smaller technology building block projects and a few who have deployed turnkey converged systems.

Continental Airlines

Continental Airlines is about to become part of the world's largest airline when its merger with United is completed. With more than 42,000 employees operating 2,600 daily departures throughout the Americas, Europe, and Asia, Continental carries approximately 63 million passengers per year and consistently earns awards and critical acclaim for its operations and corporate culture.

Continental was looking to extend the life of its existing data center and increase compute capacity. It chose to standardize on HP Converged Infrastructure-based technologies,

including HP BladeSystem and Microsoft Windows Server 2008 R2 with Hyper-V to maximize CPU utilization and reduce the number of physical servers required. With virtualization on HP BladeSystem, Continental can react to change faster. For example, if Continental is offering a special and there is a spike in demand, it can quickly and easily add capacity without purchasing anything. Plus, it has the flexibility to perform maintenance without downtime and begin projects that wouldn't otherwise have the funding to start.

IT improvements

IT improvements at Continental have resulted in the following benefits:

- ✔ An average ten-fold improvement in CPU utilization (50 percent versus 5 percent), improving utilization of assets
- ✔ An 18-fold faster server deployment (20 minutes virtual versus 6 hours physical) for faster implementation of enhancements
- ✔ A 65 percent decrease in time to value on new projects for faster ROI

Business benefits

HP projects the following business benefits:

- ✔ Projected \$6 million to \$10 million in cost avoidance by lengthening the life of the current data center
- ✔ Projected 50 percent lower licensing costs using Hyper-V rather than VMware
- ✔ Potential \$420,000 annual savings in switch operational costs due to HP Virtual Connect
- ✔ Significant reduction in operating costs projected for Fibre Channel over Ethernet due to HP Virtual Connect
- ✔ Decrease in the window for planned monthly downtime

Customer quote

“HP’s entire BladeSystem portfolio forms the backbone of our systems infrastructure. From our smallest airports to our largest data centers, HP provides an interchangeable set

of components that lower operating costs and increase agility,”

—Eric Craig, managing director of global infrastructure for Continental Airlines.

McKesson Corporation

McKesson Corporation, currently ranked 15th on the *Fortune 500*, is a healthcare services and information technology company dedicated to helping its customers deliver high-quality healthcare by reducing costs, streamlining processes, and improving the quality and safety of patient care. Part of the McKesson Corporation, McKesson Provider Technologies is the industry’s leading source of healthcare IT software, automation services, and consulting to hospitals, physician offices, imaging centers, and home healthcare agencies.

As the largest healthcare company in the nation, McKesson’s solutions are used in more than 70 percent of the hospitals in the United States with more than 200 beds. McKesson’s mission is to help transform the healthcare industry into a modern, efficient, quality-driven system. In 2009, the company decided to do the same for its own development infrastructure. McKesson IT must develop new products and new versions quickly and efficiently to stay ahead of the competition while maintaining extremely high quality standards. A bug in a production release of a healthcare information system could have far-reaching, even tragic consequences in the field and would be extremely damaging to the company’s reputation.

Their objective was to reset development environments faster and reduce physical server count while providing more resources to developers. Their approach was to move from traditional rack-mount server infrastructure to the HP CloudSystem Matrix integrated solution as part of the HP Converged Infrastructure portfolio.

Customer quote

“HP CloudSystem Matrix with Insight Dynamics is a great platform for delivering shared services. My team can easily find the information they need to make faster, more informed decisions. It is a valuable tool for

delivering consistent, repeatable services to our customers.”

—Merritte Stidston, Director, Development Center Strategy & Operations, McKesson Corp.

IT improvements

IT improvements at McKesson have resulted in the following benefits:

- ✔ 84-fold faster provisioning of development environments (40 minutes versus 7 days)
- ✔ 42 percent reduction in physical server count (700 down from 1,200)
- ✔ 67 percent less management time required (2 engineers versus 6)

Business benefits

HP estimates the following business benefits:

- ✔ Enhanced productivity by doubling the number of development environments
- ✔ Eliminated wait time for development servers
- ✔ Projected TCO savings in the millions
- ✔ Six-figure savings on cabling with HP Virtual Connect

Steelcase

Steelcase, Inc., is a global leader in the office furniture industry (headquartered in Grand Rapids, Michigan). Steelcase is known for innovation — and insight into the way people work. Innovation is at work in the company’s products — like its

Think chair, which instinctively flexes to the slightest body movement and the sitter's weight. Steelcase built its reputation on offering flexible, rock-solid furniture.

Flexibility is also important in the company's IT infrastructure, as are resilience and reliability. That's because the infrastructure links more than 50 manufacturing facilities, 650 independent dealers, and approximately 13,000 employees worldwide. Their HP Converged Infrastructure objective was to boost compute power for an expanding SAP environment, while reducing costs year-over-year.

IT improvements

IT improvements have resulted in the following benefits:

- ✓ Performance boost of 25 percent for mission-critical applications, supporting business and application growth
- ✓ 45 percent increase in utilization of computing resources
- ✓ Quick provisioning and service continuity through HP Matrix Operating Environment, enabling efficient response to business/application needs
- ✓ Easier IT maintenance facilitated through consolidated resources and virtualization

Business benefits

HP projects the following business benefits:

- ✓ 40 percent lower costs, including fewer Oracle software licenses and streamlined support
- ✓ Cost reduction by sharing the server blade infrastructure between x86 and UNIX environments
- ✓ Improved user productivity, as a result of 99.99 percent scheduled uptime and one-second average response times for 85 percent of SAP transactions
- ✓ Investment protection of legacy applications using HP ARIES Translator
- ✓ Ability to manage business growth by providing a flexible infrastructure and new SAP modules and tools in a timely manner

Customer quote

“The advent of HP Integrity server blades and the enclosures gave us a place to move some applications from the Superdome to a better price point, but still retain the mission-critical availability and performance

features we need. As a result, we’ve been able to drive down our costs year-upon-year.”

—Jon Tanner, manager, server engineering, Steelcase, Inc.

Gruppo Mediaset

Gruppo Mediaset, with headquarters in Milan, Italy, is the largest commercial broadcaster in the country. It has 5,800 employees and offers about 40 digital terrestrial channels to viewers throughout Italy. Mediaset also recently acquired TeleCinco to become a leading media company in Spain. Mediaset migrated to HP Converged Infrastructure–based technologies that allowed them to reduce server costs by 50 percent while adding 1.9 million Pay-TV customers. More importantly, they are able to turn on new IT services in minutes.

Their objective is to deliver IT services and private clouds faster to support innovation in competitive media business. The approach they took was to evaluate virtualized x86-based platform against current power-based UNIX platform testing mission-critical applications, to compare price, performance, time to value, and reliability.

IT improvements

IT improvements at Gruppo have resulted in the following benefits:

- ✔ 30 percent reduction in network switches, cards, and cables
- ✔ Minutes instead of days for new service installation
- ✔ 95 percent reduction in recovery time objective (two hours instead of days or weeks)
- ✔ Sixfold jump in storage performance

Customer quote

“Add up the operational, hardware, and support savings, and we expect to achieve 100 percent payback within six months.”

“HP Virtual Connect has reduced the switches, cards, and cables by 30

percent. One person can substitute a new server blade in a minute without downtime. In the old environment, a change could take days.”

—Christiano Fumagalli, Enterprise Architect, Gruppo Mediaset

Business benefits

HP estimates the following business improvements:

- ✔ 50 percent reduction in physical server costs
- ✔ 1.9 million viewers successfully accommodated for Mediaset Premium Pay-TV service
- ✔ 50 percent reduction in power consumption per physical server
- ✔ Fourfold faster SAP batch processing, freeing resources for more valuable uses
- ✔ 100 percent payback in six months

Hostworks

Hostworks is Australia’s market leader in complex web hosting, peak demand management, high transaction websites, and video streaming. Hostworks is renowned for its successful management of many of the most critical online and digital media environments for Australia’s leading companies including federal and state government departments, finance, retail, manufacturing, and service sectors.

Hostworks’ objective was to find a computing solution that was able to scale up and down quickly to support the elastic computer requirements of its clients. It conducted an extensive evaluation of solutions proposed by existing IT partners.

Three shortlisted solutions were analyzed against the following critical criteria: track record of deliverable solutions, technical fit to purpose, and commercial sizing of proposed solution. They chose HP Converged Infrastructure solutions.

IT improvements

IT improvements at Hostworks have resulted in the following benefits:

- ✔ HP CloudSystem Matrix provides the platform for an agile, scalable computer facility
- ✔ VMware solutions running on HP's Converged Infrastructure delivering the industry's most complete virtualization solution

Business benefits

HP estimates the following business benefits:

- ✔ Simpler and speedier delivery of new services to Hostworks' clients
- ✔ Hostworks is able to pass on genuine cost savings to clients
- ✔ Rapid provision of IT resources to meet with consumer demand

Customer quote

"As a result of embracing the cloud-style solution supplied by HP we are confident of meeting the demands, not only of our existing customer

base, but also new prospects with an enhanced level of service."

—Adrian Britton, Hostworks

Appendix B

HP Resources

Resources on Converged Infrastructure

- ✔ HP Converged Infrastructure: www.hp.com/go/ci
- ✔ HP Converged Systems: www.hp.com/go/convergedsystems
- ✔ HP Converged Infrastructure Demos on demand: www.hp.com/go/CIemos
- ✔ HP Converged Infrastructure Reference Architecture Solutions: www.hp.com/go/CI-RA
- ✔ HP Converged Infrastructure Maturity Model: www.hp.com/go/CIMM
- ✔ HP Datacenter Transformation: www.hp.com/go/DCT
- ✔ HP Services: www.hp.com/go/services

Other Important Resources

- ✔ HP VirtualSystem: www.hp.com/go/virtualseystem
- ✔ HP CloudSystem: www.hp.com/go/cloudsystem
- ✔ HP AppSystems: www.hp.com/go/appsystems
- ✔ HP BladeSystem: www.hp.com/go/bladeseystem
- ✔ HP Storage: www.hp.com/go/convergedstorage
- ✔ HP ProLiant: www.hp.com/go/proliant
- ✔ HP Mission-critical: www.hp.com/go/integrity

- ✔ HP Networking: www.hp.com/go/networking
- ✔ HP Security: www.hp.com/go/security
- ✔ HP Matrix Operating Environment: www.hp.com/go/insightdynamics
- ✔ HP ExpertONE: www.hp.com/go/expertone
- ✔ HP AllianceONE: www.hp.com/go/allianceone

ACCELERATE

IT for Better Business Results

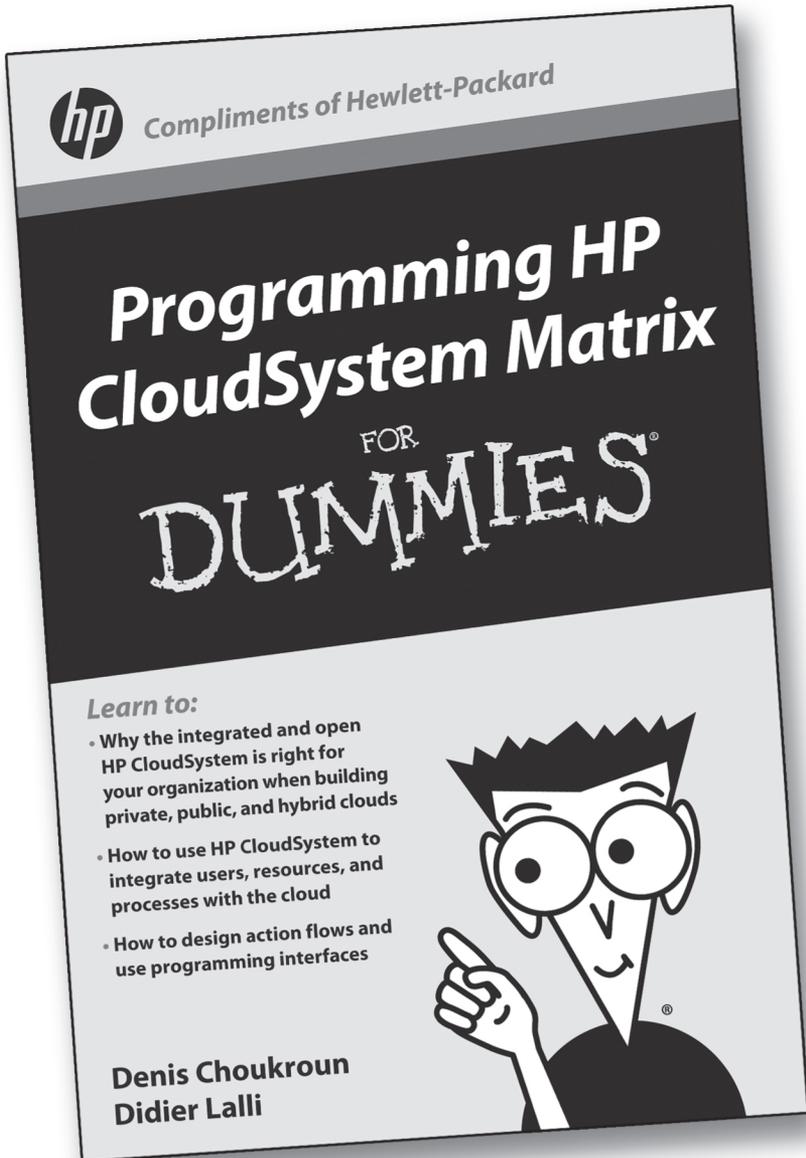


hp.com/go/CI

These materials are the copyright of John Wiley & Sons, Inc. and any dissemination, distribution, or unauthorized use is strictly prohibited.



Accelerate cloud adoption by simplifying integration with HP CloudSystem



Accelerate IT with the power of convergence!

To compete in this instant age, organizations need an IT infrastructure that enables agile and rapid service delivery. They expect their IT organization to deliver applications and services that are fast, always available, scalable, and interoperable while driving out costs. This helpful book explains how you can use infrastructure convergence to do exactly that.

- **An evolving era of IT** — find out how the data center and IT in general are evolving to address the new challenges of doing business in today's world
- **Infrastructure convergence basics** — what you need to know about convergence and shared services, the benefits and business value, how cloud computing fits in, and some considerations when seeking out solutions from technology providers
- **Working with infrastructure convergence** — how infrastructure convergence impacts various roles and responsibilities in and around IT
- **The inner-workings of a Converged Infrastructure** — discover the underlying principles and foundational architecture of how a converged infrastructure works, and how businesses are affected by the era of convergence
- **Finding a solution** — get started down the path of a Converged Infrastructure with solutions that help you transform fast or evolve at your own pace
- **Looking at HP** — get to know various tools and workshops that help you move forward quickly, ways to kick-start your cloud journey now, and other helpful services and programs



Open the book and find:

- How the data center is evolving
- Reasons you should embrace convergence
- How to converge with ease
- Information about HP tools and workshops
- Insights from HP customer case studies

Making Everything Easier!™

Go to [Dummies.com](https://www.dummies.com)
for videos, step-by-step examples,
how-to articles, or to shop!

For Dummies®
A Branded Imprint of



ISBN: 978-1-118-17163-9
Client Tracking Number: 4AA3-7077ENW
Not for resale