

IBM Midsize Company Limited Edition

DUMMES

R

Learn to:

- Make the cloud a vital enabler of your business
- Accelerate smart and proactive decisions
- Support collaboration between business and IT
- Develop a roadmap for planning your cloud journey

Judith Hurwitz Marcia Kaufman Fern Halper



by Judith Hurwitz, Marcia Kaufman, and Fern Halper



Cloud For Dummies[®], IBM Midsize Company Limited Edition

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

Copyright © 2012 by John Wiley & Sons, Inc.

Published by John Wiley & Sons, Inc., Hoboken, NJ

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. 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 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 *For Dummies* brand for products or services, contact BrandedRights&Licenses@Wiley.com.

ISBN: 978-1-118-15475-5

Manufactured in the United States of America

 $10\ 9\ 8\ 7\ 6\ 5\ 4\ 3\ 2\ 1$



Table of Contents

. . .

....

Cha	apter 1: Adding Cloud Computing Value to Midsize Companies	
	Defining Cloud Computing Seeking Out Business Benefits for Midsize Companies Impacting Your Industry Looking at the Technical Benefits of the Cloud	••••
Cha	apter 2: Fundamentals of the Cloud	
	Defining the Three Cloud Models Understanding Infrastructure, Platform, Process, and Software as a Service Going over the Ins and Outs of Virtualization Knowing When Not to Use the Cloud	· · · · · · · ·
Cha	apter 3: Cloud Economics	
	Comparing Onsite Server Environments with Cloud-Based Models Dealing with Labor Costs and Productivity Impacting Business Transformation	
Cha	apter 4: Making the Cloud Practical	
	Selecting Workloads to Move to the Cloud Dealing with Integration Issues Requirements for Cloud Integration Talking to Your Cloud Provider	· · · · · · · ·
Cha	apter 5: Security and Cloud	
	Security as a Public Cloud Service Understanding Security Risks Managing and Protecting Your Data Monitoring and Performance Sharing the Governance Responsibility	
Cha	apter 6: Starting Your Cloud Journey	
	Cloud Computing as Your Business Strategy Determining Your Priorities Developing Your Cloud Strategy Measuring and Assessing Risks Leveraging Best Practices	••••

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.

nator: Kristie Rees

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

Acquisitions, Editorial, and	Composition Services Sr. Project Coordinator: Kristie R Layout and Graphics: Carl Byers, Lavonne Roberts Proofreader: Rebecca Denoncour	
Media Development		
Project Editor: Carrie A. Burchfield		
Editorial Manager: Rev Mengle		
Business Development Representative: Sue Blessing		
Custom Publishing Project Specialist: Michael Sullivan		
Publishing and Editorial for Technology I	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

About the Authors

Judith Hurwitz is a technology strategist, author, and thought leader and President of Hurwitz & Associates, a business technology consulting and research firm focused on the business benefits from technology investments. Marcia Kaufman, founding partner and COO of Hurwitz & Associates, has 20+ years in business strategy and industry research, working extensively in the financial services industry. Dr. Fern Halper, a partner at Hurwitz & Associates, has over 20 years of experience in data analysis, business and predictive analytics, enterprise computing, and strategy development. Together, Judith, Marcia, and Fern are coauthors of numerous For Dummies books.

IBM Acknowledgments

We would like to thank the following people from the IBM Corporation for their help and support: Judith Tracy, Mitzie Riedel, Robin Barla, Alan Dickinson, Tim Kounadis, Ted Lewis, Michelle Wells, Michele Payne, Terri Hutcherson, Stephanie Stack, and Julia Means.

Introduction

Welcome to *Cloud For Dummies*, IBM Midsize Company Limited Edition. Cloud computing offers enormous benefits to companies in the midmarket. Midsize companies can leverage the flexibility of cloud computing to effectively compete against much larger competitors. By being able to leverage sophisticated business services without capital investments, midsize companies can innovate and experiment with new business models, new partnerships, and new ways of building customer intimacy. No matter what size your company is, you simply can't afford to continue with business as usual. Your company needs the flexible, elastic, and selfservice computing resources to support business change.

Midsize companies need to understand how cloud computing is valuable to many different constituents within their organization. Business leaders are partnering with IT to leverage new and emerging best practices offered by cloud computing providers. Through the use of cloud computing, even a small IT team can become a leading contributor to the business by helping make the company more responsive and proactive in the marketplace. The benefit of cloud computing for IT leaders is that it actually is an invitation to the boardroom for the IT manager who learns how to leverage the cloud to enable the business to be more flexible and responsive to client needs and new market opportunities.

Of course, as in any business initiative, one size doesn't fit all. There are situations when it is more appropriate to manage IT resources internally. However, in many situations, cloud services provide the economies of scale that a midsize business couldn't achieve on its own.

This book gives midsize companies some insights into what it means to create flexible pools of computing resources that break down silos in your company so you can perform in a smart and proactive manner.

About This Book

Much confusion is circulating in the market about how cloud computing can effectively and safely transform businesses of all sizes. Well-designed cloud computing services ranging from e-mail to collaboration and analytics can become a powerful business tool. Many companies want to be able to have pools of computing resources based on a self-service model so they can grab important opportunities without lengthy implementation cycles. This book helps put this model of computing into perspective for both the business and technical leaders.

Foolish Assumptions

This book is useful to many people, but we have to admit that we did pick a segment of the world to focus on for *Cloud For Dummies*, IBM Midsize Company Limited Edition.

Here's who we think you are:

- ✓ You're already using some forms of cloud computing and are planning a long-term strategy. Perhaps we're preaching to the choir. You understand that the benefits of using all kinds of flexible cloud computing models is your secret weapon against less agile competitors.
- ✓ You're a business person who wants IT resources to be a utility that's optimized to leverage what you've already paid for. You want IT to serve your business needs you want to be able to execute your strategy on your timetable. You want IT to be your partner in innovating for the future.
- ✓ You're an IT leader who knows a lot about technology but aren't sure precisely how cloud computing works. You want to understand both the benefits and risks. You need to understand how cloud computing changes IT and what you need to do to support the business with cloud computing as an important enabler.

How This Book Is Organized

This book isn't intended to be an exhaustive technical manual on implementing and managing cloud computing. Instead, we give you a taste of the concepts and approaches you need to consider when embarking on your journey to cloud computing.

We've organized this book into six chapters:

- Chapter 1 gives you an overview of why cloud computing makes sense for midmarket companies. We examine both the business and technical benefits.
- Chapter 2 provides you with an understanding of the technical foundation for cloud computing, including a discussion of Infrastructure as a Service, Platform as a Service, Process as a Service, and virtualization.
- Chapter 3 delves into the economics of cloud computing. What will it mean in terms of what you will spend and what you won't have to spend to gain value?
- Chapter 4 gets practical explaining what it means to manage workloads in the cloud and to provide your customers with the right level of service.
- Chapter 5 tackles the important issue of security and governance. How can Cloud actually make your company much more secure than it is today? How can you manage expectations for security and accountability?
- Chapter 6 gives you a road map for planning your journey to the cloud as a midsize company.

Icons Used in This Book

The following icons are used to point out important information throughout the book:



Tips help identify information that needs special attention.

Pay attention to these common pitfalls of managing your private cloud.

4 Cloud For Dummies, IBM Midsize Company Limited Edition _____



This icon highlights important information that you should remember.

This icon contains tidbits for the more technically inclined.

Chapter 1

Adding Cloud Computing Value to Midsize Companies

In This Chapter

- Understanding cloud computing
- Finding out the business benefits for midsize companies
- ▶ Feeling the impact of cloud for your industry
- Knowing the technical benefits of cloud computing

Cloud computing is emerging as one of the most important transformational trends in business and computing of the decade. While this may sound like a bold statement, we believe that cloud computing allows midsize businesses to compete on an even playing field with companies that are ten times their size. Think about it this way: A really big company's strategic advantage is that it has the financial resources to add new capabilities, add new product lines, and reach new markets quickly. It also has a critical mass of skills in key IT areas. The typical midsize business often has to play catch up. However, cloud computing changes the playing field and turns the competitive environment on its head.

In this chapter, we provide an overview of what cloud computing is and how it allows midsize businesses to have the agility, flexibility, and innovation to take on much larger companies without massive capital expenditure.

Defining Cloud Computing

Cloud computing is a method of providing a set of shared computing resources that include applications, computing, storage, networking, development and deployment platforms, and business process. Cloud computing turns traditionally siloed computing assets into a shared pool of resources that are based on an underlying Internet foundation. Cloud computing makes these resources easier to use by supporting a selfservice model so resources can be acquired or provisioned based on need or assigned business rules. At the same time, a business can use just the resources it needs to complete a task. After that task is completed, those resources can be returned to the pool.

Equally important is that the cloud provides a new economic model of computing. Instead of purchasing, managing, and maintaining a server environment, a business is able to purchase computing on a situational basis, avoiding capital expenditures. If a company has already invested in an internal computing environment that best serves the needs of the business, portions of that environment can be transformed into a private cloud environment with the same self-service and service management characteristics as a public cloud service. In both cases, the cloud provides elasticity that allows the pool of resources to expand or contract based on need. (See the section "Looking at the Technical Benefits of the Cloud" for more information on elasticity.)

Most businesses today are already using some kind of cloud service even if they don't realize it. For example, any company that uses ADP for payroll services is using a cloud-based service. A company may use online data backup or storage services that live in the cloud. If employees in your company use Google's e-mail or LotusLive, they're using cloud computing. Many companies find it very cost effective to use CRM systems to support their sales and marketing efforts. Products like Salesforce.com and SugarCRM are becoming commonplace in many medium-sized companies. In addition, companies are increasingly relying on compute cloud services to provide them with occasionally needed resources instead of buying extra systems for peak service requirements (for example, major holidays or new service offerings).

Seeking Out Business Benefits for Midsize Companies

One of the challenges for midsize companies is the need to remain competitive. Often large multi-national companies will try to expand into new market segments that can threaten the midsize company's traditional customer base. To continue to be competitive, midsize companies have to offer new business services that allow them to keep their loyal customers. But new offerings cost money, and innovation and experimentation can be costly.

How does the typical Vice President of Information Systems in a midsize company both expand services while restraining spending? Midsize companies are finding that cloud computing offers the greatest potential to provide a near-term solution. Why does the IT leader come to this conclusion? There are three primary reasons:

- ✓ The CIO in collaboration with the CEO and Chief Marketing Officer can design a strategy that leverages Internet-based offerings that can change based on the preferences of the customer. If the midsize company can be more nimble than larger companies with more money and resources, it can then remain competitive. Cloud computing allows the company to add more services when needed and to discontinue them if a new program doesn't work.
- ✓ The CIO may see opportunities to partner with other businesses in the community to offer the types of services that the bigger companies don't have the flexibility to attempt. Using a set of cloud-based collaboration and business process services, the midsize company can begin experimenting with various partnerships to see which ones will work without purchasing additional servers, software, and networking services.
- ✓ The CIO may understand that additional opportunities to consolidate the existing IT environment by adding virtualization will allow the company to get rid of some servers and make the existing environment more efficient. By standardizing the existing server and software environment and automating existing routine processes, the CIO can take out costs and invest in new services that don't involve capital expenditures.

It isn't always easy to come up with new strategies when competitive threats are expanding. The ability to leverage the cloud to try new strategies without capital expenditures allows the midsize company to compete more effectively with larger organizations. The ability to experiment with new offerings while saving money helps an innovative midsize business to thrive. Therefore, being able to have the same access to sophisticated technologies as larger competitors helps level the playing field for the midsize business. The combination of using cloud services while streamlining its internal server environment sets the company on the right path for future growth.

Impacting Your Industry

Each industry is different. Many different technology requirements, regulations, and ways to compete and collaborate exist. However, all industries can experience substantial benefits from leveraging emerging technical approaches like cloud computing to provide technical and business flexibility. In the following section, you look at three different markets and how each can be impacted by cloud computing.

Retail grabs the cloud

The retail industry is in the midst of major changes. Many large retailers have had substantial consolidation. These companies are leveraging many different channels to reach prospective customers. Midsize retailers are under increasing pressure to differentiate themselves so they can't just survive but thrive.



Cloud computing services offer the most cost effective and flexible technique available to midsize retailers to innovate and differentiate themselves.

Retailers can use cloud-based collaboration platforms to provide both customers and partners with streamlined processes that make it easy and more productive to do business together. Social business platforms that are cloud based can provide retailers with an innovative way to provide instant and proactive offers to targeted constituents. Because a midsize retailer has the ability to react more quickly, it can use cloud services to experiment with new go-to-market strategies.

For example, company management can leverage cloud-based analytics services to determine who the best customers for their products are and the best channels to reach them. They can analyze the results of social media campaigns and change those campaigns based on the analysis. This ability to leverage cloud services, such as a collaboration platform, social business services, and analytics in the cloud, is critical to the success of mid-market retailers. In addition, retailers can be prepared to add new computer, storage, and software-asa-service (SaaS) applications when they need them without investing in costly servers, storage systems, and a major support infrastructure.

A regional bank can roar

At first glance, a bank may not be able to do much to differentiate itself. This can be a big challenge for midsize regional or community banks that don't have the budgets and brand recognition of the major banking conglomerates. But these midsize banks can compete in the market by being more nimble, adding innovative services.

Often the midsize bank doesn't have the computing resources of its bigger competitors. With cloud computing services, the midsize bank can provide a variety of innovative services ranging from mobile device support, online credit services, and the ability to provide streamlined business processes as a service. If the bank had to build its own services to handle these new services, it would require the company to buy a lot of equipment and spend time implementing those services. With cloud-based services, the bank can experiment with new ideas and new service delivery models in a fraction of the time and at a fraction of the cost. Midsize banks can easily offer the same or in some cases even more streamlined services than their bigger competitors with cloud services.

Let's go mobile

Mobile computing is becoming a mainstay of healthcare organizations. Secure mobile services in the cloud can provide the ability for practitioners to access patient records instantly. Midsize practices have an additional challenge of managing the business processes, such as scheduling, billing, and reporting to regulatory agencies. With cloud-based services, the overhead is dramatically reduced. These cloud-based SaaS offerings incorporate best practices into the foundation. In this way, the midsize company can take advantage of the approaches to service delivery that had once been affordable only by the largest organizations.

Healthcare excellence without the pain

Providing excellent quality of care while managing costs is a huge challenge to both large and midsize healthcare organizations. While large healthcare networks have access to huge internal resources, the midsize healthcare practice has to be resourceful in order to provide a high level of care without carrying huge overhead. Patients are drawn to midsize practice groups because of the quality of those professionals and the ability of those groups to relate to patients. If these practices combine this level of patient service with cloudbased services, they can gain an advantage over larger, more bureaucratic organizations.

What type of cloud services will fit the bill for midsize healthcare organizations? These organizations can use cloud-based services that can store large complex images, such as MRI scans and X-rays. This allows a physician to have instant access to virtual information on demand. Storage-based services are available in ways that allow the use to expand and contract depending on the specific situation.

For example, a physician may be working on a case that requires a huge number of X-rays that need to be accessed from many different locations. After the situation is finalized, those records can be stored offline. Likewise, a midsize health

organization can leverage a cloud-based analytical service that allows providers to analyze test results and compare those results to publically available information very quickly. If the organization had to purchase all the hardware, software, and services needed to do this level of analysis it would be unaffordable. Therefore, the midsize practice has access to the latest technology that had only been available to the biggest healthcare providers in the past.

Looking at the Technical Benefits of the Cloud

Some fundamental technical characteristics of cloud computing provide value to you and your company. Those areas are covered in this section.

Economies of scale

One of the important technical advantages of cloud computing is its ability to allow many companies to share in advanced technical and best practices expertise. For example, a single midsize company probably can't afford to hire all of the most experienced IT security personnel it might need. By leveraging a commercial security cloud service, many midsize companies can share the benefit of this expertise without spending a fortune.

Elasticity

One of the great technical benefits of cloud computing is the ability to use just the resources you want when you need them — called *elasticity*. How does this happen? In a traditional server environment, you get a physical system that's designed with a certain amount of power and storage. You've done your homework and decide that for your needs for the coming several years this server will do the trick. However, what often happens is you either underestimate what you need or you buy too much. With cloud computing, you can purchase everything from computing resources to storage and bandwidth based on what you need right now. You may

be working on a pilot program to create a new partnership, and rather than purchasing a set of servers to support what may be a temporary project, your team uses a cloud computing provider that rents you the capacity you need. You can rent that capacity for a day, a month, or for years. You pay for what you use. To understand the technical details of what's behind making elasticity work, read Chapter 2.

Self-service and metering

Elasticity (see the preceding section) is practical for organizations because of self-service, which is basically a cloud-based service set up with an interface that allows the developer to request an amount of computing service, storage, or a seat or license for one user. You can think of self-service as you would an ATM at a bank. Rather than walking up to a teller window at a bank to deposit your check, you walk up to a self-service display, input your check, and it's deposited into the bank.

Self-service in cloud computing works exactly the same way. Of course, nothing in business or life is free. When a company goes to a self-service interface and provisions some service from a cloud computing vendor, there's a billing processing. You will be billed on a unit basis for what you use. These vendors have many different usage plans — you can pay for each instance of service you purchase or you can rent the service based on increments. The idea is that you will be billed only for what you use. And it isn't just computing or storage services that work this way.

For example, you may want to test a new application to make sure that it works as advertised. A testing service can be used to test an application for an hour or a month. Likewise, a company may want to use an analytic service to calculate a complex algorithm. Rather than buy the analytic software, the company pays for the number of times that analytic software service is used.

Business process services

While many cloud services give you the opportunity to create new software or leverage a capability, business process services

offer companies a specific solution. A *business process service* is a codified best practices approach to completing a repeatable task. A cloud-based business process service may be a billing service, a human resource management process, or a claims processing service. Thousands of process services are available as cloud services that can help companies manage complex processes without having the systems within their own physical environment. Typically a self-service interface lets the management team use the service and even customize it for its needs.

Security and management services

Cloud services don't live in isolation — instead, over time they become a normal part of doing business. Therefore, it's essential that these various services work together so employees, partners, and customers get a consistent level of service. At the same time, these services need to be delivered and managed with the right level of security that protects the privacy of the customer and the security of a company's intellectual property. No company considering cloud computing services should get started without a well-planned security and service management strategy. In Chapter 5, we give you a lot more detail on how to think about security and service management.

Collaboration services



One of the most important benefits of cloud computing is that it provides an ideal platform to enable collaboration between employees, partners, customers, and suppliers. A wide range of important collaboration services exist, including services that allow a team to work jointly on a document to conducting an interactive web-based training session.

Collaboration services also support the exchange of ideas via a social business community. Social business collaboration environments are evolving into a cost-effective and dynamic way to market and communicate with important constituents. Collaboration services enable you to identify the right experts at the right time to dynamically support your business goals.

14 Cloud For Dummies, IBM Midsize Company Limited Edition _____

Chapter 2

Fundamentals of the Cloud

.

In This Chapter

- Defining public, private, and hybrid clouds
- ▶ Understanding infrastructure, platform, and software as a service

.....

- Knowing when to say no to the cloud
- ▶ The ins and outs of virtualization

A s soon as you start reading about cloud computing, you run into the words *public*, *private*, and *hybrid* in reference to deployment models and the phrase *as a service* an awful lot. There's also a word called *virtualization* that seems to be bandied around quite a bit when people talk cloud. In order to be an informed consumer of cloud services, it is important to understand these technicalities.

In Chapter 1, we defined what the Cloud is and what it can mean for midsize companies. If you read that chapter, you probably realize some real benefits in leveraging this platform to increase the flexibility of computing. Before embarking on purchasing cloud services it is important to understand the kinds of cloud models that are out there as well as the way cloud services can be delivered. Cloud computing isn't the solution for every problem. So, in this chapter, we cover the foundational technologies that may become a part of your cloud strategy.

Defining the Three Cloud Models

When people use the word *Cloud* in the context of computing, they're really referring to three different kinds of deployment models: public, private, and hybrid. What kind of deployment

16 Cloud For Dummies, IBM Midsize Company Limited Edition ____

makes the most sense for you depends on what your company needs to support your customers. We talk more about this in the last section of this chapter, "Knowing When Not to Use the Cloud."

First, let's go into a little bit of detail about each of these cloud models so you can get a better handle on your choices. As we mentioned in Chapter 1, the cloud embodies the following basic characteristics:

- Elasticity and the ability to scale up and down
- ✓ Self-service provisioning and automatic de-provisioning
- ✓ Resource pooling
- Billing and metering of service usage
- Services including business process services

What separates the three cloud models is who actually owns the compute power.

The public cloud

When people started talking about the notion of the Cloud a number of years ago, most were referring to what's now called a public cloud. The *public cloud* is actually a set of hardware, networks, storage, services, and interfaces owned and operated by a third party for use by other companies. The huge scale of the data centers that provide these services is what provides the elasticity and flexibility discussed in Chapter 1 of this book. Also, cloud-managed service providers, because of economies of scale, can staff deep IT skills in specialty areas like security so you don't have to.

For example, a company may decide to use a public cloud service for a workload, such as electronic mail (e-mail). Why is e-mail such a good candidate for a public service? E-mail is a relatively simple application with a simple workload. Companies that specialize in public cloud e-mail services can optimize their hardware and software environment to support this type of workload. They can specialize in providing different levels of security - for a price. In reality, these companies can provide e-mail services for a fraction of the price

that it costs to run and support an internal mail service. What enables the cloud provider economies of scale is a concept known as *multi-tenancy*, which means that different companies share all or some of the same underlying resources.



E-mail isn't the only service to be put into the cloud. You can include security, too. Most midsize businesses would be more secure and cut costs if they leveraged cloud available security services instead of trying to staff a number of IT security experts in house (also, development/testing, and cyclical or spikes in workloads). These are more a commodity service, so business executives see this as a logical service to be put in the cloud. For example, it will likely cost less to run this service in the cloud than to own and operate e-mail on a local server. It can be less expensive to run application development and testing in the cloud rather than buying and configuring servers. As long as the provider is trustworthy, companies are seeing the benefit of using this type of public cloud service.

In the public cloud model, the end-user really doesn't have to know anything about the underlying technology. For example, for some services like testing and e-mail, midsize business may use its cloud provider as its de facto data center. In this way, the IT organization can focus more attention on missioncritical services rather than IT maintenance.

Business management needs to take responsibility for overall governance of data and/or services living in the cloud. Cloud service providers must provide a predictable and guaranteed service level and security to all their constituents. This service provider is responsible for IT assets and maintenance. We talk more about this in Chapter 4.

What's a private cloud?

In many situations a public platform (see the preceding section) may not be the most appropriate environment for an organization. While companies like the freedom of the public cloud, they may need more direct control for a particular

18 Cloud For Dummies, IBM Midsize Company Limited Edition _____

portion of their IT environment. Perhaps they need increased security and overall ownership. So companies typically adopt what's called a private cloud.

A private cloud is a highly virtualized group of servers that sit behind a company's firewall (see the section "Going over the Ins and Outs of Virtualization" later in this chapter). A private cloud is more cost effective for companies that already own a lot of computing resources that are the core of how they do business. Often these companies are able to actually sell their cloud-based services to other businesses.

What makes a private cloud different from a data center that includes some server virtualization? Check out these definitions:

- ✓ A private cloud includes automation of consistent processes and a self-service interface that allows internal developers to provision - allocate IT resources on demand.
- A private cloud is highly automated in terms of how it manages pools of resources including everything from compute capability to storage, analytics, process management, and middleware.
- A private cloud offers a well-managed environment based on common services to improve the efficiency of the environment.
- ✓ A private cloud implements sophisticated security and governance capabilities specially designed for a company's requirements.
- A private cloud is owned and operated by a single company that controls the way services are expensed to various departments and partners.
- ✓ A private cloud controls the service level of the platform based on constituent needs and compliance requirements.

When would a midsize company implement a private cloud? Here is an example — a specialty retail company offers customized made-to-order aprons. The company's business is entirely virtual. It has a loyal following of consumers that purchase its products for everything from birthdays to Mother's Day. It needs to keep its costs under control and it needs a way to have a seamless online partnership with key providers,

such as shipping companies, materials providers, and the like. It also has important partnerships with other retailers.

The company decided that creating its own internal cloud would allow management to leverage the systems it had already purchased. The company implemented a state-of-theart platform designed for its developers and partners. To ensure that the company was able to manage the highest level of security across these partners, it contracted with a managed service provider. As the successful partnership grew, the company added a second managed service to monitor and manage the quality of service between partners.

Understanding the hybrid cloud

A private cloud doesn't exist in isolation from the rest of your servers and the public cloud. In fact, most organizations that adopt a cloud computing strategy discover that a hybrid approach fits well into their IT strategy.



A *hybrid cloud* is a combination of a private cloud foundation with strategic use of public cloud services. A hybrid cloud often leverages services that run within your company's server rooms, as well.

A company with a private cloud may choose to combine some public services for capabilities that are commodity with private services based on the ability to deliver fast innovation to their ecosystem. For example, there was a time when all sales automation software was implemented on a company's premises. With the advent of offerings such as SugarCRM, companies are increasingly discovering that it is practical to pay a per-user, per-year price and leave the day-to-day management to a trusted vendor. But many companies also want to keep control over some of their most sensitive data. Therefore, they may choose to keep data about prospects on a private cloud. However, after those prospects become customers, they may now store that data on their own premises in their own servers, which is the hybrid cloud model. Or, if a company is in a highly regulated market, such as financial services or healthcare, it may also want to keep that data on a private cloud, but utilize some public cloud services. Again, this example is a hybrid cloud model.

The community cloud

In some circles, people talk about a fourth kind of cloud deployment model called a community cloud. According to the National Institute of Standards and Technology (NIST) a U.S. federal government agency established to design technology standards — a *community cloud* is one where the cloud infrastructure is shared by several organizations and supports a specific community with shared concerns. For example, organizations within an industry typically have common compliance, data backup/retention needs as well as common security and collaboration requirements. Industries are a natural fit for a community cloud. A community cloud can be managed by the organizations or a third party, either on or off premises.

Understanding Infrastructure, Platform, Process, and Software as a Service

There are four models for delivering cloud services. These models describe the kinds of services you can utilize in a cloud deployment model and are covered in this section.

Infrastructure as a Service (laaS)

IaaS is one of the most straightforward services of cloud computing. IaaS is the delivery of computing services including hardware, networking, storage, data center space, and even some utility software, such as a payment model based on a rental model. This means that the consumer of the service acquires a resource and is charged for that resource based on amount of resource used and the duration of that usage. The service may include dynamic scaling, so if the customer winds up needing more resources than expected, he can get them immediately. The consumer doesn't manage or control the

underlying cloud infrastructure but does control things like operating systems, storage, or deployed applications.

Additionally, the use of IaaS has led to innovation in licensing and payment models for software you want to run in these cloud environments. For example, some IaaS and software providers have created a "bring your own license" (BYOL) plan so you have a way to use your software license in both traditional and cloud environments. Another option is called "pay as you go" (PAYG), which typically integrates the software licenses with the on-demand infrastructure services. An example of IaaS is IBM's SmartCloud Enterprise.

Business users and IT developers are drawn to the ease of acquiring IaaS services. They simply go to a self-service interface and an image of compute or storage services is provided almost instantly. The truth is that the traditional methods of acquiring computing resources simply haven't kept pace with business urgency.

For example, in a three-week period, a development team may need extra compute and storage infrastructure, but purchasing this for temporary needs makes no sense. Likewise, in some situations an online vendor may need extra computing and networking capabilities during the holiday rush. Purchasing extra system resources based on something that happens three times doesn't make economic sense.



Even at a few cents per CPU hour or Megabytes of storage, expenses can add up to significant cash. Even more complicated are issues related to the ability to track IT governance. If a business user creates important content through an IaaS service, there's no accountability. Moreover, almost no IaaS vendor releases usage logs to its customers. If a customer is storing data within a public IaaS platform, there's typically no way to determine where that data is being stored. So you need to be aware of any potential compliance issues before you embark on IaaS. For example, some military or government contracts may require that the data be stored domestically. This doesn't rule out cloud solutions per se but means you have to discuss where the data is located to meet any specific needs you or your clients may have.

Exploring Platform as a Service (PaaS)

Organizations expanding their use of cloud computing typically need a platform to create, deploy, and manage their cloud environment. An integrated environment that supports the development and management of cloud-based applications is called *Platform as a Service (PaaS)*. PaaS is a packaged combination of infrastructure and middleware that can be used to develop, deploy, manage, and integrate applications in a public or private cloud environment.



According to NIST, PaaS is the ability to provide a computing environment and the related development and deployment stack needed to deliver a solution to the consuming customer. This means that a computing environment PaaS requires a complete stack of development tools that are accessible via a web browser.

The abstracted (where the details of implementation are hidden from the user) stack is designed to be cloud based so the developer can use a self-service portal interface to create enterprise applications without having to acquire and deploy platform tools. In order to provide this level of abstraction, a number of components have to be included in a PaaS platform:

- Foundational services: These make it possible for the developer to create applications without having to write to specific platform components (such as middleware and databases) because they're built into the platform. Foundational services include design, development, testing, security, databases, versioning, and the like.
- ✓ Integrated lifecycle services: In PaaS environments, it's important to manage not only the development of an application but also the lifecycle of that application. While you can purchase individual development tools, the typical PaaS environment includes the software development tools, the testing environment, a workflow engine, configuration management, and applications management tools.
- Workload management services: A workload is an independent service or collection of code that can be executed. In a well-designed PaaS environment, the critical

elements need to be packaged so they can execute in the most efficient manner. But all workloads aren't the same. There are batch workloads (processing large amounts of data), real time workloads (real time data feed), and analytic workloads (analyzing complex customer information). For more information on workloads, check out Chapter 4.

For example, a company may get its network, hardware, storage, and operating system from its cloud provider. It now wants to build a CRM-type application on top of that infrastructure, but it doesn't want to start from scratch. Using a PaaS, the customer could utilize preconfigured application development tools, databases, and templates to upload this application in a PaaS framework.

Examining Software as a Service (SaaS)

One of the first implementations of cloud services was Software as a Service (SaaS) — business applications that are hosted by the provider in a multi-tenant model and delivered as a service. SaaS gained initial traction in the customer relationship management (CRM) market and has expanded into many others including collaboration and analytics.

SaaS implementations have common fundamentals:

Customer interest: The SaaS applications are general enough so many customers are interested in the service. Some examples of these types of applications include accounting, collaboration, project management, analytics, and content management.

What doesn't work as SaaS? A specialized one-of-a-kind application with a small number of potential customers.

- Ease of Use: If an SaaS application isn't easy to use, customers simply stop subscribing.
- Measuring and Monitoring: A SaaS application needs to include measuring and monitoring. This capability allows customers to be billed only for the actual usage of the software. This ability to align payments with usage is a key advantage of SaaS applications over traditional onpremises applications.

Cloud For Dummies, IBM Midsize Company Limited Edition ____

- Interfaces: SaaS applications should have published interfaces and an ecosystem of partners who can expand the company's customer base and market reach.
- Security: SaaS applications have to ensure security of data and specialized configurations.
- Fast releases: Fast release of new features and capabilities must be done without impacting the customer's ability to continue business as usual.
- ✓ Data integrity: This fundamental includes providing techniques for allowing data to migrate either to a private database inside the firewall or to a third-party storage capability.

Buying SaaS offers a number of obvious advantages for midsize companies:

- ✓ The price of the software is on a per use basis and generally involves no upfront costs from the service provider. (Of course, the reality is that your company may have some upfront work to do to get your data loaded into the SaaS application and you may have to deal with ongoing data integration between your internal and cloud data environment.)
- Businesses get the benefit of shifting capital expenditures to operating expense. This allows for the expenses to be tied to immediate revenue sources.
- A business gains the flexibility to test new software on a rental basis and then can continue to use and adopt the software, if it proves suitable.

These reasons are why SaaS has caught on like wildfire among small and large companies alike.



There are many well-known SaaS services. These include SugarCRM, a sales automation service; Constant Contact, a marketing automation platform and collaboration services; TivoliLive, a service management service; and LotusLive, which includes social networking, e-mail, instant messaging, and the ability to share files and conduct online meetings.

Business Process as a Service (BPaaS)

Another *as a Service* cloud delivery model is Business Process as a Service (BPaaS). A business process service is a codified best practices approach to completing a repeatable task. Some of these tasks/processes are so common that you may not even think of them as BPaaS. Rather, they're an integral part of how business is conducted. Here are a couple of examples:

- ✓ Many companies use an online service to handle payroll services. While there are elements of SaaS, the primary driving force behind this type of capability is process. Some employees are paid weekly or monthly. There's a process that's standardized based on a company's business rules. An employee's deductions based on taxes, social security, and his portion of benefits are automatically deducted from the amount the employee is paid. But other complexities are thrown in the mix.
- Payment services must receive information from human resource systems that indicate changes in the employee's salary amount (deductions for a leave of absence, a commission payment, or a salary increase). In essence, the entire process of managing payments to employees becomes a set of business processes that are embedded into the hybrid computing environment.



Why should midsize companies care? A potential big cost benefit can be gained from outsourcing business processes (especially non-strategic ones) to a third party. These may include other forms of clerical activity, data backup and disaster recovery, or unified communications. The Apron company, for example, established a process as a service to handle its credit checking, shipping, returns, and billing process. This allowed the company to streamline what had been a manual and inefficient process.

Going over the Ins and Outs of Virtualization

The discussion of the fundamentals of cloud computing wouldn't be complete without an overview of virtualization, because virtualization is an important piece of the private cloud computing story. *Virtualization* is a technique for separating resources and services from the underlying physical delivery platform or environment.

Most computer operating systems (including Linux and Windows) aren't designed to efficiently handle workloads. In fact, the typical server is terribly inefficient. In the old days, it didn't seem to matter very much. Server hardware was inexpensive, and if an application got bigger, companies simply added more servers. But over time, all those servers took up a lot of floor space and used too much power. So companies discovered that with virtualization it was possible to abstract the hardware so it could be used more efficiently.



Virtualization is one of the most effective ways to reduce capital expenditures. Typically only less than 10 percent of the average server is used at any one time. Most of the time, these servers are sitting idle. After a company virtualizes its servers, utilization can be as high as 80 percent. So a lot of the compute resources that companies have invested in provide no benefit. Making matters worse, even those unused resources require a lot of manual management of the equipment.

Virtualization has three technical capabilities that help with efficiency:

- ✓ It allows multiple operating systems and applications to be supported on a single physical system.
- It allows each of these virtual machines to be isolated from each other and from the physical hardware.
- It allows optimal utilization of the physical server resources.

Virtualizing the desktop

Over the past few years, the notion of a virtual desktop has been getting a lot of attention. In a virtualized desktop, the applications, data, files, and anything graphic are separated from the actual desktop and stored on a server in a data center (not on the individual machine). These virtual PCs are created on the server and the user has what appears on the server to be a complete PC. These applications, data, etc. are then accessed using what's known as a thin client. The name thin client comes from the fact that such devices — although they're computers with CPUs, memory resources, keyboards, and mice — aren't PCs in the sense that they don't have disks or DVD drives. Virtualizing the desktop can bring down a PC's Total Cost of Ownership because it helps manage and centralize support.

With encapsulation, all the components needed to run an application can be put into a container so it can run without interference from any other application. With virtualization techniques, just about anything can be virtualized, including memory, networks, storage, hardware, operating systems, and application. Virtualization platforms provide a whole set of resources and techniques for managing the efficient and secure operation of resources in an effective manner. This foundation enables greater utilization of the underlying hardware.

Cloud computing leverages the abstractions of hardware, software, desktops, applications, and storage and networks of the virtualization environment. In essence, virtualization now transforms physical silos into a pool of resources — one of the key principles of cloud computing. Almost all vendors that sell public cloud services rely on virtualization as one of the techniques for optimizing their platform. Likewise, organizations implementing private clouds need virtualization to ensure that workloads are well balanced and well managed at the physical level.

Knowing When Not to Use the Cloud

Moving to the cloud may not fit into your plans right now. Maybe most of your computing is relegated to a small internal team that effectively manages the required services to your business needs. Some of those times you may not need the cloud include the following:

- ✓ You have what you need. If your physical environment meets your needs and gives you the flexibility to support customers today, you don't need to change to a cloud model just for the sake of change. If you've done the math and realize that your current setup costs less than a move to the cloud, then stay where you are for now. You can always move a service to the cloud at some later point in time.
- ✓ You have a specialized application. Say you're in the specialty financial services business and you have some purpose-built models that you run for your top wealth management customers. The models use highly sensitive data from your clients. Your clients want the data kept in one place for regulatory reasons. You have a good handle on the amount of computing power you need for the applications. There are no spikes in demand, but you're always making tweaks to the model. There's really nothing to be gained here by a move to the cloud.

When you get to the point where you are being held back for example you need to expand but don't want to spend money on infrastructure or introduce new innovative services — then you may need to consider the cloud.

Chapter 3 Cloud Economics

In This Chapter

- Comparing on-premise server and cloud-based models
- Figuring labor costs and productivity into the mix

.

▶ Understanding how the cloud model impacts business transformation

Midsize businesses are facing unprecedented pressure to compete with much larger organizations with much larger IT budgets. The cloud presents many attractive benefits for midsize businesses with a need to become more innovative and control IT costs. However, in order to make the most of your cloud journey, consider the relative costs and benefits from a strategic perspective. Don't think about cloud as a onetime project.

In this chapter, we provide a model for looking at the practical considerations around the economics of traditional serverbased environments compared to cloud-based computing models.

Comparing Onsite Server Environments with Cloud-Based Models

Business leaders at midsize companies are used to making tough decisions when it comes to cutting costs and operating effectiveness. The business benefits of cloud, such as accessing technology as needed while reducing IT capital expenditures, are music to the ears of many a business executive. Many C-level executives have called their top decision makers

together to ask, "How do we create highly-efficient and costeffective IT data centers?" So, assume that you've been asked to develop a Return on Investment (ROI) analysis for your company on a new cloud initiative.

When you begin your thought process around the economic impact of the cloud, you realize that there are no simple answers. You have to consider many different issues. The cost of running an application, such as e-mail or customer relationship management (CRM), is more complicated than looking at how much you pay for the software and the cost of the staff required to run the application.



IBM has a compelling estimator tool that may be of value to you. It helps you figure up the cost of running applications. Check it out at www-935.ibm.com/services/us/igs/ cloud-development/estimator/Tool.htm?cfg=us-en.



Consider all the costs associated with running an application in your internal server environment. In addition, some considerations may outweigh even the most detailed and accurate financial analysis of running an application in your server environment versus in the cloud. The following sections review both the financial and strategic business considerations to help with your analysis.

Considering costs associated with your applications

In order to prepare for your ROI analysis, you need to look at the costs that are directly and indirectly related to the application or type of workload you want to move to the cloud. Some of these indirect costs are hard to evaluate, making it difficult to accurately predict the actual costs of running any given application in your company. A particular server may be used to support several different applications. How do you accurately judge how much time any one employee devotes to a single application? While there may be a particular month when your IT staff is updating one application, in another month, those same staff members may be troubleshooting another application. To give you an idea of the questions you need to ask, check out the list below:
- ✓ Server costs: One-to-one matches between servers and applications are highly unlikely. However, if you move an application off your server environment will this free up space for other applications? Do you have unused capacity? Have you already gained economic benefit from virtualizing your servers? What's the total annual cost of ownership, which normally consists of the cost of hardware support plus some amortization cost for the purchase of the hardware?
- Storage costs: What are the management and support costs for the storage hardware required for the data associated with this application? Storage costs may be very high for certain types of applications, such as e-mail.
- ✓ Network costs: When a Web application you host internally, such as e-mail or collaboration, is moved to the cloud, this may reduce strain on your network. However, keep in mind that ensuring that users in your company have on-demand access to cloud services requires substantial bandwidth.
- ✓ Back-up and archive costs: The actual savings on backup costs depends on what the back-up strategy is when the application moves into the cloud. The same is true of archiving. Will all backup be done in the cloud? Will your organization still be required to back up a percentage of critical data locally?
- Disaster recovery costs: Your cloud service provider may have its own disaster recovery capabilities, which could lead to a big savings on disaster recovery expenses.



This area demands significant due diligence when selecting a cloud provider. You may end up spending more in disaster recovery costs if you find out too late that your provider's disaster recovery capabilities aren't adequate.

- ✓ Space: If you have a lot of servers and many applications hosted on those servers, it can be difficult to attribute the cost of floor space and building maintenance to individual applications. However, if you move several of your applications to the cloud, it can make a big difference in your space planning.
- Power and cooling: Moving specific workloads to the cloud can have a major impact on escalating energy costs, a key issue for midsize businesses.
- ✓ Software maintenance costs: What's the annual maintenance cost for the software you may move to a

cloud-based service? While this may be a simple answer, it can easily get complicated if the specific software license is part of a bundled deal or if the application is integrated with other applications in your environment.

Support personnel costs: What are your costs for staff support for day-to-day operations and management of this application? These costs cover staff responsible for everything from storage and archiving, to patch management and networks and security. In addition, do you have an internal help desk to answer calls about this application? Will some of these costs now be transferred to the cloud provider?



Some of the costs listed above, such as power and cooling or space, aren't likely to be impacted by the movement of one application to the cloud. However, if you make a significant move of multiple applications to the cloud you may realize a major decrease in many of these indirect costs.

Mulling over strategic business considerations

You have the nuts and bolts down by understanding where you may be able to cut expenses if you move to the cloud. This stance forms the basis for a detailed ROI analysis. However, you most likely have many applications to consider and you may not want to move all of them to the cloud even if the potential cost savings are significant.



Take the time to evaluate your mix of workloads based on their strategic importance to your company. To help you get started, here are some questions:

- Which aspects of your business do you consider your Intellectual Property (IP)?
- Which applications are core to your business and associated with the products and services that help you beat your competition?
- Will you be paying a premium to keep certain strategic workloads on your internal servers?

This may be the right decision for your company based on your goals and objectives.

- Do you generate revenue from IT services you provide to your customers?
- Which applications are necessary for day-to-day operations but do not help you differentiate from your competitors? Do you need IT to generate invoices, send electronic mail, manage sales prospects and keep track of customer orders?

Ultimately, your economic analysis of which workloads are the best candidates for the cloud depends on your company's strategy and competitive environment.



Many midsize businesses find that a hybrid approach, which combines usage of internal company servers along with public and private cloud services, provides the best economic and strategic outcome. (Check out Chapter 2 for more information on the hybrid cloud.) Some workloads are a good economic fit for each of the cloud-based models. A few examples are detailed in the following section.

Which workloads are a good economic fit for laaS

Some pragmatic and commodity workloads fit perfectly into the Infrastructure as a Service (IaaS) model. (See Chapter 2 for more background on IaaS.) These workloads include basic computing services to support unexpected workloads or test and development requirements. Economically, midsize companies can get the access to the same compute power that a much larger organization has in its datacenter without the need to purchase and provision the new hardware. By avoiding the expense of buying new equipment you increase your opportunities to experiment with new services or products. You can eliminate capital expenditures and move to more of a pay as you grow model. So what does this mean in practical terms? Check it out:

- ✓ Software evaluation: Testing software prior to introducing an innovative customer facing application can be a challenging and lengthy process. Typically developers need to acquire servers and specialized development software. While this process is necessary because you want to deliver a quality product, you may not need the extra overhead when your tests are complete. Therefore, it may be very cost effective for you to pay an IaaS provider for access to the additional resources needed for the duration of your software testing.
- System testing: Resources are required for a relatively short time period. You may be testing for a workload that

is expected to grow very quickly and it will be more cost effective to use laaS for your resources rather than purchasing new equipment.

✓ Seasonal demands: The flexibility of using IaaS to support peak periods of high demand means that your company doesn't have to over invest in hardware. For example, a retailer may find it cost effective to use IaaS instead of purchase additional servers in anticipation of high sales volume expected for its online channel during a holiday promotion.

Economic value of PaaS

The experimentation you need prior to launching innovative new products and services is likely to require a pool of IT resources. As we discussed previously in this section, there are many IT and business costs related to supporting an application. The costs for IT requirements, such as storage, network, and security services, may be transferred to a Platform as a Service (PaaS) cloud provider for particular workloads. (See Chapter 2 for more background on PaaS.)

Companies may decide to use a platform from a PaaS provider to create software for a special project between collaborators that goes away when the project is finished. You don't need to develop the platform within the companies' own server environment and then end up with unused resources at the end of the project.



Your cost benefit analysis of the difference between purchasing the mix of resources required and using cloud service needs to be constantly reevaluated. An arrangement that looks like a good deal for a short period may become relatively much more expensive as your company grows over time.

Economic value of SaaS

Your company's business policies and strategic considerations impact the cost/benefit analysis of SaaS applications. Many of the routine business processes that your company needs to function daily, such as managing sales prospects and tracking customer orders and invoices, can be supported with SaaS offerings. Transferring the ongoing management and support for a CRM human resources or financial application to a cloud provider can lead to some straightforward economic benefits. For example, your SaaS provider makes sure you have the most up-to-date version of the software relieving your staff of the time and expense required for this maintenance.

Getting into hot water

One of the often-promoted economic benefits of SaaS applications is that the user can pay for services monthly and can walk away at any time. However, after you commit to a SaaS vendor, this isn't really so easy to do. After you've established your data on the vendor's platform, the time and expense to make a change may be larger than you expect. In addition, one trend with SaaS vendors that has an impact on the long-term cost of these applications is the push to lock in buyers by offering volume discounts for a certain number of users over several years. This trend is both a blessing and a curse. It is hard to know when you sign a contract exactly how your needs will scale. If you know that you'll expand by a certain number of users over a 2- to 3-year period, you may benefit from taking advantage of economies of scale. But you could get yourself into a trap of overbuying without the ability to get out of a contract.

The ease with which these SaaS offerings can be adopted varies. If the application is fairly independent of the overall applications and information environment of the company, SaaS is a tactical and pragmatic approach. SaaS can have enormous financial benefit for organizations that don't want to support their own hardware and support environment.



You'll want to integrate data from your SaaS applications with data managed by applications in your internal environment. You need to plan for the additional expense of including these integration capabilities into your environment.

Dealing with Labor Costs and Productivity

A great deal of economic value can be gained by taking advantage of cloud services for the right workloads. However, your company may be in the best position to take advantage of these benefits if you apply some of the same best practices that cloud providers follow to create efficient IT environment and apply them to your own internal environments. In your own environment, economically deploy the following two key practices:

- Standardize and automate your processes wherever possible. Ensure that your internal environments are efficient or the IT labor costs you expect to save by moving some of your workloads to the cloud will never materialize.
- Virtualize the servers in your own environment. If you can turn your IT assets into pools of resources, you gain better utilization of what you have already paid for. Virtualization can provide a level of automation and standardization to optimize your computing environment. This, in turn, enables you to improve IT productivity and reduce labor costs.

Impacting Business Transformation

Midsize businesses know the value of innovating and changing quickly to seek out the right niche in a complex marketplace. Finding the right balance of cloud and internal resources gives your company the economic advantage it needs to service your customers and grow your business.



The decision to move to the cloud is usually not based on a simple cost comparison between cloud services and internal server environments. An understanding of your business strategy helps you to put the cost alternatives in perspective. Having the ability to pay on an as-needed basis for servers, storage, and security services can give your company the opportunity to implement an innovative solution with far less economic risk than buying the required infrastructure upfront. Implementing an online collaboration for your customers and partners can lead to business innovation and transformation that far outweighs the costs associated with the implementation.

Chapter 4

Making the Cloud Practical

In This Chapter

- Selecting workloads to move to the cloud
- Handling integration issues
- ▶ Finding out the requirements for cloud integration
- Working with your cloud provider

Hardware, software, networking, and services have to be brought together to make a cloud strategy a reality. How do you select and move workloads to a cloud environment? How are they orchestrated and managed? Moreover, what happens if you want to integrate services from different cloud providers? How is that done? Or, for that matter, say you want to integrate your on-premises solutions with some services in the cloud. How can that be done? Finally, how do you work with your cloud provider?

.

In this chapter, we provide you with a number of practical checklists for what to consider as you move workloads to the cloud. You also get some questions to ask your provider about service level agreements, as well as other items you should discuss with your service provider.

Selecting Workloads to Move to the Cloud

As you move to a cloud environment, you may hear people talking about workloads that run in the cloud. A *workload* is an independent service or collection of code that can be executed. In essence, the workload doesn't depend on external

elements to make it work. It needs to be available to execute the right task based on the business need. In the cloud, different workloads potentially run across different machines. In some instances, you may have a single workload that's an entire application used by customers or internal business units. In other situations, a smaller service may be used in many different contexts. For example, a workload that's a payment service can be used across a group of applications.



All workloads aren't created equal — they come in all shapes and sizes. Despite this difference, they have some common characteristics:

- A workload shouldn't have dependencies (a related piece of code or application that resides in another place within a system).
- The workload should have a consistent interface and be able to leverage the Applications Programming Interface (API) of the cloud platform. This allows for applications and services to connect more easily.
- ✓ A workload must have rules or policies about how it can be used under specific circumstances. There may be a policy that states which set of workloads must be executed in a specific order or at a specific time of year.

The cloud requires that workloads have to be handled in a way that isolates the technical implementation details from the user. The result of this abstraction is a type of service that makes it easier to have a well-defined function with a defined purpose. You can think of workloads as self-contained entities. As such, providing interfaces between these workloads may be needed to ensure that they can be managed effectively.

All workloads aren't created equal

Determining which workloads to move to the cloud is both a business decision and a technical decision. We recommend looking for workloads that are repeatable and consistent that can be standardized and automated. The workload should be able to be used by large numbers of people or applications or processes. In other words, economies of scale is the name of the game in the cloud. If you had a workload that was a

specialized workload, only used by one group, say, three times a month, it's probably not worth moving it to the cloud unless it takes an unusually large amount of resources to execute. A workload that's repeatedly used makes sense for a scalable cloud.

Examples of such workloads include e-mail, development/ testing services, seasonal processing spikes, payment services, and repeatable analytics services — for example, something that can be done over and over again without major surgery. This is where it makes sense to apply automation because there is cost associated with automating and standardizing. You need to make sure you get your money's worth.

There are various kinds of workloads. In this section, we give you a few examples.

The batch workload

Batch workloads are designed to operate in the background. Typical batch workloads include billing applications, fulfillment applications, and complex queries. These workloads require considerable compute and storage resources. Batch workloads are rarely time sensitive and can be scheduled when few real-time tasks are running.

Real-time workloads

Workloads that need to be executed in *real time* may include *online* workloads. For example, a retail system that makes recommendations to an online consumer needs to be executed in real time. These types of analytic workloads tend to require much more real-time computing capability.

Transactional workloads

Transactional workloads are the automation of business processes such as billing and order processing. Traditionally transactional workloads were restricted to a single system. However, with the increasing use of electronic commerce that reaches across partners and suppliers, transactional workloads have to be managed across various partners' computing environments. Therefore, there's a need to focus on business process of these transactional workloads. These workloads are compute and storage intensive. Development/test workloads can also be transactional in nature.

Dealing with Integration Issues

As soon as you begin moving workloads into the cloud, you need to establish a way to connect them to existing traditional workloads. While one of the first cloud integration scenarios a company may encounter is the need to integrate traditional resources and services with cloud-based resources and services, most companies very quickly find that they must contend with many different integration scenarios. The three most common cloud integration models are

- Connectivity to and from clouds
- Connectivity between clouds
- Connectivity within clouds

Connectivity to clouds

Connectivity between the data center and the cloud is one of the most basic cloud integration use cases. A typical midsize organization may manage its ERP system within its server farm and use a SaaS environment to manage sales leads. Sales, order, invoice, and inventory data must be synchronized across these systems for the company to function properly. This can be a major cultural shift for the organization that's used to having full control over its line of business applications. There is little or no control over the architectural structure of the SaaS environment. Therefore, the IT organization needs to institute new processes to institute management between the data center application and the cloud-based application. IT needs to separate the data elements within the business applications from unnecessary dependencies.

For example, there may be business processes that control a very specific circumstance that interferes with your ability to easily connect between data sources on the cloud. In addition, there are specific issues related to using cloud computing environments that impact the style of integration.

Another example — while your company gains huge value from using a SaaS based CRM system, governance requirements demand that customer data be stored behind your firewall. Therefore, when a prospect becomes a customer,

the company moves the data into the data center for additional security. This company now has a hybrid environment to manage. The company needs to automate data mobility across clouds in order to transfer and transform customer data to migrate between public and private clouds. Security and compliance requirements may be a key consideration in the movement and storage of the data.

Connectivity between clouds

In addition to connecting between your internal servers and the public cloud, companies may need to integrate across private and public clouds. One common example of this occurs when private cloud resources are insufficient to support peak demand and select workloads are allowed to burst into a public cloud environment. A good example is the entertainment biz.

An entertainment organization is testing the introduction of a new game that supports on-demand group participation. There is a great deal of interest in this new introduction by the gaming community. The company wants to test how its web application scales from 20,000 to 1 million concurrent users before going live. They know they need more cycles and more power than they have available in their private cloud so they expand their environment by leveraging public cloud resources.

Connectivity in clouds

A third key use case occurs when you need to create bidirectional integration with multiple SaaS applications in order to support a business process. For example, a services organization uses sales automation to keep track of its prospects and a different SaaS application to manage commission and salary payments. There are sales situations where multiple sales representatives collaborate on a sale and must split the resulting commission. The data in the Customer Relationship Management (CRM) system needs to be consistent with the data in the Human Resources (HR) application or the people who worked to close the deal will not get paid accurately.

Because both of these applications are in the cloud, there's a need to integrate data between clouds. You want to automate

this process so every time a product is sold, you automatically pass the information back and forth to keep track of who made the sales, who owns the account, and who gets the commission.

Requirements for Cloud Integration

Many companies initially underestimate the challenges of integrating data across applications and services, especially in hybrid computing environments. They assume they already have the tools and expertise required to manage the integration process because of prior experiences with integration in their data centers or server rooms. Traditionally most organizations used a consistent process for moving data within a computing environment. This approach known as ETL (Extraction, Transform, Load) is most appropriate for transferring and processing large volumes of data in fast, high-throughput transactional environments within an enterprise data center.



However, this approach is inadequate for integrating across multiple delivery platforms of the cloud. A major complexity with trying to make ETL work in a hybrid environment is the varied structure of the data. The IT staff typically doesn't have the same level of understanding of the data elements. data structures, data configurations, and database in SaaS platforms as compared to the applications managed and controlled in the data center.

Accommodating these third-party environments with information managed in the data center requires a lot of work on the part of the IT organization. With enough time and programming staff, companies can create custom coded connections between internal and cloud applications. However, keeping a custom solution up to date can take a lot of ongoing maintenance. Midsize companies certainly don't want to take on this burden.



Establish an effective and repeatable integration process. By leveraging new sets of integration platforms and best practices, you can overcome these integration challenges. Overall, you need a common and standardized way to link your applications wherever they are managed.

For creating this standardized approach to integrating data across internal data center applications and public and private clouds, there are the five main requirements:

- ✓ Connectivity: You need to be able to connect to many different types of applications and data SaaS applications, custom web applications, on-premises applications, private cloud applications, databases, flat-files quickly and easily without requiring a lot of ongoing maintenance. You also need to consider different types of integration, including data migration, process integration, or some unique new type of integration, which may include taking data from an internal application, such as SAP, and then displaying these data in a SaaS application, such as Tivoli Live monitoring services.
- ✓ Transformation: In a cloud environment you may need to ensure that your on-premises accounting system is consistent with your cloud sales management system. Your staff is most likely familiar with the data format specifications in your on-premises applications, but they won't have the same level of understanding of the specifics of the data in your SaaS applications. You need to make sure that you have the ability to easily map one data source to another.
- ✓ Business logic: The systems that include the data you value include business logic and processes that control the way that data's managed. Therefore, you can't simply connect data elements together without a deep understanding of how these systems behave from a business process perspective.
- ✓ Management: Data doesn't live in isolation. No matter what type of data you're working with, it lives on specific hardware platforms, leverages specific storage environments, and connects with third-party services (payment services, credit verification, partner commerce systems, and so on). These elements become part of the way you manage the flow of data between your applications in the datacenter and in the cloud. Therefore, from a management perspective you need to be able to monitor and manage these workloads. We discuss this in more detail in Chapter 5.
- ✓ Security: You need to understand that the movement of data needs to be monitored and the data protected at the various steps in any process that links workloads together. Often the data you want to move between workloads is the data that is most valuable to hackers.

44 Cloud For Dummies, IBM Midsize Company Limited Edition _



One way to increase the speed of integration is to use an integration provider that has studied metadata structure of SaaS applications. These vendors can provide a pre-configured integration pattern or template that helps begin the process of integration between data sources. One of the benefits of working with a standardized template is that the same template can be reused for other integration projects. The template is typically designed to cover about 60 percent of the requirements for a particular integration.

For example, web services providers offer their customers preconfigured data migration and integration templates such as those provided by IBM's Websphere CastIron appliance. These templates help customers to connect with hundreds of the most common enterprise applications so they can move quickly without spending the time and resources required to write custom code. Data security must be built into this platform in order to have a reliable and safe link between workloads that is protected from hackers.

Ensuring success managing complex processes

How does this work in the real world? Take the example of a midsize insurance company that deals with workers' compensation, systems including quoting, administration, and cash processing. The workflow to handle claims processing had been handled manually, and there's no contingency for workflow if an agent is unavailable or out of the office. Processes were time consuming and error prone. For example:

- Cash processing systems were incompatible.
- Claims were held in different systems than payments and each provided output in Electronic Data Interchange format.
- ✓ There were no reliable integration points.

The company decided to move its processes into a private cloud and implemented a cloud-based integration approach that included predefined integration processes between these systems and provided the ability to manage the processing of these workloads. As a result, the insurance company was able

to reduce its reliance on manual processing and thus prevent unanticipated mistakes. The business processes were streamlined as well so the number of bottlenecks in the overall system declined. The company could now focus its attention on improving its ability to serve its customers.

Talking to Your Cloud Provider

You need to start talking to cloud providers to see if they can meet your needs. These providers may be your internal IT department or an external partner. Before contracting with a cloud service provider you must understand what you require in terms of the performance and security of services and how you expect your provider to meet your needs. Sometimes a cloud provider offers different levels of service so that customers have the option of paying for services on a sliding scale based on their requirements. For example, if your workload is mission critical and subject to government regulations you want to ensure you have the highest level of service available.

The contract that stipulates the level of service you should expect from your cloud provider is called a Service Level Agreement (SLA). This contract details the type of service you need from providers and what type of penalties would result from an unexpected business interruption. SLAs are important whether your provider is your own IT department or an external service provider. The agreement theoretically gives you some assurance that the provider will meet certain service levels. Some of the issues that may be described in a SLA are summarized below:

- ✓ Uptime/downtime: Depending on how critical your applications that are running in the cloud are, you need a certain level of availability. Is 98.5 percent enough for you? Or do you require 99.5 percent or perhaps 99.9 percent? How does the provider plan to ensure that it will meet its SLA? What failover and disaster recovery mechanisms does the provider have in place? Are you comfortable with them? You need to read the fine print. Does the SLA include planned maintenance or is that separate? If so, how does the planned maintenance affect you?
- How the lines of responsibility are drawn: You don't want to be in a situation where the SaaS provider is

pointing a finger at the infrastructure provider, saying it wasn't their fault.

- Cost of downtime: What does it mean to your operations if the cloud is down? Service providers might compensate simply based on the number of hours systems are down. What about the cost to your business?
- Past incidents: Has your provider struggled with excessive downtime in the past? Check the record. Also look at the service desk metrics including time to identify problems, time to diagnose, and time to fix.
- ✓ Data integrity: What controls do you have to ensure that the integrity of my data is maintained? For example, are there controls in place to make sure that that all data input to any system or application is complete, accurate, and reasonable? What about any processing controls to make sure that data processing is accurate? And there also need to be output controls in place to ensure that any output from any system, application, or process can be verified and trusted. This dovetails into any compliance issues that your particular industry may have.
- Compliance: You're probably aware of any compliance issues particular to your industry. You need to make sure that your provider can comply with these regulations.
- Loss of data: What provisions are in the contract if the provider does something to your data (loses it because of improper backup and recovery procedures, for instance)? If the contract says that you are simply waived your monthly fee, you need to ask some more questions.
- ✓ Data storage costs: Pay as you go and no capital purchase options sound great, but read the fine print. For example, how much will it cost you to move your data into the cloud? What about other hidden integration costs? How much will it cost to store your data? You should do your own calculations so you're not caught off guard. Find out how the provider is charging for data storage. Some providers offer a tiered pricing structure. Others offer pricing based on server capacity.
- Contract termination: How will data be returned if the contract is terminated? If you're using a SaaS provider and it has created data for you too, will any of that get returned? You need to ask yourself if this is an issue. Some companies just want the data destroyed.

Understand how your provider would destroy your data in order to make sure it is not still floating around in the cloud.

- Data ownership: Who owns your data once it goes into the cloud? Some service providers might want to take your data, merge it with other data, and do some analysis.
- ✓ Switching vendors: If you create applications with one cloud vendor and then decide to move to another vendor, you need to find out how difficult it will be to move your data from one to the next. In other words, how interoperable are the services? Some of these vendors may have proprietary APIs and it may be costly to switch. You need to know this before you enter into an agreement.

Cloud computing can become a practical way to gain productivity and predictability in your computing environment. But you need to make sure that you're addressing the practical considerations of accountability, predictability. Leveraging the assistance of an experienced integrator can be very helpful to midsize companies working to understand where, when, and how to move to this new world.

48 Cloud For Dummies, IBM Midsize Company Limited Edition _____

Chapter 5 Security and Cloud

In This Chapter

- Security as a public cloud service
- Making sense of security risks and vulnerabilities
- ▶ Taking care of your data
- Looking into monitoring and performance
- Deciding who's in charge of governance

Security is one of the most important issues for companies of *all* sizes. This is the case whether you're providing services to your internal customers via your own servers or to external customers in a cloud model. To both provide customers with differentiated services and maintain their trust and loyalty requires a well designed security and governance plan for your customers' services and information. In reality, whether you overtly plan to use cloud computing as part of your strategy, we suspect that over time it will become part of your computing environment. Either departments within your company will use cloud services or business partners will insist on leveraging them. Therefore, you need to be prepared.

.

In this chapter, we explain what it means to have a security environment that incorporates cloud computing. A successful security strategy in the future has to provide a holistic method of managing security and governance across your server environment, the public cloud services you may use, as well as those cloud services that you are sharing with partners. Therefore, this chapter presents a foundational bestpractices-based approach that can help you think differently about the security and governance of the cloud.

Security as a Public Cloud Service

Security and cloud are important to think about together. For most midsize businesses, the cloud offers a way to dramatically improve the security of their IT systems by linking their internal IT infrastructure to external IT security expertise. Public cloud managed security services allows for the latest security protections to be rapidly deployed across the companies' locations in real time. This is particularly important for midsize businesses that often lack the necessary security expertise at all their locations to properly safeguard critical business data and systems.



The risk of an IT security breach is very high at most midsize businesses. As a midsize business using cloud and mobile technology, you need access to the same level of security protections as your much larger competitors. Security services such as those for vulnerability management and intrusion protection require consistent regular updates to protect against the latest threats, and to keep your company out of the headlines. Managed security service providers use the cloud to create economies of scale that enable them to keep security protection timely while offering comprehensive security solutions affordable to midsize businesses.

Understanding Security Risks

Even without knowing it, many midsize companies have been confidently using SaaS (Software as a Service) applications for years without much thought about the security risks. As more business services are available outside your server environment, there are more opportunities to innovate. Companies are discovering that they can reach customers with mobilebased cloud services; or they can sell products through a multi-channel approach that incorporates cloud as one of the sales channels. As this combination of services continues to expand, a company needs to have a governance and security policy to address this emerging world.

Midsize companies are able to drive business growth and connect more effectively with partners and customers using

cloud services for e-mail, desktop virtualization, analytics, and collaboration. While midsize companies have the same needs for these services as their much larger competitors, they are often not as well equipped to address the additional security risks that arise from these innovative technologies. For example, midsize companies are less likely to have an IT staff with dedicated security responsibilities.

One of the first steps in creating a secure IT computing environment or cloud-computing environment is to assess your risks. This is because at the end of the day, you're responsible for security of the services you deliver to your customers, whether they're delivered from your on-premises servers or utilizing a third-party cloud provider. What are the classes of security risks? According to the National Institute of Standards and Technology (NIST), a government standards body, computer systems are subject to many threats ranging from loss of data to loss of a whole computing facility due to fire or natural disaster. These losses can come from trusted employees or from hackers. NIST divides these risks into the following categories:

- Errors and omissions including data errors or programming errors
- Fraud and theft
- Employee sabotage
- Loss of physical infrastructure support
- Malicious hackers
- Malicious code
- Threats to individual personal privacy

Many of the same security risks that companies face in dealing with their own computer systems are found in the cloud but there are some twists.



According to the Cloud Security Alliance (www.cloud securityalliance.org) — an organization dedicated to ensuring security best practices in the cloud — classes of security risk in the cloud include data loss or leakage, malicious insiders, account or service hijacking, insecure interfaces and APIs from poor authentication, and access control to encryption and activity monitoring of systems.

52 Cloud For Dummies, IBM Midsize Company Limited Edition _



With the increasing use of cloud computing, wireless technology, and mobile devices, you no longer have well-defined boundaries of what's internal to your systems and what's external. Ongoing, you need to determine if there are holes or vulnerabilities across servers, network, infrastructure components, and endpoints need to properly assess and monitor your business's security posture. In other words, you need to be able to trust your own infrastructure as well as that from a potential cloud provider.

Assessing your current state



Security starts with assessing your current state. Begin by answering a set of questions that helps you form both your approach to governance and your security strategy. Here are a few top questions to get you started:

- How do you control access rights to applications and networks — both those within your company and those that are outside your firewall? Who has the right to access IT resources? How do you ensure that only the right people gain access to your applications and information?
- Can you identify web application vulnerabilities and risks and then correct any weaknesses?
- Do you have a way of tracking your security risk over time so you can easily share updated information with everyone with a need to know?
- ✓ Is your e-mail and other web traffic safe from known viruses, spyware, as well as from unknown threats?
- Are your server environments protected at all times from external security threats?
- ✓ Are you able to monitor and quantify security risks in real time?
- ✓ If you're using cloud services in a multi-tenant (shared among many different companies) environment, are you confident that your provider has applied security controls?
- How do you adequately monitor, measure, and manage your IT assets across multiple environments?
- Can you implement security policies consistently across all types of on-premises and cloud architectures?

- How do you protect all your data no matter where it's stored?
- Can you satisfy auditing and reporting requirements for data in the cloud?

We know that this list asks you a lot of questions, and we don't expect that you can answer them in a few seconds. We presented these questions because this should be the foundation of assessing your current security environment.

How safe is your cloud provider?

It's important to understand how each provider handles security. Cloud providers have to create a fine balance between making their systems easy to use and easy for you to access and share resources among employees, customers, and partners and providing an acceptable level of security. On the one hand, these vendors need to make it easy for authorized users to share information. On the other hand, they need to protect their customers from the risks associated with unauthorized access to sensitive data. Therefore, companies providing cloud computing services have alleviated that security risk by standardizing and automating processes to protect a cloud environment that allows resource sharing without compromise.

Alleviating the risks

What can any company — cloud providers and cloud users do to alleviate the risk involved in cloud computing? Consistency and predictability in risk management is the key to success. Basically, this can be accomplished through two processes:

- Standardization: Standardization is a consistent and codified process by which a resource is delivered to an application or another resource.
- Automation: Automation uses a programming technique to deliver a process in a consistent and repeatable manner.

What does this mean to you? When your business establishes security approaches, they should be delivered and executed

in the same way across the entire company. Your cloud provider also needs to prove to you that it can meet these same standards.

Here's a simple example. In your company, there may be a standard that states that only people with a particular need for an application can even log on to that application. Likewise, there can be a standardized approach to which developers are allowed to access different programming resources. You may want developers to use programming resources on your own servers. However, in certain situations it may make sense for developers to use services from a cloud provider, such as during testing or to pilot a new application. An automated rule can be established to make sure that this standard practice is followed consistently. At the same time, the automated process can assign security access while a project is being developed. After the project is complete the security access is automatically revoked. This prevents security breaches based on preventable errors, such as operator error and lack of oversight. These standardized and automated processes provide that oversight without human intervention.

Many well-run cloud providers implement sophisticated automation and standardization best practices as delineated above. But as in any complex computing environment, the cloud provider also needs to automate and standardize the foundational elements of the software lifecycle.

For example, a cloud provider needs to automate and authenticate software patches and configuration changes. Likewise, the cloud provider must manage security patches in a proactive way. Why is this so important for you to understand? Many of the outages experienced by cloud service providers are typically configuration mistakes. If a cloud provider doesn't update security, your intellectual property could be at risk.

Creating secure infrastructure environments is an important part of a comprehensive cloud security strategy. However, the central focus for your security efforts always gets around ensuring the safety of your data. Deploying public or hybrid cloud solutions results in putting your business data on your partners' systems. Data is the lifeblood of your business. Therefore, how you manage your data, regardless of where it lives, is critical to the health of your business.

Managing and Protecting Your Data

Data in the cloud can span many different environments. A typical cloud environment is tied not only to the data within a specific application but also to a line of business application running in the data center, e-commerce applications, and other customer facing environments. This data comes in all shapes and sizes. There may be transactional data, customer data, as well as various kinds of unstructured data based on everything from images to document content. Being able to manage the flow of this data is a critical issue in cloud environments. Some data may be stored in a SaaS application, such as a CRM application in a public cloud, while other data sources may be private and will be managed in traditional server environments or in a private cloud.

Ensuring data protection

Security of the data, whether in a public or private cloud or a traditional server environment, is a complex issue that continues to plague the industry. As midsize companies are increasingly distributing their data through customer portals over cloud services, the integrity of this data must be maintained. Data control becomes essential in any kind of cloud. It is critical to discuss data protection issues with your cloud provider. Here are just a few of those issues:

- ✓ Commingling of data: Even if your data is in a country that has laws you're comfortable with, your data may be physically stored in a database along with data from other companies. This raises concerns about virus attacks or hackers trying to get at another company's data. Talk to your provider about how it counters these threats.
- ✓ Data access: What controls are in place to make sure that you and only you (or whoever has access rights) can access your data? In other words, what forms of secure access control are in place? This includes identity management where the primary goal is protecting personal identity information so access to computer resources, applications, data, and services is controlled properly.

- Threat management: What software and procedures does your provider have in place to counter a variety of security threats that might affect your data? This includes intrusion protection.
- Securing data for transport: Data transport in the cloud might move from point A to point B either within a cloud environment, between your company and a cloud provider, or even between clouds. You need to make sure that your data is segregated from other companies' data and is encrypted for transport.

Of course, data security is a critical issue even when data's stored on your own premises. For example, consider the case of a midsize bank operating in over 40 branches in Asia. The bank was concerned about information leaks because some of its customer data was stored on personal computers. These computers were vulnerable to a number of security threats. Additionally, troubleshooting and maintaining these PCs created additional problems because all of the PCs weren't running standardized configurations.

To address these challenges, the bank decided to build a private cloud environment to replace the existing personal computer-based IT system. The bank constructed a thin-client system that replaced its existing x86 machines. It created a virtualized environment with virtual machines on the servers. so that while the environment is standardized, the user feels that she's working on her own PC (for more information on virtualization, see Chapter 2). The difference is that all data is stored on the servers, eliminating security issues, such as information leaks, on the users' end. Additionally, because the thin client environment allows central user administration, management can implement application control, such as defining permissions for applications to be available by user group. The system can log all user access, which helps to detect and prevent unauthorized access. The bank has also implemented additional security functionality where servers accessing the Internet are segregated from those that are just used internally to decrease the likelihood of servers with critical information being compromised.



Your company needs to develop and publish a consistent set of rules and policies regarding the creation, capture, management, transmission, storage, and deletion of confidential and business-critical data. Techniques, such as encryption and

tokenization, should be used to reduce exposure to data theft and misuse. We recommend speaking to your cloud provider regarding what controls it is providing for your data.



Hackers and thieves are always one step ahead of the latest security measure, so data protection tools need to be used wisely to provide adequate protection. For example, situations exist where thieves have been able to steal encrypted data. In one recent case, the data was encrypted only up to the point the data was delivered to the applications. At that point, it was decrypted and that's when the loss occurred. This loss could've been prevented if the receiving application had been allowed to control the decryption process.

Monitoring and Performance

Someone in your organization (most likely an administrator) needs to have visibility into your public, private, and hybrid cloud environments. Also, tie this monitoring into your governance policies. Make sure you can access the following:

- ✓ A dashboard that provides you with insights across the applications and services that are running in your server rooms and those that are running in the cloud. This should include a way to monitor when applications are running or not and whether there are incidents or problems. You need to ask your service provider (whether internal or external) what kind of visibility you have from its systems. You then need to determine the level of risk you are willing to take in terms of what you can see and what you can't see.
- ✓ A service level agreement (SLA) across your own services and those provided by cloud providers to get a true picture of the services you are providing to your internal and external customers. For more about SLAs, check back in Chapter 4.

Sharing the Governance Responsibility

A thorough understanding and evaluation of the risks your company faces is a requirement to creating a sound cloud

security strategy. There are different levels of risk and your company has the last word on finding the right balance between overprotection and too much risk exposure. IT needs to weigh the competing influences of meeting customer expectations, optimizing business goals, managing resource and cost constraints, and following industry and governmental regulations.



Sometimes these influences may be at odds with each other. In fact, because of these conflicting needs, midsize companies need to ensure that an executive team evaluates these risks from a holistic perspective. *Governance* is about making good decisions about performance predictability and accountability. To follow the performance goals of the business, you need to understand the compliance and risk measures.

Cloud governance is a shared responsibility between the users of cloud services and the cloud provider. Understanding the boundaries of responsibilities and defining an appropriate governance strategy for your company requires careful balance.

Cloud governance requires governing your own infrastructure as well as infrastructure you don't totally control. One of the important technical requirements for ensuring that governance policies are maintained and that audits are successful is the ability to log activity that takes place in your server environments and private cloud. You need to define when, where, and how to collect log information so you have an automated way to keep track of how well you're doing in terms of managing the confidentiality of your business-critical and sensitive information.

You may also want to set up some sort of governing body to deal with all of the different environments you now need to manage. If you already have a group in place, that's great. This group, in addition to dealing with your own servers should also have the responsibility for dealing with cloud providers to discuss the issues and to negotiate terms and conditions with cloud providers.

Chapter 6 Starting Your Cloud Journey

In This Chapter

- ▶ Using cloud computing as your business strategy
- Developing your cloud strategy and leveraging best practices

. . . .

Linking to IBM cloud resources

The possibility of leveraging cloud services is compelling because it enables your company to act, look, and react like a much bigger company. But a great strategy doesn't happen in a day. It requires planning — just like any other business strategy. In this chapter, you examine what you need to do to compete, armed with a compelling cloud computing strategy.

Cloud Computing as Your Business Strategy

Cloud computing is more than a set of technology options; it's really a way to rethink how you conduct your business. What will it take to enable your company to grow? Where and how do you want to invest your time and money? How can you create a business strategy that enables you to move quickly and transform your ability to act like a big company — even if you are a midsize company? Start your exploration of the cloud journey with an example.

Russell's gets efficient with cloud services

Russell's Convenience Stores manages, owns, and operates 25 stores located within office complexes. Stores are complex to operate because they involve many different suppliers, landlords, local, state, and federal regulations and contractors to manage — to name a few. Russell's has to provide a high level of service to the building management where its stores are located as well as the customers that use its services. At the same time it has to be able to satisfy all of its constituents in the most efficient and cost effective manner. The organization's greatest challenge has been to keep track of all these details of managing day-to-day details.



There were several key challenges:

- Implementing a physical server in each store where employees had to manage the environment
- ✓ Store with unique sets of constituents to manage
- Keeping track of projects, inventory, catering requests, and the like

The solution was to leverage cloud computing services. Russell's deployed IBM's LotusLive Engage. This cloud-based collaboration platform enabled the company to keep track of project details in a centralized collaboration space so that it was easy for highly distributed teams to keep track of project details. Using the web meetings online conferencing capability of the platform, teams were able to not only communicate online but also have consistent access to building diagrams, regulations, and to-do lists. In addition, it was easy for Russell's to temporarily connect a new subcontractor into the system. The system also was able to connect directly to a web-based Point of Sale system. Without having to invest in expensive hardware, software, and support personnel, Russell's had the benefit of sophisticated services at a reasonable cost. Even more important, these services allowed Russell's management team to be able to effectively compete and keep projects moving effectively.

Mapping to the problem

Russell's could have approached its strategy in many different ways. However, what made Russell's plan successful was that the strategy was driven by both the short- and long-term business strategy. When planning a cloud computing strategy companies that begin by looking at business goals, opportunities, and roadblocks are the most successful.

In the case of Russell's, the most important business driver was being able to continually bring disparate groups together to facilitate a project. Russell's also needed to present itself to large corporate office buildings as a sophisticated organization that could meet changing needs. Midsize businesses are most successful when they can be the most nimble, flexible, and professional team. This flexibility can often allow the midsize business to win even when the competitor is much larger. Therefore, cloud computing because of its built-in flexibility is a great partner for the midsize business.

Determining Your Priorities

As you begin to look at what's possible with the cloud, you should start by asking yourself some fundamental questions about the role of technology in your business. Start with this list:

- ✓ What's the role of technology infrastructure in your business?
- ✓ Is my company in a highly regulated industry?
- How do I assess how well I service my customers today and how could this be different? Do I have the right technology in place to meet unanticipated needs?
- How much value am I getting from my existing technology environment?
- ✓ Am I under pressure to reduce capital expenses?
- ✓ Do I have plans to introduce new innovative technology over the next 12 to18 months?

- Is my company looking for new partners and business approaches? Will our current technology support these new initiatives?
- ✓ Is the business under pressure from large companies entering my market? Are there technologies that will help us be more agile?
- Can I use the fact that my company is more nimble as a strategic advantage?

Developing Your Cloud Strategy

Answering the questions above may lead you to recognize that cloud computing can be a strategic direction. A cloud strategy isn't a one-shot effort; it's a long-term plan. The following five steps help you get started on your journey.

Step #1: Business assessment

You need to start by assessing your business today and where it is going in the next several years. For example, you need to define your competitive advantage in your market. You need to assess your strengths and weaknesses in comparison to your competitors. Understanding your business strategy helps you plan your cloud strategy.

Step #2: Technology assessment

After you understand your business direction, take a look at your current technology environment. For example:

- You may benefit from a cloud-based collaboration platform to better support employees and business partners.
- ✓ You may want to use a SaaS business application to improve customer service.
- You may want a more efficient way to pilot a new experimental business approach without a better way to collaborate with your own employees and with partners.

- You may want access to extra computing capability for peak customer demand without investing in new servers.
- ✓ You may want to minimize business disruptions and facilitate quicker, more effective disaster recovery.

Step #3: Create a staged plan

With your business and technology assessment completed, you're in a good position to plan your cloud journey. You have many options that can be part of your plan. You need to decide which of these capabilities are the most important so you can stage your plan. These options include the following:

- ✓ You may decide that you need a set of cloud development services that will help make it easier and more efficient for your development team to be productive.
- You may want to have a way to add new computing and storage services for special projects and peak holiday cycles.
- You may want to have a collaboration platform that can be used to locate expertise and work with project teams.
- ✓ Your organization may be interested in using some SaaS applications.
- You may also want to optimize your existing server environment.

Step #4: Establish a project team



A cloud computing strategy is a collaborative effort between business and IT, so you want to make sure that you have good representation of all the stakeholders. Depending on the size of your business, you can have a small team that owns the strategy and then works with different divisions or offices so you execute your plan in a holistic manner. You can involve your strategic partners and suppliers as part of your cloud team. Important customers are able to provide you with guidance in terms of how you can service their needs.

Step #5: Pick a project as a proof of concept

Picking the right project is important. Your starting point depends on several factors:

- Picking a well-defined project that demonstrates quick results: You don't want to select an effort that takes six months before anyone appreciates how the cloud is helping the business to be more competitive. Many public cloud solutions can have very short implementation cycles which can help demonstrate ROI rapidly.
- Looking for a project that demonstrates a reduction in capital expenditures: For example, virtualizing and consolidating servers could help you streamline IT operations and demonstrate value, or a public cloud solution could help you move a capital expense into a monthly operational expense.
- Selecting a project that's tied to a new business initiative that is important to the CEO: For example, create a simplified way to collaborate with business partners that can create new revenue opportunities.

Measuring and Assessing Risks

Risks come in all shapes and sizes, so when you plan to move forward with a new technology initiative, understand your risks so you minimize the impact on your organization. The primary risks to address include people, process, and technology resources. Begin by asking yourself the following questions:

- ✓ What are the people and process risks associated with any new technology? Are the people on the business and technical side of your company ready to embrace change? Do they understand how their use of technology services and business process will change?
- How can my processes change in the cloud? How will cloud-based processes impact your organization?

Chances are that you can effectively address any people or process issues, but you shouldn't forget to address them.

✓ What about the technology resources?

Every company has its own tolerance level when it comes to risk. This may vary by the type of application you are dealing with. There may be applications that have to be carefully managed because of compliance requirements. As you begin your cloud journey consider each type of asset that you could move to the cloud and determine the level of risk.

Assessing the risk associated with a move to the cloud is important to protect the integrity of your business. Chapter 5 discusses some solutions to managing risk if you do your homework and are well educated to select the right approach and solution. The requirement to assess risks isn't a one-time thing. Monitoring what your cloud providers are actually doing is critical to your success.

Leveraging Best Practices

There is nothing like making big mistakes to teach you important lessons about what not to do. Best practices in IT are the way to avoid costly errors — and also learning from the successes of companies in your own market that do things well. One of the benefits of cloud computing is the fact that it's based on a service-oriented model. What do we mean by this?

Chapter 2 covered a lot of the fundamentals of the cloud. One of these characteristics is that with cloud services you leverage a well-defined service that can be used in a lot of different situations. Examples of these types of services include an analytics process to understand customer buying patterns or a process to determine web traffic. A cloud service may be a payment service or a service that verifies the credit worthiness of a new customer.

What do these types of services have in common? They are designed as independent business services that don't have dependencies outside of the process they execute. They have well-defined interfaces so they can be used in many different situations. These types of services are also designed based on the experience of developers and integrators who've created services for many different business situations.

66 Cloud For Dummies, IBM Midsize Company Limited Edition _____



Best practices are an important part of your cloud journey. You want to be able to learn from the experience of your colleagues in your industry. For example, if you're a retailer, you want to understand how your competitors use cloud-based services to create new business opportunities in a costeffective manner. There may be social business cloud services that allow you to reach out proactively to untapped markets. There may be partnership opportunities that can allow you to experiment with new online retail models without spending hard-earned capital on the line. If you're in the healthcare industry, you may want to allow the hospital staff to have easier and less costly access to patient records, X-ray images, and the latest medical research.

Linking to Resources



Some IBM links that you may find useful include the following:

SmartCloud E-mail Management Express

www-935.ibm.com/services/us/en/it-services/ email-management-express.html

SmartCloud Enterprise

www.ibm.com/smartcloud/solutions/enterprise

BlueWorks Live

https://www.blueworkslive.com

Tivoli Live — monitoring services

www-935.ibm.com/services/us/en/it-services/ tivoli-live-monitoring-services.html

✓ LotusLive Engage

www.lotuslive.com/en/services/engage

WebSphere Cast Iron Cloud integration

www-01.ibm.com/software/integration/
cast-iron-cloud-integration/#

Rational AppScan OnDemand (SaaS)

```
www-01.ibm.com/software/awdtools/appscan/
ondemand/
```
✓ Smart Business Desktop on the IBM Cloud

www-935.ibm.com/services/us/en/it-services/ smart-business-desktop-cloud.html

Express managed e-mail security

www-935.ibm.com/services/us/en/it-services/
express-managed-e-mail-security.html

Express managed protection services for server

www-935.ibm.com/services/us/en/it-services/ express-managed-protection-services-forserver.html

Express Managed web security

www-935.ibm.com/services/us/en/it-services/ express-managed-web-security.html

Express penetration testing services

www-935.ibm.com/services/us/en/it-services/
express-penetration-testing-services.html

Managed Security Services (Cloud Computing) — hosted vulnerability management

www-935.ibm.com/services/us/en/it-services/ cloud-based-vulnerability-management-andpci-scan-service.html

$\delta 8$ Cloud For Dummies, IBM Midsize Company Limited Edition _____

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

Cloud computing offers enormous benefits to midsize businesses

Midsize companies can leverage the flexibility of cloud computing to effectively compete against much larger competitors. These companies can innovate and experiment with new business models, new partnerships, and new ways of building customer intimacy. Your company needs the flexible, elastic, and self-service computing resources to support business change at a price you can afford.

- Develop a cloud strategy establish a roadmap and goals
- Automate your consistent processes allow internal developers to provision services on demand
- Develop flexibility and agility bring innovative solutions to market quickly
- Govern your data securely integrate across multiple clouds



Open the book and find:

- How to leverage Cloud to improve security
- How to be certain where your data rests
- The scoop on the cloud
- The technical foundation for cloud computing

Making Everything Easier!"

Go to Dummies.com

for videos, step-by-step examples, how-to articles, or to shop!

Find out more information about how to leverage Cloud to improve your business success at the following websites:

*www.ibm.com/businesscenter *www.ibm.com/engines For Dummies® A Branded Imprint of

ISBN: 978-1-118-15475-5 Not for resale Part #SMM03003-WWEN-00