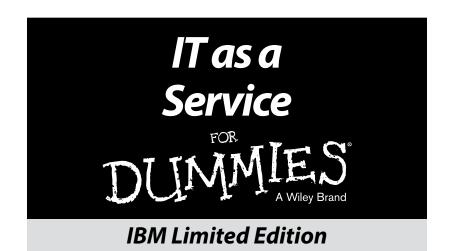# IT as a Service

FOR DUMMIES

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Learn to:

- Transform your IT organization into a services provider
- Become a trusted partner to the business
- Understand the importance of modular services
- Recognize the value of the hybrid cloud model

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IT as a Service

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IBM Limited Edition

by Judith Hurwitz and
Daniel Kirsch

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Publisher's Acknowledgments

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Introduction

*W*elcome to *IT as a Service For Dummies,* IBM Limited Edition. IT as a Service is the emerging technique that gives technology leaders the flexibility of providing the right set of services to the business. The world of IT is changing dramatically. Businesses are increasingly discovering that IT services are becoming the foundation for the customer experience. IT as a Service isn't simply a new delivery model for applications. Instead, IT as a Service is a new approach to providing an array of modular services that are targeted to solve changing business problems. While services can be as straightforward as compute or storage in the cloud, they can also be used to complex solutions. Other services may include microservices or integration services that enable a business to quickly create new solutions to help service customers in a more creative and efficient manner.

The model for IT as a Service requires some advanced planning in order to create consistency and predictability. Before you achieve a new model for computing, you need to start with your current reality. What type of infrastructure is in place now? What applications are running in your data center and in your business units? How well does your current environment serve your business? Even more important, how well does your current environment support your customers?

The goal of IT as a Service is to increase the capability of the business to create new innovative solutions quickly. Are you prepared to change when new competition emerges? Can the IT organization become an agent to support this change?

About This Book

This book is intended to help you understand the fundamentals of IT as a Service. IT as a Service is a hybrid computing environment that enables companies to leverage the data center and public and private clouds in order to provide the business with the appropriate services based on price, availability, security, and level of service.

How does the IT organization change as it becomes a service provider to the business? This book focuses on the strategy and planning process needed to begin to make the transition to a new model. In addition to doing the right level of planning, IT organizations have to be able to coordinate with business units in order to address their future requirements.

If you're a business leader or the head of IT services, this book provides you with a road map to the types of technology you need to understand and how the planning process works. This book also gives you an understanding of the ongoing collaboration process between IT leadership and business leaders.

Foolish Assumptions

The information in this book is useful to many people, but we have to admit that we did make a few assumptions about who we think you are:

- ✔ You are already using a variety of internal and external services to better support the business's need for change. You want to be seen as a partner with the business.

- ✔ You are in the process of creating a radically new model for computing that is focused on speed, agility, and compliance. You know that responding to the need for innovation is the heart of technology adoption for your company.

- ✔ You understand the huge potential value of a services model and are prepared to move forward to help your company grow and avoid competitive threats.

- ✔ Your organization is beginning to understand that all your computing resources are becoming a set of IT services that are designed with the modularity and flexibility to move your company forward efficiently and effectively.

Icons Used in This Book

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

Tips help identify information that may help you save time, money, and more.

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

This icon highlights important information that you should remember.

This icon contains tidbits for the more technically inclined.

Chapter 1

Why You Need IT as a Service

In This Chapter

▶ Explaining the transformation of IT

▶ Defining IT as a Service

▶ Leveraging modular services

▶ Understanding the value of the hybrid model

▶ Differentiating cloud delivery models

▶ Looking at the role of DevOps in the hybrid cloud

▶ Discovering the importance of automation

▶ Promoting flexibility through brokering services

*I*T is changing rapidly in the era of digital disruption. IT can no longer exist as a rigid environment where applications are built based on business processes that are outdated before an application is written. IT can't afford to play defense against the changing needs of the business. Just a few years ago, IT organizations were fearful of the advent of cloud services. As a result, IT leaders saw that business units were beginning to use public cloud services because they couldn't convince IT to be responsive to their needs.

A lot has changed. IT leaders have recognized that to both survive and thrive they need to be part of the solution so that the organization can respond to new challenges and opportunities. In this chapter, we explore why IT is transforming to an IT as a Service model. We also explain the changes and how the business benefits from the value of the new IT.

Explaining the Transition of IT

Technology adoption and change has typically followed major business upheavals. In eras where businesses change slowly, technology adoption is also slow. However, when there are major shifts in business strategy and game changing technologies emerge, new ways of leveraging innovation explode.

The typical IT organization has gone through many different transformations over the past five decades. The initial era of computing actually looked a lot like cloud computing. This model, called *timesharing,* was created to allow companies to buy time and capability from large complex systems. When computing needs of enterprises were static, this partnership between service providers and businesses worked well. But as the pace of business change quickened in the 1980s, it became clear that this model was too slow, too expensive, and too inflexible. As a reaction, businesses moved IT in-house. The results were well received. But there were massive changes in technology that began to explode in the last decades of the 20th century that brought in new distributed technologies and new software options that helped smart businesses move faster than their competitors.

In the last several years, new competitive threats and business opportunities have emerged from new, never imagined companies. The advent of the public cloud changed everything for IT. Business units were unhappy with the lack of agility of many IT organizations. Line of Business (LoB) leaders were seeing emerging companies leverage cloud services to create new product and service offerings that had the potential to attract new buyers and hold onto loyal customers. Something had to change. These leaders took charge and leveraged the public cloud to build new innovative services in an effort to innovate and keep customers happy.

Even as LoB leaders used public cloud services at an increasingly rapid pace, many IT leaders fought the transition for a while. They didn't want to see their IT organizations undermined. These IT leaders had legitimate concerns about issues such as privacy and governance. But they began to recognize that if they were to have a seat at the management table, they would have to change. Change meant that they would have to embrace the cloud and find ways to offer the right level of flexibility with the right level of control. IT as a Service is

the strategy and process of balancing flexibility with financial management and control.

IT leaders are using IT as a Service as a way to build alliances with business leaders so that IT can deliver the right services with the right service level at the right time.

Defining IT as a Service

IT as a Service is an operational delivery model for providing IT services in a variety of consumptions models based on the requirements of the business at that time. Many IT organizations are transforming themselves into IT service providers and adopting an IT as a Service strategy. By transitioning to an IT as a Service model, IT organizations are transforming themselves from traditional IT groups to brokers of a variety of public and private cloud services, third-party managed service providers, and traditional data center services. By offering brokering services, IT is able to have insights into costs and help the business make better decisions to keep costs in check. By adopting an IT as a Service strategy, IT organizations are able to gain the trust and confidence of the business leaders.

Becoming a trusted partner

A mid-sized retailer was experiencing massive changes in the market. There was an ever-increasing number of online retailers that were challenging the retailer's market position. The company was well established and had a reputation of delivering excellent products to a loyal customer base. But with the influx of competitors something had to change.

The LoB leaders were in revolt. They demanded that IT move quickly so the company could offer customers a sophisticated online experience that would leapfrog the upstarts. IT was eager to help, but there were problems. The CEO didn't want to use cloud services for fear that customer data would be compromised. The business leaders were more concerned about keeping up with the latest technology. IT practitioners were unfamiliar with cloud services and wanted to build a new customer application within the data center.

(continued)

Things were not going well. Each meeting ended up as a shouting match. Business leaders stopped attending meetings all together and began sending a junior analyst as their representative.

As a result of the communications breakdown, business leaders instructed their analysts to use public cloud services to build the type of customer facing applications that could help it survive the new competitors.

The writing was on the wall. The CIO realized that the fight for control was hopeless. It only managed to cut the IT organization out of planning and decision making. Therefore, the CIO made a decision to rethink the role of IT. The IT organization could become a service supply for whatever technologies the business needed. It wasn't a simple process. It required transforming IT from an integrated set of platforms and applications to an organization that had a catalog of self-service offerings that would meet the changing business needs. These would not be static services. Rather, there would be a catalog of services that would be in compliance with corporate security and governance policies. Application Programming Interfaces (APIs) would be added to link the right services together to deliver results. All these offerings would include a self-service interface for business users.

At first, the business leaders were skeptical that IT could change. But over time, IT became a service organization and trust began to grow. No longer did business leaders skip strategy meeting with IT leaders.

The Importance of Modular Services

Being able to move from a hierarchical computing model to a more flexible services model requires modularity. The idea is straightforward: To become an IT service provider, you need to provide a catalog of services that can be linked together to create new applications and new value for the company. These services have to be orchestrated together to create business value. A monolithic application can be deployed in a cloud, for example, but it can't be easily modified. A legacy application would need to be decomposed so that all the individual modules are understood. At this point, these modules would need to be assessed to determine if they're viable for use in the cloud environment. After you have these modular services, they become the foundation for a cloud marketplace.

A *modular service* is a clearly defined process that has no dependencies to outside services. It also includes well-defined APIs. Each service needs to be tested both for accuracy of the captured policy and for technical accuracy. These services are then put into a catalog so it's clear where the service originated, how it should be used, and who's allowed to change that service.

This type of modular architecture helps to create the type of environment where services can be used in a variety of deployment models based on the needs of the organization.

The Value of the Hybrid Computing Model

The hybrid cloud is becoming the de facto approach for IT organizations that are adopting IT as a Service models. A hybrid cloud strategy allows companies to quickly change processes and compute requirements to keep up with the pace of business change. For example, you may want to create a new mobile application that satisfies customer demands to access key services via a mobile application. For many customers, mobile applications are the primary way they interact with companies. Satisfying the expectations of customers is a critical requirement for companies because many emerging competitors are able to reach high levels of customer intimacy and accessibility via mobile and web applications. When hit with a strong competitor, suddenly you have to be able to demonstrate that your company can react quickly to retain market leadership. This means supporting the right deployment model while maintaining access to the right data and the right workloads. Ultimately, forward-looking companies think of the computing resources as a set of services and best practices that can be brought together to support changing customer requirements.

There are many approaches to adopting a hybrid cloud environment based on IT as a Service. There isn't one right answer. The solution depends on your objectives and needs. Some companies have jumped all in on cloud computing and have made the decision to operate totally on a public cloud. However, as a company grows, it's important to assess how well the public cloud vendor handles changing security and governance requirements to protect customer data.

When your company has backend transactional systems, you have to make sure that your cloud services can work seamlessly with these assets. These backend systems are often best managed inside the data center to protect intellectual property and to manage performance. Costs can also become a major concern. You need to have a consistent and predictable way to calculate costs and expenses of the different options. If you choose to deploy all your operations on a single public cloud, make sure that you have a well-designed contract that protects your company from unanticipated pricing changes. Finally, as you plan for your hybrid cloud strategy, break down the barriers between your on-premises and cloud-based systems in order to gain the insights you need to service customers and grow your business.

Looking at Different Cloud Delivery Models

To support a sophisticated services model, you can use four different cloud models.

Infrastructure as a Service

Infrastructure as a Service (IaaS) is the foundational cloud service. IaaS provisions compute, storage, and networking services through either a virtualized image or directly on the computer systems (also known as *bare metal*).

An IaaS service is designed as a self-service environment. A customer can simply use a credit card to purchase a service such as compute or storage. Consumers are typically charged based on the amount of resources they consume. When a consumer stops paying for the service, the customer loses access to the resources. In a private IaaS, the environment is controlled directly by a company's IT organization. The IT organization will have direct control over things like security and who has access to what resources.

In an IT as a Service model, it's critical to provide users with the right infrastructure for the task at hand. For example, if your organization handles medical information, you may need to provide this level of compliance in your infrastructure

services. Likewise, if a team is running data intensive analytics workloads, the infrastructure has to support high availability.

The emergence of a Software-Defined Environment (SDE) provides a next generation approach to IaaS and other cloud services. The goal of IaaS is to optimize the use of system resources so they can support workloads with maximum efficiency. An SDE is an abstraction layer that unifies the components of virtualization in IaaS so the components can be managed in a unified fashion. In effect, the SDE's intention is to provide well-designed APIs and a management environment for the variety of resources used within an IaaS environment.

REMEMBER

SDE brings together compute, storage, and networking to create a more efficient hybrid cloud environment. It also allows developers to use a variety of types of virtualization within the same environment without the burden of hand-coding the linkages between these services.

Software as a Service

Today, many applications are available in a Software as a Service (SaaS) model. SaaS is an application that's architected to operate as a cloud service. Many business users benefit from the ease of use and fast delivery of applications delivered on the public cloud. Alternatively, an IT organization can use its private cloud to host and deliver internal applications to meet the needs of its internal business users.

One of the benefits of leveraging applications delivered via the cloud is that the user isn't responsible for software updates and maintenance of the application. However, unlike a traditional on-premises application, the user doesn't have a perpetual license for the application. Instead, the user pays on a per-user, per-month, or per-year basis.

Platform as a Service

Software development, deployment, and operations has evolved over the last several years. Platform as a Service (PaaS) is a cloud development platform that gives developers an underlying level of middleware services that abstract the complexity away from the developer. In addition, the

PaaS environment provides a set of integrated software development tools. When a company is taking an as-a-Service approach, leveraging a PaaS environment allows developers to focus on creativity and innovation.

A well-designed PaaS consists of an orchestrated platform to support the life cycle of both developing and deploying software within the cloud. A PaaS platform is designed to build, manage, and run applications in the hybrid cloud environment.

Unlike traditional software development and deployment environments, the software elements are designed to work together through APIs that support a variety of programming languages and tools. Within the PaaS environment are a set of prebuilt services such as source code management, deployment of workloads, security services, and various database services.

Business Process as a Service

One of the benefits of a hybrid cloud environment is the ability to link business processes from a variety of services and systems in order to satisfy a customer need. Encapsulating business process allows teams to reuse prebuilt and tested processes. Rather than recoding common procedures, development teams can leverage predefined business processes. In an IT as a Service model, making business processes reusable allows development teams to focus on innovation and helps ensure that services will function in a predictable manner. Flexibility is key for companies that want to change a process when the business changes.

There are several different ways that business processes are handled in a hybrid cloud environment. A number of business processes are mature and not likely to change quickly. For example, some services include payment services. Payment processes can be complex and include taxes, shipping options, and so on. However, other situations arise where business processes need to be able to be changed on the fly. For example, your company has discovered that an emerging competitor has come up with a novel approach to streamlining the payment process. If the core business processes can be modified quickly, your company can adapt business processes across the company and keep up with competition.

REMEMBER

Often customers demand that companies adapt their business processes based on what they see from emerging vendors in the market. As customer expectations rise, businesses must adapt to meet their customers' expectations.

Hybrid computing isn't a single environment. Instead, it's a combination of resources, including the following:

- ✔ The traditional data center
- ✔ A variety of public cloud services (including IaaS, SaaS, PaaS, Process as a Service, and Data as a Service)
- ✔ Private services managed for a single company either without its own firewall or in a securely managed service

The hybrid cloud is intended to help you use whichever computing services make the most sense given your requirements and constraints.

The value of a hybrid computing environment is flexibility. No one can anticipate when a new deployment model will emerge or when company or regulatory policies may dictate a change. For example, an application has been piloted in a public cloud. However, when the application moves into production, management may decide that it should be deployed in a private cloud because of either governance or security concerns. Cloud capacity is another imperative. You need to include business strategy, organizational skills, the ability to manage projects, and the portfolio of services. In some situations, financial managers may decide that the current pricing model doesn't work and an alternative must be sought.

TIP

When you leverage an IT as a Service model based on a modular set of services, you have a lot more flexibility to move workloads based on issues, such as performance, security, or costs. Offering this level of flexibility can help transform the reputation of the IT organization.

What Is DevOps in the Hybrid Cloud?

Developing, updating, managing, and monitoring applications are all mandates of IT organizations. But with the advent of

hybrid clouds and a variety of deployment models including mobile, DevOps requires a technical change in how applications are created. At the same time, there's a cultural change required to ensure that the business and technical organizations are collaborating to achieve the right outcome.

We are in an era where both business users and customers have rising expectations. Customers expect applications to give them the right data and the right time in an easy way. In addition, customers have no tolerance for application errors or outages and will simply move to a competitor's offering if they have difficulty with an application. Many organizations are rethinking their application development, deployment, and management techniques to help better serve customers.

DevOps isn't an isolated process or a one-time action. DevOps is a technique that combines the processes of dynamically creating applications in concert with the processing of deploying and managing those applications. DevOps is a continual process and requires changes to both technology and team culture. DevOps supports the requirement to continuously improve, deploy, and monitor new innovative applications to support changing business needs.

DevOps requires both a technical change in how applications are created and a cultural change in how IT collaborates.

The focus on innovation

Innovation is becoming a key to business change and transformation. Emerging companies with little legacy and new business models are challenging incumbent business leaders like never before. To meet the speed of innovation, the software development, deployment, and operations have begun to transform from silos of deployment and deployment into a continuous life cycle model. By allowing developers and deployment specialists to work in collaboration, they can create applications that are dynamic and flexible.

Flexibility at the core

Services must be flexible and continually modified to meet the requirements of constituents. Achieving fast application deployments and updates requires collaboration between the

business, development, and IT operations. This need for align-
ment and collaboration is the driving force behind the shift
to DevOps. Organizations that have implemented DevOps are
able to achieve the following goals:

✔ **Continuous innovation:** Employees from across devel-
opment, operations, business owners, and so on work
together to quickly release new software that can delight
customers and maximize opportunities.

✔ **Continuous delivery:** Automating software delivery
processes and eliminating the need for routine tasks
removes inefficiencies and allows the organization to
continually deliver innovation.

✔ **Continuous learning:** Creating a feedback loop by moni-
toring software and customer interactions allows an
organization to adapt applications to meet expectations.

The end-users (whether they're customers or business users)
don't care how an application is developed, deployed, or
monitored.

A DevOps approach needs to be complemented with addi-
tional business process changes that support innovation
and rapid customer feedback cycles. Establish standardized,
consistent, and repeatable processes for managing software
quality from requirements definition through to delivery,
deployment, and operations. Equally important is the neces-
sity to ensure that these new applications perform well based
on customer expectations.

The Importance of Automation

IT as a Service has the potential to transform the delivery of
critical application services to the business. But it doesn't
happen by magic. Instead, providing a set of well-defined
services across a hybrid environment requires automation
services that deliver both agility and speed. IT as a Service
requires the following automation services:

✔ **Orchestration services:** These services automate the
process of enabling a variety of services from on-premises
systems to connect with services in both public and pri-
vate clouds based on best practices and policy.

✔ **Business policy services:** When creating IT as a Service, make sure that users are directed to the right IT service based on everything from the business requirement to budget and governance and security. There is a need to make sure that users are accessing the right data from these services so results are accurate.

✔ **Catalog services:** Business services and components that are to be used in an as-a-Service environment have to be managed in a consistent and predictable manner. Each service should be vetted and tested. Does this service conform to corporate guidelines? What are the dependencies for use of the service? Who is allowed to change the service? Where are the services located? In essence, when you create an as-a-Service model, all the elements have to be identified and managed so things operate seamlessly behind the scenes. This protects the integrity of the business.

✔ **Workload balancing services:** It is important to make sure that when you link a variety of services together that they operate as though they're consistent and pre-dictable. One aspect of this requirement is to make sure that workloads are well balanced so their performance is guaranteed.

These examples help ensure that IT as a Service can operate in a predictable manner. These automation components are part of an overall hybrid cloud management framework that's emerging to enable a variety of services to act and behave as a single environment.

The Value of Brokering Services

The cloud computing world offers a vast array of riches from which IT organizations can choose. Hundreds of different public cloud offerings exist. There are thousands of SaaS applications and even more cloud computing tools. How do you select the right environment and the right services when you're contemplating offering your users IT as a Service? This question may not be simple to answer.

IT as a Service must be a dynamic environment. The environment has to serve a variety of changing business needs. It also has to have the capability to manage and predict costs. The value of brokering is that it begins with a planning process to understand the needs of the business to be proactive combined with the constraints on costs and need for the right level of security and the right level of service.

Policy-driven approach

The value of cloud brokering is to establish a process so business units have the right mix of freedom to select the right service with the right amount of control from IT. Cloud brokering is an environment that acts as an intermediary between different cloud services. A cloud broker provides self-service IT across a variety of hybrid cloud environments, managed services, and data center services. A well-designed cloud broker provides a holistic model for a policy-driven approach.

The idea of a cloud broker is not new. The early cloud brokers were vendors that could negotiate deals with public cloud providers. However, there's a new generation of cloud brokers that combines planning services with a software infrastructure to provide an end-to-end view of all your cloud and on-premises resources. The brokering service provides an infrastructure that has capabilities to evaluate a workload and determine the best environment for deployment.

The broker identifies a set of authorized services combined with business process and policy rules. After these services are in place, business units can freely use a self-service portal to procure the right capabilities with the right service level and security that's authorized by both IT leadership and the business. A well-designed brokering environment provides the business with the choice and flexibility to use public, private, or data center services when needed. The environment can streamline the process of discovering, planning, managing, and governing computing services. In essence, this approach is analogous to a supply chain where all the individual elements come together to create a seamless process.

The importance of planning

Imagine this scenario. A CFO of a public company asks the CIO to attend an emergency meeting. The CFO is getting ready for the next quarterly earning announcement. One of his analysts has shown him that spending for IT services is 25 percent higher than the previous quarter. This increased spending wasn't anticipated, and it is clear that the spending will require explanation. The CIO is taken by surprise. The IT budget had been approved earlier in the year. After reviewing the information presented by the CFO, the extra costs are for public cloud services — including both compute services and SaaS applications being used by most of the business units in the company. The amount of money spent per month is staggering. Clearly, the CIO is embarrassed and angry. From her perspective, the business units have gone rogue in their spending without any accountability.

While this may be an extreme example, it's an indication that business units often take matters into their own hands when they are unhappy with the performance of IT. While it's imperative to enable business unit leaders to move quickly to innovate, IT services have to be planned and managed so spending can be planned and controlled.

Chapter 2

Explaining the
IT Supply Chain

*O*ne of the requirements to achieve IT as a Service is to create a supply chain of related services that creates a model that supports the business goals. Without an IT supply chain, you have a set of services that aren't designed to work together in unison. To be successful with IT as a Service, you should pull in all the required elements needed to fulfill the requirement. These components may be internal IT services, such as transaction management or third-party data or security services. Some of these services will be designed and managed by ecosystem partners.

In this chapter, we explain what an IT supply chain is and how it makes IT as a Service a viable approach to the industrialization of IT.

Understanding the Value of a Supply Chain

What is an IT supply chain? To understand this concept, we begin by explaining the traditional supply chain model and

then relate this to the IT supply chain. A *supply chain* is a combination of all the resources, people, and activities that come together to bring a product or service to the customer to achieve the desired outcome. The most common use of the supply chain is in the manufacturing sector. In manufacturing, it is critical to bring together the right parts, supplies, and related specialized services to get products to market efficiently and effectively.

REMEMBER

The successful supply chain requires an ecosystem of fully vetted participants. In addition, managers of that ecosystem must coordinate every element of the supply chain, including sourcing, shipping, parts management, manufacturing, and the final distribution of completed goods. The supply chain needs to be tightly coordinated with customer demands and expectation. The manufacturer must find a balance among satisfying customers, keeping manufacturing costs low, and making sure that there's enough inventory. All the processes have to be in sync so the company is profitable, maintains the right level of quality, and satisfies current and future customer needs. A well-designed supply chain is a system of organizations, people, activities, information, and resources that work in collaboration to successfully execute a company's product creation and delivery of products or services.

Defining the IT Supply Chain

When an organization moves to an IT as a Service model, it's required to create a supply chain of products and services. Just as in the manufacturing supply chain, the IT supply chain must be created that brings together all the right elements in order to create transparency for the end-user of the IT services. After all, with IT as a Service, users want to access the right services whenever they want based on policies such as cost, security, and resiliency. Furthermore, the IT organization must be prepared for possible disruptions with the supply of services, and it needs to plan for alternative deployment options.

Like a supply chain, an IT as a Service model requires tight control, insight, and management. IT as a Service requires that an ecosystem of trusted services comes together and can work across a hybrid computing environment as though it were a single unified system. In the manufacturing supply

chain, the vendor has its complex ecosystem of suppliers ranging from component producers to warehousing. This same transition is happening within IT. With any supply chain model, there needs to be an infrastructure that understands all the elements of IT service model operating as an ecosystem of services, partners, and management services. As with a manufacturing supply chain, the ecosystem of services and partners has to match with cost, performance, policy, and quality requirements.

Therefore, IT leaders must be able to create a unified process that brings together a variety of services that includes public clouds, private clouds, SaaS applications, managed services, security services, data services, and services that reside in the data center. To be successful, you can't plan and execute cloud services in isolated ad hoc project silos. You need to increase the level of maturity across the organization so cloud becomes the platform for executing on both IT and business strategies.

Today's disconnected silos

In the days of unified computing environments, there wasn't a need for an IT supply chain. However, today most organizations leverage a wide variety of on-premises and public cloud services. In most cases, these IT services are operated and managed as disconnected silos. One department may select an Amazon public cloud service to develop a new application while another organization will use IBM Bluemix or Azure for infrastructure services. Another department may use a designated Platform as a Service (PaaS) environment like IBM Bluemix, while others may encourage developers to choose whatever cloud service they prefer. Adding to the complexity and inefficiency, three or four business units may all be using identical services from the same vendor. Because coordination between departments isn't happening, economies of scale don't exist, and the company cannot negotiate better business terms. When business units select their own cloud services without a planned strategy coordinated with the IT organization, it leads to Shadow IT. Selecting a set of independent services can be helpful to execute a task quickly, but it can lead to problems. These Shadow IT projects can quickly become strategic and therefore will have to comply with overall business governance and policy requirements.

Shadow IT is a term to describe the common trend in companies where employees leverage technology resources without the approval or knowledge of the internal IT department. Shadow IT became more common with rise of cloud computing because employees could easily obtain technology resources on their own. In most cases, employees utilize Shadow IT because they want to efficiently perform their jobs. For example, many employees began using cloud collaboration tools to share large files with co-workers. However, Shadow IT can put corporate, customer, and partner data at risk and make it difficult to comply with regulatory and compliance rules.

No department is an island

The status quo might suffice in a world where each business unit is an island without the need to connect to other business units and partners. However, we know that in the real world this approach simply doesn't work. Too many connections between lines of business and partners need to happen. These linkages must be coordinated in order to maintain a strong and vibrant environment. In addition, as compliance and regulatory rules become more stringent, companies need to gain visibility and enforce the same policies across the business.

The only way to overcome these challenges is to create an IT supply chain that links all the business elements, as well as those of IT, together in a coordinated and predictable manner that supports business change and agility.

Creating and Managing the IT Supply Chain

Like any supply chain, the IT supply chain is made up of various parts from a wide number of vendors. When you start to think of IT as a supply chain, the role of IT begins to evolve. Instead of remaining the organization that creates and manages the whole environment, IT becomes the manager or broker of IT services to support business goals. It is the IT team's mission to orchestrate these services as one consistent environment.

A fundamental element of the supply chain is the constant change in supply and demand. Like a manufacturing supply chain, the IT organization must be able to predict demand in order to keep customers happy. For example, if your organization has initiative to engage customers via mobile applications, you need to make sure that your mobile application development and deployment platforms can scale to accommodate more users. In addition, make sure that your application management and operations platform is up to the task of monitoring more applications and interactions on a variety of devices. This process requires you to acquire the right performance management tools to ensure that the mobile applications are satisfying end-user expectations.

Core Foundations of the IT Supply Chain

In this section, we discuss some of the core elements of the IT supply chain. These IT supply chain foundations are depicted in Figure 2-1.

Self-service portal	Service Orchestration	Business Process Services	Application Services	Data Services	Integration & APIs	Cloud Services

Figure 2-1: The IT supply chain.

These services aren't stand-alone technologies; they're managed and delivered as a set of integrated services. Each organization will have different supply chain elements based on business and customer requirements.

Self-service portal

In the IT as a Service model, the way users procure IT services is completely different. In the traditional IT model, if a business unit wants an IT service, it typically had to submit an official request to the IT department. The request would go into

a queue and may take days, weeks, or even months to be ful-filled. This traditional IT provisioning approach fails to meet the demands of high-paced, changing businesses. In an IT as a Service model, users are given access to a self-service portal where they can select the services they require. The portal only reveals the services that the user is permitted to access. For example, a developer's portal might display options for different PaaS environments, while a business user's portal may show a variety of approved business applications.

Service orchestration

Orchestration services help tie services together in an auto-mated way. Effective management of core elements of the IT supply chain have to be managed dynamically depending on how the underlying services are used. As business process and workflow change, orchestration services need to adapt in order to pull all the IT supply chain elements together. It's important that orchestration provides a way to bring the right services together based on the usage of services and best practices.

Business process services

Business process services allow developers to create new applications based on the way a business has to operate. In an IT as a Service model, business processes are designed based on bringing the right software modules together. For example, inventory tracking might be an important aspect for a variety of applications. By creating inventory tracking as a reusable service, this process can be used in many different situations within the company. The result of successfully creating busi-ness process services is that development groups can quickly create consistent applications based on pre-vetted code.

Application services

The IT as a Service model is designed to apply technology to solve a wide variety of business problems. There isn't a single way that organizations are utilizing applications and applica-tion services in their IT supply chain. Therefore, a well orches-trated IT supply chain must be able to accommodate many different application services and models. Most organizations

have existing applications that the business depends on. In some cases, those core applications should be left untouched because they contain years of complex business rules. However, the business may gain flexibility and cost savings by moving other applications to different platforms. There is also a need to modernize aging applications by modularizing key services through containerization. In addition, many companies are opting for Software as a Service (SaaS) applications that reside in the cloud. In most cases, companies will leverage a combination of PaaS, SaaS, and on-premises services to meet their needs. It's important for the IT organization to have visibility into what applications are present in the company, who has access to what applications, and what types of data reside on each application.

Data services

Companies want to be able to leverage key data sets in order to make better decisions. One of the issues many organizations face is that the important data about customers, products, and process isn't unified. Instead, critical data may be spread across different business units.

REMEMBER

To be effective, organizations are beginning to create data services that are designed to be able to be used outside of the way that data was created. These data services are designed for use in many different situations. For example, there could be data services that relate to product problem issues. Another data service may contain all the important information about all the products a company sells. These services can be offered as a service to both various divisions in a company or to key business partners in the IT supply chain.

The importance of cognitive analytics

Cognitive analytics is an integral element in making an IT as a Service platform operate effectively and efficiently. The underlying system is required to collect the massive amount of data about how the components operate as a system. By applying cognitive analytics, the system can learn and change based on best practices and the required level of service. Over time, cognitive analysis can ensure that anomalies are detected before they can impact performance.

Integration and APIs

In the era of modular business services, the Application Programming Interface (API) becomes the most important technique for creating new applications to support business goals. APIs must be designed based on standards so both internal constituents as well as members of the company's ecosystem of partners can use them. Using these APIs enables integration of components to be much more straightforward.

Cloud services

IT as a Service is predicated on providing a set of foundational cloud services. Turning these services into an IT supply chain requires a supporting dynamic service catalog that identifies each service and its policies of use. There will be policy and business rules that dictate when and who can access different services. Just like in a manufacturing supply chain, these dynamic cloud services ensure that all the elements that make up a successful execution of processes are followed. This same approach applies to application creation and deployment of new services to support evolving business requirements.

Creating the Path Forward

Thinking about IT as a Service in the context of a supply chain is helping businesses change their approach to IT. This new industrial model means that the business has a reliable and predictable partner to enable agility and fast business change. The IT supply chain does not happen in a vacuum. It requires collaboration with key business leaders in your company and your trusted suppliers.

Chapter 3

Defining the Services Model

*M*oving from a traditional computing environment to IT as a Service requires rethinking how IT is organized and how it executes a variety of services, processes, and applications in a seamless manner based on business requirements. All the orchestration and management of these elements has to be handled seamlessly in a consistent and predictable manner.

In this chapter, we examine what it takes to lay the foundation for IT as a Service. What are the services that have to be in place? How is the environment managed so that business users can access the right services at the right time? When a well planned IT as a Service model is put in place, IT can become a true business partner.

Supporting a Hybrid Environment

IT as a Service goes hand in hand with the hybrid computing environment. Organizations are increasingly embracing

a computing environment that includes a variety of public and private cloud services and a variety of managed services, combined with services from backend systems. In fact, many CIOs think of all these environments as computing and don't distinguish between the various capabilities. For this thinking to become a reality, it requires that IT as a Service is a hybrid environment based on providing transparency across any service that exists today and those that are emerging as important to the business. Therefore, the IT as a Service journey must begin by rethinking what it means to provide the right IT services to the business in a modular and flexible manner.

Begin with planning

The journey must begin with a planning process that includes the ability to understand what the current environment looks like today. This first step gives you an understanding of both your strengths and weaknesses. For example, how modular is your existing infrastructure? Has your company begun to move to create reference architecture? Even more importantly, you should collaborate with the business units and business strategists to understand the changes that the business is undergoing today. You have to begin planning so you're ready when there are unanticipated changes to business strategy.

How a hybrid approach supports change

With a hybrid approach, organizations need to be able to incorporate new and emerging cloud services based on changing circumstances. A change might be the emergence of a new type of data integration service that will help business units break down silos between their organizations to support a new business initiative. There might be new business process services that will make it easier to provide a brand new offering to customers to prepare to take on a competitor. This approach requires a combination of hybrid computing with reference architecture.

The Underpinnings of IT as a Service

Most companies would love to be able to start from scratch and build a modular services-based architecture that would allow them to service all their customers and suppliers in a consistent and predictable way. Unfortunately, most companies have a variety of data center applications, departmental systems, private clouds, public clouds, managed services, and Software as a Service (SaaS) applications. So, you have to deal with a complex world where companies need to create a road map to move from their current state to a more flexible future mode of operations. This may include creating a "bi-modal" IT operations so you can combine traditional hardened IT services, such as secured transactional systems, with agile services designed to solve a new problem. The more agile service may only require a subset of the rich set of IT operational services. Businesses will need a combination of different services to address a variety of changing needs.

The Journey to IT as a Service

A successful approach to IT as a Service means that you have to think about the way you can abstract complexity so the users of the services have a seamless customer experience. One of the greatest benefits of the movement to IT as a Service is the self-service portal. When the details of services, integration, service orchestration, and the like are abstracted, it's possible that a business analyst can create new value without needless delays. Business unit leaders don't care about what is behind the scenes in IT. They care that IT services can be created to serve customers quickly and effectively.

Take the example of an application development leader in a mortgage department of a financial services company. The company has just acquired a business that offers a unique type of mortgage product that provides agents with new revenue opportunities. The development team has been asked to quickly create a new application that can provide a self-service for agents to sell both existing and new product offerings.

In the old days, the team had several options. They might use existing resources in the data center or a departmental computing environment. They might have requisitioned new resources. However, given the short time frame and the bureaucracy involved, the team leader decided to use a set of public cloud services.

Behind the scenes it gets tricky for the team because it needed to access the right customer and prospect data from a variety of sources. The team leader wanted to make sure that her team could easily collaborate on development and deployment of these new services. She also has to make sure that the right level of security is in place based on the identity of both the developers as well as the ultimate users of the service. The application had to be modular and to be able to support a variety of deployment models from browsers and mobile devices. The application also had to scale from a small pilot to an environment that could support up to 10,000 agents. Long term, the application would also have to be available directly to potential customers.

Keep in mind that not every organization can immediately implement IT as a Service. Effectively leveraging IT as a Service requires changes throughout the organization. The capability to move quickly depends on the level of maturity and modularity of your existing IT infrastructure and the elements you already have in place to support your goals. You also have to consider the changes in business strategy and what services you need to execute your plans.

Needless to say, this can be a complicated process with the current reality of most IT organizations. The value of transforming into an IT as a Service model is to make the task of developing applications become a much more industrial model with best practices and underlying technology services. When IT as a Service is in place, there will be consistent ways of developing, deploying, and managing the right applications and services with the right security and right performance. This is the goal of IT as a Service.

Everything is a service

Managing services isn't a one-time process. It involves making sure that all the moving parts work together as a system. You need to establish checks and balances for customer goals, financial goals, and strategic objectives. Therefore, services have to be understood in many dimensions ranging from customer experience metrics and business performance indicators to how individual components operate and interrelate.

Remember, services are simply the way that users experience your offerings. At the end of the day you need to hide the complexity and provide the right level of integration and manageability under the covers. A great example is how a banking customer deposits a check. Decades ago the customer had to take a physical check, hand it to a teller, and wait for that teller to complete the transaction. Contrast this with the current business process where the banking customer captures the image of the check and sends the transaction to the bank via a mobile device.

Life Cycle Management of IT as a Service

It is important to understand IT as a Service in context with a life cycle management process. All the services that are required to create a services platform need to be updated and managed to reflect changes in the business and the evolution of technology offerings. In this section, we focus on the technology underpinnings of this life cycle, including the service catalog, patterns and best practices, orchestration, automation, brokerage services, integration, and Application Programming Interface (API) management.

REMEMBER

IT as a Service isn't a static approach to managing your computing environment. You need to change your thinking about the overall IT environment and begin thinking in terms of life cycle management of services. In order to be successful with IT as a Service, you need to have visibility across the services and have an understanding of how all the pieces fit together. This is important because you are moving away from the traditional approach of managing each application or environment as if it were its own closed system. IT as a Service

requires a context that encompasses all different types of services and how they can work together to support user needs. Life cycle management has four goals:

- ✔ **Transparency:** The ability to get available resources and services and how they can operate together

- ✔ **Measurability:** The requirement to manage workloads and anticipate future resource needs

- ✔ **Accounting:** The ability to track which services are being used for what purpose and how much they cost

- ✔ **Cost management:** The ability to understand and compare costs of obtaining both internally and externally provided services; enables organizations to do capacity and resource planning

REMEMBER Don't think of each of these parts of the life cycle management as isolated issues. Instead, understand that they are all related to the best practice of creating an environment that will stand the test of time. If you adhere to these principles, IT becomes a true partner to the business because it addresses visibility and control that is imperative to the way business leaders think.

The service catalog

A service catalog is at the core of being able to manage services across a hybrid cloud environment. A *service catalog* identifies and defines the services that are available for developers and users to meet business objectives. The catalog defines the parameters and characteristics of each service. For example, who is allowed to use the service, how can the service be used, what are the security requirements of the service, and what are the dependencies? You need to be able to establish context across a variety of IT services no matter where they're physically located.

WARNING! Each service that's identified and managed in the service catalog has to be carefully vetted. The service has to be identified by IT and procurement as an important resource that will be used by multiple business units. After the service is identified, it must be tested for accuracy. These services also have to include the policy rules that govern its use. Some of the questions that outline these rules include the following:

 ✔ Who within IT or the business is allowed to use the service and for what purpose?

 ✔ What deployment models are permitted for operating this service?

 ✔ Can it run in a specific public or private cloud?

 ✔ How is the service integrated with other services?

The service catalog provides guidance as to what services can be integrated via well-defined APIs. Data governance is key to your success. In some countries, data has to remain within that country. There are different corporate and governmental regulations that have to be part of your overall plan.

One of the benefits of the service catalog is that it keeps the details of the service itself abstracted from the user of that service. The actual code is encapsulated into images, containers, or as microservices. The catalog also indicates how and when a service can be altered.

The catalog allows IT to manage commonly deployed IT services to ensure compliance, consistency, and security based on corporate policy. The IT services in a catalog can include provisioning services, storage services, virtual machine images, authentication services, and business processes. The service catalog is one of the lynch pins of IT as a Service and works hand in hand with the service orchestrator.

Patterns and best practices

A best practices pattern is a solution that includes management services available as a standard predefined architectural pattern. A *pattern* is a copy of code or a database or an application service. Each pattern has a specific function that can be repeatedly deployed for a client. A virtual machine is a good example of the use of a pattern. A virtual machine can include a common configuration and a set of assets that are used to solve one specific problem. This same pattern can be used over and over again for many different customers or use cases. The virtual machine brings together all the tools, the patches, and the monitoring tools needed for the situation. Without the underlying pattern, developers have to start from scratch to build a solution each time.

How the service desk leverages the service catalog

How would you integrate the catalog into existing system? One good example of how the service catalog can help with a user-facing application is the service desk. Service desks have long been the first line of defense when something goes wrong with IT services. However, the service desk can also become a bottleneck if there are not enough individuals who can address user problems. Typically, the IT organization requires that the user generate a trouble ticket, which then requires another set of actions before the problem is addressed. Ironically, many of these problems aren't serious. Often a user will forget a password or forget how to access an application. Increasingly, companies want to have a standardized self-service model that creates a frictionless way to allow users to take the necessary steps themselves.

This type of service desk can be used as a consistent service portal so users can provision the cloud resources they need, change passwords, and find the right business service they need to create a new application. This can be accomplished if there are standardized templates built out of best practices knowledge. If implemented correctly, these templates can help organizations manage the life cycle of both internally created systems as well as third-party services that are acquired outside of IT. Therefore, this approach is important in a hybrid cloud world where you need to account for costs, workload management, security, and governance.

Executing on best practices creates patterns. These patterns are the accumulated knowledge of implementation professionals who've had to work with a variety of customers over months and years. Inevitably, smart consultants are focused on determining patterns of code that can be used to support different customer engagements. These patterns can be transformed into code that can be reused repeatedly. The most sophisticated patterns are a combination of foundational middleware services with modular services that can be configured for different use cases. Adding configurability means that it is easy to take the same service and leverage it to support different customer requirements. A well-designed pattern has been tested for quality and predictability.

Service automation and orchestration

Intelligent automation is the technique for bringing together the right services and then orchestrating them based on how they're being implemented. This is a core to how service management is designed to operate in an as-a-Service model. Automation helps an IT organization keep a system healthy by executing on service requests and monitoring overall performance. When there are incidents, automation can be used to resolve problems before they impact performance. Intelligent automation also ensures compliance with governance requirements.

Orchestration is essential when you want to build an application from existing services. Orchestration requires process management through the use of APIs. If the service catalog is the way you identify and classify services, automation and orchestration are the techniques for linking together these services to create workflows. Lower-level repetitive tasks can be managed by using service automation. These services aren't visible to the user. Automation is used for tasks such as initiating a trouble ticket or provisioning a cloud instance.

How service orchestration works

A consumer goods company sells consumer devices through a variety of retail stores and distributors. The company has a number of business units each with its independent IT groups. While each group had created valuable services, these services weren't shared with other business units with similar problems to solve. IT leadership created a task force with representatives of each business unit to determine what services and processes each had created that could have broader use. After identified, these services were put into a service catalog that was made available across all business units. When there was an opportunity to offer a new self-service option to configure the consumer offerings for distributors, the business unit IT group was able to quickly select the right services from the catalog and use orchestration services. This new service provided partners with a more seamless way to work with the company.

In contrast, service orchestration is used when the task involves bringing together services defined in the catalog to create a new business process. The value of service orchestration comes into play as you move to the as-a-Service model where you're taking a variety of predefined services and linking them together dynamically. This is in stark contrast to the traditional application that's written as an end-to-end process. Automation has to be implemented in context with application performance management. It is not enough to simply link services together. It is critical to be able to ensure that when those services create a new business application that the performance reflects business requirements.

Brokering IT services

A *cloud broker* is an environment that acts as an intermediary between various cloud services. A cloud broker provides self-service IT across a variety of hybrid cloud environments, managed services, and data center services. A well-designed cloud broker provides a holistic model for a policy-driven approach. One of the important benefits of a cloud broker is that it can provide comparisons between a variety of cloud services in terms of price and technical capabilities based on business objectives. A brokerage service can ensure that the right services are selected based on requirements for visibility, compliance, security, and governance across the business. On the other hand, your business demands choice, speed, and agility. As organizations move from managing massive, integrated applications to modular services, change is required. Successful organizations must be able to move away from simply managing physical "things" to managing highly distributed services acquired from many different providers.

The broker provides a mechanism for supporting both the delivery and consumption side of the business. The delivery side must have the right services (integration, orchestration, and so on) to create value that's needed for those consuming the services.

Service integration

Integration of data and process has always been one of the most difficult tasks for IT. In early decades IT simply created integrated environments where data, process, and middleware were integrated together to create a solution. A lot changed when the business needed the flexibility to change applications quickly as customer requirements changed. With the advent of hybrid clouds, the need to be able to bring a variety of services across many different deployment models is critical. Next-generation agile and modular applications require access to data that might reside in the data center or in applications owned by a variety of business units. The business requires brand new business models that depend on innovative business processes.

Increasingly, services such as virtualization, container architectures, and microservices are changing the way applications are created. Rather than writing code as an integrated business process, new applications are designed to link well-defined services together through API wrappers. These services leverage orchestration services to create the solution needed by the business.

Integration as a Service becomes a hybrid integration platform that enables cloud applications or application services to be linked to each other and to on-premises applications. These integration services have to be designed so they can withstand changes in both business and technology strategies. This hybrid approach to integration helps solve the problem of application and data silos.

What is a container?

A *container* is an environment that includes a set of application services, any dependent services, and code needed to operate that service. This set of services is packaged in a way that it can reside on any operating system. The container includes a well-defined API so it can be connected to other services to create an application.

Explaining a microservice

A *microservice approach* is a technique for building software applications based on bringing together a set of software modules that are independent of the underlying platform. These microservices don't have dependencies to outside services or infrastructure. These services have to include a well-defined API so the microservices can be linked together to create new applications.

API management

APIs are critical in an IT as a Service environment. An API is a defined interface to a service or tool that helps more effectively develop programs through linking components together. Standardized APIs have become very important in a hybrid cloud environment because they enable self-service. In addition, these standardized APIs can be stored in the service catalog to ensure that they are properly vetted. APIs need to be secure, easy for developers to understand, tested, and reliable. In addition, adding the APIs to the catalog can control who is able to access the API. The value of APIs is that they abstract the details of the implementation of the service and only expose the service that the developer needs.

It is likely that in most IT as a Service environments there will be hundreds, if not thousands, of APIs to help create modular and flexible services architecture. Therefore, managing these APIs is mandatory and critical to the success of IT as a Service, especially because APIs are the most effective way to create interfaces between backend systems and a variety of application services.

API management provides a consistent way to manage APIs as a life cycle. This is critical since APIs are also an essential means of sharing this intellectual property with customers and partners. A typical API management platform or portal enables centralized administration to make deployment easier and safer. The API management platform provides a set of tools that helps to build, debug, and deploy these APIs. The API management portal can also be used to discover what APIs exist and the rules that govern their use. The portal can also monitor the performance of APIs so they help manage the performance of the system.

Chapter 4

Getting Started with IT as a Service

*I*f you've read this book from the beginning, you may now have a sense of what it means to transform IT into a set of services that provide the business with the right solutions to the right problem at the right time — with the right planning and collaboration between IT and the business. In this chapter, you discover some best practices that give you a starting point for your IT as a Service journey. While there are concrete steps to take, there are also important sets of planning milestones that help make your journey a success.

The Business Requirement

The emergence of Shadow IT was a rude awakening for IT organizations (see Chapter 2 for more on Shadow IT). Business units were rebelling because teams couldn't support new ways of doing business. The digital transformation was

making it impossible to remain with business as usual. As Line of Business (LoB) leaders took matters into their own hands, it became clear that things would change forever. IT organizations that had resisted the rebellion of LoB executives began to see that they had to rethink the way IT could be delivered. The answer has become IT as a Service.

In this new era of computing IT, organizations are adopting an industrial model for services that support business change. Creating this model doesn't begin by coding or running out and purchasing an application. Instead, the process of creating an agile and nimble computing environment has to align with the strategic business initiatives.

Successful organizations begin by establishing a road-map that has five fundamental components:

- ✔ Understanding the current state of the business and the supporting IT assets
- ✔ Coming to terms with what works and what needs to change
- ✔ Understanding how IT can become a set of services built with reusability in mind
- ✔ Focusing on the customer experience and the right key performance indicators both short term and long term
- ✔ Setting guidelines for best practices, including economic viability, governance security, resilience, and predictable performance

Understanding Your Workloads

Before you can make a successful move to IT as a Service, you have to take a step back and understand the changing nature of your workloads. Making an effort to gain an objective understanding of the nature of your workloads will help your planning and decision making. Are your workloads self-contained or are they modular? If you have a fitness wearable device, all your workloads will probably reside in a single public cloud. However, if you have complex analytics you may use a combination of private services and then burst into a public cloud service for additional compute. You may have a sophisticated analysis that you run once a quarter. It makes sense to use an analytics as a service platform.

REMEMBER

There are situations where workloads are complex and written as integrated applications tightly integrated with the hardware platform. Also, if your workloads are steady and don't change frequently, an on-premises deployment for your workload deployment helps. In this situation, your consumption patterns won't change often. There is an important cost factor involved as well. It doesn't make economic sense to simply move workloads to the cloud en masse. If this application works well for the business, there's no reason to change.

The journey from a monolithic IT environment to a hybrid cloud supporting a variety of workloads has many different starting points. Therefore, you can't assume that you can implement a fully automated and orchestrated environment that supports a range of complex applications. Instead, it's much more pragmatic to start slowly with simple workloads that can operate easily on the cloud. You might start with a set of compute services for the development organization or even a self-contained Software as a Service (SaaS) application. As your organization matures and understands the best practices for hybrid cloud, you will add more and more automation and more sophisticated services modularity.

The Role of Standardization in Infrastructure

TIP

One of the principles of IT as a Service is the ability to standardize through automation. If all your services are one-off in every situation, you won't be able to achieve economies of scale of the cloud. Therefore, consider what type of services you're dealing with. For example, if an application has been optimized to operate in a specific hardware environment, it may not be economical to move that workload to the cloud. In that situation, there's often a requirement for developers to manually change settings or configurations. Without a level of automation, creating an environment focused on IT as a Service can be difficult.

Protecting Your Company

No matter how well you've designed your environment, if it isn't safe for customers and partners, you have put your

company at risk. Therefore, think about the following three factors that help you create a well-performing IT as a Service environment:

- ✔ **Design security policies and controls as part of the IT as a Service fabric.** Without a good security platform, you can't protect your company's assets. You may have the most innovative services, but if you put your customers and partners at risk, you'll fail. Policies and controls must be in place to support governance rules and requirements. You might have a policy that requires a password to have eight letters. However, you also need a control that states that the password can't be the word "password." You have to include education as part of implementing policy to protect your company.

- ✔ **Implement data governance.** Many industries have requirements to protect customer data. The risks and financial penalties for failure are high. In an IT as a Service environment, you have to have modules that can be deployed based on rules and policy. Don't take for granted that basic data governance exists in your company.

- ✔ **Manage the right service level.** When you're thinking about your IT as a Service environment, you must take into account performance in terms of both service levels and security. Pragmatically, you have to be able to leverage a variety of services that combine to create innovative and practical solutions to support customers. However, if these services don't perform well, you will disappoint customers. You have to understand that these services have to act as an integrated environment.

Thinking beyond the Data Center

At the end of the day, your responsibility is to the customer experience. Therefore, when you think about your data center and the myriad of cloud services that are available, you need to understand how they support the business and your customers. Each service provides a different function in terms of agility, predictability, and scalability. Too often companies create a separate cloud environment to support the online experience in isolation from the rest of the business. Your

cloud services aren't simply an extension of your data center. Cloud services can provide you with the type of flexibility to create a new and imaginative customer experience.

REMEMBER When you begin to create an IT as a Service environment, you're designing for change. What types of new services can you provide to customers that transform the business relationship? How can you make it easier for customers and partners to do business with you? Are there new services that will distinguish your products and services from those of your competitors? Can you be ready to disrupt a well-established market?

Creating a Sustainable Model

Through experimentation and a step-by-step approach, you prove to the business that IT as a Service is a model that can have an impact on the pace of business and the ability to innovate. Now it's time to take the next step by creating services models that can be used repeatedly for different business needs. You begin to create reusable business services that codify business rules. You then link these services together based on new business needs without reprogramming at every turn. This transition of IT into a set of services has a profound impact on the speed of business change. These new services are paired with other IT services, including testing, security, monitoring, and management.

REMEMBER You need to perform all these functions each time you bring a set of services together to solve a new business problem. You also need to have a best practices model that helps developers create new reusable services when new ideas are put into practice. This new model differs from the traditional IT model because nothing is created in isolation. All services are a joint effort between the business and IT, so work collaboratively to support change and innovation.

Managing for Predictability and Change

The day when the IT organization was responsible for managing the past is over. The emerging IT organization has the potential to become an agent of change and a true partner

to the business. This movement is a step-by-step process. It requires both an understanding of the strategic objectives of the company and the availability and applicability of emerging technologies. Most importantly, IT as a Service is an economic model that looks at the types of technology that will lead to real change combined with the costs of those technologies. IT as a Service represents the industrialization of IT so it can fulfill the promise of technology to protect revenue in the midst of upheaval.

The Journey Is Just Beginning

It would be wonderful to assume that you can simply create a new platform that consists of a set of well-defined services with APIs. However, real innovation isn't that simple. Keep in mind that you will begin to build a new generation of applications based on the DevOps model where the developers work hand in hand with the operations team. You want to select SaaS applications that solve specific business problems. Leverage your data across your environment to improve your decision making.

Think about business process completely differently in this new model of IT. Business processes are guaranteed to change as the business changes. The most advanced and innovative companies understand that new business processes are the hallmark of innovators. As you look into the future, you'll see the evolution of the IT organization as the broker of services. This means that IT will not only create or manage services but also make sure that services are designed to work together seamlessly. IT makes sure that its leaders are partners with the business in designing strategies that focus on digital disruption.

You are embarking on an important journey of transformation. There are many tasks before you. But you aren't alone. Talk to your peers. Engage with professionals who have helped other enterprises move to this new IT as a Service model. To help you get started on your journey, check out this link to some resources: `ibm.biz/itasaservice`.

You don't have to do everything at once. Select tasks and projects that will help prove the value of IT as a Service. Educate your team on the type of services you're creating and how it can benefit from the agility and productivity of your organization for years to come.

IT as a Service is revolutionizing IT organizations

The movement to IT as a Service provides users with the right IT services for the right task. The IT organization has to be able to support the right deployment models while maintaining access to the right data and the right workloads. Forward-looking companies think of computing resources as a set of services and best practices that can be brought together to support changing customer requirements.

- *Transform IT — establish a roadmap for change*

- *Gain a seat at the table — provide strategic guidance for the business*

- *Develop modular services — maximize flexibility and support business change*

- *Support continuous innovation — quickly release new software to support changing customer expectations*

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