Capturing the Potential of Cloud

How cloud drives value in enterprise IT strategy

IBM

This is one paper of a two paper series on cloud strategy from IBM Global Business Services

Abstract

Information technology (IT) is at a breaking point, and there is a critical need to improve IT's impact on the business. Consider the following:

- As much as 85 percent of computing capacity sits idle in distributed computing environments.[1]
- Seventy percent of IT budgets are typically spent on maintaining current IT infrastructures, and only 30 percent are typically spent on new capabilities.[2]
- Over 30 percent of consumers notified of a security breach will terminate their relationship with the company who contributed to the breach.[3]

Clearly, infrastructure needs to be more dynamic to free up budget for new investments and accelerate deployment of superior capabilities being demanded by the business. Nearly all CEOs are adapting business models, and cloud adoption can support these changing business dynamics.

This paper explores key questions in the minds of many CIOs today, including:

- How do I keep pace with the rate of innovation in the new economic environment?
- Is IT aligned with the business and can IT help me compete against new, nimble competitors?
- How do I optimize IT costs? Do I have the right balance of fixed and variable costs?
- Are cloud consumption models appropriate for my organization?
- Should I be a leader or follower in adopting clouds based on my business model?
- How can I get started with cloud pilots?

This paper will discuss how cloud is helping enterprises, governments and industries around the globe meet their current challenges through key value drivers.

Cloud value drivers provide a framework for building business and IT strategies. A key value driver is the dramatic reduction of IT costs that is achieved with dynamic infrastructure (virtualization, standardization and automation). When developing strategies, organizations should take a holistic approach to developing a cloud strategy due to the broad impact cloud has on an organization's business models, operating principles, processes, technology and organization design.

We strongly believe that cloud is real and here to stay. The successful infusion of the right cloud strategy into your business approach, including focused pilots into your overall IT roadmap, will result in significant business dividends.

What is Cloud Computing?

Some are calling cloud computing the next big paradigm shift for technology. As with any major technology transformation, there are many definitions of cloud computing each with their own nuances and subtleties. In very simple terms, cloud computing is a new consumption and delivery model for information technology (IT) and business services and characterized by:[4]

- On-demand self service
- Ubiquitous network access
- Location independent resource pooling
- Rapid elasticity and provisioning
- Pay-per-use

Cloud has evolved from on demand and grid computing, while building on significant advances in virtualization, networking, provisioning and multi-tenant architectures. As with any new technology, the exciting impact comes from enabling new service consumption and delivery models that support business model innovation.

How Do Clouds Create Business Value?

There are a number of different ways that cloud computing can drive business value. In addition to lowering the cost of IT, cloud can help provide access to new markets and enable new business models. The full potential of cloud is much more than a cost-focused ROI model.
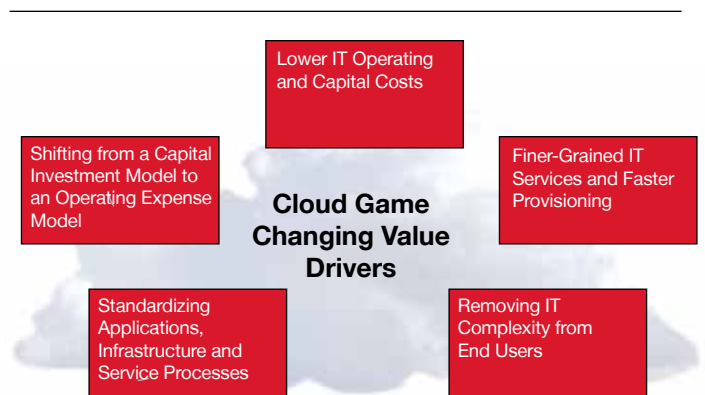

Figure 1: **Cloud value drivers help define how business value is created.**

Cloud value drivers have the potential to transform business strategy in the following ways:

- Driving business innovation with a large number of new applications developed with newly affordable cloud development environments.
- Increasing business responsiveness.
- Lowering total cost of ownership and improving asset utilization.
- Providing an open and elastic IT environment.
- Optimizing IT investments.
- Enabling real-time data streams and information sharing.
- Providing globally available resources.

The manifestation of these value drivers may be realized through the adoption and use of private, public or hybrid cloud environments.

Lowering IT Operating and Capital Costs

Cloud will lower the capital and operating costs of an IT unit (either sourced internally or externally) through dynamic infrastructure implementation (virtualization, standardization, self-service provisioning and management automation). Enhanced utilization of IT assets decreases both IT capital investment and operating costs. Standardization of infrastructure and processes drives down process and system administrative labor costs by decreasing complexity and reducing errors and re-work.

The potential cost savings of cloud vary significantly based on the utilization of existing IT infrastructure. The largest savings will come from business applications that vary greatly in their IT processing loads and the infrastructure needed to process these loads. Examples include CAD/CAM, financial modeling and analysis, supply chain management planning and order-to-cash applications. Traditionally, capacity for these types of applications has been planned for by focusing on peaks in demand and investing in infrastructure to meet these estimated peaks. Infrastructure utilization may be low in non-peak times and re-use and re-deployment of this underutilized infrastructure is difficult to do. Cloud infrastructure services provide the capability to quickly provision more or less capacity as needed. Cloud provisioning speed and pay-for-use models enable a more just-in-time or when needed approach, and thus reduce IT investment and support costs.

IBM Research has studied the cost-savings of private test clouds. The team analyzed comparable application testing services; one that used a private test cloud against the current application testing IT environment, using the same level of IT support for both environments. They discovered:[5]

- Hardware savings of 65% through reduced infrastructure and improved hardware utilization.
- Software savings of 27% from lower license costs from improved utilization.
- System administration savings of 45% from reduced system administration and operation costs.
- Provisioning savings of 76% from labor savings in service request management.

Cloud can lower IT costs and free up funding and developer time to enable the new ideas or applications that were previously not possible or too expensive to initiate.

A large financial institution in the United States uses IBM Smart Business Test Cloud service to slash the time needed for internal processes from weeks to minutes. The bank's application developers immediately build new or improve existing customer services, such as online account transactions. By only paying for the capacity they use, their department's cost and time spent on developing and testing products is expected to drop by more than 50 percent.

Finer-Grained IT Services and Faster Provisioning

Finer-grained IT services open up entirely new markets for enterprise level IT solutions sourced through new delivery models.

Today's model of enterprise IT requires companies to purchase IT at the product/package level or through relatively long-term leases. This model is designed for larger companies with robust data center and IT departments. Smaller businesses or business in emerging markets often cannot afford a robust IT infrastructure and as a result are limited in their ability to access the benefits of sophisticated, enterprise IT solutions. Cloud breaks down these barriers by enabling IT services to be obtained in very small increments on a pay-as-you-go basis.

The ability to buy IT services in smaller increments will help all businesses, but it will be especially beneficial for Small & Medium-sized Businesses (SMBs) and businesses in emerging markets. Cloud consumption models enable access to IT solutions that would not be otherwise economically possible.

For example, the city of Wuxi, about 100 miles outside of Shanghai in China, is a hot bed of software innovation with many small software start-up companies. To help foster the growth of these companies the local government created a local cloud enabling these companies access to sophisticated development tools and testing environments.[6]

Without cloud's finer-grained IT services and a pay-as-you-go model, only a few of these start-ups would be able to afford such a sophisticated application development solution. This cloud-based model allows them to compete with larger companies with robust datacenters and IT departments.

Removing IT Complexity from End Users

Cloud computing enables the ability for greater separation between the user and the core IT infrastructure, application and support processes. Users access applications and information that are lcoated and maintained in the cloud using devices. The user does not have to worry about the database, back-up, upgrades, and patches. All of these functions can be handled by the cloud provider.

The ability to remove IT complexity from end users will open up new business models. For example, this will facilitate new models of IT outsourcing. Today's IT outsourcing model is primarily focused on larger companies that have large IT requirements. Outsourcers are able to provide these large companies with greater efficiencies and improved services. But the current model does not scale well to companies with smaller IT requirements. Cloud will enable companies that don't have large IT requirements to gain access to the greater efficiencies and service quality of world class outsourced IT operations, providing them with better quality IT services and lower cost.

Large companies will also benefit from the ability to remove IT complexity from end users in the areas of mobility and data security. Cloud will enable employees on the move greater access to enterprise systems and data through a wider range of model devices. The days of every mobile employee needing to lug an expensive and heavy computer around are ending. There will be a wide range of devices available to the mobile employee and they will be able to choose the one that best fits their needs. All devices will be able to access corporate systems and data, but not all will need the same level of processing, memory, speed and storage.

Moving away from the PC/notebook centric model has the potential to improve data security. Corporate data will reside in the cloud and employees will access the information when needed. When their computers are shut down, the data will be kept in the cloud—not on the device. So when the notebook is left on the plane or dropped down the stairs, the data will remain secure in the cloud.

Shifting from a Capital Investment Model to an Operating Expense Model

The impact of cloud extends beyond IT operations to the underlying cost structure of IT support. Specifically, cloud facilitates a pay-per-use cost structure for IT services. On-demand pricing models allow businesses to transform IT costs from a fixed to a more variable cost structure. SaaS applications and on demand instances from various cloud service providers are examples of this pay per use model of cloud computing.

This structure has the inherent benefit of aligning IT cost to overall IT usage where capacity contracts and expands to match business needs. The extent that IT operations move to a variable cost structure depends on the organization's overall enterprise architecture and IT demands. Companies with high variability in IT demand will benefit greatly from this new operating structure, and most companies will benefit to some degree. An example is where large enterprises with existing infrastructure would be able to leverage such pay-per-use models to expand and contract capacity for select applications or services, such as acquiring and then releasing capacity during an initial pilot or ramp-up of a new application, or setting a percentage variability target for core IT costs to mitigate the risk of a business downturn. In these times of economic turbulence, businesses will respond more favorably to variable IT cost structures.

Standardizing Applications, Infrastructure and Service Processes

Cloud's use of dynamic infrastructure provides the foundation for standardizing infrastructure and the associated provisioning and operational processes.

Cloud also opens up the opportunity for business improvement through use of cloud-based applications, which will replace current non-core applications. Instead of just migrating current non-standard applications to cloud, these new cloud applications provide the opportunity to challenge current processes and adopt industry practices and processes from these new cloud applications. In many cases, the approach will be to replace applications supporting non-standard processes with standardized process and applications, which can reduce complexity, decrease costs, and also take advantage of industry practices to improve business processes.

A large semiconductor manufacturing company in Asia was challenged to compete more effectively in their fast-moving industry. One key area was enabling their researchers to collaborate more effectively, get access to information more quickly and accelerate the speed of development. Working with IBM, they developed a virtual research environment that enabled both quick access to information and the ability to collaborate and share within the cloud environment regardless of where the researchers are located.

Cloud Adoption Patterns

The first question for CIOs to ask when contemplating investment and capabilities decisions is "why is cloud not my first choice?" The second question to ask is, "what is the right strategy and timeline for my organization to adopt cloud delivery models?" and the third question to ask is "how do I move forward and get started?"

The starting point for cloud adoption will be determined by the size of your organization and your industry dynamics. Other factors that might influence adoption are the size of the gaps when current performance is measured against meeting business imperatives such as adopting new business models, implementing change much more quickly and bringing new innovative products to market. IT factors, including existing IT capabilities, also may influence adoption such as ability to meet business needs and cost of service. Larger gaps would tend to accelerate the adoption of cloud as a strategy to help close these gaps.
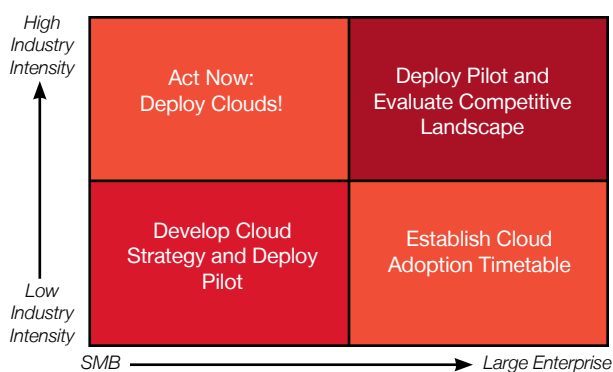

High Industry Intensity	Act Now: Deploy Clouds!	Deploy Pilot and Evaluate Competitive Landscape
Low Industry Intensity	Develop Cloud Strategy and Deploy Pilot	Establish Cloud Adoption Timetable
	SMB ————————→ Large Enterprise	

Figure 2: **As you can see from the above, cloud adoption is a key initiative irrespective of your type of organization or the dynamics/ intensity of your industry.**

Small & Medium-Sized Businesses and Startups

As we outlined in the value driver section, cloud computing holds tremendous potential for Small & Medium-sized Businesses (SMBs). It will enable them to have access to enterprise-level IT at affordable price points.

Many cloud based services already available for SMBs including:

- Amazon.com – offers pay-for-use models such as Amazon Elastic Compute Cloud (EC2) for application development environments and infrastructure services for storage and operations that lower investment and support costs.
- SalesForce.com – offers CRM applications delivered by subscription over the Web that can replace traditional in-house IT developed and supported applications. They also offer enterprise cloud computing services on a pay-for–use model to develop and operate applications that could replace in-house IT investments and change the IT cost structure.

And many more cloud applications are launched every day. Ultimately, it is possible that almost all SMB IT needs could be met through cloud providers. But we are not there yet; so what should an SMB do now?

We recommend that SMBs monitor this space closely. There are already great services available – and more coming every day. These businesses should examine what is already available; chances are there are services available that could help their business today. Cloud computing is fundamentally easier to use

than the traditional IT model – the sooner a business starts experimenting with cloud the better. Because these services are based on pay-for-use models, SMBs can try them with very little risk, and many providers even offer free trial periods.

Organizations in Emerging Markets

Cloud computing also holds tremendous potential for those organizations in emerging markets, such as Brazil, Russia, India, China and others. SMBs in these markets generally have the same benefits that we outlined above. Governments in emerging markets have similar cloud benefits to SMBs by enabling them also to have access to enterprise level IT sophistication at affordable price points. Emerging market governments have struggled with building and operating sophisticated IT environments for reasons such as the lack of IT skills in their markets and inadequate infrastructure. Cloud provides an opportunity to re-think whether to build and operate sophisticated IT environments or to move now to utilize cloud technologies and environments.

But for large enterprises, cloud provides added benefits in emerging markets relative to mature markets. Large enterprises in emerging markets comprise the following two segments:

- Local enterprises that have grown into large businesses.
- Multinational enterprises that are entering emerging markets.

For the first segment, many local large enterprises in emerging markets are now starting to invest in sophisticated enterprise IT systems. Many of these companies don't have extensive legacy systems and investments as their counterparts in mature markets do. This lack of legacy investment puts them in a position to potentially adopt a cloud architecture and service model and leapfrog the traditional investment in enterprise IT. They can get to the benefits of cloud from the start, and don't

have to worry about the depreciation or conversion of their legacy IT environment.

Cloud offers the second group, large multinational companies seeking to enter an emerging market, significant benefits as well. A common challenge for these companies is to create an appropriate cost structure for the emerging market. They cannot simply replicate their existing business model and cost structure in emerging markets. That structure is far too expensive and rigid for a fast-growing emerging market. A cloud based architecture and support model can provide the cost structure and flexibility required for a successful entry into an emerging market. A cloud model can be the ideal architecture to help a large company successfully enter and grow their business in a fast-paced emerging market.

We recommend that large enterprises focused on emerging markets ensure that their IT strategies incorporate a robust approach to cloud computing. Without adoption of cloud computing, significant investments in a traditional enterprise IT architecture could create a long term competitive disadvantage.

Large Enterprises

For large companies and organizations in mature markets, a key question being asked is "what approach should I take to cloud computing right now?" Cloud computing holds tremendous potential for all types of organizations, and large organizations should be taking advantage of current cloud services. But large organizations adopting cloud computing as an enterprise model is still in the early stages.

We expect cloud adoption to vary by industry. The first industries we expect to make serious moves toward cloud adoption are banking and financial services, healthcare and government. These industries are early adopters today, and

have often already gained experience with cloud. There are cloud SaaS applications available today that can replace non-core applications. Also, these industry segments are adopting cloud infrastructure services with the support of their large IT organizations.

The next industries to adopt cloud are likely to be retail, utilities, manufacturing and transportation as new cloud applications are developed and become available that address their ERP, logistics and BI needs. In the next stage, cloud enterprise applications will emerge for automotive, chemicals and petroleum, consumer products and electronics and be adopted by those industries.

Piloting Cloud Capabilities

We recommend that every IT department do an initial assessment of the potential impact cloud may have on their business, and depending on the impact, create the appropriate cloud strategy as part of their larger IT strategy. In assessing the potential impact of cloud, CIOs should evaluate both the impact on their core IT operations and the impact to the broad business model. The companies and organizations that aggressively go after cloud first will be those where cloud computing will change their products and services, as well as their delivery and sales models. These organizations will look to their respective CIO to help them develop and create these new business models using cloud. These CIOs must be prepared to drive true business innovation rather than just being a manager of the IT function.

Depending on the outcome of your cloud assessment, companies should start piloting cloud today. If you believe most of the transformation will ultimately be in the application layer though SaaS, then you should start with a SaaS pilot. There are many areas where SaaS applications are already on the market – such as CRM or email.

For many companies, this assessment will show that by evaluating the cloud value drivers against business and IT imperatives, cloud computing will have significant potential for

their business now, but that cloud adoption will evolve as cloud capabilities and services further emerge. Cloud computing is a major paradigm shift, and now is the time for most IT organizations to start learning more about cloud computing through hands-on pilots. These pilots should be at the center of a comprehensive cloud strategy. For example, if you see most of the change residing in the core infrastructure, then you should consider a cloud storage pilot or experiment with greater virtualization in the data center.
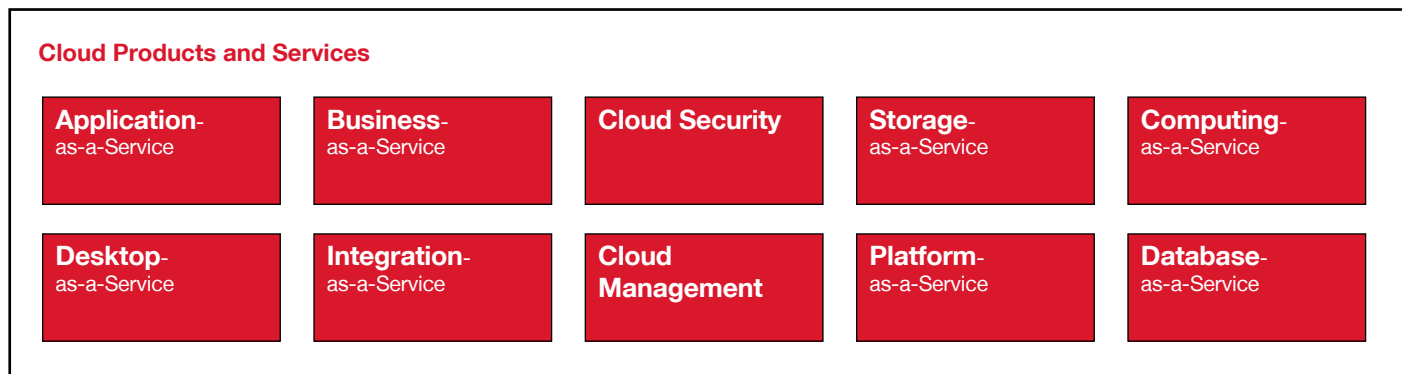
Companies should not wait to start working on cloud computing until their competitors are well ahead of them. CIOs should be helping their business to separate the hype from the reality through establishing a solid cloud strategy today to ensure they capture the full benefits of cloud computing tomorrow.

How do I move forward and get started with cloud computing?

As we saw in the cloud adoption patterns, irrespective of your company size and industry dynamics, you need to get started now. Your competitors (existing and emerging) certainly have begun the transformational journey, and some are already reaping the benefits.

Cloud is a transformational and disruptive force. Organizations should develop a robust strategy and implementation plan. Cloud should be embedded in your IT strategy, and aligned with your business model and strategy. Piloting cloud applications or platform or infrastructure services is one method to gain a better understanding of how to begin to integrate cloud into existing business and IT environments.

There are a variety of cloud products and services available today. A perfect way to initiate the journey for cloud transformation is to conduct a pilot.

Cloud Products and Services

Application-as-a-Service	**Business**-as-a-Service	**Cloud Security**	**Storage**-as-a-Service	**Computing**-as-a-Service
Desktop-as-a-Service	**Integration**-as-a-Service	**Cloud Management**	**Platform**-as-a-Service	**Database**-as-a-Service

Figure 3: There are many potential services that can be targeted for pilots.

Pilots encourage experimentation and innovation in a cost effective manner. There are three key steps to conducting a successful pilot:

Step 1:
Understand business imperatives and target appropriate workloads that support those imperatives. For example, if you need to reduce cost and improve performance of business applications, then you would execute a pilot for Software as a Service (SaaS).

Step 2:
Evaluate options for a pilot. In the above example, you should understand the level of cloud SaaS adoption in your particular industry and quickly evaluate these SaaS providers. The depth of the evaluation should be sufficient to support the rationale for the right type of pilot.

Step 3:
Launch a pilot and collect and analyze experience with cloud delivery models. This insight will help shape your overall cloud strategy development and provide the foundation to build a robust and actionable transformation roadmap.

How IBM Can Help

IBM can assist clients in getting started with cloud. We can work with your enterprise to discuss your challenges and relate how others are using cloud in the current environment to meet their challenges. We can leverage our extensive cloud experience with clients and share our own cloud experience both as a cloud adopter and as a provider. IBM's cloud advisory, consulting and implementation services help your organization ask and formulate answers to the following questions:

* How do I innovate faster and how can cloud help?
* What business value will I achieve by moving to cloud? Which business areas and workloads should I consider for cloud?
* How can I standardize business processes using cloud applications and services?
* How ready is my existing application architecture to move to cloud environment?
* What cost savings can I expect by moving to cloud?

Organizations that take a holistic approach to integrating their cloud strategy with business imperatives and look beyond cost savings are the ones that will develop enduring competitive advantage.

Our experience with cloud adoption strategy engagements is that cloud strategy must be driven from business requirements and not focus only on the IT efficiency benefits. A strategic approach to cloud is not solely about technology, and cloud strategy should address the process, services and people aspects as well. Focusing solely on cloud efficiency could lead to adapting the infrastructure and gaining tremendous efficiencies, but continuing to approach the business and applications in the traditional manner, and losing the opportunity for business impact. For example, cloud changes the user experience and enables a significantly higher level of self-service. These changes, as well as the impact of pay-as-you models and fine grained IT services have a multi-dimensional impact on the organization and need to be addressed in the strategy.

The IBM strategy approach for cloud adoption is illustrated in Figure 4 and describes how we work with clients to develop a cloud strategy and recommended pilot.
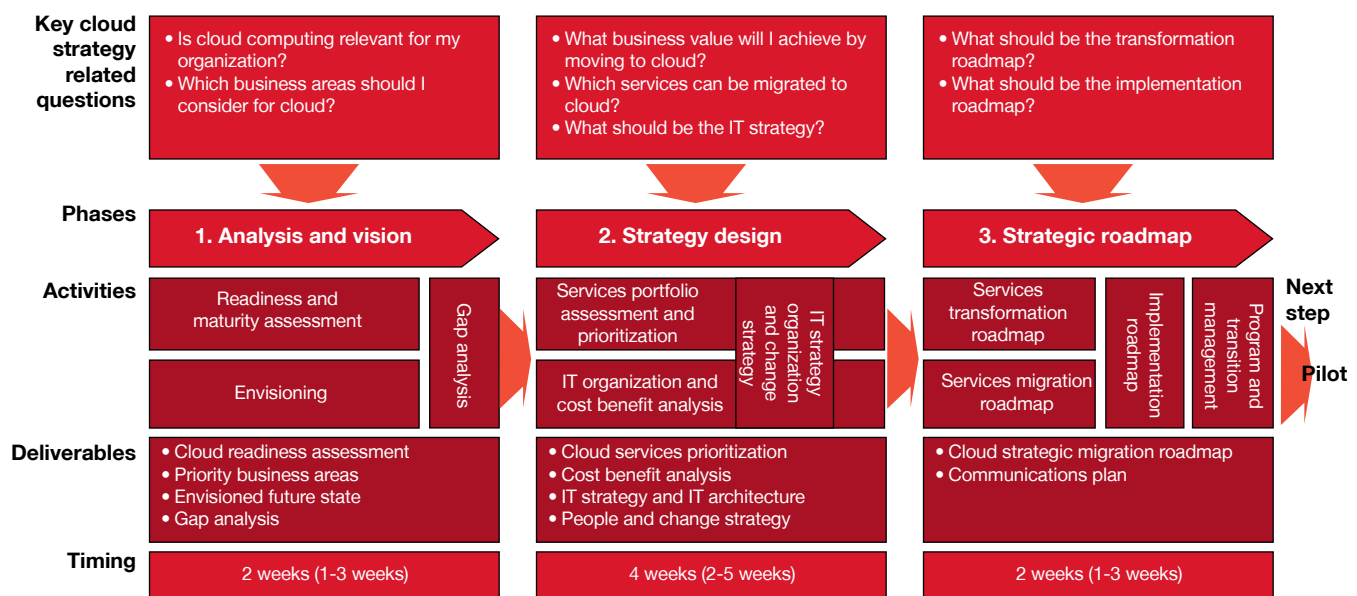

Figure 4. **IBM's approach incorporates analysis and vision, strategy design, a strategic roadmap that leads to targeting the right workloads for one or more cloud pilots.**

Analysis and Vision

In the initial phase, readiness analysis uses business and IT imperatives, gaps and cloud value drivers to show the enterprise which areas are possible for cloud adoption. A business value analysis is performed that prioritizes the cloud adoption areas. The visioning during this stage may result in new business models and opportunities that could result in dramatic changes to operating models. The readiness assessment also enables clients to quickly understand and gain insight into their IT organizational design, including resources and skills, systems and technology, service and IT management.

Strategy Design

This phase designs the cloud IT strategy and the associated change strategy, as well as delivers a cost-benefit analysis that can help with application prioritization.

Strategic Roadmap

This phase builds the strategic roadmap and is focused on getting started with cloud by prioritizing workloads to target for pilots and determining the actions needed to execute them. The strategic roadmap would include the implementation roadmap that has prioritized initiatives including the pilots, required investments and the desired benefits realization.

Organizations that are successful with cloud will challenge current IT delivery and deployment models. They will consider emerging cloud applications delivered as a service as possible best practices. They will avoid just converting the current applications and business processes to a new technical environment, and replicating the current business processes that result in few changes to business process and little business improvement.

Cloud is a key advancement that is real and being adopted by organizations (large and small) across many industries. The benefits are tangible but realizing true business impact requires a holistic IT strategy approach grounded in business dynamics.

Appendix

Business Process Services.[7] Any business process (for example, payroll, printing, ecommerce) delivered as a service via the Internet with access via Web-centric interfaces and exploiting Web-oriented architecture. Advertising services exploiting real-time Internet-based fulfillment are included here.

Cloud Software as a Service (SaaS).[8] The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

Cloud Platform as a Service (PaaS).[8] The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.

Cloud Infrastructure as a Service (IaaS).[8] The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).

Authors

Matt Porta

VP and Global Leader for the Technology Strategy Practice in IBM Global Business Services

Anthony Karimi

Associate Partner in the Technology Strategy Practice in IBM Global Business Services

Joseph Plaskon

Managing Consultant in the Technology Strategy Practice in IBM Global Business Services

Deepak Sharma

Sr. Managing Consulting in the Operations Strategy Practice in IBM Global Business Services

About IBM Global Business Services

With business experts in more than 160 countries, IBM Global Business Services provides clients with deep business process and industry expertise across 17 industries, using innovation to identify, create and deliver value faster. We draw on the full breadth of IBM capabilities, standing behind our advice to help clients innovate and implement solutions designed to deliver business outcomes with far-reaching impact and sustainable results. IBM Global Business Services has cloud strategy offerings to help companies address key issues associated with entering the cloud marketplace.

For more information visit: **ibm.com/**services/cloud

Special Notice

The information contained in this document has not been submitted to any formal IBM test and is distributed AS IS. The use of this information or the implementation of any of these techniques is a customer responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment.

While IBM may have reviewed each item for accuracy in a specific situation, IBM offers no guarantee or warranty to any user that the same or similar results will be obtained elsewhere. Any person attempting to adapt the techniques contained in this document to their own environment(s) does so at their own risk. Any performance data contained in this document were determined in various controlled laboratory environments and are for reference purposes only. Customers should not adapt these performance numbers to their own environments as system performance standards. The results that may be obtained in other operating environments may vary significantly. Users of this document should verify the applicable data for their specific environment.

References

1 United States Department of Energy, May 18, 2007.

2 IBM estimates based on client experience.

3 Ponemon Institute, 2007.

4 National Institute of Standards and Technologies; Draft NIST Working Definition of Cloud Computing, August 2009.

5   IBM Internal Estimates, July 2009.

6 "Wuxi iPark Selects IBM to Build Innovation Incubation Platform", PRNewswire, July 29, 2009.

7 Gartner, "Forecast: Sizing the Cloud; Understanding the Opportunities in Cloud Services" by Ben Pring, Robert H. Brown, Andrew Frank, Simon Hayward and Lydia Leong, March 2009.

8 National Institute of Standards and Technologies, "Draft NIST Working Definition of Cloud Computing", August 2009.

IBM

GBW03097-USEN-01