WHITE PAPER

The Cloud-Enabled Enterprise
Developing a Blueprint and Addressing Key Challenges

Cloud computing offers a significant opportunity for improved business outcomes through the delivery of innovative and more cost-effective IT and business services. A "cloud-enabled enterprise" adopts and implements a "cloud-first" approach to IT service delivery. Cloud-first advocates believe that this approach, over time, will become the default approach for enterprises.

However, simply sourcing cloud technology as the first option will not in itself provide the required IT transformation. The greatest benefit will be derived from re-orienting the focus, skills and architecture of the enterprise to change the way IT is delivered, operated and consumed.

This first-in-a-series of papers on the cloud-enabled enterprise addresses the initial stage in the transformation process—developing and implementing a cloud-enabled enterprise blueprint.

Attributes of a cloud-enabled enterprise

Building a cloud-enabled enterprise requires more than implementing cloud technologies and procuring cloud services. It involves a fundamental shift in how IT services are viewed, procured and implemented. First and foremost, it involves adopting a cloud-first approach to sourcing IT capabilities. Instead of building high-cost, custom IT solutions in house, cloud-first organizations take advantage of cloud capabilities offered by external suppliers to meet business needs.

With this cloud-first approach, IT service delivery is unified across multiple suppliers and delivery channels and access is based on a self-service model with automated provisioning capabilities. Web-based systems are preferred to enable anywhere, anytime access.

Resources in a cloud-enabled organization are acquired on demand and released when no longer required. IT skills are realigned to maximize the benefits and manage the risks of cloud-based services. The enterprise's IT department increasingly acts as an internal broker of IT services delivered from external suppliers to meet business needs, rather than acting as the internal provider of IT services. The risk of new IT service development as well as the responsibilities of managing underlying IT capacity and keeping IT services current shifts to the external cloud service providers.

Most significantly, a cloud-enabled organization exploits new, disruptive cloud patterns and benefits to deliver next generation systems and services. Innovative solutions are procured from the market to drive rapid business value. These solutions are customized using standard, modular components, and agile principles of iterative design are employed to continually implement evolutionary changes.

The end result is a highly responsive, flexible, cost efficient and evergreen IT environment that is closely aligned with business goals and seamlessly evolves as business needs change. Transforming into such a cloud-enabled enterprise, however, requires a clear blueprint, a thorough recognition and understanding of key challenges and anti-cloud patterns, and a well-planned roadmap to succeed.

Blueprint for building a cloud-enabled enterprise

The blueprint below depicts the future state of a cloud-enabled enterprise. It encompasses three key constituents:

- Cloud service consumers
- Cloud service brokers
- Cloud service providers

Cloud service consumers

A wide variety of consumers will access cloud sourced services via a unified, multi-channel access portal—from anywhere, at any time, and on any device. Service consumption will take place on demand and in a self-service mode. Typical consumers include employees, remote workers, mobile workers, business partners, customers, etc.

Cloud service brokers

The brokerage layer is at the heart of a transformed IT service delivery approach. It's the fundamental enabler to becoming an enterprise that efficiently buys and uses modern, increasingly commoditized, cloud-based IT services that deliver all of the advantages of cloud computing. Internal cloud service brokers—often assisted by external third-party cloud

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service brokers—offer expertise and a single point of contact when working with multiple cloud service providers.

Cloud service providers

The goal of a cloud-enabled enterprise should be to build and cultivate a trusted cloud ecosystem made up of cloud service providers, consultants, integrators, and partners who deliver better, more cost-effective services, new delivery channels, greater agility, and faster responsiveness to business and client demands—all while providing data confidentiality, security and privacy, and an increasingly evergreen cloud-based service environment.

Cloud-Enabled Enterprise Blueprint
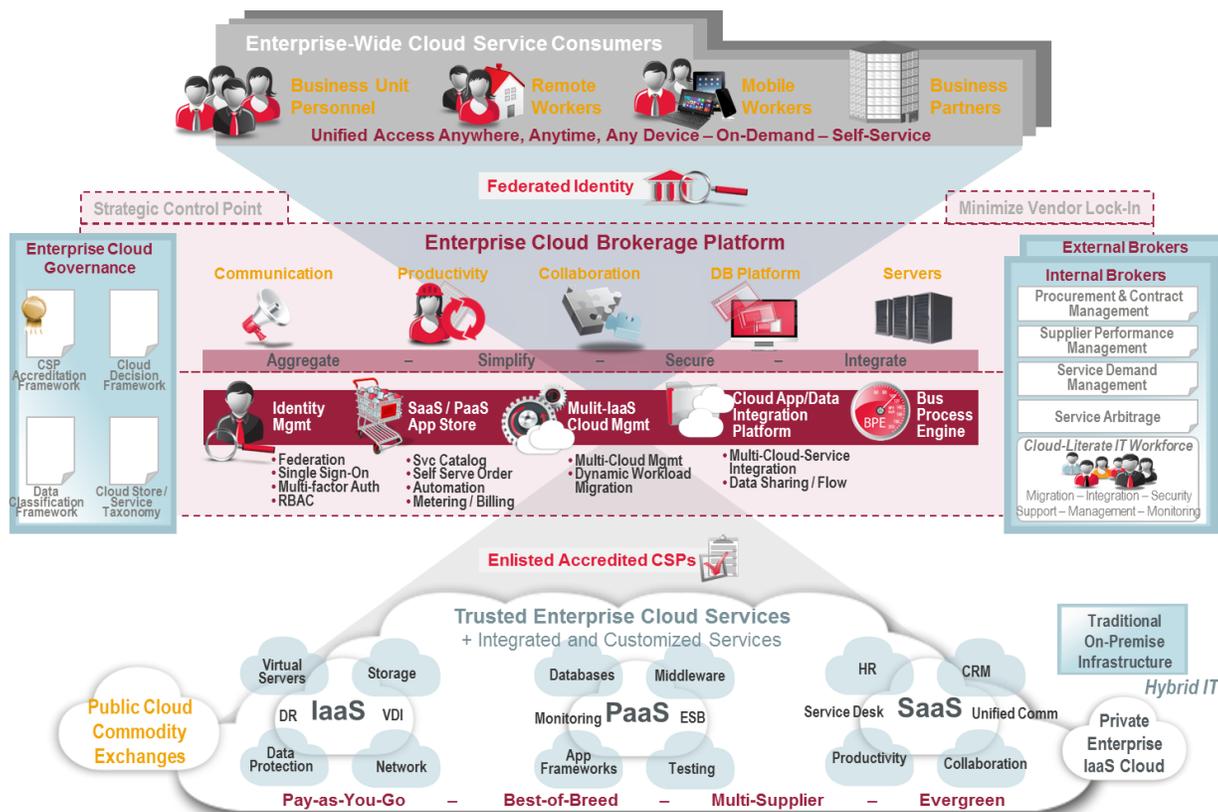
Fundamentally, this blueprint for a cloud-enabled enterprise aims to enable and accelerate an enterprise's cloud adoption in a structured manner while efficiently managing risk and simultaneously maximizing value through the following:
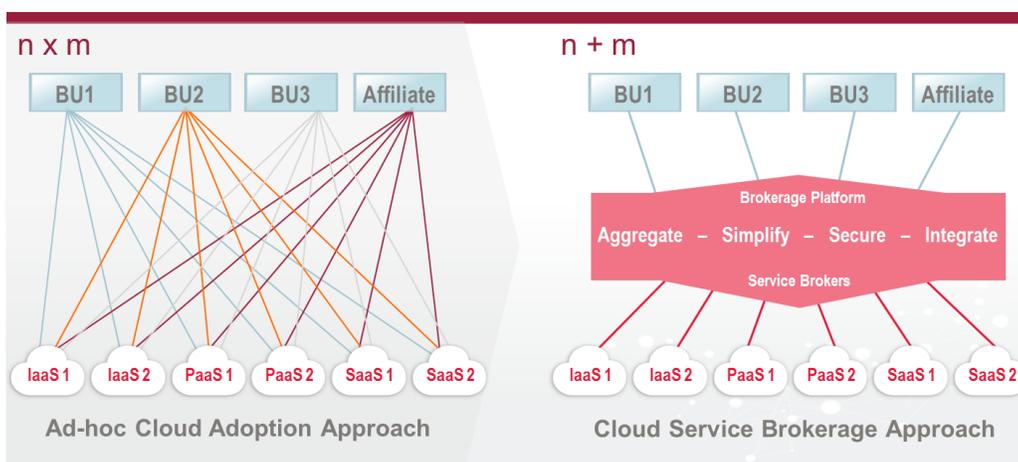
- Streamlining procurement and realizing enterprise-wide procurement economies

- Engaging with cloud service providers through an IT storefront managed by internal and external brokers to create an efficient distribution hub, lower barriers to entry for new providers, better leverage evolving technology, and support the development of customized and/or integrated solutions from multiple sourced cloud services.

Core to the cloud enabled enterprise is establishing this new intermediate— or brokerage— layer between cloud service providers and enterprise's IT service consumers. This layer ensures the enterprise, and specifically its IT department, maintains a level of strategic

control and governance over a diverse and rapidly evolving outsourced multi-cloud and multi-vendor IT service environment.

Without a structured approach to cloud-based service acquisition and consumption, enterprise-wide cloud adoption can easily be slowed by issues such as integration complexities, new procurement processes and security concerns. Further, the acquisition of cloud services directly by business units in circumvention of the brokering enterprise IT department can lead to duplication and inefficiencies and will limit the savings that an enterprise could otherwise achieve through the cloud. The difference between taking an ad-hoc approach versus a coordinated brokerage approach to cloud adoption is that the former would result in a disjointed and fragmented service and data environment as shown below.

While the potential benefits of the cloud-enabled enterprise are significant, the adoption and transformation path must be carefully considered.

Cloud service brokerage approach versus ad-hoc approach

Key brokerage platform technologies depicted in the blueprint address governance, compliance and visibility to ensure the enterprise IT department maintains strategic control and that the risks of technology and vendor lock-in are minimized. Specifically, they provide the following functions and benefits:

- Control of technical diversity, baseline standards, and supplier assurance and accreditation through an **"enterprise cloud store"** with an underlying normalized service taxonomy

- Enterprise-grade, contextual and risk-based security policies and controls that are applied consistently across all connected cloud environments through **federated identity management**

- Brokering interfaces to multiple cloud infrastructure (IaaS) providers through a multi-CSP **cloud management platform** to ensure security and enable the migration of workloads among suppliers

- Secure data and information exchange and service integration through a **cloud app/data integration platform**

- Business process innovation and orchestration across standardized commodity service components through a **business process management** platform.

Transformation challenges

While the potential benefits of the cloud-enabled enterprise are significant, the adoption and transformation path must be carefully considered. Cloud computing represents a significant shift in the sourcing approach of IT services for an enterprise.

This transformation brings with it a number of challenges and potential risks that need to be considered, some of which are listed below. The challenges/risks listed will vary depending on the maturity and current enterprise architecture of the enterprise. Depending on their prevalence, they will influence the future IT and enterprise architecture and ultimately the cloud delivery model (i.e., private, public or hybrid) that best meets the enterprise's and its business units' needs.

Careful assessment through use of a cloud decision framework will assist in the proper placement of applications and workloads.

ORGANIZATIONAL CHANGE MANAGEMENT

The adoption of cloud services will involve significant business change to IT services sourcing and delivery and also impact the enterprise's business practices, operations and processes. Additionally, changes to IT staff skill sets, roles and responsibilities, as well as contractual and financial operating models, will need to be considered. Comprehensive and well-planned organizational change management is required.

BUSINESS PROCESS AND PRACTICE CHANGES

The transitioning of IT services to cloud solutions will impact the enterprise's business processes and practices. IT systems are inherently linked to business service delivery and support internal processes and practices. Changes to IT systems will require follow-up changes to interrelated and interdependent business processes, policies and practices.

Cloud services are highly standardized and therefore cannot accommodate the same level of customization and integration that is possible (subject to cost) with traditional software packages. In government enterprises, legislative changes may be required to facilitate changing business processes to suit commercially supplied cloud software services.

In all cases, this presents an opportunity or "challenge" for business in terms of the following:

- Rationalization, re-engineering or re-designing of business processes
- Simplification and standardization of business processes
- Enabling new business models

IT WORKFORCE SKILLS AND CAPABILITIES

The adoption of cloud services will have an impact on the core IT functions that will continue to be performed in the enterprise and the types of knowledge and skills that IT departments and business units will require. The enterprise will need to focus its skills to be more aligned with IaaS and SaaS approaches and progressively move away from the management of in-house IT assets (both servers and applications).

INFORMATION AND DATA MANAGEMENT

There are a number of issues relating to data governance that need to be considered when utilizing cloud services:

- **Data location/retrieval:** The enterprise IT department will need to ensure that data is portable between CSPs and retrievable within agreed timeframes. Government enterprises, in particular, might have requirements that data can be only stored in agreed locations.

- **Data ownership and protection:** The enterprise will want to retain control over any data or information that is placed in a cloud computing service and ensure it is adequately protected from loss.
- **Privacy, confidentiality and retention:** Privacy of any data stored on a cloud computing service must be maintained in accordance with enterprise policies or, in the case of governments, with statutory/regulatory obligations. While this is true especially for government enterprises, it also applies to commercial enterprises.

SECURITY

In a cloud-enabled enterprise, much of the information that the enterprise has traditionally believed to be protected within the perimeter of its own networks will be shifted to the cloud. The enterprise will need to adapt security models to suit cloud environments and consider end-to-end embedded security models as opposed to traditional perimeter-based models.

HYBRID IT SERVICE INTEGRATION

Using services from the cloud will present unique challenges to the enterprise when those services need to be integrated with enterprise systems that are not in the cloud or, alternatively, when data integration/migration is required between multiple services from different cloud providers. Cloud integration brokerage and the enabling technologies are two to four years behind aggregation technology in terms of maturity.

SERVICE LEVEL / PERFORMANCE MANAGEMENT

The enterprise IT department will need to ensure that contracts established with cloud providers contain prescriptive requirements regarding performance and that compliance with these requirements can be accurately measured by key performance indicators (KPIs). Applications/architecture changes and/or business process adjustments may be required in some circumstances to ensure satisfactory service levels in a cloud environment.

FINANCIAL AND FISCAL MANAGEMENT CHANGES

As the enterprise moves to consume more pay-as-you-go services and utilize cloud-based service delivery more and more, a proportion of capital expenditure (Capex) will need to be translated into operational expenditure (Opex).

PROCUREMENT AND CONTRACTUAL CHANGES

A shift to the use of pay-as-you-go cloud services also introduces new contractual challenges that will require IT departments to revise IT legal contracts to cater to cloud providers and to cover issues such as protection of information, liability, contract termination, dispute resolution, early warning of bankruptcy (or similar situation), introduction of harmful code, compensation for data loss/misuse, change of control, change of terms at the discretion of the provider, and information privacy.

EXISTING LEGACY IT INVESTMENT CONSTRAINTS

Finally, today's enterprise has a significant existing investment in IT applications and infrastructures that will need to be considered as services are slated to be moved to the cloud. It will be important to understand which applications or infrastructure should be maintained and leveraged for what time period. Also, any instances where current contractual models (e.g., software licensing) may present a potential impediment to cloud will require special consideration.

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Conclusion

IT industry observers and analysts predict that within a decade up to 80 percent of IT services will be commoditized and cloud sourced. While often overhyped, cloud computing is not a fad. It is here to stay, and its adoption will accelerate. Most importantly, it will fundamentally change how IT service providers deliver IT, how enterprises source IT, and how IT departments within the enterprises provide value to their business clients.

Only enterprises who carefully and methodically plan for this transformation will succeed in cloud adoption and in reaping the associated benefits of establishing a highly responsive, flexible, cost efficient and evergreen IT service environment that is closely aligned with business goals and continuously evolves as business needs change.

Therefore, adoption of cloud computing should be viewed as a 3-5 year transformational change requiring a clear vision and blueprint for the future and an understanding of the multitude of challenges and patterns obstructing cloud adoption.

In addition to a blueprint, we also recommend the development of a set of clearly defined technical and organizational transformation strategies designed to implement the blueprint and realize its benefits while minimizing risk. The next paper in this series will focus on transformation strategies. Lastly, implementation and execution of these strategies should be planned via a detailed, multi-phased and multi-track roadmap. The third and final white paper in this series will present and explore such an implementation roadmap.

To discuss the topics addressed in this paper in more detail, please contact us at info@cgi.com.

About the Author

Ralf Schlenker is a director in CGI's Global Marketing team where he is responsible for CGI's strategic positioning and service offerings in the areas of cloud computing and infrastructure services. He has nearly 20 years of IT and business consulting and architecture experience. He joined CGI in 1995 and holds master's degrees in aerospace engineering and in business administration.

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