WHITE PAPER

The Cloud-Enabled Enterprise:

A Set of Transformation Strategies

This is the second-in-a-series of CGI white papers on transitioning to a “cloud-enabled enterprise.” Cloud-enabled enterprises take a “cloud-first” approach to IT service delivery, taking advantage of cloud capabilities offered by external suppliers instead of building them in house. This approach, which experts predict will soon become the default approach for enterprises, is key to realizing the full benefits of cloud computing.

Our first paper addressed the initial stage in transitioning to a cloud-enabled enterprise—developing a cloud-enabled enterprise blueprint. Once an effective blueprint is developed, the next stage involves implementing the right transformational strategies to ensure success. This second paper discusses in detail 10 transformation strategies CGI recommends in managing the complex transition to a cloud-enabled enterprise.

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Introduction

One of the central premises of our first paper on the cloud-enabled enterprise was that an uncoordinated, ad-hoc cloud service adoption approach can easily negate the benefits of cloud computing. Consuming many different types of cloud services from multiple suppliers in an ad-hoc fashion will create a highly heterogeneous and fragmented IT environment as each cloud service is inherently different in terms of the following:

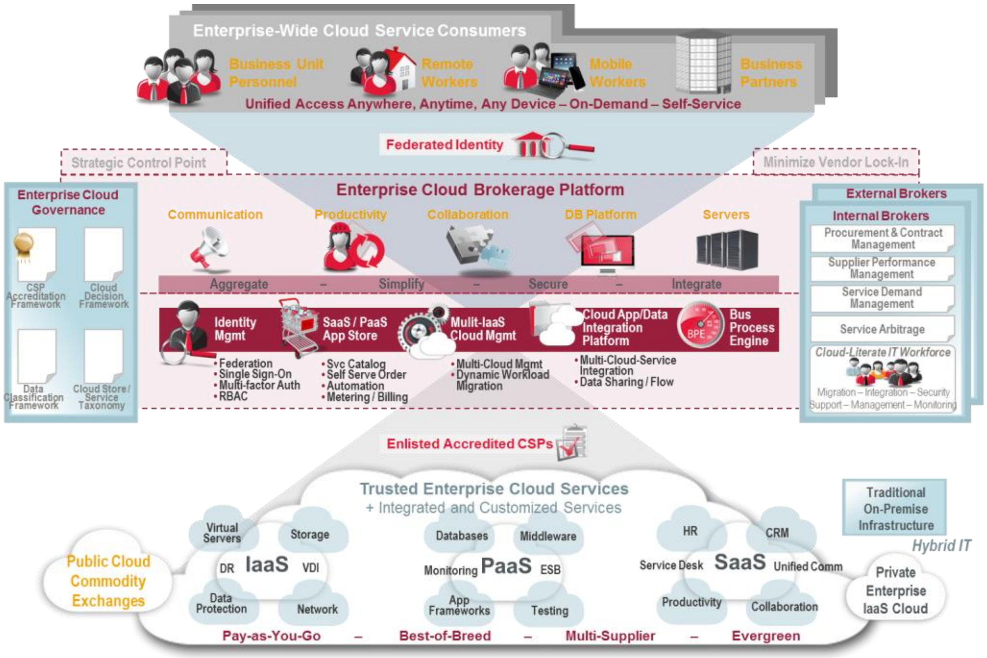
- Contract, service level agreement, billing and licensing
- Security (identity sources, credentials, access control and audit capabilities)
- Data integration interfaces and use of standards
- Provisioning mechanisms

An enterprise-wide cloud service brokerage capability was introduced as key to developing an effective blueprint for a cloud-enabled enterprise. With this brokerage model, 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. Such a model is fundamental to becoming a cloud-enabled enterprise.

In this second paper, we discuss 10 transformation strategies required to build an effective cloud service brokerage model. These strategies consist of five technology and five organizational strategies, which are discussed in detail below.

CGI recommends the implementation of 10 technology and organizational strategies in transitioning to a cloud-enabled enterprise.

Figure 1: Cloud-enabled enterprise blueprint with cloud service brokerage layer (red)


Enterprise-Wide Cloud Service Consumers
Business Unit Personnel
Remote Workers
Mobile Workers
Business Partners
Unified Access Anywhere, Anytime, Any Device – On-Demand – Self-Service
Federated Identity
Strategic Control Point
Minimize Vendor Lock-In
Enterprise Cloud Governance
CSP Accreditation Framework
Cloud Decision Framework
Data Classification Framework
Cloud Store / Service Taxonomy
Enterprise Cloud Brokerage Platform
Communication
Productivity
Collaboration
DB Platform
Servers
Aggregate – Simplify – Secure – Integrate
Identity Mgmt
• Federation
• Single Sign-On
• Multi-factor Auth
• RBAC
SaaS / PaaS App Store
• Svc Catalog
• Self Serve Order
• Automation
• Metering / Billing
Mulit-IaaS Cloud Mgmt
• Multi-Cloud Mgmt
• Dynamic Workload Migration
Cloud App/Data Integration Platform
• Multi-Cloud-Service Integration
• Data Sharing / Flow
BPE
Bus Process Engine
External Brokers
Internal Brokers
Procurement & Contract Management
Supplier Performance Management
Service Demand Management
Service Arbitrage
Cloud-Literate IT Workforce
Migration – Integration – Security
Support – Management – Monitoring
Enlisted Accredited CSPs
Trusted Enterprise Cloud Services
+ Integrated and Customized Services
Virtual Servers
Storage
DR
IaaS
VDI
Data Protection
Network
Databases
Middleware
Monitoring
PaaS
ESB
App Frameworks
Testing
HR
CRM
Service Desk
SaaS
Unified Comm
Productivity
Collaboration
Public Cloud Commodity Exchanges
Traditional On-Premise Infrastructure
Hybrid IT
Private Enterprise IaaS Cloud
Pay-as-You-Go – Best-of-Breed – Multi-Supplier – Evergreen

Technological transformation strategies

We view the following five technical capabilities as fundamental to building a cloud service brokerage model and becoming a cloud-enabled enterprise.

Technological transformation strategies
T1. A **cloud storefront** will enable the sourcing of a wide range of mass-market IT services from public cloud service providers and internal private cloud resources.
T2. A **federated identity model** will allow for the sharing of commodity and common services, support multi-vendor sourcing approaches and be instrumental in the establishment of a new cloud security perimeter.
T3. A **unified, multi-channel access portal** will enable access to cloud-based IT services via an "any time, any location, any device" model.
T4. A **multi–CSP management platform** will provide a brokered interface to multiple cloud infrastructure (IaaS) providers with embedded policy controls to determine workload placement and provide workload portability among suppliers (both external public and internal private).
T5. A **cloud application/data integration platform** will provide control over the exchange of information and data sets, including the brokering of interfaces between cloud services and traditional on-site systems.

T1 – CLOUD STOREFRONT

An enterprise-wide cloud storefront supports the sourcing and consumption of a wide range of IT services from both public and private cloud service providers. The storefront creates a vibrant, interactive enterprise marketplace that enables business unit and IT managers to do the following:

- Access multiple offerings and cross-compare to identify the best solution at the best price
- Evaluate offerings against business needs
- Purchase, upgrade or switch services
- Manage consumption and associated costs

The ideal storefront simplifies and standardizes enterprise procurement processes and promotes the sharing and reuse of common IT services across the enterprise. Other advantages delivered include the following:

- Catalog of trusted cloud services from accredited and vetted vendors
- Enterprise-wide storefront, along with business unit /division sub-stores
- Common taxonomy for categorizing and comparing cloud services based on criteria such as contract jurisdiction, data storage location, data extraction capabilities, cloud deployment model, provider security accreditations, prices, performance levels, etc.
- Intelligent placement and improved management of cloud workloads
- Common financial model for services across public, private and hybrid clouds

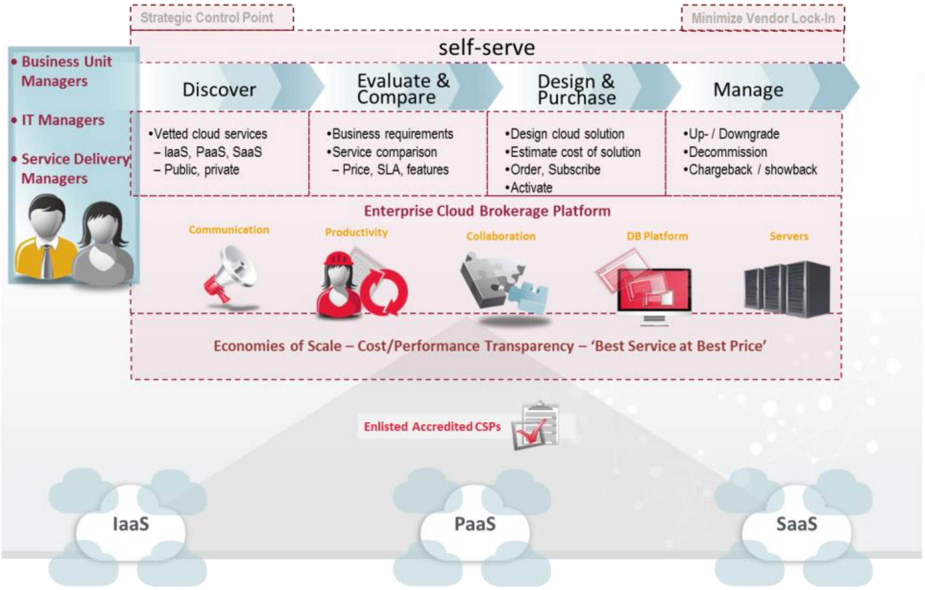
Best solution at best price

The enterprise-wide cloud storefront helps to drive the best solution at the best price through the following:

- Encouraging cloud service providers to offer innovative solutions
- Broadening competition to encourage specialty and niche suppliers
- Leveraging enterprise-wide purchasing economies of scale
- Providing transparency of cost and comparative performance indicators
- Streamlining procurement by simplifying the recurring acquisition of products and services
- Reducing duplication of cloud procurement and redundant security assessments
- Offering mechanisms for business units to quickly discover and use evolving technology
- Contracting cloud services on a short-term basis
- Enabling continuous competition and higher flexibility, including options for dynamic workload allocation

Figure 4 below depicts an enterprise cloud store that institutes consistent acquisition processes and provides a tangible means for IT procurement managers, IT architects and strategists, as well as service delivery managers to discover, evaluate, compare and provision cloud services, as well as manage their consumption and associated costs.

Figure 4: The enterprise cloud store concept



T2 – FEDERATED IDENTITY MODEL

With large-scale cloud adoption, an enterprise's IT environment will become more fragmented, distributed and much more of a virtual concept. Protecting enterprise data in this kind of environment requires a new security approach. Traditional security approaches rely heavily on network-based security perimeters, which have proved to be problematic and less effective with cloud-based services.

Further, each cloud service has its own disparate authentication model, making it difficult to consistently apply enterprise security controls, gain visibility and control of enterprise data, and enforce compliance.

A degree of integration (at an identity level) is therefore required to connect multiple cloud services. This type of integration enables security controls to be enforced consistently across all connected environments and providers. It also enables multiple business units to share cloud services and facilitates the integration of systems, data and processes among cloud services and providers.

The implementation of an integrated and federated identity model is a major undertaking. Identity architectures are often positioned to support "inward identity propagation" for internal applications, compared to "outward identity propagation" (or federation) for external services and business partners.

It is also challenging and expensive for an enterprise to achieve the required level of integration due to varying standards, systems and vendors, as well as continually changing application programming interfaces (APIs). Identity broker technology is required to connect and normalize identity and access management across multiple cloud services, including integration with existing and possibly fragmented enterprise identity repositories. Identity

Benefits of a federated identity model

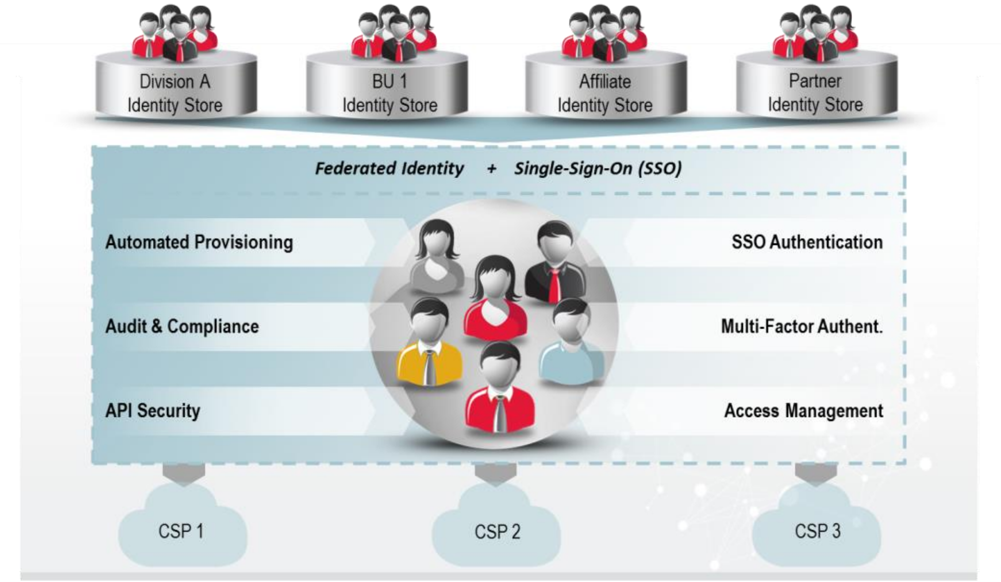
An integrated view of identity delivers the following benefits to cloud-enabled enterprises:

- **Secure cloud services:** By ensuring the enterprise's security policies are applied consistently across cloud service providers
- **Shared cloud services:** By enabling multiple business units to share cloud service to enhance collaboration (e.g., a shared CRM or travel management system)
- **Integrated cloud services:** By facilitating integration (system/data/process) among multiple cloud services (or providers), including the ability to facilitate dynamic migrations of workloads and services between clouds or providers

brokerage technologies provide access to large portfolios of pre-integrated cloud services and extensible integration points to enable and speed up cloud adoption.

Without a shared identity framework and identity brokering capability, duplication and disconnectedness will remain an inhibitor to effective and efficient cloud service delivery.

Figure 5: The federated identity broker concept



T3 – UNIFIED, MULTI-CHANNEL ACCESS PORTAL

A unified access portal provides a single landing page for users to securely and transparently access brokered cloud services from anywhere, at any time and from a wide range of devices. This consistent and managed access point provides the following:

- Ability to control access based on user/role, device, location, time, etc., including authentication strength
- Sign-on capabilities to provide a single, secure password for all services to ensure enterprise credentials are never known or stored repeatedly by external providers and to enable compromised credentials to be changed in one place
- Self-service administration and delegation of entitlement management
- Automated provisioning/de-provisioning of user accounts
- Central point for audit and compliance

Figure 6 below depicts the concept of a unified access portal in conjunction with the federated identity model and portrays the grouping of cloud services based on a user's role and organizational home.

Need for standard APIs

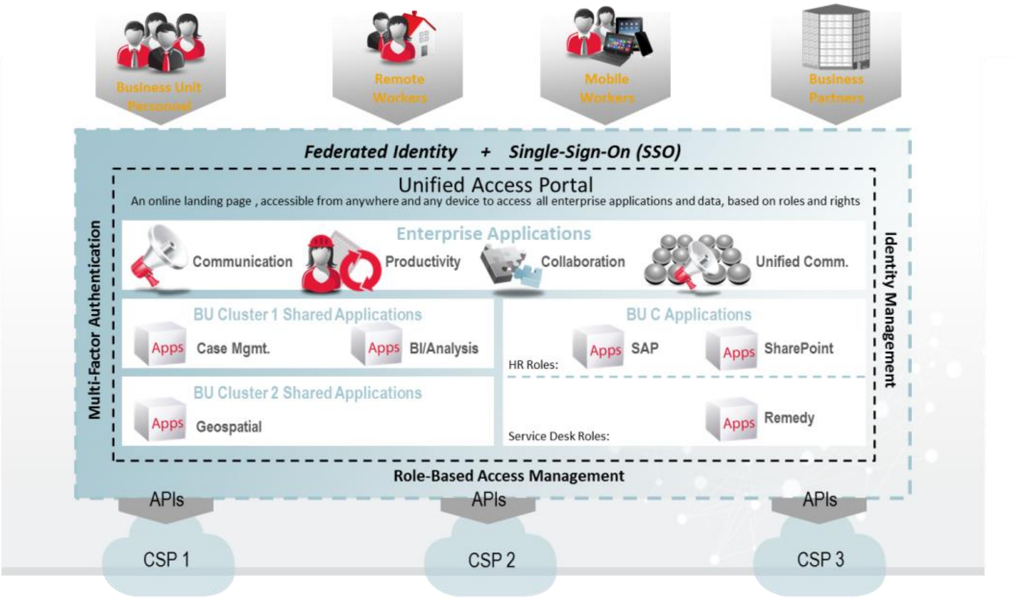
Each of the five technical strategies discussed in this paper will need standard APIs to achieve the following:

- Normalize integration requirements and provide a common way to integrate cloud services (and suppliers)
- Securely broker identity information to cloud providers
- Consistently authenticate and authorize users, including single sign-on
- Automate the activation of new services or service changes
- Synchronize with changes to a CSPs service catalog
- Discover provisioned services which didn't originate through the brokerage platform
- Electronically receive metered billing information from suppliers
- Secure and broker data and information interchange

Any brokerage technology's integration or API framework should support the following:

- Multiple out-of-the-box plug-ins to connect to standards-based cloud services
- Pre-developed adaptors to connect to propriety cloud services interfaces
- Ability to integrate the enterprise's custom and legacy systems and solutions to the platform

Figure 6: Unified Access Portal with Federated Identity Broker Concept



T4 – MULTI-CSP MANAGEMENT PLATFORM

Public IaaS cloud service providers build and operate their clouds on a variety of technology stacks and a lack of standardization in the industry is still the norm. Examples of IaaS cloud technologies are VMware/vCloud, Microsoft Azure and Cloud OS / Hyper-v, AWS (proprietary version of Eucalyptus), KVM, and Openstack. It is important that an enterprise's cloud brokerage platform has the capability to interface with all these technology stacks to guarantee maximum flexibility in CSP choices and prevent possible vendor lock-in.

Supported functionality should include automated provisioning, management and de-provisioning of services and assets within public clouds. More advanced requirements are embedded policy controls and service attribute normalization/modeling to enable the determination of optimal workload placement and to provide workload portability among suppliers. Elastic resource scaling or bursting (horizontal and vertical) based on workload demand and policies is another key functionality, eventually even between multiple CSPs.

Future requirements include automated workload shifting among providers based on performance monitoring and other policies.

Additionally, this multi-cloud management platform will also need to interface and aggregate with the enterprise's own private IaaS cloud(s).

T5 – CLOUD APPLICATION/DATA INTEGRATION PLATFORM

While strategies T1–T4 primarily support aggregation brokerage, a cloud application/data integration platform will be key to enabling "integration brokerage" between different SaaS providers and also between cloud-based applications and in-house applications. Integration brokerage will facilitate the actual integration and security of data flows and the interfacing among multiple cloud-sourced SaaS applications.

For IaaS this technology will enable migration of workloads between different IaaS clouds.

Unlike the previous four technologies, which have rapidly matured over the last 12-18 months, this technology area is comparably immature. We believe it will take at least 24 months to see this technology ready for enterprise use.

Use of IaaS private cloud

The establishment of an enterprise private IaaS cloud — to complement available public cloud offerings — should be considered in laying the technical foundation for a cloud service brokerage model. A private cloud may better support some of the enterprise's IT requirements and accommodate a wider range of existing traditional computing workloads not immediately suitable for the public cloud.

In the case of sensitive enterprise data or mission-critical workloads, a private cloud can more extensively address the privacy, compliance, security, availability and performance needs or risk tolerance of its tenants.

In the short term, a private cloud serves as an intermediate stage between current enterprise on-site IT models and public cloud computing. A more controlled computing environment with limited membership will help to build trust in cloud models as resources are not shared with non-enterprise tenants.

When available, however, it will represent the enterprise service bus (ESB) of the cloud era and will provide control over the secure exchange of information and datasets, including the brokering of interfaces between cloud services and traditional on-site systems to avoid tight coupling in the growing enterprise cloud and in-house app portfolio. It will support the ability to transparently migrate components to the cloud or between clouds.

Practically, it will allow the solution architect to design orchestrated business process flows and solutions with individual SaaS components and systems provided from multiple cloud providers. The technology will also provide the following:

- Cross-SaaS interface abstraction and customization via a GUI framework
- Data and VM image normalization/translation
- Data and Network security regardless of where the data and service resides

Organizational transformation strategies

While the technical capabilities discussed so far are crucial for a cloud enabled enterprise the following organizational changes are equally critical.

Organizational Transformation Strategies
O1. Create new organizational roles/entities for cloud brokers for IaaS, PaaS, and SaaS services
O2. Transition enterprise and business unit IT departments from the role of IT service provider to IT service broker
O3. Train the enterprise's IT workforce to become cloud-literate, so that they can deliver innovative solutions and cost savings by continuously exploiting new cloud capabilities
O4. Select and vet in advance a portfolio of trusted cloud services from multiple cloud service providers
O5. Establish a hybrid IT delivery model where cloud-based and on-premise traditional IT environments co-exist

O1 – APPOINTMENT OF CLOUD BROKER ENTITIES/ROLES

A "cloud broker" is an enterprise internal or external role or entity that manages the use, performance and delivery of cloud services and negotiates supplier relationships. A cloud-enabled enterprise will need to appoint at least one cloud broker and, more than likely, many brokers. A cloud broker may be either an external broker (private business with requisite expertise) acting on behalf of the enterprise or an internal broker responsible, for example, for core line of business needs, for the needs of a certain business area or for certain enterprise-wide services.

All cloud brokers are required to do the following:

1. Participate in a common cloud marketplace for the enterprise
2. Use the enterprise brokerage platform to consistently aggregate, secure, integrate and simplify the consumption of services from multiple brokers and vendors. The enterprise brokerage platform provides the following:

Broker appointments

The appointment of cloud brokers should be done very selectively. External brokers may initially be in a better position to perform the core business process functions of a broker (e.g., market research, negotiation, integration services, on/off-boarding, management, etc.).

Brokerage responsibilities may be segmented based on the following:

- Service classification (category)
- Architectural brokerage role performed (e.g., aggregation versus integration, market research, negotiation, migration, integration or management services)
- Level of neutrality required

A broker (internal or external) may also utilize other brokers (or integrators) for niche integration or customization capabilities, or to provide access and aggregation across other specialty cloud services, negating the need to manage each vendor relationship.

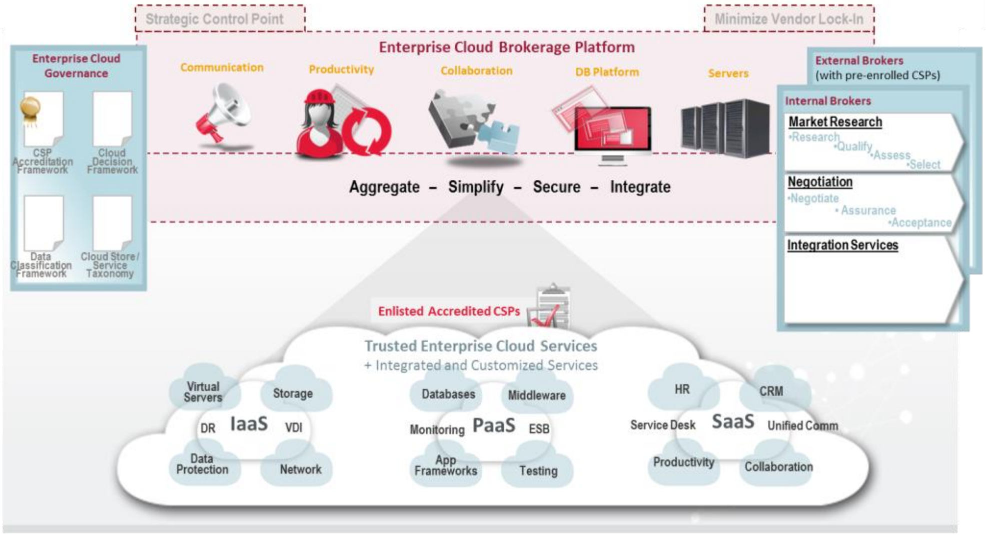
The commercial obligation and contractual commitments may either be held directly by the enterprise or by the external broker. Cloud brokers may also hold pre-established arrangements with cloud service providers.

- Storefront to offer, discover, compare, provision, manage and meter cloud services
- Identity and authentication framework for all cloud-sourced services
- Cloud management interface for IaaS services from multiple providers
- Integration bus for data interchange and integration to in-house information systems

3. Operate under a common enterprise cloud governance model

As depicted in the figure below, multiple cloud brokers establish commercial agreements for cloud services that are added to the enterprise cloud store. Brokers also use the enterprise's common data classification and supplier accreditation frameworks.

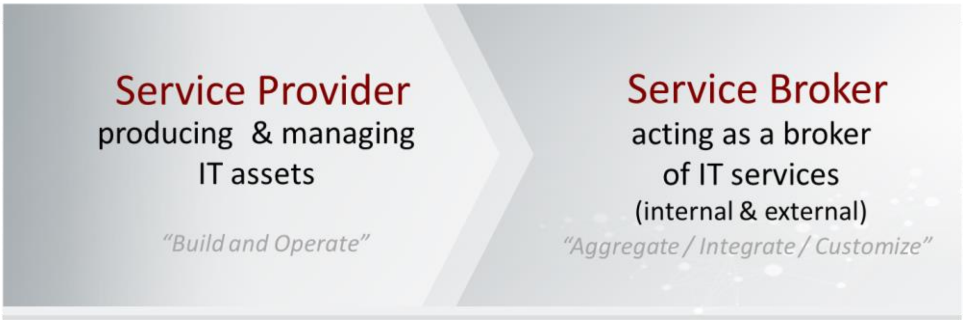
Figure 7: Multiple broker entities participating on the enterprise cloud brokerage platform with cloud store



O2 – TRANSITION OF IT DEPARTMENTS FROM PROVIDERS TO BROKERS

Traditionally, enterprise IT departments have been the in-house provider of IT services. However, with cloud adoption and the corresponding outsourcing of commodity and common IT services, their role and mindset will need to shift from producing and managing assets to acting as a broker of IT services from external suppliers or utilizing other brokers to satisfy business needs. This paradigm shift is depicted below:

Figure 8: Enterprise IT department must shift from IT service provider to cloud service



Role of a broker

The enterprise may engage a broker to perform one or more services (or sub-services). These services can be broadly categorized as market research, negotiation and integration services.

Market research

- **Research** – Researches available cloud options and models
- **Qualification** – Qualifies services based on business requirements
- **Assessment** – Assesses the enterprise business to gauge suitability
- **Selection** – Recommends services for selection

Negotiation and assurance

- **Negotiation** – Supports the negotiation of business terms
- **Assurance** – Follows the enterprise's information assurance and risk management frameworks
- **Acceptance** – Manages the acceptance of business terms on behalf of the enterprise

Integration

- **Onboarding** – Supports the enterprise's transition, migration and provision of cloud resources.
- **Management** – Manages the relationships between the cloud service providers and the enterprise
- **Integration** – Optionally, the broker may assist with integration via an integration hub or bus.
- **Failover** – May handle and provide support with switching out cloud service providers
- **Off-boarding** – May facilitate the transition from a CSP, including contract termination, as well as the extraction of data

Enterprise IT departments in a cloud-enabled enterprise must have a minimal IT footprint and should be brokering, investing in, and leveraging a network of ready-made IT capabilities to assemble and deliver innovative business-driven IT solutions. Notwithstanding this role shift, there will still be a need to continue maintaining traditional IT delivery components in a hybrid IT model.

The enterprise IT department or service broker’s primary role will be to work with cloud service providers and business units to do the following:

- Facilitate the acquisition of cloud capabilities (e.g., procurement and contract management)
- Assess the benefits, risks and costs of business requirements against cloud offerings
- Orchestrate and help to intelligently place workloads and capabilities across a portfolio of service providers
- Manage service demand, optimize consumption, licenses and associated costs
- Monitor and manage service quality and supplier performance
- Understand the wider cloud market to optimize financials and manage service lifecycles

Value in this new model is delivered through a broker’s ability to source, orchestrate and offer for consumption multiple pre-packaged services in a structured way that does the following:

- Unifies delivery across multiple cloud service providers and delivery channels
- Enables anywhere, anytime self-service access to IT capabilities
- Assembles custom-fit IT solutions using standard and interchangeable cloud services
- Exploits new disruptive cloud patterns and benefits to deliver more cost-effective services
- Continually brokers and enables new and innovative services and solutions

O3 – ESTABLISHING A CLOUD EDUCATED IT WORKFORCE

A cloud-enabled enterprise will require a cloud educated workforce to readily consume and exploit new cloud-sourced services. Persistent use of traditional IT practices will hinder the agility, innovation and cost-saving benefits delivered by cloud computing. IT personnel will need to recognize new cloud patterns and develop a new mindset and skills to be able to fully leverage the services offered in a dynamic cloud marketplace, ensure their efficient use, and continuously support a “cloud first” approach. Due consideration must also be given to cloud computing experience when hiring new IT employees.

Cloud-educated IT personnel must be able to do the following:

- Design cloud-optimized solutions, exploiting the scale, elasticity, multi-tenancy and high availability benefits of cloud computing, with consideration of cloud sensitivities such as latency, performance and security
- Manage cloud solutions efficiently to keep charges to a minimum
- Integrate cloud services and other on-site systems using modern web-based and API-driven integration technologies
- Customize cloud services to deliver new functionality using modular cloud SaaS platforms or other workflow technologies to externalize business logic
- Engage collaboratively with the consumer and provider communities in translating requirements and capabilities across both groups

Enterprise cloud governance

The operation of the marketplace and cloud brokers (internal or external) should be governed consistently through the following key policy and governance frameworks:

- **Standard guidelines for cloud service provider accreditation** to ensure consistent vetting of CSPs and assurance levels, including possibly matching the level of certification to data classification/sensitivity
- **Standard data classification framework** for information security classification to ensure a consistent approach to dealing with the sensitivity and confidentiality of information assets
- **Common cloud decision framework** and methodology to ensure informed and evidence-based decisions surrounding placement and orchestration of workloads (system/application/data) across cloud services, including the selection of appropriate service and deployment models
- **Common cloud store taxonomy** to assist with categorizing and comparing cloud service offerings against desirable business and non-functional service attributes and characteristics (e.g., contract jurisdiction, data storage location, data extraction ability, cloud deployment model and recognized security accreditations held by a cloud service provider)

O4 – SELECTING AND VETTING TRUSTED CLOUD SERVICES AND CSPS

In the cloud-enabled enterprise, central purchasing agreements are replaced with pre-qualified cloud services suppliers through whom commodities can be bought via short-term contracts. Multiple cloud providers are used to minimize lock-in and create competitive tension to drive service quality and price advantages.

Agreed exit strategies are made a part of cloud service contracts to facilitate the process of switching providers should a provider fail to deliver on its service level agreement, exit the market, or fall behind the capabilities of its competitors. These exit strategies typically stipulate certain pre-conditions and caveats for data management (e.g., allowance for data migration upon contract exit).

Increased importance will be placed on the use of open standards to reduce the risk of vendor lock-in and provide data portability and/or facilitate interoperability among different vendor clouds. The inadvertent creation of “islands” of cloud technologies and data would otherwise lock the enterprise into solutions that may become rapidly out-of-date or be difficult or expensive to change. Current IT solutions are often vertically coupled into single vendor contracts or technology silos.

New IT solution components should also be loosely coupled to preserve options for the enterprise to transparently source capabilities at each layer of service from multiple providers where the added complexity is outweighed by additional business value.

It can be expected that there will be specific SaaS cloud providers for line-of-business applications, a smaller number of PaaS cloud providers to support mainstream application development frameworks, and an even smaller number of IaaS cloud providers in an enterprise’s cloud ecosystem.

Each best-of-breed cloud offering provides varying degrees of security, availability, scalability, performance and price to support different workload requirements. Over time, the enterprise brokerage platform will enable highly commoditized functions (e.g., IaaS compute services) to be rapidly switched between suppliers based on policy variables such as cost-effectiveness, performance, availability, geography and security.

The current close coupling of systems and all layers within their operating stack, including vendor-introduced lock-in, means replacing one component often dictates the modification or replacement of other dependent components. The forced upgrade of interrelated components often imposes unnecessary costs, as those components could continue to be functional, meet business requirements and operate cost-effectively. In a cloud-enabled enterprise, IT departments should have a constant focus on reducing (“loosening”) dependencies between components to allow components to be swapped out, upgraded or replaced when required and driven by genuine business need or by market innovation with minimal impact.

Creating an “evergreen” cloud ecosystem

Developing a portfolio of trusted cloud services pre-selected from multiple CSPs helps to create an “evergreen” cloud ecosystem that continually delivers the latest technologies and technological advantages.

While acquiring “evergreen” cloud-based capabilities that are managed, maintained and upgraded by external parties is a key enabler, this in itself does not guarantee a legacy-free environment. Achieving and sustaining an evergreen cloud environment requires a concerted effort and a set of new thinking, design practices and architectural patterns.

Adopting practices and patterns that aim to deliver loose coupling among logically distinct layers within the IT stack will allow components to be interchanged and continually refreshed in a relatively simply manner with minimal consideration for the interdependencies between layers. This provides an efficient and effective way of avoiding the creation of legacy complexities and cost with continued incremental investment.

O5 – FORMING A HYBRID IT DELIVERY MODEL WITH CLOUD-BASED AND TRADITIONAL IT ENVIRONMENTS CO-EXISTING

Legacy/traditional IT delivery will not cease to exist with the ascension of the cloud; certain applications and workloads will continue to be delivered as a traditional (in-house or managed) service. The resulting state, where some services are cloud-delivered while others are delivered under traditional models, is referred to as hybrid IT. For certain legacy systems/applications that cannot operate in the cloud, the hybrid IT model will be required until those systems/applications are decommissioned.

While the first preference for the cloud-enabled enterprise is to source new capabilities and replacements for existing systems from the cloud, enterprises typically will still have a continued dependency on licensed, on-site, enterprise applications for a sub-set of operations. This may be attributed to market availability of suitable cloud alternatives, leveraging existing ROI, software licensing, technical constraints (such as throughput or latency) or particular requirements for greater levels of security, privacy or trust for critical data and applications. In these cases, the ownership and management of such dedicated enterprise infrastructure can of course also be outsourced to trusted managed services providers. The cloud decision framework will guide the enterprise’s ongoing cloud planning and assessments. Integration frameworks and platforms between these traditional IT services and co-existing cloud services become a key enabler of hybrid IT delivery.

Conclusion

The cloud computing revolution holds great promise of increased flexibility and savings, and IT service delivery is in the midst of a dramatic change that will continue for the next three to five years. Uncoordinated, ad-hoc cloud service adoption can easily negate the benefits of adopting cloud computing. Consuming many different types of cloud services from multiple suppliers in an ad-hoc fashion will create a highly heterogeneous and fragmented IT environment.

To avoid this and to avoid unsanctioned shadow IT consumption, enterprise IT departments will need to adapt and reinvent themselves. They need to increasingly transition from a traditional IT service provider to an IT service broker. This multi-year, multi-dimensional transition requires a comprehensive and structured long-term roadmap with a clear future blueprint. A set of technological as well as organizational transformation strategies—introduced in this paper—can help “break down," structure and guide an otherwise daunting and long-term transformation. These transformation strategies should be viewed as focus areas over time. They should be used to develop and structure an enterprise’s specific and prioritized transformation roadmap. The roadmap, in turn, should consist of a series of achievable and manageable technical and organizational transformation projects and change efforts, all providing their own ROI yet contributing towards the larger blueprint.

CGI stands ready with hundreds of seasoned cloud consultants and years of experience in cloud computing innovation—such as Europe’s Helix Nebula Cloud Marketplace for high performance scientific computing—as well as IT transformation services around the world to help our clients adapt to the exciting world of cloud-sourced services and realize the potential of cloud computing for their enterprises. We can engage at the strategic level with your enterprise with services such as our IT transformation services or more tactically by assisting you with our application or infrastructure cloud readiness assessments to provide initial triage decisioning on which applications and infrastructure might be most appropriate and ready for a migration to a cloud.

Cloud brokerage case study

Helix Nebula Cloud Marketplace for Science Computing

CGI, since 2011, has played a lead role—among a small group of European cloud service providers and integrators —in designing, proving and now operating the Helix Nebula Marketplace (HNX). HNX is a cloud brokerage-based marketplace where large European science institutions and universities can procure high-performance IaaS computing and storage resources.

- CGI acted as a lead architect and integrator to develop and success-fully test cloud brokerage technology.
- High performance, big data use cases were successfully shifted to and brokered to multiple public cloud service providers.
- CGI today operates the HNX cloud service brokerage and acts as a third-party independent commercial brokerage entity between HNX’s cloud providers and its consumers.
- Flagship workloads currently include applications from high-profile institutions like CERN’s Large Hadron Collider and the European Space Agency.
- For more information, visit:

  https://bb1.hnx.helix-nebula.eu/

cgi.com