Executive Summary

In a few short years, the scalable, transactional "cloud" approach to IT and application delivery has evolved from being a cutting-edge (and risky) science experiment to an established and increasingly mainstream IT development and deployment option. Simply stated, cloud computing offers an "IT as a service" model that makes IT easier and cheaper to consume. The following key attributes define a "cloud service":

- **Shared, standard service**: Built for multitenancy, among or within enterprises
- **Solution packaged**: A "turnkey" offering; preintegrates required resources
- **Self-service provisioning and management**: Typically via a Web portal
- **Elastic resource scaling**: Dynamic, rapid, and fine-grained
- **Elastic, usage-based pricing**: Supported by service metering
- **Ubiquitous (authorized) network access**: Typically accessible via the Internet
- **Standard UI technologies**: Browsers, RIA clients, and underlying technologies
- **Published service interface/API**: Web services and other common Internet APIs

Cloud builds upon preexisting IT innovations such as virtualization and orchestration, but certain characteristics – particularly granularity and self-service – create a radically different service model that is much more than a next-generation evolution from hosting or IT outsourcing. The dramatic and potentially disruptive nature of this transformation means that traditional approaches to IT sourcing and usage need to be rethought. Cloud alters the way that IT capabilities are purchased, deployed, and consumed within organizations. This white paper provides a context for these changes, which impact organizational, financial, and operational dimensions of business IT. Organizations need a better understanding of their internal IT dynamics and how they can be more closely aligned with business objectives to develop practical use case frameworks for agile cloud-based IT.
Key Benefits of Cloud

To some extent, the primary benefits of the cloud computing model are not unlike those cited for other types of third-party IT services. They include the potential to reduce costs and improve operational processes, augment in-house skills and competencies, and refocus existing IT staff on more strategic tasks. However, cloud computing offers something different, namely the ability to facilitate different ways of deploying, delivering, and consuming IT within organizations. Because cloud computing is self-service in nature, it also makes IT resources accessible to a broader population of players inside the organization.

Figure 1 presents recent IDC survey results on organizations’ reasons for using or planning to use public cloud services.

FIGURE 1

Key Drivers for Public Cloud

- Get access to the newest functionality faster (% of respondents) 44
- Reduce the total size of IT budget (% of respondents) 41
- Improve resource utilization (% of respondents) 41
- Ability to build new revenue-generating products and services faster (% of respondents) 41
- Improve IT staff productivity and/or reduce head count (% of respondents) 40
- Give business units more direct control over sourcing their own IT solutions (% of respondents) 40
- Improve internal service delivery levels and business agility (% of respondents) 39
- Reduce our carbon footprint, power, cooling, and related costs (% of respondents) 38
- Demonstrate that we are technology leaders (% of respondents) 37
- Simplify and standardize IT infrastructure and applications platforms (% of respondents) 37
- Restructure the IT financial footprint/shift capex to opex (% of respondents) 37
- Other, please specify (% of respondents) 2

n = 805
Note: Multiple responses were allowed.
Source: IDC’s CloudTrack Survey, 2013
Cloud Use Cases in Context

The benefits of cloud easily lend themselves to a set of generic "slam dunk" use cases:

- **Testing/development.** Not all new applications or Web-based business models pan out. Cloud computing provides a low-risk, capex-lite platform for innovation at all stages of the life cycle: proof of concept, development, testing, staging, and scale production.

- **Short-term or seasonal requirements.** Cloud computing eliminates the need to deploy resources for high-capacity workloads that are predictable but time limited, thus avoiding stranded investment in underutilized resources.

- **Unexpected, unpredictable peak loads.** Cloud computing provides dynamic burst capacity for applications with variable or spiky resource requirements, such as Web sites and Web applications where increased traffic is often triggered by external, unforeseen events.

- **Datacenter capacity constraints.** Following a datacenter consolidation, certain workloads (particularly, non-mission-critical tasks) may need to be migrated offsite.

- **Rapidly expanding storage requirements.** Rich media Web sites, Internet video, and ever-expanding volumes of business data require scalable and anytime/anywhere storage.

- **Business continuity/disaster recovery.** Cloud computing can be used to provision lower-cost, more easily manageable, and high-availability application environments.

While these use cases are highly descriptive, they lack context and do not provide perspective on how organizations (as opposed to individuals or departments within organizations) can leverage the potential of cloud computing. Another way to think about use cases for cloud is to take a step back and look at the big-picture considerations that inform IT decision making within organizations. Use cases include:

- **Organizational structure:** Buyers, users, and implementers of IT

- **Financial factors:** Budget constraints and preference for opex versus capex

- **Operational circumstances:** The extent to which line-of-business and/or general end users feel neglected or even victimized by IT

- **Business velocity requirements:** New applications, business processes, or entire business units that need to get up and running fast

- **Individual application profiles:** Life-cycle stages, usage patterns, application behavior characteristics, data criticality, and data compliance

Approaching cloud from this big-picture view leads back to the generic use cases described previously, but does so in a way that recognizes the different paths to cloud that may exist within a single organization. By looking at the use cases as the finish line rather than the starting blocks, organizations can harness the potential of cloud more strategically, moving cloud beyond the realm of IT sourcing and making it an enabler of business transformation.
Organizational Dynamics of IT

A good first step in developing a cloud adoption strategy involves identifying the different IT-consuming constituencies within a business organization. The needs of these diverse groups all link back to the generic use cases for cloud, but they come to the cloud by various paths. Organizational IT stakeholders can be grouped as follows:

- **IT buyers.** This group includes chief financial officers (CFOs) and others responsible for organizationwide financial planning.

- **IT decision makers.** This group includes chief information officers (CIOs) and chief technical officers (CTOs) who set IT strategy, direct IT operations, and make recommendations about what to buy.

- **IT administrators.** These are the people who deploy, operate, and manage IT resources for the organization and make IT resources available to end users.

- **IT end users.** Depending on the organization, this category may include several constituencies—those who consume IT resources indirectly (i.e., email, desktop productivity suites, business applications such as CRM, backup/recovery); application developers for whom compute and storage capacity are inputs to their work process; and line-of-business managers, particularly those with Web-centric online business workflows, who leverage IT as part of operations or product development functions.

For the IT buyers (i.e., those who pay the bills), the case for cloud computing is clear. The usage-based pricing model of cloud facilitates just-in-time IT sourcing, meaning diminished expenditures on idle or underutilized resources. According to IDC, average enterprise server utilization is currently 30%—the result being needlessly tied-up capital and IT attention that could be deployed more effectively elsewhere.

For IT decision makers, the appeal of cloud depends largely on the extent to which this group sees IT as more of a business enabler than a "necessary evil" cost center. Transformation-oriented IT leaders view themselves as "enterprise architects" who ensure that IT resources are tightly aligned with business and promote increased leverage of IT-based applications and workflows for internal and external business functions. As business becomes ever more technology dependent, cloud computing infrastructure provides the flexibility and granularity needed to support new ways of performing familiar tasks such as disaster recovery and application development. Furthermore, agile, cloud-based IT can also enable new ways of doing business, such as omnichannel sales and customer support and remote diagnostics and repair.

For IT administrators, the path to cloud may not seem obvious given the perceived threat of disintermediation. However, global end users, accustomed to acquiring on-demand capabilities from the cloud outside of work, are demanding the same type of instant access in their work lives as well. Therefore, the consumerization of IT means that there may already be considerable rogue cloud procurement (or at least pent-up demand for cloud capabilities) within business organizations. As a result, business consumption of IT is happening outside of IT's purview and control. This is bad enough from a financial/accounting point of view. More importantly, increasing levels of "do it yourself" IT can have serious consequences for network security, regulatory compliance, overall business process performance, and end-user satisfaction. Yet, in organizations that see IT as a business enablement engine, a centralized approach to cloud procurement can satisfy end users' dynamic IT requirements while giving IT administrators the more strategic role of managing and optimizing end-user access to IT resources (both internal and external) that run the business. This broader
organizational role for IT goes hand in hand with tighter business and IT alignment and the dynamic IT imperatives of the cloud computing era.

The three categories of business IT end users (line-of-business people, application developers, and general users) use and benefit from the cloud in different ways.

For those engaged in line-of-business activities such as marketing or product development, improved business velocity is the key driver for cloud. However, these people are not necessarily IT focused. Rather, the business functions for which they are responsible – online marketing campaigns, ecommerce, business analytics – are heavily reliant on IT. On-demand, scale-up/scale-down access to IT resources helps accelerate the business process for limited-duration activities such as data analytics processing that needs to be performed prior to starting big projects in areas such as construction or mining/extraction, as well as more generic functions such as product launches, market segmentation, online promotions, or "pop-up" ecommerce microsites. In these situations, the business function is the important thing – the computing resources that power it just need to be available.

Similarly, application developers are not network or datacenter administrators. What they need from IT is flexible access to compute capacity to create, test, and run their software. However, IT departments in many large organizations are stretched thin just keeping the lights on, meaning that there is no time (and often no budget) to procure, deploy, and maintain infrastructure for the shifting IT workload requirements of developers and business units. For smaller organizations, this situation may be compounded by the lack of dedicated IT personnel. Furthermore, the static nature of in-house IT typically results in new applications or new ways of doing business being put on hold while the innovators wait for IT attention and resources.

General business end users are another IT constituency within organizations. These users consume IT resources as "finished services" such as messaging, desktop productivity software, business applications such as enterprise resource planning, and "productized" raw IT resources such as backup/recovery and email storage. To the extent that flexible, elastic cloud-based computing resources help accelerate deployment and maintenance of the day-to-day services that end users consume, IT can become a business enabler rather than a business bottleneck.

Financial Considerations

At the end of the day, cloud is less about cutting-edge technology and more about a new financial and operational model for the delivery and consumption of IT resources. Other third-party service provisioning models such as IT outsourcing and managed hosting offer IT decision makers options around buy versus build, but cloud computing adds an extra dimension – on-demand sourcing and scaling, fractional usage capabilities, and low-risk transactional pricing.

Cloud computing can help bridge the divide between the CFO, the IT department, and IT end users by reducing overall cost through better alignment of IT expenditures with actual business needs. Shifting expenditure from capex to opex is one way to achieve this alignment. Generally speaking, if an IT project requires up-front capex (datacenter space and hardware) and permanent operating costs (i.e., IT staff to support the implementation), the project may not get done, regardless of the potential revenue impact (increased sales, new customers) or bottom-line cost impact (customer satisfaction/retention, workflow efficiency, and overall productivity).
Business processes with predictable but periodic demand for compute resources (e.g., payroll and tax processing; retail, travel, and hospitality workflows; quarterly earnings) can take advantage of the fractional runtime capabilities of cloud computing to capture cost in a pay-for-what-you-use model. Similarly, the ability to tap into temporary computing capacity for large-scale, event- or project-driven needs makes it possible to directly align IT costs with business requirements without capex overhead or long-term service provider contract commitments.

Organizational Structure/Culture

The operational dynamics of the business and the "cloud native" mindset of application-focused individuals within the organization may lend themselves well to the use of on-demand cloud computing. For smaller businesses, particularly start-ups, cloud computing makes it possible to leverage standardized, self-service IT infrastructure that can be paid for as needed on an operating cost basis and scaled in line with business success and growth. However, larger organizations can use cloud computing in the same way, provided that the IT department has a C-level mandate to serve as an internal service provider charged with facilitating the operational empowerment of line-of-business units' workflows and customer-facing activities.

The on-demand/pay-as-you-go nature of cloud computing may seem extremely risky to traditional command-and-control IT organizations given the immediate threat of IT disintermediation as well as the business risks of network security and regulatory compliance that come with "do it yourself" IT and "rogue" cloud purchasing. However, to the extent that enterprise IT departments can incorporate cloud computing into formalized IT procurement, implementation, and governance processes, IT becomes a facilitator rather than a roadblock to more efficient and dynamic cloud-based infrastructure delivery.

Increasingly, organizations will find that hybrid combinations of onsite, in-house IT and cloud-based IT resources offer the best of both worlds on several fronts – cost optimization, business velocity, and the ability to respond to rapidly changing markets. In addition, "extended enterprise" business models are becoming the norm, involving on-net and off-net communities of employees, customers, partners, and suppliers that require varying degrees of access to internal applications and IT resources. Cloud computing can help by putting some of these functions on the other side of the corporate firewall, providing IT resources that third parties and internal users can share and reuse for product design, development, distribution, and other collaborative business processes.

Workload Requirements

Once an organization has made the decision to leverage the flexibility, agility, and financial benefits of cloud computing, the next step involves putting the cloud resources to work. It is important to make the distinction between workloads, which are aggregated units of application functionality that run on servers (e.g., business process tasks such as enterprise resource planning or online transaction processing), and use cases, which describe the organizational functions that the technology serves (e.g., process automation or decision support). For line-of-business users for whom IT is a business enabler, use cases are the key consideration related to cloud. For IT departments and application developers for whom IT functionality is the deliverable, workloads and use cases are important factors underpinning the appeal of cloud.
Certain workloads quite naturally lend themselves to the cloud. One obvious example is high-performance computing workloads for scientific and engineering models, simulations, and Big Data business analytics. Computational science workloads require large "scale up" clusters of processing power or smaller (yet still massive) "scale out" clusters of IT resources, along with high-bandwidth, low-latency networking. External cloud compute resources that can be invoked on demand to support the precise resource and time frame specifications on an individual workload basis offer an efficient, opex-oriented sourcing strategy.

Machine-to-machine (M2M) Internet of Things (IoT) applications such as smart metering, remote health monitoring devices, and asset/fleet tracking systems are also prime candidates for cloud computing infrastructure. As application developers in energy/utilities, transport/logistics, and healthcare organizations begin exploring the business process benefits of M2M, they need scalable resources to get proof-of-concept and pilot tests up and running. Further down the road, they will also need flexible IT resources to cope with peak load demand triggered by seasonality, unforeseen major events, and overall usage growth.

As use cases for Big Data spread beyond the scientific/engineering communities and become a standard component of the decision support function and as smart devices and IoT are increasingly integrated into operational business processes, IT resource allocation and management will need to become more dynamic to support these and other next-generation workloads.

**Journey into the Cloud: But Which Cloud?**

Not all clouds (or cloud providers) are the same. There are two basic types of shared multitenant cloud compute services.

Enterprise-grade cloud services feature the types of brand-name hardware and software and the built-in redundancy and security that IT managers are used to. This type of cloud facilitates the implementation of hybrid IT models in which existing datacenter and infrastructure investments, traditional hosting and managed IT services, and on-demand, transactional computing can be combined into a unified IT resource ecosystem.

"Developer clouds" are cloud computing services more oriented to the needs of tech-savvy line-of-business users within enterprises, application developers, and Web-native small business start-ups. This type of cloud, better suited to the requirements of IT builders than IT users, is a self-contained ecosystem featuring broader ranges of hypervisors and operating systems, APIs, toolsets, and mix-and-match compute resource options (virtual machine, virtualized, and bare-metal dedicated servers). CIO-sanctioned self-service developer clouds are an ideal solution for IT departments that are unable (or unwilling) to meet the dynamic computing demands of IT-intensive line-of-business end users.

**Embrace the Cloud: Advancing the Transformation of Organizational IT**

Cloud is not an either/or proposition. IT departments can incorporate flexible, on-demand, pay-per-use computing capacity into their operations to keep pace with end users’ expectations and requirements, thus solidifying the leadership role of organizational IT and improving internal customer satisfaction. This pragmatic approach to cloud, bolstered by use cases that take into account the full range of
financial, technology, and operational considerations, plays an important role in forging tighter linkages between IT resource requirements, immediate business objectives, and longer-term organizational strategies. Increasingly, IT is both an internal business enabler and an external delivery mechanism for tactical and strategic and business functions. Going forward, business-focused IT departments will be tasked with the procurement, operation, management, and coordination of heterogeneous IT “service catalogs” that meet a diverse array of internal and external customer requirements. Putting cloud into context with practical use cases helps CIOs and IT departments harness and disseminate the cost and business agility benefits of dynamic IT while advancing the transformation of organizational IT from cost center to business enabler.
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