

White Paper



Cloud computing

What beyond operational efficiency?

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Abstract

Cloud Computing is one of the most talked about emerging technology trends today. While the short term driver for cloud computing adoption has been IT optimization for cost savings, this paper explores its potential for fundamentally changing business models. This paper elaborates how the internet consumer industry has innovated at a rapid pace, explores how this has changed the consumer mindset and how this is going to drive the Global 2000 enterprises to adopt similar approaches in the long term and the role cloud computing will play in that. This paper also explores how such an enterprise/industry transformation has fundamentally changed the business models in the telecom industry, which is one of the earliest adopters, and what other industry leaders can learn from it.

Note: Originally published in the Sys-Con Cloud Computing Journal

Cloud Computing Context

Cloud Computing is one of the most talked about emerging technology trends today for its potential to be a “disruptive” technology.

National Institute Of Standards and Technology (NIST) defines Cloud computing *“as a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”*

Early adoption of cloud computing in Global 2000 enterprises has largely been for IT optimization. The early drivers have been cost savings and faster infrastructure provisioning. As per a Forrester Report (Dec 2008) more than 70% of IT budget is spent on maintaining current IT infrastructure instead of adding new capabilities. So, organizations are looking to adopt cloud computing model for their enterprise applications for better utilization of the infrastructure investments. Several of these organizations have data center consolidation and virtualization initiatives already underway and they look at cloud computing as a natural progression of those initiatives. Enterprise private cloud solutions add capabilities like self-service, automation and charge back over the virtualized infrastructure and so make infrastructure provisioning faster and help improve the overall utilizations. Some of these enterprises have also been experimenting with public cloud solutions as a new infrastructure sourcing option.

IT spend of Global 2000 enterprises constitutes less than 5% of their revenues so, optimizing IT isn't going to impact their top line or their bottom line. For these large enterprises, in current economic climate, IT optimization is a good reason to start looking at cloud computing. The true “disruptive” potential of cloud computing is in the way it is going to help these large enterprise reinvent themselves and their business models to meet the changing business landscape.

Changing Consumer Behavior and Business Models

Digital Consumers are driving changes in the way products and services are being consumed and being delivered. This is leading to changes in the entire value chain, including changes to the roles of the different players in the ecosystems, their business models, their innovation models and so on.

Social Networking and Customer Stickiness

By 2013, worldwide e-Commerce transactions will be worth more than \$16 trillion. By 2012 over 50% of all adult Internet users in the US will use social networks. 49% of web users now make a purchase based on a recommendation from social media. Increasing adoption of social media is making it easier for consumers to stay connected and get opinions on products and services. It's too late by the time a consumer reaches a website or a store, the consumer has already made up his/her mind. This is resulting in significant changes in consumer marketing and the B2C business models. The relationship is no longer between the enterprise and consumer; it is changing to a deeper relationship encompassing the consumer's community.

To remain relevant and ensure loyalty, large enterprises can no longer afford to have “websites” or “brick-and-mortar stores”, they will need to provide online platforms that engage the consumers constantly along with their social community thereby incorporating the enterprise business services in their day-to-day life. It's only a matter of time (when the Gen Y consumers reach the market) before “community driven” social commerce will replace traditional “website based” e-commerce. Accordingly enterprises need to start building such next generation industry specific services platforms for the domain that they operate it.

Pervasiveness of computing

There are 3.3 billion active mobiles in the world, equal to half the entire world population. Increasing use of such hand held devices is also changing the expectations of consumers on the availability of services. The expectation is the products and

services should be available to the consumer wherever they are and whenever they need the service through innovative applications.

With increasing adoption of technologies like RFIDs, wireless sensors, wearable computing, the number of such smart devices is expected to reach one trillion by 2012. All these will lead to significant changes in the way consumers use technology. The consumers of tomorrow will be used to and will be expecting more intelligent products and services like intelligent buildings that save energy, intelligent home appliances that can alert and make decisions, intelligent transportation systems that can make decisions based on real-time traffic information, smart-grids etc. A whole new set of innovative products and services based on such pervasive computing will have to be created for the next generation.

Faster Pace of Change

With increasing adoption of information and communication technologies, the pace of change is increasing. This is leading to change in the pace of innovation which in turn is driving changes in the innovation models. Traditional model of in-house R&D for innovations isn't going to keep pace with the rate of innovation in the market. More and more organizations will start adopting open approach to innovation so that there is an ecosystem of partners and customers who are co-creating innovative solutions. P&G has adopted such an open innovation approach

Business Clouds

In response to these changes, industry leaders will eventually start creating "business clouds". The business cloud will have the following characteristics

- It will offer the industry specific core business services platform that defines the "operating system" of that business domain and provides a programmable API for others to build upon.
- It will comprise of an ecosystem of partners bringing innovative solutions to the consumers leveraging the core business services offered by the enterprise.
- It will also use a social networking centric model to engage the consumer through online social communities.
- It will provide the business computation platform for the pervasive smart devices.
- It will also be offering services personalized to each consumer, delivered through the consumer's choice of channel at his\her choice of time and location.

The conceptual model of a business cloud is shown below.

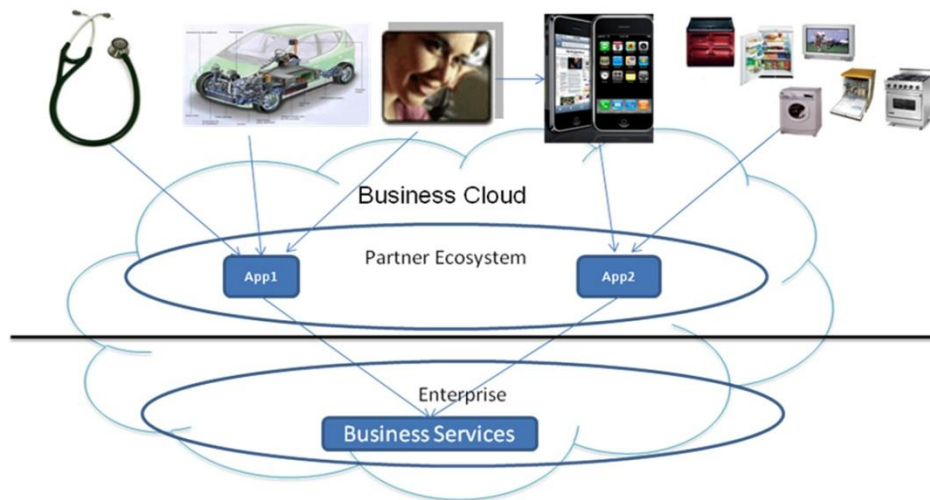


Figure 1: Business Cloud Conceptual View

Business clouds are already getting created in certain business domains like telecom.

Telecom Business Clouds

In the telecom services domain, service providers are facing challenges with increasing commoditization of their services. Consumers can change service providers with a click of a button. Annual churn rates of 25-35% are becoming common. Also, increasing competition is resulting in falling Average Revenue per User (ARPU). To address these challenges, several telecom service providers are looking to increase the stickiness of consumers and improve their ARPU by offering value-added services (VAS) and social networking capabilities. The pace of innovation at which these VAS applications need to be created and the collaboration needed across multiple players of the ecosystem like the content providers the ISVs and developers to create the VAS applications makes it challenging. Telcos are creating “telecom clouds” supported by open telecom platforms and application stores that provide the telecom capabilities as programmable services that partners can leverage to build VAS applications.



Figure 2: Telecom Business Cloud Conceptual View

Apple and AT&T adopted such open approach to innovation in the mobile services space. There are over 85,000 iPhone and iPod Touch applications available via iTunes. Over 125,000 software developers are participating in the Apple iPhone Developer Program and over 6.3 million iPhone apps are being downloaded every single day. (Source: Apple).

Social Collaboration Cloud

Facebook revolutionized this concept in the social networking space. It provided a “collaboration cloud” supported by a platform that enabled ISVs like Animoto, Geni, and Real to create innovative applications. In fact most of the popular Facebook applications including Animoto use cloud computing infrastructure to meet the unpredictable usage patterns.

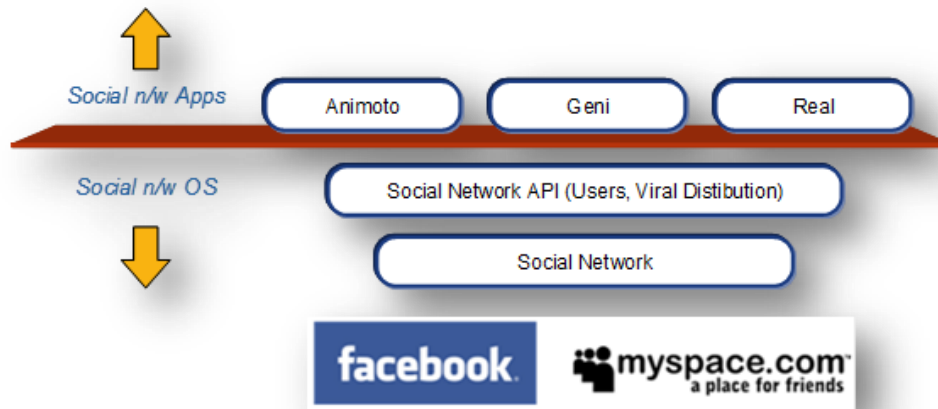


Figure 3: Social Collaboration Business Cloud Conceptual View

Financial Services Cloud

In the financial service domain, wealth management services have traditionally been personal advisor driven so it has only been economical for banks to offer them to a small group of wealthy individuals. But, with increasing relevance of emerging economies and increasing middle class consisting of the tech savvy mass affluent in 30-55 age group who look to social media for advice, it won't be long before banks start creating online "financial services clouds" that engage these new consumers with new online social media and deliver services through new business models. These financial services clouds will expand to engage a consumer all long their financial life from childhood to professional to retirement personalized for their specific needs along with a community that they like to part of. These online self-service models will make it economical to address the long-tail market.



Figure 4: Financial Services Business Cloud Conceptual View

Retail Business Cloud

Retailers are already building business clouds providing programmable APIs which partners and external developers can extend in building social applications. Through these APIs developers can retrieve product information and access e-commerce functionalities like shopping cart, product search, reward program and payment services. This allows developers, web site publishers and others partners to leverage the data that retailers use to power their own business, and potentially make money by virtue of various affiliate and revenue-sharing programs tied to many of these APIs, While Amazon (AWS) is pioneer in this area, other retailers like Best Buy (Remix API), eBay, Tesco, Yahoo Shopping are also building similar solutions.



Figure 5: Retail Business Cloud Conceptual View

Implementing Business Clouds

Traditional solutions will not be scalable and cost effective for such next generation platforms. For example, if we consider the storage aspects, unstructured and semi-structured data is projected to grow to comprise more than 80% of corporate information. Storage in high performance arrays costs \$20/GB while raw cost of storage is less than \$1 per GB. Several organizations like Google and Amazon are already using such clustered storage technologies to meet the storage needs for such internet scale data economically.

Similarly processing data captured at such scale isn't going to be feasible or economical with traditional BI solutions. Yahoo WebMap uses a 10000+ core Hadoop cluster processing 5 petabytes in production to analyze the search data. Organizations will have to look at such cloud storage and processing solutions as they build such next generation services platforms.

Open Social provides a standardized platform for creating online application container platforms with social networking capabilities. There are open source solutions like Apache Shindig which are being used by application containers like LinkedIn's InApp platform.

Some of the key capabilities needed for implementing a business cloud include

- Ecosystem and Partner Management
- Product Management
- Multi-Channel App Store
- ISV Portal

- Social Application\Widget Container
- Domain Services Platform
- Cloud Infrastructure

A representative technical capability view of the business cloud solution is shown below

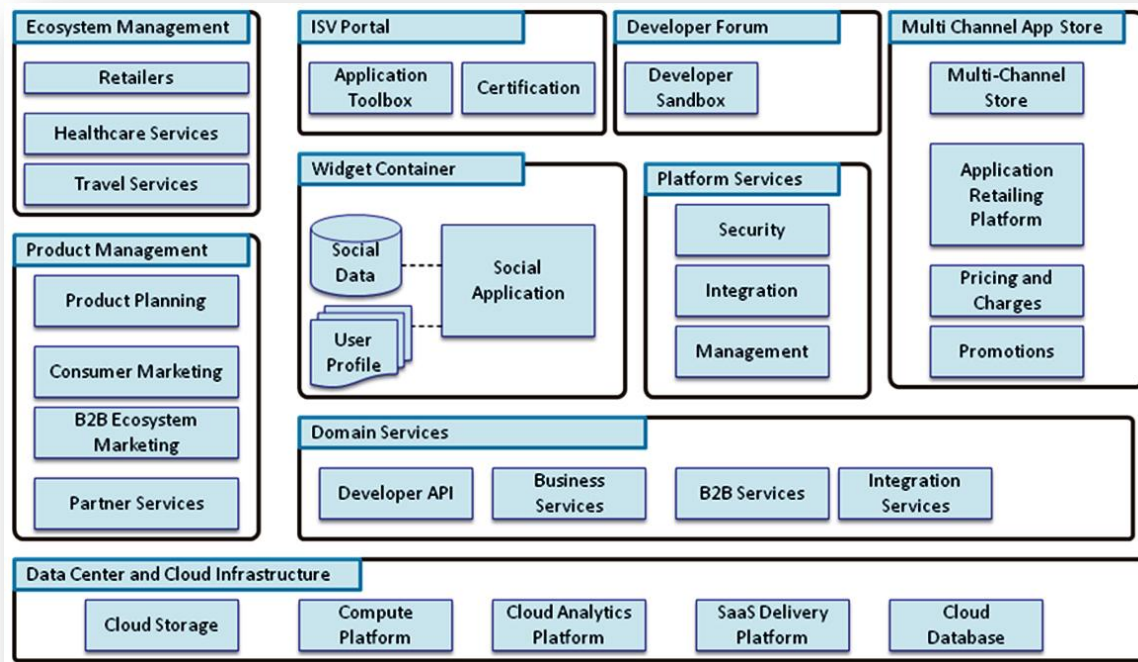


Figure 6: Business Cloud Technical Capability View

The ecosystem and partner management solution will help manage the relationships with the different partners with appropriate incentive structures.

The product management solution helps plan the products and manage the marketing to the consumers together with partner services. ISV portals and developer forums provide the governance framework for development and on-boarding of new products and services. The social application container provides the runtime environment for the different applications to work together while incorporating social networking features. The multi-channel application store will provide a registry for the applications and will also provide commerce capabilities. The domain services platform will provide the business services while the cloud layer will provide the scalable infrastructure.

Conclusion

As products and services get commoditized, service providers will look to increase customer loyalty with wider breadth of offerings, providing better services and maintaining deeper relationships. In order to increase the portfolio of offerings and innovate faster, several industry leaders are increasingly adopting open innovation models there by creating business clouds supported by an ecosystem of partners. As computing becomes more and more pervasive with increasing adoption of smart devices, a new generation of applications need to be created and to manage the scale of information and processing involved in such cases economically, organizations should start looking at cloud computing solutions and build their next generation business cloud platforms leveraging them.

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