CLOUD COMPUTING - OPPORTUNITIES

White Paper
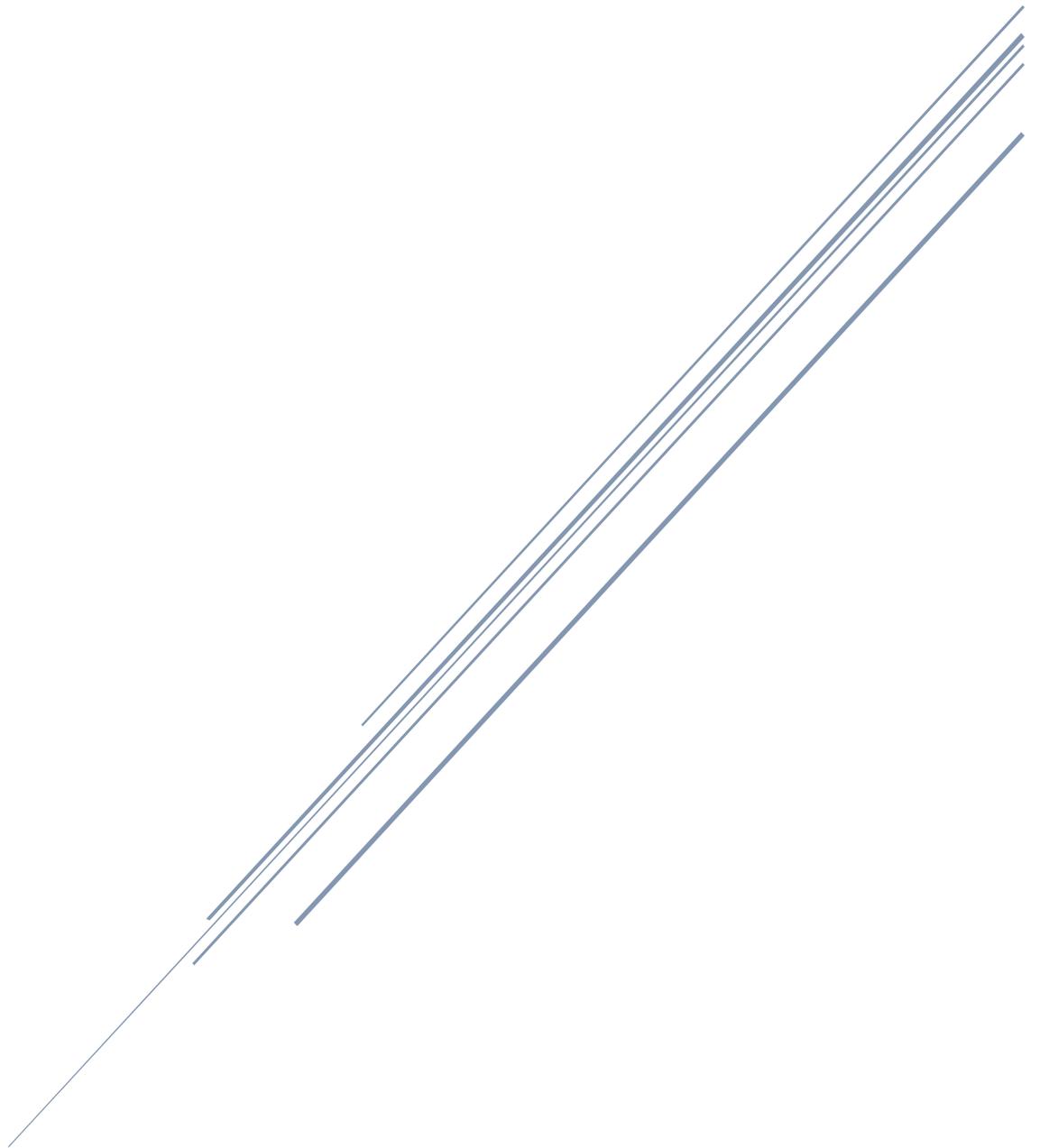
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What's Cloud Computing?

For a commoner, Cloud Computing is a model of a service bureau. You do not build or own capital infrastructure or manage operational aspects. Instead, you pay for what you use.

To give an example, it's like buying a flight ticket instead of buying an airplane and managing the huge expenditure with regard to operation and management. The airline company adopts a service model where the company is responsible to manage expensive assets, and to recruit and manage crew while offering services to passengers at a fee that is far below the capital investment and operation costs. Here, a passenger can avail service at a much lower cost compared to the earlier model of having a dedicated aircraft. At the same time, the airline company does profitable business by offering services to the large number of passengers. A win-win situation for both sides.

NIST proposed the model that can serve as a standard to understand various cloud services offered by multitude of cloud providers. The model is intended to serve as a means for broad comparisons of different cloud services and deployment methods. This also provides the basis to understand the whole paradigm, and to make the best use in business and common usages.
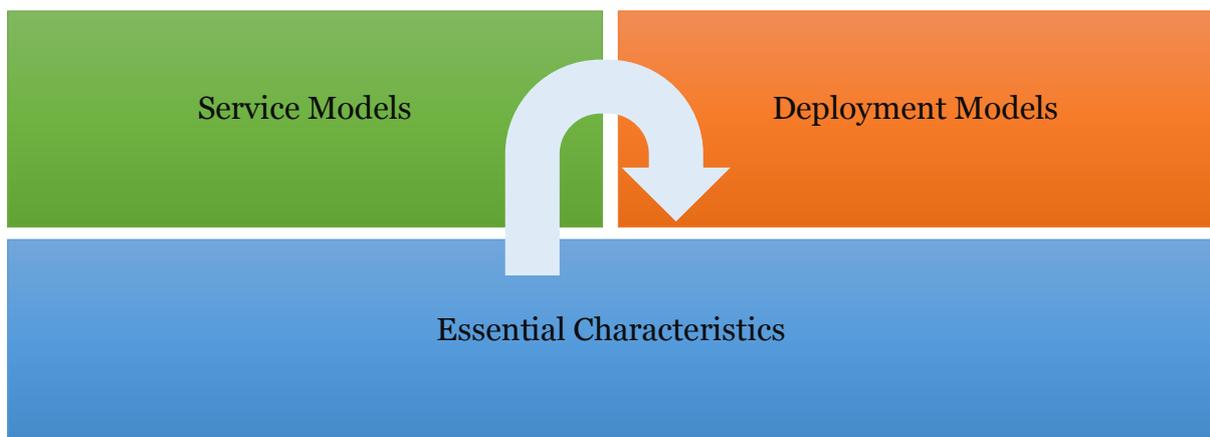
Constituents of the Model of Cloud Computing

As per the definition by NIST, 'Cloud Computing' is 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. The Cloud Model is composed of five **essential characteristics** (on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service), **three service models** (cloud software as a service or SaaS, cloud platform as a service or PaaS, and cloud infrastructure as a service or IaaS), and **four deployment models** (private cloud, community cloud, public cloud, and hybrid cloud).

Cloud Computing for Business

Cloud Computing has been instrumental in converting the large investment as CAPEX into a recurring and rather small OPEX in IT infrastructure usage. In fact, the following factors provide adequate reason to lean on this computing model:

1. **Big Data:** The large data storage and usage in the present days have changed the way we handle data at large scale – we manage Big data. Moreover, the availability of Big data and accessing these universally have their influences on analytics, the faculty of developing optimal recommendations based on insights into data. Analytics use statistical models, and analysis against existing or simulated future data or both to arrive at decision making. This approach is popularly known as **pattern-based strategy**. Each cycle of analytics is based on seeking a pattern from the available data, modeling the impact, and finally, adapting according to the patterns.

2. **Universal Access:** The challenges of new ways of doing business have required that the access to data be secure yet universal (of course, limited to the right users). People should be able to access their data anytime, with any device and from anywhere.

3. **Economy of Scale:** Today, people emphasize on reducing the time gap between a plan and its materialization or Time to Value (TTV), and the Total Cost of Ownership (TCO) while making a decision on IT investment. Thus, the subscription-based usage model has become popular as it facilitates instant use of IT resources, eliminates the capital expenditures (CapEx), and curtails operational expenditures (OpEx).
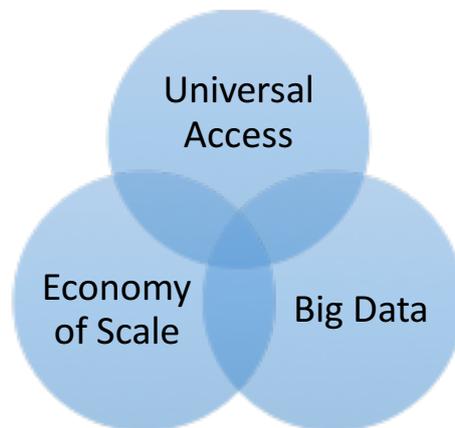

Three Major Drivers of Cloud Computing

As the Web 2.0 wave spread, content piled up at websites. This created a challenge to manage data of large scale. Data size of Terabyte then became usual; and went up to Petabyte, and Exabyte, scales easily. You may take the example of large video content, such as movies and surveillance camera outputs, being handled in day-to-day life by

us – these are also about data of these scales. To give another example, Walmart handles more than a million customer transactions every hour; and this data, having an approximate size of 2.5 Petabytes, is equivalent of 167 times the total information contained in all the books in the US Library of Congress!

Growth in Cloud Adoption

With a strong advocacy for cloud computing based on ground realities of today, it would be justified to know about the adoption of this computing paradigm in practice.
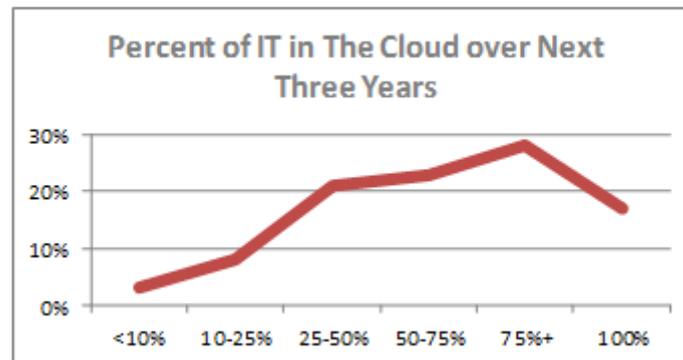
Symbolic Representation of Cloud Computing Adoption Rate.

(Ref: Article by Balakrishna Narasimhan and Ryan Nichols in March 2011 Issue of Computer, IEEE Computer Society. The Horizontal Axis Denotes the Percentage of Respondents)

The above illustration has been used to denote the trend in a symbolic way. In fact, there are many surveys with distinct trends that establish faster adoption, even substantial increase in the rate of adoption, and above all, a very positive scenario. Let us now scan through some important data from different surveys that provide insights into the adoption of cloud computing in various spheres:

- As a report of Redshift Research suggests, 54% of business and 27% of government prefer private cloud solution. Public cloud adoption would be 9% and 17% respectively; similarly, hybrid cloud adoption would be 5% and 7% respectively.
- CDW 2011 Cloud Computing Tracking Poll brings out figures for IT adoption in the USA as 21% for SMEs, 37% for large businesses, 29% for federal government, 23% for state and local governments, 30% for healthcare, 27% for schools and 34% for higher education.
- Asia-Pacific Business and Technology Report informs that the cloud computing market in Japan will grow to U.S.$29.2 billion by 2015.

SMB Cloud Adoption Study Dec 2010 by Microsoft points that 39% of SMEs would be paying for one or more cloud services within three years.

A Closely-Knit Business Ecosystem

If we look at the cloud ecosystem, we can notice different stakeholders responsible for playing different roles along the entire supply-chain. This chain usually spans over multiple organizations having different core objectives, independent operations and management processes. However, these interact with one another and make a federated ecosystem.

For example, a service provider with IaaS will depend on developers, on one hand, to create new cloud toolkit or to upgrade the existing ones. On the other hand, the same provider will depend on other providers with PaaS to offer value-added services on the top of the available infrastructure. It may also be possible for the developers to subscribe to the infrastructure services to test and to deploy their Apps. It is a synergetic relationship.

The way the interactions between different stakeholders of a cloud ecosystem happen, we can visualize a federated conglomeration of different businesses and end-users.

Business Models for Service Providers

Cloud Infrastructure Service Providers (CISP) are the ones who provide IaaS. These are major players in the industry who can invest significantly in creating large-scale infrastructure and maintaining it. The major players in this segment are Rackspace, Amazon, etc. Similarly, Cloud Platform Service Providers (CPSP) offer PaaS. They provide programming tools and facility for building and deploying applications faster and with ease. Google and Microsoft are two major players in this segment.
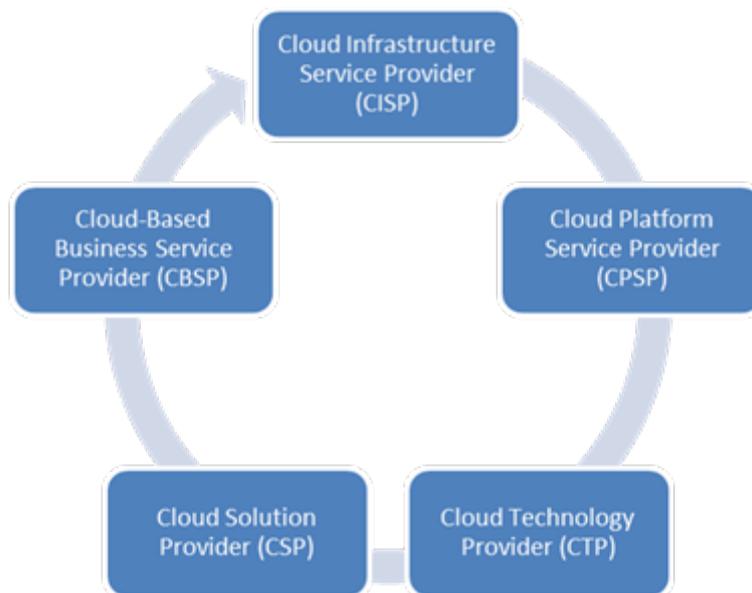

Different Business Models

Next, Cloud Technology Providers (CTP) create and supply technology tools and products to different cloud service providers. Similarly, Cloud Solution Providers (CSP) provide different IT solutions based on infrastructure and platform services. SaaS providers are included in this category. Finally, Cloud-based Business Service Providers (CBSP) are the ones who provide various services that depend primarily on cloud technologies.

New Career Opportunities

With cloud computing gaining ground in different sectors, existing IT roles are receiving new demands. The responsibilities of these roles have also seen changes apart from just their names.

We can see major roles that have been visible these days (refer to the illustration below) such as Cloud Administrator (CA), Cloud Developer (CD), Cloud Service Manager (CSM), Cloud App Architect (CAA), and Cloud User (CU):
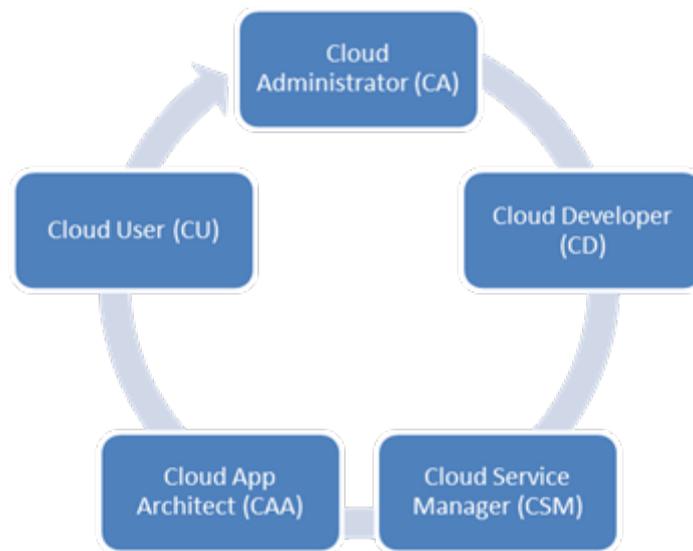
Different Roles for IT Professionals While Working in Cloud Environment

- **Cloud Administrator (CA):** The role of old System Administrator has seen changes during the course of time. With the GUI tools being available, some of the responsibilities are being passed to service managers. On the other hand, system administrators are being asked to perform complex task of managing the backend tools and subsystems. The earlier role had the responsibilities like managing the servers, networking, installing and managing storage arrays, load balancers, DNS, etc. These activities have been eased considerably due to the availability of APIs to manage these; and Administrators have migrated to the backend of cloud environment leaving earlier responsibilities to Cloud Service Managers (to be discussed later in this section). These require further specialized skills.

- **Cloud Developer (CD):** Developers have got a new role to play in creating new tools and frameworks for cloud environment. As the "self-service" motto is the key behind this computing paradigm, system automation demands greater skills and innovations in the technology development areas. These people many a time are called **Cloud Toolkit Developers**.

- **Cloud Service Manager (CSM):** As more and more organizations adopt cloud computing for their IT implementations, professionals with knowledge of specific cloud systems are needed in large numbers. These professionals, CSMs, are responsible to provision, monitor and control cloud services on behalf of their clients or the stakeholders.

- **Cloud App Architect (CAA):** Every other day, we see new Apps flooding into Apps stores or market places. This is due to innovative applications of IT for different user expectations and requirements. CAA is an evolution of the traditional software architect, but with changed responsibility where the focus is more on using various services to create new innovative applications.

- **Cloud User (CU):** He/she is anybody who uses Apps on cloud. Though it is currently a separate role, it may later be merged with any IT user's role as cloud adoption becomes ubiquitous.

Road Ahead

While the market of the Cloud-based services is expanding rapidly, there is a need for skilled manpower at every stage of services and production development. It is important for both new developers and experienced professionals to have a strong knowledge in the use of the Cloud for IT infrastructure.

ABOUT BATOI SYSTEMS PVT LTD

Batoi Systems Pvt Ltd provides end-to-end IT solutions using an enterprise-class cloud computing platform. The Batoi Enterprise Apps Platform is capable of serving customizable software applications at a large-scale across the globe. You can subscribe pre-built Apps, and can create your own custom Apps in minutes! You can also integrate your legacy software applications through ReSTful API.

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