

# INTRODUCTION TO CLOUD COMPUTING AND COMMUNICATION SERVICES OF RASHTRIYA SANSKRIT SANSTHAN

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**ABSTRACT:** *One of the most talked about topics today is cloud computing – the new phenomenon set to change the way we use computers forever. Cloud computing refers to the delivery of software and other technology services over the internet by a service provider and has been widely acknowledged as a viable way to reduce capital expenditures and operational costs. Although many companies have embraced this technology, some are unwilling to switch from internally owned and managed IT systems to cloud computing technologies due to fears of security threats and loss of control over company systems and data. With its growing popularity, a large number of firms have started providing this service. We tried to compare some of these offerings on various parameters like infrastructure, data storage systems, supported applications/frameworks, scalability, security etc.*

**Keywords:** Cloud Computing; Communication Services; Communications in Cloud; Characteristics of Cloud Computing; Service Models; Deployment Models; Benefits Of Cloud Computing; Challenges in Cloud Computing

## 1. INTRODUCTION

This paper introduces internet-based cloud computing, exploring the characteristics, service models, and deployment models in use today, as well as the benefits and challenges associated with cloud computing. Also discussed are the communications services in the cloud (including ways to access the cloud, such as web APIs and media control interfaces) and the importance of scalability and flexibility in a cloud-based environment. This paper is an introduction to the terms, characteristics, and services associated with internet-based computing, commonly referred to as cloud computing. Characteristics, such as infrastructure, provisioning, network access, and managed metering are presented.

The primary business service models being deployed (such as software, platform, and infrastructure as a service) and common deployment models employed by service providers and users to use and maintain the cloud services (such as the private, public, community, and hybrid clouds) are discussed. Also introduced are

the benefits and challenges associated with cloud computing, and for those seeking to use communication services in the cloud, briefly presented are different ways of determining the interfaces needed to use these communication services.

## 2. CLOUD COMPUTING

The term “cloud”, as used in this appears to have its origins in network diagrams that represented the internet, or various parts of it, as schematic clouds. “Cloud computing” was coined for what happens when applications and services are moved into the internet “cloud.” Cloud computing is not something that suddenly appeared overnight; in some form it may trace back to a time when computer systems remotely time-shared computing resources and applications. More currently though, cloud computing refers to the many different types of services and applications being delivered in the internet cloud, and the fact that, in many cases, the devices used to access these services and applications do not require any special applications.

Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the internet). The name comes from the use of a cloud – shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user’s data, software and computation.

Everyone is talking about cloud computing today, but not everyone means the same thing when they do. While there is this general idea behind the cloud – that applications or other business functions exist somewhere away from the business itself – there are much iteration that companies look to in order to actually use the technology. Cloud computing offers a variety of ways for businesses to increase their IT capacity of functionality without having to add infrastructure, personnel, and software.

Here are seven different types of cloud computing and a little bit about what they offer to businesses:

- 2.1. **SaaS (Software as a Service):** This is the idea of providing a given application to multiple tenants, typically using the browser. SaaS solutions are common in sales, HR, and ERP.
- 2.2. **Platform as a Service:** This is a variant of SaaS. You run your own applications but you do it on the cloud provider’s infrastructure.
- 2.3. **Utility Cloud Services:** These are virtual storage and server options that organizations can access on demand, even allowing the creation of a virtual data center.
- 2.4. **Managed Services:** This is perhaps the oldest iteration of cloud solutions. In this scenario, a cloud provider utilizes an application rather than end – users. So, for example, this might include anti – spam services, or even application monitoring services.

**2.5. Service Commerce:** These types of cloud solutions are a mix of SaaS and managed services. They provide a hub of services which the end – user interacts with. Common implementations include expense tracking, travel ordering, or even virtual assistant services.

These are, of course, just the beginning. There are constantly new ideas and new iterations being brought to the forefront. As cloud computing becomes a viable and even necessary option for many businesses, the types of services the providers can offer to organizations will continue to grow and grow.

Many companies are delivering services from the cloud. Some notable examples as of 2010 include the following:

- ❖ **Google:** Has a private cloud that it uses for delivering many different services to its users, including email access, document applications, text translations, maps, web analytics, and much more.
- ❖ **Microsoft:** Has Microsoft® Share point® online service that allows for content and business intelligence tools to be moved into the cloud, and Microsoft currently makes its office applications available in a cloud.
- ❖ **Salesforce.com:** Runs its application set for its customers in a cloud, and its Force.com and Vmforce.com products provide developers with platforms to build customized cloud services.

### 3. CHARACTERISTICS

Cloud computing has a variety of characteristics, with the main ones being:

- 3.1. Shared Infrastructure:** Uses a virtualized software model, enabling the sharing of physical services, storage, and networking capabilities. The cloud infrastructure, regardless of deployment model, seeks to make the most of the available infrastructure across a number of users.
- 3.2. Dynamic Provisioning:** Allows for the provision of services based on current demand requirements. This is done automatically using software automation, enabling the expansion and contraction of service capability, as needed. This dynamic scaling needs to be done while maintaining high levels of reliability and security.
- 3.3. Network Access:** Needs to be accessed across the internet from a broad range of devices such as PCs, laptops, and mobile devices, using standards-based APIs (for example, ones based on HTTP). Deployments of services in the cloud include everything from using business applications to the latest application on the newest smart phones.

**3.4. Managed Metering:** Uses metering for managing and optimizing the service and to provide reporting and billing information. In this way, consumers are billed for services according to how much they have actually used during the billing period.

In short, cloud computing allows for the sharing and scalable deployment of services, as needed, from almost any location, and for which the customer can be billed based on actual usage.

#### **4. SERVICE MODELS**

Once a cloud is established, how its cloud computing services are deployed in terms of business models can differ depending on requirements. The primary service models being deployed are commonly known as :

##### **4.1. Platform as a Service (PaaS)**

Consumers purchase access to the platforms, enabling them to deploy their own software and applications in the cloud. The operating systems and network access are not managed by the consumer, and there might be constraints as to which applications can be deployed.

##### **4.2. Infrastructure as a Service (IaaS)**

Consumers control and manage the systems in terms of the operating systems, applications, storage, and network connectivity, but do not themselves control the cloud infrastructure.

Also known are the various subsets of these models that may be related to a particular industry or market. Communications as a Service (CaaS) is one such subset model used to describe hosted IP telephony services. Along with the move to CaaS is a shift to more IP-centric communications and more SIP trunking deployments. With IP and SIP in place, it can be as easy to have the PBX in the cloud as it is to have it on the premise. In this context, CaaS could be seen as a subset of SaaS. Enduser application- is delivered as a service. Platform and infrastructure is abstracted, and can deploy and managed with less effort.

Application platform onto which custom applications and services can be deployed. Can be built and deployed more inexpensively, although services need to be supported and managed. Physical infrastructure is abstracted to provide computing, storage, and networking as a service, avoiding the expense and need for dedicated systems.

#### **5. BENEFITS**

The following are some of the possible benefits for those who offer cloud computing-based services and applications:



- 5.1. **Cost Savings:** Companies can reduce their capital expenditures and use operational expenditures for increasing their computing capabilities. This is a lower barrier to entry and also requires fewer in-house IT resources to provide system support.
- 5.2. **Scalability/Flexibility:** Companies can start with a small deployment and grow to a large deployment fairly rapidly, and then scale back if necessary. Also, the flexibility of cloud computing allows companies to use extra resources at peak times, enabling them to satisfy consumer demands.
- 5.3. **Reliability:** Services using multiple redundant sites can support business continuity and disaster recovery.
- 5.4. **Maintenance:** Cloud service providers do the system maintenance, and access is through APIs that do not require application installations onto PCs, thus further reducing maintenance requirements.
- 5.5. **Mobile Accessible:** Mobile workers have increased productivity due to systems accessible in an infrastructure available from anywhere.

## 6. CHALLENGES

The following are some of the notable challenges associated with cloud computing, and although some of these may cause a slowdown when delivering more services in the cloud, most also can provide opportunities, if resolved with due care and attention in the planning stages.

### 6.1. Security and Privacy

Perhaps two of the more “hot button” issues surrounding cloud computing relate to storing and securing data, and monitoring the use of the cloud by the service providers. These issues are generally attributed to slowing the deployment of cloud services. These challenges can be addressed, for example, by storing the information internal to the organization, but allowing it to be used in the cloud. For this to occur, though, the security mechanisms between organization and the cloud need to be robust and a Hybrid cloud could support such a deployment.

### 6.2. Lack of Standards

Clouds have documented interfaces; however, no standards are associated with these, and thus it is unlikely that most clouds will be interoperable. The Open Grid Forum is developing an Open Cloud Computing Interface to resolve this issue and the Open Cloud Consortium is working on cloud computing standards and practices. The findings of these groups will need to mature, but it is not known whether they will address the needs of the people deploying the services and the specific interfaces these services need. However, keeping up to date on the latest standards as they evolve will allow them to be leveraged, if applicable.

### 6.3. Continuously Evolving

User requirements are continuously evolving, as are the requirements for interfaces, networking, and storage. This means that a “cloud,” especially a public one, does not remain static and is also continuously evolving.

### 6.4. Compliance Concerns

The Sarbanes-Oxley Act (SOX) in the US and Data Protection directives in the EU are just two among many compliance issues affecting cloud computing, based on the type of data and application for which the cloud is being used. The EU has a legislative backing for data protection across all member states, but in the US data protection is different and can vary from state to state. As with security and privacy mentioned previously, these typically result in Hybrid cloud deployment with one cloud storing the data internal to the organization.

## 7. COMMUNICATIONS IN THE CLOUD

For service developers, making services available in the cloud depends on the type of service and the device(s) being used to access it. The process may be as simple as a user clicking on the required web page, or could involve an application using an API accessing the services in the cloud. Telcos are starting to use clouds to release their own services and those developed by others, but using Telco infrastructure and data. The expectation is that the Telco’s communications infrastructure provides a revenue generating opportunity.

### 7.1. Using the Communications Services

When in the cloud, communications services can extend their capabilities, or stand alone as service offerings, or provide new interactivity capabilities to current services. Cloud-based communications services enable businesses to embed communications capabilities into business applications, such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems. For “on the move” business people, these can be accessed through a smartphone, supporting increased productivity while away from the office.

These services are over and above the support of service deployments of VoIP systems, collaboration systems, and conferencing systems for both voice and video. They can be accessed from any location and linked into current services to extend their capabilities, as well as standalone as service offerings.

In terms of social networking, using cloud-based communications provides click-to-call capabilities from social networking sites, access to Instant Messaging systems and video communications, broadening the interlinking of people within the social circle.

#### 7.4 Communications Scalability

To deliver on the scalability requirements for cloud-based deployments, the communications software should be capable of running in virtual environments. This allows for easily increasing and decreasing session densities based on the needs at the time, while keeping the physical resource requirement on servers to a minimum.

#### 7.5 Getting Started with Communications Services

Businesses desiring to use the communications capabilities of cloud - based services will stand to benefit by determining the right interfaces. Dialogic supports a broad range of interfaces, including Web 2.0 APIs, media control interfaces, Java interfaces, and XML-based interfaces, catering to a wide range of application and service creation developers. These interfaces, available over media and signaling capabilities, support the scalability needed in a cloud-based environment while still being easy to deploy and administer.

Furthermore, by using resources like the Dialogic® inCloud9™ — a free, cloud-based developer network designed to make it easier and more efficient for developers to test Dialogic products while building new applications — businesses have support for creating innovative new voice and video-enabled value-added services, without requiring local server hardware or a development environment.

### 8. CONCLUSION

Cloud computing today is the beginning of “network based computing” over Internet in force after so many years. It is the technology of the decade and is the enabling element of two totally new computing models, the Client-Cloud computing and the Terminal-Cloud computing. These new models would create whole generations of applications and business. Our prediction is that it is the beginning to the end of the dominance of desktop computing such as that with the Windows. It is also the beginning of a new Internet based service economy: the Internet centric, Web based, on demand, Cloud applications and computing economy.

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