

# Cloud Computing Application for Hrm

Saloni and Anuj Saxena

**Abstract**— Cloud Computing is an effective term for delivering different types of hosted services over the Internet. It provides pay-as-you-go approach. Cloud Computing offers numerous benefits for the organizations, however, here are also many issues, as with any new epitome or technology. One of the main issues relate to the security and confidentiality of user data in terms of its location, relocation, availability and security. The cloud applications are extensively used in HR as Human Resource Information Systems (HRIS).The aim is to provide some useful information for enterprises fixing to transmigrate to the cloud to take vantage of this most recent computing paradigm.

**Index Terms**— cloud computing, business computing, data secrecy, data protection, cloud computing application.

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## 1 INTRODUCTION

Cloud Computing is an Internet based on-line computing environment, where the resources are shared, dynamically scalable and often virtualized for individual uses. It deals with hosted services over the Internet .Clearly [1] define it as a style of computing where massively scalable IT-enabled capabilities are delivered as services to external customers using Internet technologies. According to NIST(National Institute of Standard and Technology, US), Cloud Computing provide a convenient, on demand network access to a shared pool of computing resources [2], [3].Here resources refer to computing applications here, resources refer to computing applications, software services, platforms, network resources, virtual servers and computing infrastructures. The main idea is to make applications available on flexible execution environments primarily located in the Internet.

Several flavors are known, and three important ones are depicted in the figure below. Infrastructure as a service refers to the sharing of hardware resources for executing services, typically using virtualization technology. With this so-called Infrastructure as a Service (IaaS) approach, potentially multiple users use existing resources. The resources can easily be scaled up when demand increases, and are typically charged for on a per-pay-use basis. In the Platform as a Service (PaaS) approach, the offering also includes a software execution environment, such as an application server. In the Software as a Service approach (SaaS), complete applications are hosted on the Internet so that e.g. your word processing software isn't installed locally on your PC anymore but runs on a server in the network and is accessed through a web browser. General public have been using Cloud Computing in the form of Internet services like Hotmail (since about 1996), YouTube (since about 2005), Face book (since about 2006) and Gmail (since about 2007). Hotmail is probably the first Cloud Computing application that allowed the general public to keep their data in the form of text and image files at remote servers, provided and managed by others. In the last decade, many other similar and extended services have emerged that allow enterprise to extend their IT provision by using Cloud provision. In the commercial sector, Amazon.com was one of the first vendors to provide storage space, computing resources and business functionality following the Cloud Computing model. In 2006, they launched Elastic Compute Cloud (EC2) that allowed companies and individuals to rent computers to run their own enterprise applications and services. Salesforce.com, founded in 1999, pioneered the concept of delivering enterprise applications as Cloud-based services to enterprises. The number of Cloud providers is increasing at such a rate that

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- *Saloni is currently Assistant Professor Department of Masters of Computer Applications, Krishna Engineering College, Ghaziabad, 201007(U.P.) India. E-mail: saloni.goyal@gmail.com*
  - *Anuj Saxena is currently pursuing Masters of Computer Applications, Krishna Engineering College, Ghaziabad, 201007(U.P.) India. E-mail: anuj8365@gmail.com*

Gartner listed Cloud Computing as number one in its top ten strategic technology areas for 2010 [4], [5]. The benefits that Cloud Computing promises include:

- reduced costs because of reduced upfront corporate investment
- reduced management as some of the responsibilities now lie with Cloud providers
- increased business efficiency and agility as additional services are available in the Cloud
- easy access to software and hardware resources available in the Cloud
- No longer are term contracts with vendors as service and resources used on a pay-as-you-basis.

## 2 CLOUD COMPUTING

The Benefits Cloud Computing is an initiative proposed and taken up by big organizations such as IBM, Dell, Oracle, Google, Amazon and Sun. They are already taking strong positions with respect to Cloud provisions [5]. The essential features of this latest paradigm include [3], [18]:

**On-demand self-services:** to enable consumers to use Cloud provisions as and when required by business demands.

**Resource pooling:** to allow dynamically assigned computing resources to serve multiple consumers through the use of virtualization technologies.

**Rapid elasticity and scaling:** to allow Cloud services, resources and infrastructures to be automatically provisioned as business requirements change.

**Measured provision:** to provide a metering capability to determine the on-demand usage for billing purposes.

**Effective management:** to provide and facilitate easy monitoring, controlling and reporting.

Cloud Computing is an attractive paradigm for businesses as it provides scalability, efficiency, Flexibility, which in turn, results in reduced capital investment, less management and lower Operational expenditure. There is no doubt that

Cloud Computing is making supercomputing available to the masses: individuals and enterprises alike.

### 2.1 DEPLOYMENT APPROACHES

Cloud Computing is generally deployed in four ways as public, community, private and hybrid Clouds.

Public Clouds are networks where Cloud services are provided by third parties and hosted and managed by the service providers. The Cloud providers take on the responsibilities of installation, management, provisioning and maintenance. The resources and services are openly available and accessible to all, with the same common standards and policies. The resources may be offered free (e.g. Face book and YouTube provisions) or offered at a cost Consumers are charged only for the resources they use following a pay-as-you-go model.

Community Clouds are similar to public Clouds except that their access is limited to a specific community of Cloud consumers. These are semiprivate Clouds in that they are used by a defined group of certain tenants (consumers) with shared backgrounds and requirements. However, these are public Clouds in that they exist outside the domain of the community.

Private Clouds are proprietary networks normally residing within the enterprises generally for the exclusive use of the organization. In case of Private Clouds, the enterprise is in charge of maintaining the Cloud and also responsible for security, legal and other regulatory compliance issues. In these Clouds, data is much more secure than if it is held in a Public Cloud.

Hybrid Clouds are a combination of Private and Public Clouds. Here, the management responsibilities are often split between the enterprise and the Public Cloud providers, which can often become an issue of concern. For mission critical processes, this type of Cloud infrastructure is much more effective because of enhanced control and management by the enterprise itself. For example, businesses can keep sensitive data and execute sensitive services in the Private Cloud; otherwise, they can migrate to the Public Cloud.

The Cloud model consists of, typically, three types of services: Software Services, Platform Services

and Infrastructure Services. These are related to three delivery models, defined as follows:

Software as a Service (SaaS): this normally refers to prebuilt pieces of software or complete applications (e.g. an email system, human resource management, payroll processing, database processing) provided as services. Here, customers are looking to 'hire' easy to-consume functionality.

Platform as a Service (PaaS): this model refers to application development toolkits and deployment tools e.g. application servers, portal servers and middleware. Consumers use these to build and deploy their own applications. Here, customers are looking to buy time and cost savings.

Infrastructure as a service (IaaS): this refers to infrastructure-centric IT resources such as visualized servers, storage, network devices, operating systems, etc as well as hardware services to enable cloud platforms and software to operate. This model provides a self-contained (IT) environment. Here, customers are looking to hire computing.

## 2.2 INHERENT ISSUES

Cloud Computing promises many benefits, however, there are also numerous issues and challenges for organizations embracing the Cloud technology. Zhen [8] lists a number of such challenges including the following:

- Governance, management and updating of data.
- Management of software services.
- Monitoring of products and processes.
- Reliability and availability of systems and infrastructure.
- Security of information and data.

The Expert Group Report [16] mentions a number of issues including:

- Concerns over security with respect to valuable knowledge, information and data placed on an external service.
- concerns over availability and business continuity

- Concerns over data transmission across anticipated broadband speeds.

Other shortcomings, as mentioned by various researchers, include: 1) no native security attributes. 2) Inadequate or no security provisioning by providers. 3) Lack of understanding of Cloud legal issues. and 4) the failure to recognize potential liability from either legal issues or a lack of security. Issues with respect to "control" are also real concerns. A closer examination reveals that the major concerns may be broadly classified as those relating to the following:

- Security, including reliability and availability
- Governance and Management.

In this paper, we discuss issues with respect to data location, relocation and security. Other issues are discussed in a companion paper which is under preparation.

## 3 SECURITIES IN CCHRM

It is all about bringing efficiency in the workplace, and a growing organization needs this efficiency to continue in its growth path. So, if you have a growing business, then make your IT infrastructure "cloud ready" from day one.

Cloud Computing provides services with respect to enterprise applications (software components and systems), computing platforms (development tools) and infrastructures (hardware including Servers). In this context, one of major issues is with reference to the security of data, in particular: data privacy, data protection, data availability, data location and data transmission.

### 3.1 HRMS DATA LOCATION AND RELOCATION

Cloud Computing offers a high degree of data mobility. Consumers do not always know the location of their data. In most cases, this does not matter. For example, emails and photographs uploaded to Face book can reside anywhere in the world and Face book members are generally not concerned. However, when an enterprise has some sensitive data that is kept on a storage device in the Cloud, they may want to know the location of it.

They may also wish to specify a preferred location (e.g. data to be kept in the UK). This, then, requires a contractual agreement, between the Cloud provider and the consumer that data should stay in a particular location or reside on a given known server. The issue is that consumers are, sometimes, not aware of the implication of this and thus no such contract is agreed beforehand. Although, cloud providers should take responsibility to ensure the security of systems (including data) and provide robust authentication to safeguard customers' information, under the circumstance, what is required is that the providers not just inform the consumers, as a matter of course, but also provide the necessary information that the consumer may not be aware of. An example is the UK laws with respect to data privacy. It is required by law that the personal data of UK citizens must reside within the country. The Cloud provider must know this and advise consumers accordingly. If the consumers know this then obviously they can suggest, even demand, that the data be kept on a device that physically resides within the UK. Many other countries have legal requirements with respect to the location and movement of personal data.

### 3.2 DATA RELOCATION

The movement of data from one location to another. Data is initially stored at an appropriate location Decide by the Cloud provider. However, it is often moved from one place to another. Cloud providers have contracts with each other and they use each other resources. Consumers do not always know this and often it does not matter. Reasons for using other providers' resources are usually the following:

- Lack of own resources due to high demand from consumers
- Requirement to scale up and scale out Another provider has a better pricing policy or there is an opportunity of cost saving
- Efficiency of retrieval and availability of data
- Efficient linking of different data resident on different locations
- Flexibility of provision and resource optimization General public do the same all the time.

An important factor influencing the choice of location for data centers is the cost of running a centre (by reducing the electricity bills, for example) [8]. The attraction of relocation and distribution of data is particularly justifiable due to the bandwidth efficiencies that such movement could provide. The main factor is the cost of provision. Research [9] suggests the possibility of reducing electricity costs by up to 40%. Qureshi's [9] proposes a method of dynamically routing data that may become an attractive solution for Cloud storage providers. Dynamic routing of data is also considered to improve resource optimization. This, in turn, may also help to reduce costs. Another influencing factor is the cost relating to high capacity internet access. Cross border data transition (from one country to another) also happens for the same reasons. This can lead to additional potential legal risks due to different countries having varying policies, regulations and legislation. This has implications in that data protected by legislation in one country may not have the same, or even similar, protection in another country [10]. For example, European Union and United States of America have different definitions of data privacy as a result of disparate privacy policies [8]. Their Data Protection Laws are based on the assumption that the location and responsibility of data is known and understood. Presently, a majority of data centers are located in the United States [11]. As a result, data protection and privacy concerns are influenced by the US laws e.g. USA Patriot Act 2001, the Foreign Intelligence Surveillance Act (FISA amendments act, 2008), the Electronic Communications Privacy Act (1986), the Privacy Act (1974) and the Homeland Security Act (2002). Under these acts, the FBI and similar agencies have the regulatory power to demand access to any data stored on any computer within the USA, even if it is stored on behalf of another jurisdiction [11]. Enterprises consuming Cloud services may not be aware of what has been mentioned above. However, as they become more knowledgeable, they may decide to request locations of their choice. This, in turn, may result in higher bills to pay which will become another issue of concern.

### 3.3 HRMS PRIVACY

For the giant organization need the data to be private and secure in all the way, because data require privacy, not to be disclose to anyone any kind of organization data, but also the to be available all the time with very low risk and not to

be allow anyone can access company data without owner permission.

Security risks and related issues are already big concerns. When data mobility is at a high level then the risks and issues increase many folds especially when data is transferred to another Country with different regulatory framework.

As mentioned before, Qureshi's method [9] of dynamically routing data, that is an attractive solution for Cloud storage providers may also exacerbate the data security and availability issues.

A valid question with reference to security of data residing in the Cloud is: how to ensure Security of data that is at rest. Although, consumers know the location of data and there in no Data mobility, there still are questions relating to its security and confidentiality of it. The Obvious answer suggests that data should be encrypted. Unfortunately, this is not always possible. For example, if data in the Cloud is being processed by a SaaS or PaaS applications (such as Salesforce.com or Google Apps), then encryption may not be suitable as this may Prevent Indexing or searching of data. If this happens then availability and access of data will become problematic. Although, a number of solutions have been suggested [12], [13], [14] and New methodologies being developed, a lot more work needs to be done. Other research efforts are focusing on methods to fragment the data and limit the amount of data that needs to be decrypted for processing in the Cloud [15].

### 3.4 HRMS DATA ACCESSIBILITY

Organization data is normally stored in clump on different servers often residing in different locations or in different Clouds. The major issue for HR is data availability all the time and possible to access it anywhere with real fast way, even processing speed of request and response is possible in so faster way with less delays.

Well the cloud will solve this problem data availability issue, actually the data availability is also possible with servers but the data accessing and availability is problematic on different locations for users while using servers.

So the cloud will give the solution to the entire data processing and data availability issue.

The issue of data availability is exemplified by the outages suffered by Google's Gmail service in February 2009 which resulted in embarrassing headlines for the company [14]. In the Subsequent service agreement for its Premier Apps range of

products which also covers Gmail, Subsequently, Google promised that customer data availability will be at least 99.9% of the Time in any calendar month [15].

## 4 ORGANISATION WORK WITH CLOUD

### THE SIMENS

- Simens human capital management system is said to be the largest cloud computing model in the world.
- Simens decided to align its HR operations with the strategic objectives.
- They followed "right people for the right job".
- Simens examined about 50 HR solutions from about 30 vendors during the cloud procurement process.
- Simens chose USA based "Success Factors" HR solution for their in-house Human Capital Management.
- Clipped about 1, 70,000 employees within 6 months and proposed to add 4, 00,000 in due course.
- They feel that cloud computing will change HR-IT sooner than the expected time.

### MAXWELL SYSTEMS

- A pioneer construction industry Maxwell" in USA has selected a leading "Fair sail" HR solution provider for their in-house HR operations.
- Fair sail uses "Force.com" [17] (Salesforce's CRM) cloud computing platform.
- Maxwell has about 200 employees to support their 5 separate HR systems.
- It is using "Fairsail" as a central hub for structured feedback and personnel goal setting for all its employees, as well as to review the employee benefits.



## LUITINFOTECH

- LuitInfotech is a Bangalore based company, which has moved to cloud with SaaS model LuitBiz HRM.
- The cloud solutions, as they say, support Employee Management, Attendance, recruitment, Appraisal, Training, and Assets [16].

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## 6 FUTURE SCOPE OF CLOUD COMPUTING APPLICATION FOR HUMAN RESOURCE MANAGEMENT

- Application gives supervision for all hr work and in future the calculation can also do by cloud.
- Provide an excellent service for hr and they can also use the cloud services for betterment of organization in different departments.

## 7 CONCLUSION

- Most of the organizations need a quick and effective solution for data security and availability for example financial companies, banks etc. Cloud Computing will provide an effective solution and provide to a shared pool of computing resources. Cloud technologies, if used appropriately, can help to reduce costs of data storage, can help to process faster and greener in work. Companies' wants flexible, scalable, reliability in work and most importantly security is major concern for the organization sensitive data which companies really do not want to be disclosing to anyone. Services fully managed by the vendor, customer need a computer with internet access. While services need the multi-processing and time sharing which is the most significant conclude to accept cloud computing. The cloud Computing will give user device and Location independence and use the data is real handy for the organization.

- A good HR system will take over from recruitment; provide a system of induction, employee database and history, performance appraisals, correspondence, tie in the attendance and payroll. And, if you use the cloud, all this will come in at a throw away prices to free.

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