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Impact and General Awareness of Cloud Computing In Public Domain

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ABSTRACT

In this paper, we characterize the problems and their impact on adoption. in addition, and equally importantly, we describe our experience and lessons learnt in construction of a cloud computing platform, cloud computing is a new general purpose internet-based technology through which information is stored in servers and provided as a service and on-demand to clients. In this we describe the reasons of that why people switch from traditional IT to the cloud and also discuss the characteristics and types of cloud computing. This paper describes cloud computing, a computing platform for the next generation of the Internet. The paper defines clouds, explains the business benefits of cloud computing, and outlines cloud architecture and its major components. In particular, we argue that with continued research advances in trusted computing and computation-supporting encryption, life in the cloud can be advantageous from a business intelligence standpoint over the isolated alternative that is more common today.

KEYWORDS: Cloud, Computing, Information processing, security, privacy, Cost.

INTRODUCTION

Cloud computing to put it simply means Internet Computing. The Internet is commonly visualized as clouds; hence the term cloud computing for computation done through the Internet. With Cloud Computing users can access database resources via the Internet from anywhere, for as long as they need, without worrying about any maintenance or management of actual resources. Besides, databases in cloud are very dynamic and scalable.

The Cloud has become a new vehicle for delivering resources such as computing and storage to customers on demand. Rather than being a new technology in itself, the cloud is a new business model wrapped around new technologies such as server virtualization that take advantage of economies of scale and multi-tenancy to reduce the cost of using information technology resources. This paper discusses the business drivers in the Cloud delivery mechanism and business model, what the requirements are in this space, and how standard interfaces, coordinated between different organizations can meet the emerging needs for interoperability and portability of data between clouds.

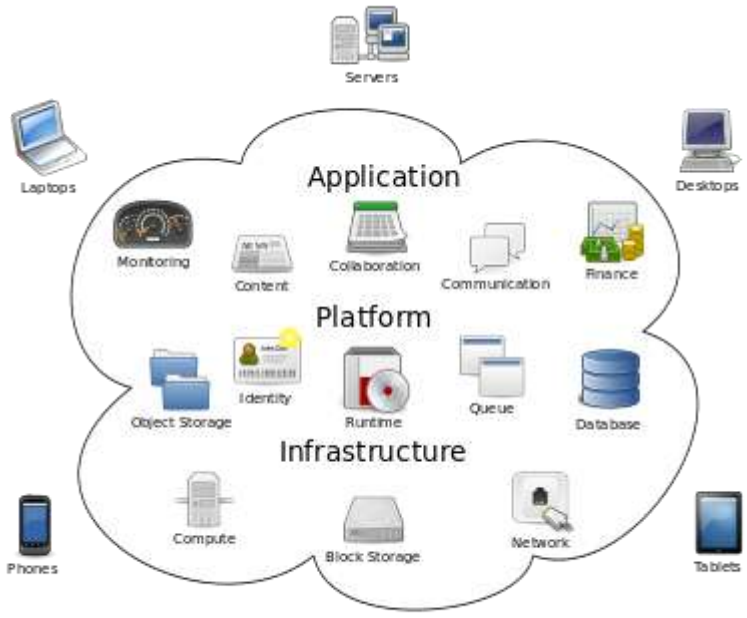
There is a critical need to securely store, manage, share and analyze massive amounts of complex data to determine patterns and trends in order to improve the quality of healthcare better safeguard the nation and explore alternative energy. Because of the critical nature of the applications, it is important that clouds be secure. The major security challenge with clouds is that the owner of

the data may not have control of where the data is placed. This is because if one wants to exploit the benefits of using cloud computing, one must also utilize the resource allocation and scheduling provided by clouds. Therefore, we need to safeguard the data in the midst of un-trusted processes.

WHAT IS CLOUD COMPUTING?

Cloud Computing

Having secure access to all your applications and data from any network device



Cloud Computing

The term "cloud", as used in this white paper, 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 provides the facility to access shared resources and common infrastructure, offering services on demand over the network to perform operations that meet changing business needs. The location of physical resources and devices being accessed are typically not known to the end user. It also provides facilities for users to develop, deploy and manage their applications
„on the cloud", which entails virtualization of resources that maintains and manages itself.

Recent interest in Cloud Computing has been driven by new offerings of computing resources that are attractive due to per-use pricing and elastic scalability, providing a significant advantage over the typical acquisition and deployment of equipment that was previously required. The effect has been a shift to outsourcing of not only equipment setup, but also the ongoing IT administration of the resources as well.

OBJECTIVES OF THE STUDY

- In this we will study about the reasons for switching traditional IT to cloud computing.
- To study about the cloud computing in India.
- To know characteristics of the cloud computing.
- In this Paper we will study about different types and challenges of cloud computing.

CHARACTERISTICS OF CLOUD COMPUTING

- **MANAGED METERING:-**Uses metering for managing and optimizing the service andto 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.
- **HIGH SCALABILITY:-**Cloud environments enable servicing of business requirementsfor larger audiences, through high scalability.
- **AGILITY:-**The cloud works in the distributed mode environment. It shares resourcesamong users and tasks, while improving efficiency and agility.
- **HIGH AVAILABILITY AND RELIABILITY:-**Availability of servers is high andmore reliable as the chances of infrastructure failure are minimal.
- **COST SAVINGS: -** Companies can reduce their capital expenditures and useoperational 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. There are a number of reasons to attribute Cloud technology with lower costs. The billing model is pay as per usage; the infrastructure is not purchased thus lowering maintenance. Initial expense and recurring expenses are much lower than traditional computing.
- **MULTI-SHARING:-**With the cloud working in a distributed and shared mode, multipleusers and applications can work more efficiently with cost reductions by sharing common infrastructure.
- **RAPID ELASTICITY:-** Elasticity is defined as the ability

to scale resources both up anddown as needed. To the consumer, the cloud appears to be infinite, and the consumer can purchase as much or as little computing power as they need. This is one of the essential characteristics of cloud computing in the NIST definition.

- **MEASURED SERVICE:-**In a measured service, aspects of the cloud service arecontrolled and monitored by the cloud provider. This is crucial for billing, access control, resource optimization, capacity planning and other tasks.

- **UBIQUITOUS NETWORK ACCESS:-**Ubiquitous network access means that thecloud provider‟s capabilities are available over the network and can be accessed through standard mechanisms by both thick and thin clients.

ON-DEMAND SELF-SERVICE:- The on-demand and self-service aspects of cloud computing mean that a consumer can use cloud services as needed without any human interaction with the cloud provider.

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.

- **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.

- **NETWORK ACCESS:-** Needs to be accessed across the internet from a broad range ofdevices 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.

- **RELIABILITY:-** Services using multiple redundant sites can support businesscontinuity and disaster recovery.

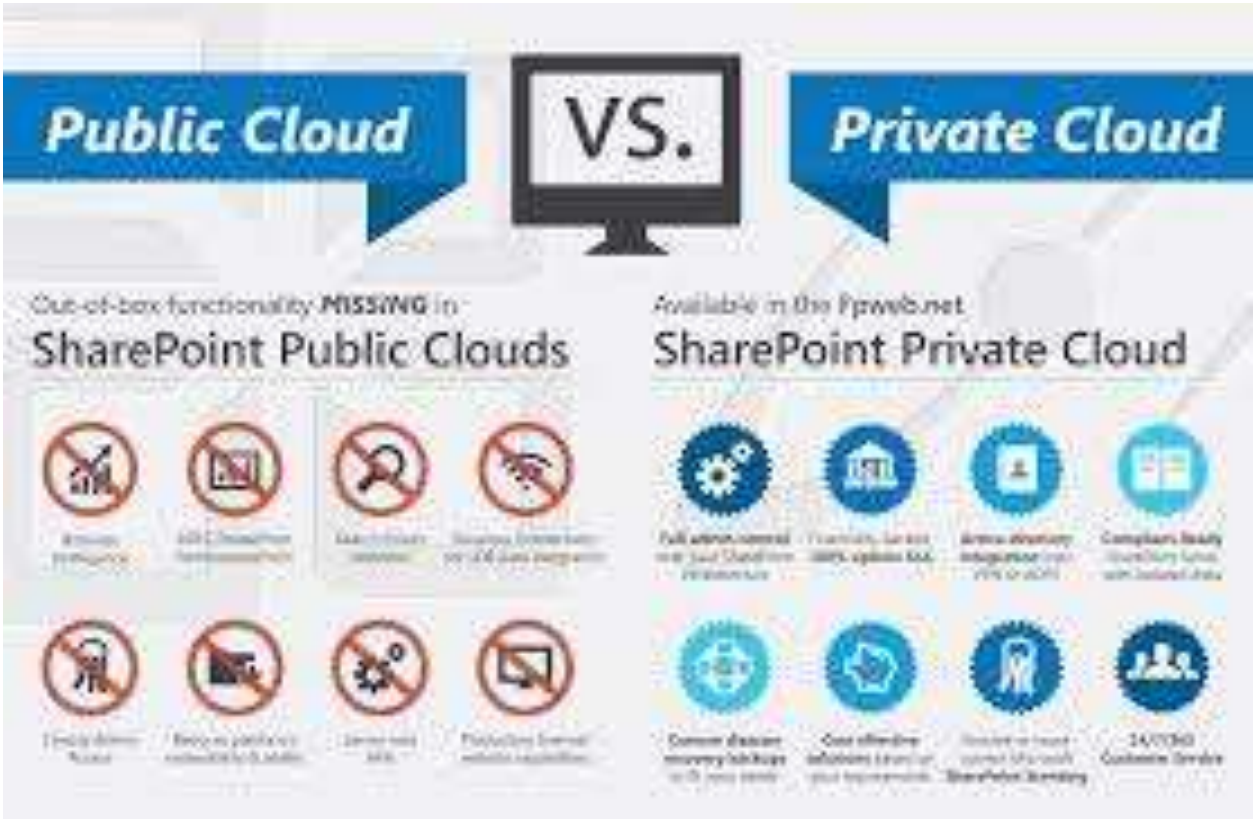
- **MAINTENANCE:-** Cloud service providers do the system maintenance, and access isthrough APIs that do not require application installations onto PCs, thus further reducing maintenance requirements.

- **SCALABILITY:-**Companies can start with a small deployment and grow to a largedeployment 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. Flexibility benefits derive from rapid provisioning of new capacity and rapid relocation or migration of workloads. In public sector settings, cloud computing provides agility in terms of procurement and acquisition process and timelines.

- **MOBILE ACCESSIBLE:-**Mobile workers have increased productivity due to systemsaccessible in an infrastructure available from anywhere.

- **RESOURCE POOLING:-**Resource pooling allows a cloud provider to serve itsconsumers via a multi-tenant model. Physical and virtual resources are assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction.

TYPES OF CLOUD COMPUTING ENVIRONMENTS



PUBLIC CLOUDS:-The cloud infrastructure is available to the public on a commercialbasis by a cloud service provider. This enables a consumer to develop and deploy a service in the cloud with very little financial outlay compared to the capital expenditure requirements normally associated with other deployment options. This environment can be used by the general public. This includes individuals, corporations and other types of organizations. Typically, public clouds are administrated by third parties or vendors over the Internet, and services are offered on pay-per-use basis. These are also called provider clouds.

PRIVATE CLOUDS:- The cloud infrastructure has been deployed, and is maintainedand operated for a specific organization. The operation may be in-house or with a third party on the premises. This cloud computing environment resides within the boundaries of an organization and is used exclusively for the organization‟s benefits. These are also called internal clouds. They are built primarily by IT departments within enterprises who seek to optimize utilization of infrastructure resources within the enterprise byprovisioning the infrastructure with applications using the concepts of grid and virtualization.

HYBRID CLOUDS:-This is a combination of both private (internal) and public(external) cloud computing environments. The cloud infrastructure consists of a number of clouds of any type, but the clouds have the ability through their interfaces to allow data and/or applications to be moved from one cloud to another. This can be a combination of private and public clouds

COMMUNITY CLOUD:- The cloud infrastructure is shared among a number oforganizations with similar interests and requirements. This may help limit the capital expenditure costs for its establishment as the costs are shared among the organizations.

The operation may be in-house or with a third party on the premises.

CHALLENGES OF CLOUD COMPUTING

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. Despite its growing influence, concerns regarding cloud computing still remain. In our opinion, the benefits outweigh the drawbacks and the model is worth exploring. Some common challenges are:

DATA PROTECTION:-Data Security is a crucial element that warrants scrutiny.Enterprises are reluctant to buy an assurance of business data security from vendors. They fear losing data to competition and the data confidentiality of consumers. In many instances, the actual storage location is not disclosed, adding onto the security concerns of enterprises. In the existing models, firewalls across data centers protect this sensitive information. In the cloud model, Service providers are responsible for maintaining data security and enterprises would have to rely on them.

SECURITY AND PRIVACY:- Perhaps two of the more "hot button" issuessurrounding 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. Many organizations are uncomfortable with storing their data and applications on systems they do not control. Migrating workloads to a shared infrastructure increases the potential for unauthorized exposure. Consistency around authentication, identity management, compliance, and access technologies will become increasingly important. To reassure their customers, cloud providers must offer a high degree of transparency into their operations.

DATA AND APPLICATION INTEROPERABILITY:-It is important that both dataand applications systems expose standard interfaces. Organizations will want the flexibility to create new solutions enabled by data and applications that interoperate with each other regardless of where they reside (public clouds, private clouds that reside within an organization‟s firewall, traditional IT environments or some combination).

Cloud providers need to support interoperability standards so that organizations can combine any cloud provider‟s capabilities into their solutions.

MANAGEMENT CAPABILITIES:- Despite there being multiple cloud providers, themanagement of platform and infrastructure is still in its infancy. Features like „Auto-scaling‟ for example, are a crucial requirement for many enterprises. There is huge potential to improve on the scalability and load balancing features provided today.

DATA AND APPLICATION PORTABILITY:-Without standards, the ability to bringsystems back in-house or choose another cloud provider will be limited by proprietary interfaces. Once an organization builds or ports a system to use a cloud provider‟s offerings, bringing that system back in-house will be difficult and expensive.

METERING AND MONITORING:- Business leaders will want to use multiple cloudproviders in their IT solutions and will need to monitor system performance across these solutions. Providers must supply consistent formats to monitor cloud applications and service performance and make them compatible with existing monitoring systems. It is clear that the opportunity for those who effectively

utilize cloud computing in their organizations is great. However, these opportunities are not without risks and barriers. It is our belief that the value of cloud computing can be fully realized only when cloud providers ensure

REGULATORY AND COMPLIANCE RESTRICTIONS:-In some of the Europeancountries, Government regulations do not allow customer's personal information and other sensitive information to be physically located outside the state or country. In order to meet such requirements, cloud providers need to setup a data center or a storage site exclusively within the country to comply with regulations. Having such an infrastructuremay not always be feasible and is a big challenge for cloud providers. With cloud computing, the action moves to the interface that is, to the interface between service suppliers and multiple groups of service consumers. Cloud services will demand expertise in distributed services, procurement, risk assessment and service negotiation areas that many enterprises are only modestly equipped to handle.

GOVERNANCE AND MANAGEMENT: -As IT departments introduce cloudsolutions in context of their traditional datacenter, new challenges arise. Standardized mechanisms for dealing with lifecycle management, licensing, and chargeback for shared cloud infrastructure are just some of the management and governance issues cloud providers must work together to resolve.

LACK OF STANDARDS: -Clouds have documented interfaces; however, no standardsare 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.

CONTINUOUSLY EVOLVING:-User requirements are continuously evolving, as arethe requirements for interfaces, networking, and storage. This means that a "cloud," especially a public one, does not remain static and is also continuously evolving.

CONCLUSION

The objective of this research paper was to analyze the scope of cloud computing and we have outlined the challenges facing organizations that want to use the cloud. These issues lead to a call to action for the IT industry around a vision of an open cloud. We as industry participants must work together to ensure that the cloud remains as open as all other IT technologies. , Cloud computing today is the beginning of "network based computing" over Internet in force. 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. The advantages present in a world where user interface augmentation is delivered using the same Web technologies used to deploy end-user access to application services opens up a wealth of opportunities for users with special needs.

Model: Vendor cloud (External), Private Cloud (Internal), Hybrid Cloud, Community Cloud

Benefit: Vendor Cloud (External)

- Quick startup time; no capital investment required.
- Allows outsourcing of non-core functions to a service provider.
- Leverages a highly scalable provider infrastructure.
- Uses a reliable and standardized software stack.
- Lower initial fees, variable costs, billed by usage.

Private Cloud (Internal)

- Quick startup and flexibility of resource allocation; requirescapital investment.
- On-premise data and systems; allows

direct support of governance and compliance, security, data privacy, etc; limited opportunities for reduction of staffing.
- Cost savings through leveraging virtualization and more effective use of assets to increase resource utilization and lower internal costs.

Hybrid Cloud (Mixed):
- Quick startup, but the integration of vendor and private cloud adds complexity.
- Can permit control of data and reduction of non-core focus.
- Allows selection of scalable provider infrastructure when needed;can allow internal control when required.

Community Cloud:
- Sharing service costs between organizations. Can be architected to permit information sharing between organizations without passing data into external network environments.

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