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Future of Cloud Network Computing

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ABSTRACT

Resource sharing in a pure plug and play model that dramatically simplifies infrastructure planning is the promise of cloud computing. The two key advantages of this model are ease of-use and cost-effectiveness. Though there remain questions on aspects such as security and vendor lock-in, the benefits this model offers are many. This paper explores some of the basics of cloud computing with the aim of introducing aspects such as: Realities and risks of the model Components in the model Characteristics and Usage of the model The paper aims to provide a means of understanding the model and exploring options available for complementing your technology and infrastructure needs. Cloud computing is a computing paradigm, Where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. With the advent of this technology, the cost of computation, application hosting, content storage and delivery is reduced significantly. Cloud computing is a practical approach to experience direct cost benefits and it has the potential to transform a data centre from a capital-intensive set up to a variable priced environment. The idea of cloud computing is based on a very fundamental principal of „reusability of IT capabilities'. The difference that cloud computing brings compared to traditional concepts of "grid computing", "distributed computing", "utility computing", or "autonomic computing" is to broaden horizons across Organizational boundaries.

Keywords: cloud computing techniques, cloud networking, Cloud aspects, Cloud models, private cloud opportunity

I. INTRODUCTION

Cloud computing is an umbrella term used to refer to Internet based development and services. The cloud is a metaphor for the Internet. A number of characteristics define cloud data, applications services and infrastructure:

· Remotely hosted: Services or data are hosted on someone else's infrastructure.
· Ubiquitous: Services or data are available from anywhere.
· Commoditised: The result is a utility computing model similar to traditional that of traditional utilities, like gas and electricity. You pay for what you would like.

II. Cloud Services

A. Software as a Service (Saas)

In this model, a complete application is offered to the customer, as a service on demand. A single instance of the service runs on the cloud & multiple end users are serviced. On the customer's side, there is no need for upfront investment in servers or software licenses, while for the provider, the costs are lowered, since only a single application needs to be hosted & maintained. Today saas is offered by companies such as google, sales force, microsoft, zoho, etc.

B. Platform as a service(Paas)

Here, a layer of software or development environment is encapsulated & offered as a service, upon which other higher levels of service can be built. The customer has the freedom to build his own applications, which run on the provider's infrastructure. To meet manageability and scalability requirements of the applications, Paas providers offer a predefined combination of OS and application servers, such as lamp platform (linux, apache, mysql and php) restricted j2ee, ruby etc. Google app engine, force.com, etc are some of the popular Paas examples.

C. Infrastructure as a Service (Iaas)

Iaas provides basic storage and computing capabilities as standardized services over the network. Servers, storage systems, networking equipment, data centre space etc. Are pooled and made available to handle workloads. The customer would typically deploy his own software on the infrastructure. Some common examples are amazon, gogrid, 3 tera, etc.

III. understanding private and public cloud\

Enterprises can choose to deploy applications on Public, Private or Hybrid clouds. Cloud Integrators can play a vital part in determining the right cloud path for each organization.

A. Public Cloud

Public clouds are owned and operated by third parties; they deliver superior economies of scale to customers, as the infrastructure costs are spread among a mix of users, giving each individual client an attractive low-cost, "Pay-as-you-go" model. All customers share the same infrastructure pool with limited configuration, security protections, and availability variances. These are managed and supported by the cloud provider. One of the advantages of a Public cloud is that they may be larger than an enterprises cloud, thus providing the ability to scale seamlessly, on demand.

B. Private Cloud

Private clouds are built exclusively for a single enterprise. They aim to address concerns on data security and offer greater control, which is typically lacking in a public cloud. There are two variations to a private cloud:

1) On-premise Private Cloud: On-premise private clouds, also known as internal clouds are hosted within one's own data center. This model provides a more standardized process and protection, but is limited in aspects of size and scalability. IT departments would also need to incur the capital and operational costs for the physical resources. This is best suited for applications which require complete control and configurability of the infrastructure and security.

2) Externally hosted Private Cloud: This type of private cloud is hosted externally with a cloud provider, where the provider facilitates an exclusive cloud environment with full guarantee of privacy. This is best suited for enterprises that don't prefer a public cloud due to sharing of physical resources.

C. Hybrid Cloud
Hybrid Clouds combine both public and private cloud models. With a Hybrid Cloud, service providers can utilize 3rd party Cloud Providers in a full or partial manner thus increasing the flexibility of computing. The Hybrid cloud environment is capable of providing on-demand, externally provisioned scale. The ability to augment a private cloud with the resources of a public cloud can be used to manage any unexpected surges in workload.
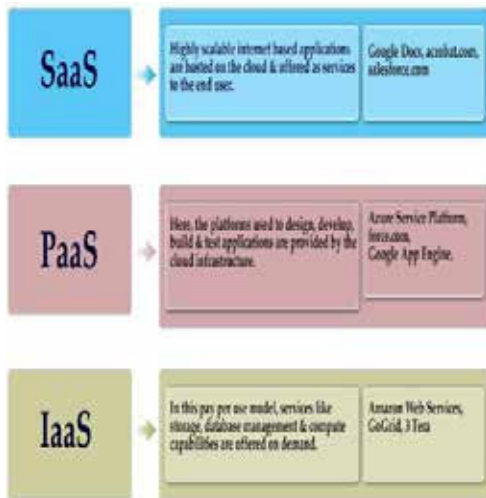

Fig. 1. Cloud computing service models

IV. cloud storage and data cloud
Over time many big Internet based companies (Amazon, Google…) have come to realise that only a small amount of their data storage capacity is being used. This has led to the renting out of space and the storage of information on remote servers or "clouds". Information is then temporarily cached on desktop computers, mobile phones or other internet-linked devices. Amazon's Amazon Elastic Compute Cloud (EC2) and Simple Storage Solution (S3) are the current best known facilities. Cloud Services can also be used to hold structured data. There has been some discussion of this being a potentially useful notion possibly aligned with the Semantic Web [2], though concerns, such as this resulting in data becoming undifferentiated [3], have been raised.

V. opportunities and challenges
The use of the cloud provides a number of opportunities:

· It enables services to be used without any understanding of their infrastructure.
· Cloud computing works using economies of scale. It lowers the outlay expense for start up companies, as they would no longer need to buy their own software or servers. Cost would be by on-demand pricing. Vendors and Service providers claim costs by establishing an ongoing revenue stream.
· Data and services are stored remotely but accessible from 'anywhere'.
· Use of cloud computing means dependence on others and that could possibly limit flexibility and innovation. The 'others' are likely become the bigger Internet companies like Google and IBM who may monopolise the market. Some argue that this use of supercomputers is a return to the time of mainframe computing that the PC was a reaction against.
· Security could prove to be a big issue. It is still unclear how safe outsourced data is and when using these ser-

vices ownership of data is not always clear.
· There are also issues relating to policy and access. If your data is stored abroad whose FOI policy do you adhere to? What happens if the remote server goes down? How will you then access files? There have been cases of users being locked out of accounts and losing access to data.

VI. cloud computing challenges
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:

A. 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 (owned by enterprises) protect this sensitive information. In the cloud model, Service providers are responsible for maintaining data security and enterprises would have to rely on them.

B. Data Recovery and Availability
All business applications have Service level agreements that are stringently followed. Operational teams play a key role in management of service level agreements and runtime Governance of applications. In production environments, operational teams support

· Appropriate clustering and Fail over
· Data Replication
· System monitoring (Transactions monitoring, logs monitoring and others)
· Maintenance (Runtime Governance)
· Disaster recovery
· Capacity and performance management

If, any of the above mentioned services is under-served by a cloud provider, the damage & impact could be severe.

C. Management Capabilities
Despite there being multiple cloud providers, the management 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.

D. Regulatory and Compliance Restrictions
In some of the European countries, 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 infrastructure may 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.

Conclusion and Future Work
Many of the activities loosely grouped together under cloud computing have already been happening and centralised computing activity is not a new phenomena: Grid Computing was the last research-led centralised approach. However there are concerns that the mainstream adoption of cloud computing could cause many problems for users. Whether these worries are grounded or not has yet to be seen.

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