Survey Paper on Cloud Computing

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Abstract- Everyone has an opinion on what is cloud computing. It can be the ability to rent a server or a thousand servers and run a geophysical modelling application on the most powerful systems available anywhere. It can be the ability to rent a virtual server, load software on it, turn it on and off at will, or database, Perl, Python, and PHP with the ability to scale automatically in response to changing workloads. Cloud computing can be the ability to use applications on the Internet that store and protect data while Providing a service anything including email, sales force automation and tax preparation. It can be using a storage cloud to hold application, business, and personal data. And it can be the ability to use a handful of Web services to integrate photos, maps, and Web browsers. Clone it ten times to meet a sudden workload demand. It can be storing and securing immense amounts of data that is accessible only by authorized applications and users. It can be supported by a cloud provider that sets up a platform that includes the S, Apache, a MySQL™.

Index Terms- cloud, disk,data,service .

I. WHAT IS CLOUD COMPUTING?

Cloud computing is emerging at the convergence of three major trends — service orientation, virtualization and standardization of computing through the Internet. Cloud computing enables users and developers to utilize services without knowledge of, expertise with, nor control over the technology infrastructure that supports them. The concept generally incorporates combinations of the following: Infrastructure as a service (IaaS) Platform as a service (PaaS) Software as a service (SaaS) Users avoid capital expenditure (CapEx) on hardware, software, and services when they pay a provider only for what they use. Consumption is billed on a utility (e.g. resources consumed, like electricity) or subscription (e.g. time based, like a newspaper) basis with little or no upfront cost.

A. Software as a service (SaaS)

Software as a service features a complete application offered as a service on demand.A single instance of the software runs on the cloud and services multiple end users or client organizations. The most widely known example of SaaS is salesforce.com, though many other examples have come to market, including the Google Apps offering of basic business services including email and word processing.

Although salesforce.com preceded the definition of cloud computing by a few years, it now operates by leveraging its companion force.com, which can be defined as a platform as a service.

B. Platform as a service (PaaS)

Platform as a service encapsulates a layer of software and provides it as a service that can be used to build higher-level services. There are at least two perspectives on PaaS depending on the perspective of the producer or consumer of the services:

• Someone *producing* PaaS might produce a platform by integrating an OS, middleware, application software, and even a development environment that is then provided to a customer as a service. For example, someone developing a PaaS offering might base it on a set of Sun™ xVM hypervisor virtual machines that include a NetBeans™ integrated development environment, a Sun GlassFish™ Web stack and support for additional programming languages such as Perl or Ruby.

• Someone *using* PaaS would see an encapsulated service that is presented to them through an API. The customer interacts with the platform through the API, and the platform does what is necessary to manage and scale itself to provide a given level of service. Virtual appliances can be classified as instances of PaaS. A content switch appliance, for example, would have all of its component software hidden from the customer, and only an API or GUI for Configuring and deploying the service provided to them. PaaS offerings can provide for every phase of software development and testing, or they can be specialized around a particular area such as content management. Commercial examples of PaaS include the Google Apps Engine, which serves applications on Google's infrastructure. PaaS services such as these can provide a powerful basis on which to deploy applications, however they may be constrained by the capabilities that the cloud provider chooses to deliver.

C. Infrastructure as a service (IaaS)

Infrastructure as a service delivers basic storage and compute capabilities as Standardized services over the network. Servers, storage systems, switches, routers, and other systems are pooled and made available to handle workloads that range from application components to high-performance computing applications. Commercial examples of IaaS include Joyent, whose main product is a line of virtualized servers that provide a highly available on-demand infrastructure.

II. CLOUD COMPUTING INFRASTRUCTURE MODEL

There are many considerations for cloud computing architects to make when moving from a standard enterprise application deployment model to one based on cloud computing. There are public and private clouds that offer complementary benefits, there are three basic service models to consider, and there is the value of open APIs versus proprietary ones.

Public, private, and hybrid clouds

IT organizations can choose to deploy applications on public, private, or hybrid clouds, each of which has its trade-offs. The terms *public*, *private*, and *hybrid* do not dictate location. While public clouds are typically "out there" on the Internet and private clouds are typically located on premises, a private cloud might be hosted at a colocation facility as well. Companies may make a number of considerations with regard to which cloud computing model they choose to employ, and they might use more than one model to solve different problems. An application needed on a temporary basis might be best suited for deployment in a public cloud because it helps to avoid the need to purchase additional equipment to solve a temporary need. Likewise, a permanent application, or one that has specific requirements on quality of service or location of data, might best be deployed in a private or hybrid cloud.

A. Public clouds

Public clouds are run by third parties, and applications from different customers are likely to be mixed together on the cloud's servers, storage systems, and networks. Public clouds are most often hosted away from customer premises, and they provide a way to reduce customer risk and cost by providing a flexible, even temporary extension to enterprise infrastructure. If a public cloud is implemented with performance, security, and data locality in mind, the existence of other applications running in the cloud should be transparent to both cloud architects and end users. Indeed, one of the benefits of public clouds is that they can be much larger than a company's private cloud might be, offering the ability to scale up and down on demand, and shifting infrastructure risks from the enterprise to the cloud provider, if even just temporarily. Portions of a public cloud can be carved out for the exclusive use of a single client, creating a virtual private datacenter. Rather than being limited to deploying virtual machine images in a public cloud, a virtual private datacenter gives customers greater visibility into its infrastructure. Now customers can manipulate not just virtual machine images, but also servers, storage, network devices, and network topology. Creating a virtual private data center with all components located in the same facility helps to lessen the issue of data locality because bandwidth is abundant and typically free when connecting resources within\ the same facility.

Fig:- **A public cloud provides services to multiple customers, and is typically deployed at a colocation facility.**

B. Private clouds

Private clouds are built for the exclusive use of one client, providing the utmost control over data, security, and quality of service (Figure 4). The company owns the infrastructure and has control over how applications are deployed on it. Private clouds may be deployed in an enterprise data centre, and they also may be deployed at a collocation facility. Private clouds can be built and managed by a company's own IT organization or by a cloud provider. In this "hosted private" model, a company such as Sun can install, configure, and operate the infrastructure to support a private cloud within a company's enterprise data center. This model gives companies a high level of control over the use of cloud resources while bringing in the expertise needed to establish and operate the environment.

Fig:- Private clouds may be hosted at **a colocation facility or in an enterprise data center. They may be supported by the company, by a cloud provider, or by a third party such as an outsourcing firm.**

C. Hybrid clouds

Hybrid clouds combine both public and private cloud models (Figure 5). They can help to provide on-demand, externally provisioned scale. The ability to augment a private cloud with the resources of a public cloud can be used to maintain service levels in the face of rapid workload fluctuations. This is most often seen with the use of storage clouds to support Web 2.0 applications. A hybrid cloud also can be used to handle planned workload spikes. Sometimes called "surge computing," a public cloud can be used to perform periodic tasks that can be deployed easily on a public cloud.

Hybrid clouds introduce the complexity of determining how to distribute applications across both a public and private cloud. Among the issues that need to be considered is the relationship between data and processing resources. If the data is small, or the application is stateless, a hybrid cloud can be much more successful than if large amounts of data must be transferred into a public cloud for a small amount of processing.

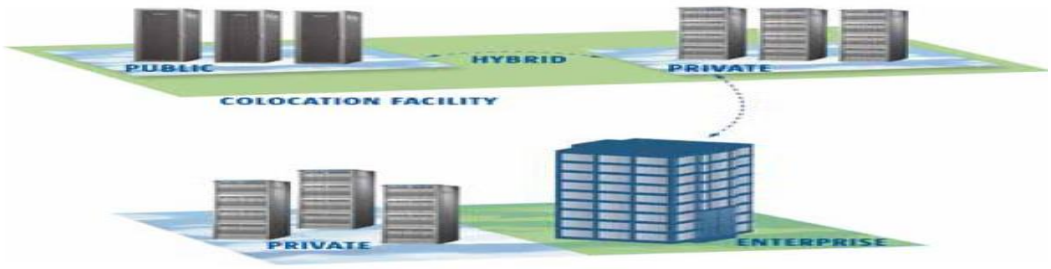

Fig:- Hybrid clouds combine both public and private cloud models, and they can be particularly effective when both types of cloud are located in the same facility.

III. ADVANTAGES

There is a lot of benefit for the business looking for the service from the cloud service provider. Apart from the bundle of suits they have to offer, it focus all an escape from huge investment into IT infrastructure and operating cost.

A. Reduce Runtime and Response time

For applications that use the cloud essentially for running batch jobs, cloud computing makes it straightforward to use 1000 servers to accomplish a task in 1/1000 the time that a single server would require. The New York Times example cited previously is the perfect example of what is essentially a batch job whose run time was shortened considerably using the cloud. For applications that need to offer good response time to their customers, refactoring applications so that any CPU- intensive tasks are farmed out to 'worker' virtual machines can help to optimize response time while scaling on demand to meet customer demands. The Animator application cited previously is a good example of how the cloud can be used to scale applications and maintain quality of service levels.

B. Minimise Infrastructure Risk

IT organizations can use the cloud to reduce the risk inherent in purchasing physical servers. Will a new application be successful? If so, how many servers are needed and can they be deployed as quickly as the workload increases? If not, will a large investment in servers go to waste? If the application's success is short-lived, will the IT organization invest in a large amount of infrastructure that is idle most of the time? When pushing an application out to the cloud, scalability and the risk of purchasing too much or too little infrastructure becomes the cloud provider's issue. In a growing number of cases, the cloud provider has such a massive amount of infrastructure that it can absorb the growth and workload spikes of individual customers, reducing the financial risk they face. Another way in which cloud computing minimizes infrastructure risk is by enabling surge computing, where an enterprise data centre (perhaps one that implements a private cloud) augments its ability to handle workload spikes by a design that allows it to send overflow work to a public cloud. Application lifecycle management can be handled better in an environment where resources are no longer scarce, and where resources can be better matched to immediate needs, and at lower cost.

C. Lower cost of entry

Since the infrastructure is rented, not purchased, the cost is controlled, and the capital investment can be zero. In addition to the lower costs of purchasing compute cycles and storage "by the sip," the massive scale of cloud providers helps to minimize cost, helping to further reduce the cost of entry. Applications are developed more by assembly than programming. This rapid application development is the norm, helping to reduce the time to market, potentially giving organizations deploying applications in a cloud environment a head start against the competition.

D. Increased pace of innovation

Cloud computing can help to increase the pace of innovation. The low cost of entry to new markets helps to level the playing field, allowing start-up companies to deploy new products quickly and at low cost. This allows small companies to compete more effectively with traditional organizations whose deployment process in enterprise data centers can be significantly longer. Increased competition helps to increase the pace of innovation — and with many innovations being realized through the use of open source software, the entire industry serves to benefit from the increased pace of innovation that cloud computing promotes.

E. Free from software licensing/up gradation/maintenance

Cloud computing frees up user from any further licensing of the software or from up gradation and maintenance. All the

services are provided by the service providers. No longer having to worry about constant server updates and other computing issues, government organizations will be free to concentrate on innovation.

F. A mobile profile

Since all is accessible through internet, it will be accessible globally. It will be too much beneficial for a small and medium sized enterprise that is not willing to invest a lot in network setup and wish to free from maintenance.

G. An interim evaluation for the Business

In cloud computing models, customers do not own the infrastructure they are using; they basically rent it, or pay as they use it. The loss of control is seen as a negative, but it is generally out-weighed by several positives. One of the major selling points of cloud computing is lower costs. Companies will have lower technology-based capital Expenditures, which should enable companies to focus their money on delivering the goods and services that they specialize in. Still there are key features for consideration before one talk for the need of the business. Since entire gamut of services is available in the market one has to be very choosey and do lots of self evaluation before drawing a final plan for the business.

- In which stage of your business life cycle you are planning to scale for the service of cloud computing?
- What business line you need to support and how much is the requirement so for your business.
- How much cost effective it can be when you rent the services?
- Which type of service is going to be beneficial for you?
- What is the organization preferred technology, development platform and business that require for this type of service?
- Is your organization having the capabilities to handle these services, as these services needs lot of competency to handle it as there are lots of mechanism with different layers of service present in them.
- How much risk is associated with the data dependency when it is a kept in others infrastructure?
- How much performance and bandwidth is required to use this type of service with comparison to the current business needs? Is the company able to cope it up with the existing bandwidth to its business needs? There is no limit for the evaluation, and consideration should be made with respect to the current business in one is, with respect to the multiple factors with responsiveness towards stake holders and business needs, financial goals, investment capabilities, profitability, future planning, industrial growth, service providers offerings etc. One can only earn the advantage through the new technology only if they are able to do a correct feasibility study to mitigate the business need.

IV. DISADVANTAGES

As any technology is a boon for an evaluation as the history is evidence, there are disadvantages too which cannot be ignored. Despite a fact cloud computing has so many features which can be awaiting a new horizon there are also key factors which cannot be ignored. Few have been summed up below:

- Lack of connectivity causes 100% downtime, whereas with traditional applications, lack of connectivity allows for some local function to continue until connectivity is restored.
- The lack of industry-wide standards means that a usage surge can easily overwhelm capacity without the ability to push that usage to another provider.
- Companies providing computing services will over-sell these services similar to how bandwidth is over-sold based on average or "peak" usage, instead of "maximum" usage.
- ISP's typically operate at multiples of 5 to 1, where they sell times more than they have in capacity, assuming users will not use more than 20% of their allotted resources. This works, until there is a popular YouTube video that everyone wants to see at the same time...resulting in outages. Cloud computing is even more vulnerable to the peak-usage problem than internet bandwidth.
- "Denial of service" attacks, currently common, become easier. What's more they become harder to trace, as compromised "cloud resources" can be leveraged to launch the attacks, rather than compromised "individual pc's". Cloud computing is vulnerable to massive security exploits. Currently, when a system is broken into, only the resources of that system are compromised. With cloud computing, the damages caused by a security breaches are multiplied exponentially.
- By "centralising" services, cloud computing increases the likelihood that a systems failure becomes "catastrophic", rather than "isolated".

V. CONCLUSION

The key motive to publish this paper is to give a glimpse of understanding on cloud computing as a technology for a new era. Its potential is considered so vast that it is surely going to give up a new dimension for the generation to come. So, in the long run, most of the companies (large, mid size or small) do not want to have the overhead cost associated with running a large IT department that is solely involved in sustaining existing enterprise application. Large companies do not have the risk tolerance to start using cloud computing immediately. The concept is so new that work is still going on to cater the world with the best way for the companies having a technology appetite. There is a big push for cloud computing services by several big companies. Amazon.com has been at the forefront of the cloud computing movement. Google and Microsoft have also been very publicly working on cloud computing offerings. Some of the other companies to watch for in this field are Yahoo!, IBM, Intel, HP and SAP. Several large universities have also been busy with large scale cloud computing research projects.

There is no end to the evolution until one stops thinking. In the future, more cloud adoption is certain, this year alone the move to the cloud by many business has been phenomenal, so much so that some cloud business have grown by over 200%. Large vendors see this as the growing model for software and services in the future so more focus by the vendors is afforded. Do not be surprised if the cloud bursts with offerings over the next 24 months.

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