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AN OVERVIEW ABOUT CLOUD COMPUTING

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ABSTRACT: This paper gives a brief introduction about cloud computing by giving its definition, nature, components, types, advantages and misperceptions. By having a look at this paper, an individual surely will have a clear idea about the basics of cloud computing.

Keywords: Cloud Computing, Private Cloud, Public Cloud, Software as a service (or SaaS), Platform as a service (or PaaS), Infrastructure as a service (or IaaS).

1. INTRODUCTION

In today's economic environment, organizations are focused on reducing costs and doing more with less while still trying to remain competitive. This means that IT departments are facing greater scrutiny to ensure that they match key business needs and deliver intended results in the most efficient and cost-effective manner. To meet these challenges, IT organizations are increasingly moving away from device-centric views of IT, to one that is focused on applications, information, and people and more towards the new paradigm of Cloud Computing.

Cloud computing is the current buzzword in the air. The name "Cloud Computing" was inspired by the cloud symbol that's often used to represent the Internet in flow charts and diagrams. In short cloud computing means using the Internet for all computer needs. Rather than having disc storage, software, and hardware of your own, all information can be on the Internet. Cloud computing is a natural evolution of the widespread adoption of virtualization, service-oriented architecture, autonomic and utility computing. Cloud Computing, as the name suggests is a style of computing where dynamically scalable and often visualized resources are provided as a service over the internet. Any user can consume the services over a standard HTTP medium. The user doesn't need to have the knowledge, expertise or control over the technology infrastructure in the "cloud" that supports them. The clouds denoted the abstraction of the complex infrastructure it conceals.

In traditional network diagram, the cloud always represented a fairly static view of an intermediary virtual area on the Internet. It basically had no real function other than passing data from one point to the other between servers on the Internet and client where we cloud setup our applications to run.

The cloud-computing model changes this slightly. Instead of providing just a medium for messages to pass through between clients and severs, it tries to provide a number of services within the Internet "cloud" itself. These services can range from storage, computation, applications and even complete operating systems. All available as a service on the Internet which you can go ahead and use directly.

2. TYPES OF CLOUDS

The various types of clouds are:

1. Public Cloud: The cloud infrastructure is made available to the general public or a large industry group and owned by an organization selling cloud services. The organization using public cloud does not control how those cloud services are operated, accessed or secured.
2. Private Cloud: The cloud infrastructure is operated solely for a single organization. It may be managed by the organization or a third party and may exist on or off-premises. While the organization does not need to physically own or operate all the assets, the key is that a shared pool of computing resources can be rapidly provisioned, dynamically allocated and operated for the benefit of a single organization.
3. Community Cloud: The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, or compliance considerations). It may be managed by the organizations or a third party and may exist on premises or off-premises.
4. Hybrid Cloud: The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

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3. ARCHITECTURE OF CLOUD COMPUTING

The success of cloud computing is largely based on the effective implementation of its architecture. In cloud computing, architecture is not just based on how the application will work with the intended users. Cloud computing requires an intricate interaction with the hardware which is very essential to ensure uptime of the application.

These two components (hardware and application) have to work together seamlessly or else cloud computing will not be possible. If the application fails, the hardware will not be able to push the data and implement certain processes.

On the other hand, hardware failure will mean stoppage of operations. For that reason, precaution has to be done so that these components will be working as expected and necessary fixes has to be implemented immediately for prevention as well as quick resolution.

Data Centers: One of the most distinguishing characteristics of cloud computing architecture is its close dependency on the hardware components. An online application is just a simple application that could be launched in different servers but when the application is considered with cloud computing, it will require massive data centers that will ensure the processes are done as expected and timely.

Data centers for cloud computing architecture are not your run-of-the-mill data processing centers. It's composed of different servers with optimal storage capacity and processing speed. They work together to ensure that the application will be operating as expected. The area is usually in a highly controlled environment where it would be constantly monitored through various applications and manually checked for actual physical problems.

4. CATEGORIZATION OF CLOUD SERVICES

Cloud computing into three parts:

1. Platform as a Service (PaaS)
2. Infrastructure as a Service (IaaS)
3. Software as a Service (SaaS)

Platform as a Service (PaaS) is a delivery of a computing platform over the web. PaaS enables you to create web applications quickly, without the cost and complexity of buying and managing the underlying software/hardware. PaaS provides all the facilities required to support the complete life cycle of building and delivering web applications entirely on the web. As Platform-as-a-Service (PaaS) is available as a service, the developer and ISV's get full control of the application development and deployment. PaaS enables developers and ISV's to create custom web applications and deliver it quickly, as many of the hassles like setting up hosting, servers, databases, user interaction process and frameworks are prepackaged.

Infrastructure as a Service (IaaS) is a provision model in which an organization outsource the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis. Infrastructure as a Service is sometimes referred to as Hardware as a Service (HaaS).

Characteristics and components of IaaS include:

- Utility computing service and billing model.
- Automation of administrative tasks.
- Dynamic scaling.
- Desktop virtualization.
- Policy-based services.

Software as a Service (SaaS) is one of the methodologies of Cloud Computing, which is based on a "one-to-many" model whereby an application is shared across multiple clients. The exact definition of software as a service (SaaS) is open to debate, and asking different people would probably result in different definitions. Everyone believe that SaaS is going to have a major impact on the software industry, because software as a service will change the way people build, sell, buy, and use software. For this to happen, though, software vendors need resources and information about developing SaaS applications effectively. Still, most experts would probably agree on a few fundamental principles that distinguish SaaS from traditional packaged software on the one hand, and simple websites on the other. Expressed most simply, software as a service can be characterized as "Software deployed as a hosted service and accessed over the Internet".

Software as a service (or SaaS) is a way of delivering applications over the Internet-as a service. Instead of installing and maintaining software, you simply access it via the Internet, freeing yourself from -* software and hardware management. SaaS applications are sometimes called Web-based software, on-demand software, or hosted software. Whatever the name, SaaS applications run on a SaaS provider's servers. The provider manages access to the application, including security, availability, and performance. SaaS customers have no hardware or software to buy, install, maintain, or update. Access to applications is easy: you just need an Internet connection. This types of cloud computing delivers a single application through the browser to thousands of customers using a multitenant architecture.

5. ADVANTAGES OF CLOUD COMPUTING

Advantage of cloud computing is the notion of green IT: With the help of using current assets instead of purchasing additional hardware, organization can reduce the size of their carbon footprint. With secured cloud computing, organization can enjoy reduced software maintenance, increased reliability/redundancy, increased scalability and efficiency, greater accessibility for mobile/remote users, and the cloud becomes a very compelling value proposition.

6. DRAWBACKS OF CLOUD COMPUTING

While the business benefits of cloud computing are clear, some businesses are still reluctant to move critical data and applications to cloud computing, and especially to a third-party cloud infrastructure.

Some common concerns include the following.

1. Lack of direct control: With data hosted by a cloud provider and not on the company's premises, management may feel that data is no longer under the direct control of the business and somehow more vulnerable. The cloud provider should give the customer tools for data management, and the provider should have ample disaster recovery and fault tolerant measures in place to protect the data 24X7.
2. Uncertain security: Once customers become familiar with the security procedures and measures that most cloud-computing providers have deployed, they find there is little concern about security. In fact, depending on the cloud provider, customer data in most cases is far safer at a cloud computing facility than on typical network LANs, where decentralized security management can introduce any number of ongoing security vulnerabilities.
3. Utility pricing: Unpredictable pricing is a frequent concern of many companies considering cloud computing. Because many cloud providers operate on a utility pricing model, customers are charged by usage-similar to cell phone or electricity use. Therefore, many companies are concerned about the potential for wildly fluctuating computing costs. However, not all cloud computing providers use utility pricing, but instead offer fixed price plans, keeping computing costs predictable and affordable.
4. Data lock-in: Many companies fear that once they commit to cloud computing, their data and businesses are locked in, making them "hostage" to a particular provider of cloud services. For this reason, companies should ensure that any hosted applications or services they use are based on open standards and open data formats in the event that they need to quickly and cleanly migrate their resources to another vendor or system.
5. Supplier viability and reliability: Customers should be concerned about the viability of any IT supplier, especially one tasked with hosting critical applications and data. For this reason, potential cloud customers should check not only the viability of the host's infrastructure but also check its financial health and market standing. Aside from the cloud provider's long-term market viability, what measures do they take to ensure their data centers are reliable and available 24X7?
6. Cost of converting to cloud computing: Many customers are understandably concerned about the cost of converting from their current applications to cloud-based applications. In many cases, such as SQL databases, spreadsheets, and word processing documents, the cost will be nominal as cloud-based applications can preserve the formats most businesses are currently using. Custom applications may require more time and expense to convert, however. For these reasons, many companies moving to cloud computing often do so incrementally. They may first offload their email, word processing, or data storage tasks to offsite cloud computing resources on a trial basis before committing larger aspects of their business infrastructure to a new platform. A recent study found that 70 percent of companies that utilized cloud computing on an incremental or test basis planned to further deploy cloud computing more broadly.

7. MYTHS AND MISPERCEPTIONS ABOUT CLOUD COMPUTING

Cloud computing, like many new products, is subject to misperceptions and myths. These myths probably arise primarily from a poor understanding of the technology or the capabilities of the providers.

1. Myth: Cloud security and compliance is impossible to achieve.
2. Myth: All clouds scale on demand.
3. Myth: Virtualization = cloud computing.
4. Myth: Performance is worse in the cloud.
5. Myth: The cloud requires more IT management.
6. Myth: Cloud computing is only good for low end applications and software as a service.
7. Myth: Cloud computing is less reliable than in-house systems.

8. CONCLUSION

Companies can save capital expenses, software maintenance, personnel, and energy costs by shifting significant portions of their business processes to cloud computing platforms. The flexibility of cloud computing also allows them to more quickly develop and deploy innovative software applications. Despite fears of lack of data control or application security, cloud computing has proven itself to be a safe, reliable platform for enterprise computing throughout its evolution.

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