A Review Paper on Private Cloud Computing

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Abstract - This paper discusses about an advancement in Cloud computing i.e. PRIVATE CLOUD COMPUTING. Cloud Computing is an increasingly popular paradigm for accessing computing resources. In practice, cloud service providers tend to offer various services. It proceeds to discuss the private cloud characteristics and formation as well as implementation .This paper aims to provide a means of understanding and investigating Private cloud Computing. This paper also outlines the responsibilities of private cloud provider and the facilities to consumer.

I. INTRODUCTION

Cloud computing is Web-based processing, in which distributed assets, programs, and information are supplied to computers and other devices (such as smart phones) on demand through the Internet. Cloud computing is a natural development of the prevailing adoption of virtualization, Service-oriented structures and utility computing. A private cloud is a particular model of cloud computing that involves a distinct and secure cloud based environment in which only the specified client can operate.As with other cloud models, private clouds will provide computing power as a service within a virtualized environment using an underlying pool of physical computing resource. However, under the private cloud model, the cloud (the pool of resource) is only accessible by a single organization, therefore providing that organization with greater control and privacy. As a result, private cloud is best for businesses with dynamic or unpredictable computing needs that require direct control over their environments.

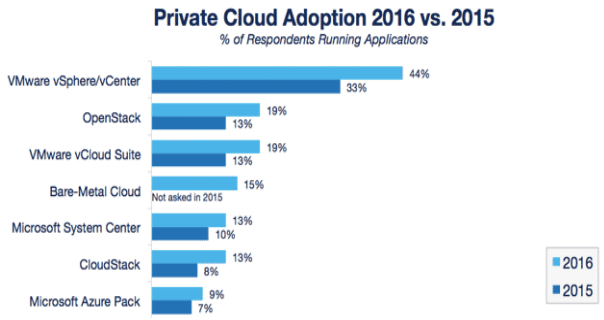

Fig 1.Private Cloud Adoption 2016 vs. 2015

II. ORIGIN

The private cloud is a great fit for businesses that require direct control over environments that have dynamic or unpredictable computing configuration requirements. German businesses are keenly aware of the possibilities and potential security concerns of using the cloud. In fact, in August 2015, Germany passed a new law for the use of public cloud computing services for government and federal entities. Under this law, data can only be processed in Germany. This law was an effort to help the German government safeguard its own data assets from the risk of foreign threat, and speaks volumes on how closely Germany is monitoring the cloud revolution.This interest in cloud security has infiltrated German culture, as a 2015 poll found that 57% of German companies preferred their data to be processed only in Germany; in other words, they preferred a private cloud option over a public one. This has resulted in a number of industry and public pressures that have increased the demand for localized data to be stored within Germany.The German market's confidence in private cloud computing services is evident in the growth of this segment over the past few years. The chart below shows the results of a survey on the usage of private cloud computing services solutions in German companies from 2011 to 2014, underlining the growth in this segment of the market.

III. EXISTING METHOLOGY

The concept of cloud computing was invented in 2002 by Amazon, a leading e-business, which had invested in a fleet of huge machines, sized to handle the heavy load of orders made on their site at the time of Christmas, but Instead, the unused balance of the year. Under-sizing their fleet would have caused downtime of their website at peaks, thereby jeopardizing their business during the holidays (a big part of their turnover) (Grossman 2009). Their idea has been to open these unused resources to businesses to hire them on demand. Since then, Amazon has invested heavily in this area and continues to expand its fleet and services. Recently, other players in the IT world such as Google and Microsoft, in turn, offer similar services. These cloud services based on the data center hardware (digital stations) huge (only these large companies can afford), and in software on virtualization techniques offer enterprise customers of IT resources.

Scenario 1: Infrastructure as a service

The most widely adopted private cloud model currenty is infrastructure as a service (IaaS), is a cloud computing offering in which a vendor provides users access to computing resources such as servers, storage, and

networking. Organizations use their own platforms and applications within a service provider's infrastructure.

Key features

- Instead of purchasing hardware outright, users pay for IaaS on demand.
- Infrastructure is scalable depending on processing and storage needs.
- Saves enterprises the costs of buying and maintaining their own hardware.
- Because data is on the cloud, there is no single point of failure.
- Enables the virtualization of administrative tasks, freeing up time for other work.

Consider a development team that needs a server for their project. In large companies, it takes at least 30 days to make a new physical resource available. Imagine that, rather than 30 or 40 days, that server becomes available within a few hours. How many additional projects could that same team deliver in a year?

Scenario 2: Platform as a service

PaaS is a cloud computing offering that provides users a cloud environment in which they can develop, manage, and deliver applications. In addition to storage and other computingresources, users are able to use a suite ofprebuilt tools todevelop, customize and test their own applications.

Key features

- PaaS provides a platform with tools to test, develop, and host applications in the same environment.
- Enables organizations to focus on development without having to worry about underlying infrastructure.
- Providers manage security, operating systems, server software, and backups.
- Facilitates collaborative work even if teams work remotely.

Scenario 3:Software as a service

SaaS is a cloud computing offering that provides users with access to a vendor's cloud-based software. Users do not installapplications on their local devices. Instead, the applications reside on a remote cloud network accessed through the web or an API. Through the application, users can store and analyze data and collaborate on projects.

Key features

- SaaS vendors provide users with software and applications on a subscription model.
- Users do not have to manage, install, or upgrade software; SaaS providers manage this.
- Data is secure in the cloud; equipment failure does not result in loss of data.
- Use of resources can be scaled depending on service needs.
- Applications are accessible from almost any Internet-connected device, from virtually anywhere in the world.

IV. WORKING PRINCIPLE

The **client–server model** is a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called servers, and service requesters, called clients. Often clients and servers communicate over a computer network on separate hardware, but both client and server may reside in the same system. A server host runs one or more server programs which share their resources with clients. A client does not share any of its resources, but requests a server's content or service function. Clients therefore initiate communication sessions with servers which await incoming requests. Examples of computer applications that use the client–server model are Email, network printing, and the World Wide Web.

V. ADVANTAGES

Cloud computing has proven to be a good alternative for companies, because it reduces costs and generates flexibility. But security and availability issues still need to be resolved. That is why more and more companies are choosing private clouds. Banks, for example, cannot join public, Internet-access clouds. Organizations that need greater security will have to invest in private clouds, but they also need to be sure that they can rely on the availability and performance of services.

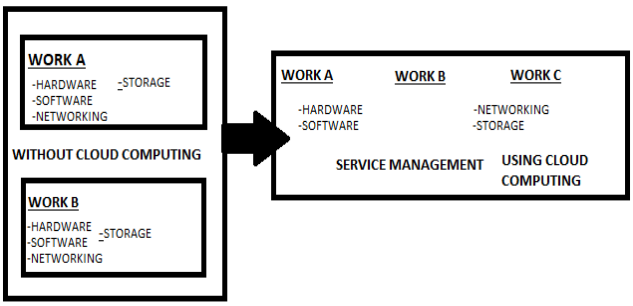

Fig 2.Service Management using cloud computing

A private cloud, also called an "internal cloud" or "corporate cloud," resides within the company environment (firewall) and its access is restricted, usually to company employees or business partners.The reasons for using a private cloud are cost reduction, enhancing service quality, and, more importantly, reducing the time it takes to deliver what users demand. **An IT executive from McDonald's explains why they chose a private cloud: "We needed a model that was flexible in any business and development conditions. Sometimes, we have months focused on development, and other periods are dedicated to deployment. The model must be flexible enough to**

handle this."Thus, cost savings are driven by standardization or automation of services or IT computer resources.

Features and benefits of private clouds:

1. **HIGHER SECURITY AND PRIVACY:** While public cloud services offer a certain level of security, private clouds are the more secure option. This is achieved using distinct pools of resource with access restricted to connections made from one organisation's firewall, dedicated leased lines and on-site internal hosting
2. **MORE CONTROL:** As a private cloud is only accessible by a single organisation, that organisation will have the ability to configure and manage it inline with their needs to achieve a tailored network solution
3. **COST AND ENERGY EFFICIENCY:** Implementing a private cloud model can improve the allocation of resources within an organisation by ensuring that the availability of resources to individual departments/business functions can directly and flexibly respond to their demand. They make more efficient use of the computing resource than traditional LANs and can also reduce an organisation's carbon footprint
4. **IMPROVED RELIABILITY:**Even where resources (servers, networks etc.) are hosted internally, the creation of virtualised operating environments means that the network is more resilient to individual failures across the physical infrastructure. Virtual partitions can, for example, pull their resource from the remaining unaffected servers
5. **CLOUD BURSTING:**Some providers may offer the opportunity to employ cloud bursting, within a private cloud offering, in the event of spikes in demand. This service allows the provider to switch certain non-sensitive functions to a public cloud to free up more space in the private cloud for the sensitive functions that require it.

VI. BEST PRIVATE CLOUD PROVIDERS

1. **HPE:** Synergy Research said that HPE was the biggest provider of private cloud hardware in the second quarter of 2016, comprising more than 20 percent of the market.HPE's private cloud offerings span hardware, software and services. Many of its private cloud solutions are sold under the "Helion" brand name, and they include the Helion Cloud Suite software, Helion CloudSystem hardware, Helion Managed Private Cloud and Managed Virtual Private Cloud services, as well as many other products.
2. **DELL:**Dell's private cloud offerings include virtual private cloud services, cloud management and cloud securitysoftware, and a variety of cloud consulting services.
3. **ORACLE:** Oracle's Private Cloud solutions include its Cloud Platform, applications, infrastructure, lifecycle management tools and integration services. It also offers Managed Cloud Services.
4. **IBM:** IBM's private cloud solutions include hardware such as IBM Systems and IBM Storage, hosted private cloud services, IBM Cloud Managed Services, cloud security tools and software like Cloud Manager and Cloud Orchestrator. It also has cloud solutions and services for its System z mainframe platform.
5. **CISCO:** While best known for its networking hardware and solutions, Cisco also offers a variety of cloud software for analytics, infrastructure automation, cloud management and orchestration, development and cloud security.

VII. APPLICATIONS

1. Globally distributed development: Collaboration between external and internal teams is transparent through the IBM® Rational Team Concert™ collaboration environment, installed and configured in a standardized way for all teams and available in the cloud.

Outsourcing has been an increasingly common reality in companies. It has generated the need for an effective means of communication between internal and external resources. As mentioned earlier, during development peaks, we can work concurrently with many distributed suppliers or teams, and then save resources during slow development cycles when there are few projects to be developed.

2.Virtual test farms: Virtual test farms are preconfigured cloud images with agents for functional testing with, for example, Rational® Functional Tester. These test farms enable efficient regression testing in applications and an agile setup process for running on different operating systems and middleware combinations.

Services related to performance testing (Rational® Performance Tester), which are also associated with physical or virtual agents in the cloud, can be executed, thus enabling optimized use of infrastructure (known as "pay-as-you-go").

3. Application security testing: Security testing is necessary to mitigate risks associated with regulatory requirements and to protect applications against malicious or fraudulent use.

By using a cloud service (Rational® AppScan®, for example), you can keep web applications secure through an

infrastructure that is also available in the pay-as-you-go model.

VIII. CONCLUSION

Private clouds do not make sense for small businesses. But for large and even medium-sized businesses, IT teams can make parts of their infrastructures virtual, so they can use their business processes and computer resources in a private cloud. As the concept becomes more mature, the idea would be to move everything that needs more flexibility to the cloud. We have some big challenges ahead, and we should start facing them now. Cloud computing is not a promise but a reality, and if you do not design your adoption strategies, you will miss the bus.

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