CLOUD COMPUTING WITH ITS MODELS

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Abstract:

Sharing of resources in a pure manner is the main concept of cloud computing. Cloud computing is the recent research in the IT that transfer the data from desktop and portable PC into large data center.Cloud computing become very important these days because in the cloud computing customer do not have to spend his money for infrastructure, its installations and also do not require man power to handle such infrastructure and maintenance.

In this paper we will discuss the various model of cloud computing its advantages and disadvantages.

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Introduction:

Cloud computing is a computing paradigm where a large numbers of system component are connected with the public and private network to give the dynamically large infrastructure for applications, data, information and file storages. With the enhancement in this technology the cost of communication ,application hosting ,information storages and delivery is decreased significantly the cloud computing approach we can experience direct cost beneficial **Cloud computing** is shared pools of configurable computer system resources and higher-level services that can be rapidly provisioned with minimal management effort, often over the Internet. Cloud computing relies on sharing of resources to achieve coherence and economies of scale, similar to a utility's [1]. The main logics behind the cloud computing is very fundamental principal "reusability of IT capabilities".Forrested define cloud computing as A pool of abstracted ,highly sacble manager compute infrastructure capable of hosting end customer application and billed by consumption. Cloud computing deals with computation, software, data access and storage service that may not required end user knowledge of physical locations and configuration of the system that is delivering the services. The definition of cloud computing provided by National Institute of standard and technology(NIST) says that "Cloud computing is a model for enabling convent, on demand network access to a shared pool of configurable computing resources e.g. Network,Server,Storage application and services that can be rapidly provisioned and released with minimal management efforts pr services provider interactions" The main objective of cloud computing is to make better use of scattered resources ,integrated them to gather large throughput and be able to solve big scale computation problems.

Related work:

IlangoSriram et al [2]. Go through more definitions of cloud computing and proposed the following definition: Clouds are a large pool of easily usable and accessible virtualized resources (such as hardware, development platforms and/or services). These resources can be dynamically reconfigured to adjust to a variable load (scale), allowing also for optimum resource utilization. Typically these pools of resources exploited by a pay-per-use model in which guarantees are offered by the Infrastructure Provider by means of customized SLAs. Imran Ashraf [3] states that: Cloud computing is being embraced by many fields and is most adoptable field of information technology at the moment. Due to its pay-per-use principle it is becoming very

attractive and competitive solutions for even small organizations who cannot afford to have their own hardware or software infrastructure. Moreover, it's on demand changing scalability has made it very viable solution for organizations who need to change their acquired services with the changing workload. Apart from being simple and easy to use it has other advantages over traditional framework. It works in distributed environment and serves the user according to his needs. Users just need to have internet to connect to the services and it is accessible from everywhere. It has minimized cost, improved throughput, and fast access of software and hardware resources and can scale readily and easily as required. Eugene Gorelik [4] proposed that: Cloud computing begins with the huge IT transformation in history, and this transformation has opened many new business opportunities. It is expected that public750 Dr. Chinthagunta Mukundha & K. Vidyamadhuri clouds will provide most of the opportunities for cloud service providers. According to a recent survey conducted by Morgan Stanley, the percentage of companies using a public cloud is expected to rise to 51% though 2013.IEEE states the use cases of the service models IaaS is easily used for website hosting, where a web server and operating system stack are put on VM's, where they can easily take advantage of cloud features such as easy scaling, global availability, managed environment, geographical load balancing, special content delivery front-end or infrastructure. PaaS is good for deploying applications which came from an "applications container" world before like J2EE or .NET. In fact PaaS systems such as Red Hat Open Shift or Cloud Foundry from IBM or Pivotal are very much like J2EE, and Windows Azure from Microsoft is very much like .NET In the Mobile world SaaS is known as "an app", because the front end User Interface sits on the phone, while the back end sits in the cloud. In fact while many Mobile apps don't look like it, they are built with the reconfigurable Mobile version of a browser called Web Kit. [5] Santosh Kumar and R. H. Gondar [10] state that Cloud Computing is the development of parallel computing, distributed computing, grid computing, and is the combination and evolution of Virtualization, Utility computing, Software-as-a-Service (SaaS),Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS). Cloud is a metaphor to describe web as a space where computing has been pre-installed and existas a service, data, operating systems, applications, storage and processing power exist on the web ready to be shared. To users, cloud computing is a Pay-per-Use-On-Demand mode that can conveniently access shared IT resources through the Internet. Imran Ashraf compares the service models as: IaaS: The core computing resources are hardware and software components. They lay

the foundations of every computing infrastructure. PaaS: Platform as a service provides a development platform to its users so that they can develop and maintain their applications and cloud specific utilities. SaaS: It is different than traditional software services, where traditional software need own hardware and software components, Where SaaS makes users, independent of their own resources. Kalpasna Parsi and M.Laharika[6] state that: A public cloud is the obvious choice when: Public Cloud Computing is the easiest of cloud solutions to setup and maintain and is the preferred choice of most small scale and start-up enterprises, that Cloud Computing

III. SERVICE MODELS

Cloud supports XaaS (Everything as a Service), but offers its services as three major service models recognized as IaaS, PaaS and SaaS. Now we discuss about these models in detail.

1.   Infrastructure as a Service(IaaS)

2.   This service model deals computer infrastructure as a service. This service is made available as a platform for virtualized machines. Unlike, traditional hardware machines which need special maintenance and limited flexibility, cloud makes these machines easily available virtually on the internet with flexible specifications and improved performance, optimized according to the requirements of the customer. 752 Dr. Chinthagunta Mukundha & K. Vidyamadhuri Developers can run the platforms necessary for their software development and run them. This service also makes it easy for the customer to create instance for his required virtual machine simple and easy. In most of the cloud services provided by various service providers, setting up of virtual machines can be done with no or less cost. Cloud gives this virtualization feature in the containers forms. A direct virtual machine requires a hypervisor on its hardware above the kernel for efficient virtualization whereas containerization doesn't need a hypervisor which saves the processor efficiency and improves its performance. And also, container size is not fixed i.e., it can be changed dynamically, so that it remove over-provisioning. Generally, these virtual machines are installed in the form disk images, object, load balancers or IP addresses which can be dynamically installed on the cloud and also check the security of the virtual machine by giving the virtual instance with a unique host address each time installed.

3.   These virtual instances are pre-installed on large pools of equipment called data canters. These virtual machines are provided by the service providers on the utility computing basis. These are the various virtual components which can be offered by IaaS are1. Computer Hardware 2. Computer Networks (such as routers, firewalls, load balancers etc.) 3. Internet Connectivity (using optical carriers) 4. Platform virtualization environment for running client-specified virtual machines. 5. Service level agreements. Advantages of IaaS are: 1. readily available environment, customized for client, promotes efficient IT services. 2. Maintenance such as software updates, latest versions can be readily available on the internet. 3. Reduces the maintenance cost for the hardware which is quite expensive. 4. Data stored on the virtual machine is secured and can be recovered in case of any failure of host allocation. 5. Can accommodate many virtual instances as per the demand. 6. Virtual instances can be rented for machines like servers, operating systems, networks as a fully outsourced service. Some of the IaaS service providers are: 1. Amazon Elastic Cloud Compute (EC2) service from Amazon Web Services by Amazon. Cloud Computing Models: A Survey 753 2. Google Compute Engine from Google Cloud Services by Google. 3. Windows Azure Virtual Machines from Windows Azure by Microsoft. 4. IBM Smart Cloud Enterprise by IBM. 5. HP Enterprise Converged Infrastructure from HP.

4.   2**. Platform as a Service (PaaS**) This service model delivers platforms for building and running web-based applications. It provides all the facilities required to support the complete software development life cycle. This service basically delivers a computing platform for the customer who includes operating system, programming platforms, web servers, databases etc. Since everything is run on internet, there is no need to worry about the infrastructure and minimum requirements for the platform. This model can hence eliminates the worry of incompatibility of software environment on the machine, since hardware specifications required by the platform are met by the cloud service provider directly, thus providing powerful and unlimited computing power. Anyone with an internet connection can now develop powerful and efficient applications without worrying about the infrastructural and cost issues. The traditional on premise models were expensive and complex, which required specific, set of hardware and software specifications. For every problem statement, there is a different business solution, which meant different set of hardware and software specifications. This situation used to force

the developers to change the application every now and then. Enormous electricity power was also required to run the hardware. With the entry of PaaS model of cloud, application development became quick, cost effective and efficient. PaaS provides infrastructure along with the workflow facilities required for the software development. It also provides application services for the software development such as security, storage, database integration, instrumentation etc. Another characteristic of PaaS models is the integration of web and mobile applications and services with the databases using Simple Object Access Protocol. PaaS consists of three main components 1. Stack- consisting of all the backend implementation components such as language virtual machine, servers, databases load balancers, caching mechanisms etc. 2. Deployment Machinery- consisting of scripts and services for deploying the developed applications on the internet. 3. User Experience- consisting of all the frontend components such as user interface, customized abstraction, flexibility to choose the environments and design. 754 Dr. Chinthagunta Mukundha & K. Vidyamadhuri Advantages of PaaS are: 1. can develop and deploy agile applications. 2. Can focus on the important resources for the enterprise without worrying about the cost of infrastructure. 3. The platforms provided by a PaaS provider are revised editions which are updated time to time, thus applications can be built using best technologies. 4. Maximizes the productivity and minimized the development time. 5. Doesn't require the developer to know the backend processes of the platform environment of the cloud. Some of the PaaS service providers are: 1. Google App Engine by Google Cloud services from Google. 2. Windows Azure PaaS services by Windows Azure from Microsoft. 3. Amazon Elastic Beanstalk by Amazon Web Services from Amazon. 4. Open shift by Red Hat from Linux. 5. Engine Yard run on Amazon Web Services by Amazon.

3. Software as a Service (SaaS) This service model provides the access to the application services and databases. Cloud providers take care of the infrastructure and platforms required to run the software applications on the Internet. It is sometimes referred to as 'on-demand software', which can be used after paying the subscription fees. In this model, cloud users directly install the subscribed applications on the cloud and directly access the software from their cloud clients. The cloud users need not manage the necessary infrastructure or the platforms required to run the software application. Some of the SaaS applications are Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), accounting and other business software, which are

mainly non-core-competency software. Most of the companies today opt for SaaS solutions, which don't require the employee to know the infrastructure, background logics and platform details to run the application. Instead he can just install the application on the cloud and run the application as a browser based service on the Internet. The present day advancements in cloud make it easier for the customer to use these SaaS applications anywhere at any time. These applications can be used on a web browser or a program interface without having to manage the specifications of the software. These applications have limited user-specific configuration settings which abstract most of the complex background details, making it easier for the user to d Cloud Computing Models: A Survey 755 Features of SaaS1. Can manage applications on a strong network and access to licensed software at low costs. 2. Follows Multitenancy model. 3. Customer specific enhancements of the software. Advantages of SaaS are: 1. easily available software reduces the time required for the application development. 2. Increases the availability of the applications globally. 3. Data consistency and compatibility across the company/organization/enterprise. 4. These applications are scalable and flexible. 5. The updated versions of the SaaS software are looked after by the service providers. Some of the SaaS service providers are: 1. Sales force CRM from Sales force. 2. Oracle CRM from Oracle On-Demand from Oracle. 3. SAP ERP and SAP CRM by SAP Business By Design from SAP. 4. SaaS applications and services from Cloud9 Analytics. Fig: Service models and Services 756 Dr. Chinthagunta Mukundha & K. Vidyamadhuri Apart from these three service models, there are other service models of the cloud. Some of them are: 4. Communication as a Service (CaaS) This service model is responsible for managing hardware and software required for communication services such as Voice over IP (VoIP), Instant Messaging (IM), Collaboration and Video conferencing capabilities using fixed and mobile devices. This service model offers guaranteed Quality of Service (Quos), flexibility and expandability of small or medium -sized businesses which cannot afford the cost for devices or modes. This model allows the user/customer to select the types of communication services which are to be deployed by the organization for their core business processes. Network Capacity and feature sets can be changed dynamically, so that these small or medium-sized businesses can keep their pace with premium enterprises in the market. This service model needs little to no management, hence alleviates the cost for maintenance and operations overhead. It also allows the customer to pay for the required communication services easily. Forrester Research is one of the vendors which provide CaaS solutions. Some of the

communication features provided by CaaS are: 1. Chat 2. Multimedia Conferencing 3. Real-time interfacing 4. Software based telephones 5. Video Conferencing 6. Unified messaging and mobility. 5. Data as a Service (DaaS) This service model provides data on demand to the customers, without any constraint of geographical or organizational distance between the customer and the service provider.

5.   Conclusion

Cloud computing is an emerging technology which introduced itself as a service oriented technology. It is working on the principle of on demand service and scalability. It is providing services in many ways including software, platform and infrastructure and making the users free of installing and administering these services. In spite the fact that cloud computing provide high performance, high available, fault tolerant services; the issues it comes with are also very serious in nature. Of the worth mentioning are data and network security, data authenticity and audit ability, lack of user control over data and security polices and virtualization problem. In order to attract the organizations and build the confidence of customer, these issues need to be well researched and resolved.

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