A Component Based Re-engineered Architecture for Cloud Computing

Introduction

Cloud computing is an emerging computing technology that uses the TCP/IP protocol of internet and central remote servers and PC’s to maintain the data as well as an applications. It allows much more efficient computing by centralizing storage, memory, processing as well as bandwidth and uses the technology of Virtualization. The only thing the user's computer needs to be able to run is the cloud computing systems interface software, which can be as simple as a Web browser, and the cloud's network takes care of the rest (Peeyush Mathur 2010). An application is known as virtual which contains all the application along with all the components which are required with a good operating system (Sharma A et al (2010)).

Cloud providers are the means by which the clients will be getting cloud computing services based on “pay as you use policy” with full availability all the time with higher bandwidth. Here a large number of computers are grouped together and also there is full utilization of resources which are on demand, and on pay per cycle basis. The end users are unaware of the servers and they just pin p the applications they want to use and thereby start the work. The main advantage of Cloud computing is the flexibility which makes it distinguishable from grid or utility computing and SAAS (Software as a Service). This ability to launch new instance of application with minimum labor & expense allows application providers to:

- Scale up & down rapidly.
- Recover from a failure
- Bring up development or test instance
- Efficiently load test an application

In the cloud environment, attempts have been made in predicting Hadoop job performance. One such effort is a statistical modeling approach - Kernel Canonical Correlation Analysis (KCCA) (Ganapathi A et al (2009)).

Cloud computing services

Cloud computing unlike traditional computing provides the computing facility the client by means of various services that are handled by different cloud vendors or cloud providers. One cloud provider may have multiple clients as well.

Software as a Service (SaaS)

Software is presented to the end user as a service on demand usually in a browser. It saves the users from the troubles of software deployment & maintenance. The software is often shared by
multiple tenants, automatically updated from the clouds, and no additional license needs to be purchased. It is a model of software deployment wherein a provider delivers its service to the user on demand basis. Example:- Google Apps.

**Platform as a Service (PaaS)**

It delivers a computing platform & solution stack as a service. It hides all the complexity of managing the underlying hardware, provides all the facilities required to support the complete lifecycle of building & deploying the web application and services entirely from the internet. Platform as a Service (PaaS) is a way to rent hardware, operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

**Infrastructure as a Service (IAAS)**

It is also referred to as the resource cloud. Consumers control and manage the system in terms of the operating systems, applications storage and network connectivity but don’t themselves control the cloud infrastructure. IaaS delivers a platform virtualization or network equipment; clients instead buy those resources as a fully outsourced service. Amazon S3, SQL Azure are the examples of IaaS.

**Hardware as a Service**

Hardware as a Service, also known as (HaaS), provides your business with the ability to provide a complete end-to-end managed service solution, which can include anything necessary to bring a client's network into today's technology. This can include servers, desktops, notebooks, infrastructure components, licensing, and much more, all in a monthly, recurring revenue based solution, with no up-front costs. Hardware as a Service (HaaS), in a managed services context, is a procurement process similar to licensing. Generally speaking, a managed service provider (MSP) remotely monitors and administers hardware on a client's site on a subscription basis.

**Characteristics of Cloud Computing**

The various characteristics that describe the cloud computing are as follows:

**Dynamic computing infrastructure**

Cloud computing requires a dynamic computing infrastructure. The foundation for the dynamic infrastructure is a standardized, scalable, and secure physical infrastructure. There should be levels of redundancy to ensure high levels of availability, but mostly it must be easy to extend as usage growth demands it, without requiring architecture rework.
IT service-centric approach

Cloud computing is IT (or business) service-centric. This is in stark contrast to more traditional system- or server-centric models. In most cases, users of the cloud generally want to run some business service or application for a specific, timely purpose; they don’t want to get bogged down in the system and network administration of the environment.

Elasticity & Scalability

Service provider can’t anticipate how customers will use the service. Customers can use service three times a year during peak season while others in different conditions and situations. Therefore service needs to be available all the time and it implies elasticity. Scalability may also mean that an application can scale when additional users are added and when the application requirements change.

Application Programming Interface

Cloud providers need to have standardized API. These interfaces provide the instruction on how two application or data sources can communicate with each other.

Cloud Deployment Models

The various classification of cloud computing are as follows:

**Public cloud:** A public cloud is one based on the standard cloud computing model, in which a service provider makes resources, such as applications and storage, available to the general public over the Internet. Public cloud services may be free or offered on a pay-per-usage model.

**Private cloud:** Private cloud is infrastructure operated solely for a single organization, whether managed internally or by a third-party and hosted internally or externally.

**Internal cloud:** The Inter cloud is an interconnected global "cloud of clouds" and an extension of the Internet "network of networks" on which it is based.

**Hybrid cloud:** Hybrid cloud is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together, offering the benefits of multiple deployment models.