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RESEARCH ARTICLE

Cloud Computing and Faults in Cloud Computing

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Abstract

Cloud computing is an emerging concept combining many fields of computing Cloud computing will play a major role in the Internet of Services, enabling on-demand provisioning of applications, platforms, and computing infrastructures.. The foundation of cloud computing is the delivery of services, software and processing capacity over the Internet, reducing cost, increasing storage, automating systems, decoupling of service delivery from underlying technology, and providing flexibility and mobility of information. This paper include the basic concept of cloud computing with its architecture and some faults arise in cloud computing.

Keywords: Cloud Computing, Faults in cloud computing

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1. Introduction

Cloud Computing is the computing with cloud. Cloud is the Internet. In the cloud we can do many applications at the time on the connected computers in the network.

Although cloud computing has been widely adopted by the industry, still there are many faults in cloud computing [1]. Cloud provides the some basic service with the help of service models.

1.1Service models of cloud

Following are the service models of cloud computing. To share services within any one of the following service models are:

- ***Software as a service (SaaS):*** The capability provided to the consumer is to use the provider's application running on a cloud infrastructure. The applications are accessible from variant client devices through a thin client interface such as a web browser. The consumer does not manage or control the underlying cloud infrastructure [2].

  Advantages: Rapid start-up, maintenance and upgrades performed by the vendor, scalable. Risks: Minimal customization, data integration, security and privacy, no control over upgrades, exit strategy, proliferation.

  Examples: Salesforce.com, Google Apps.
- ***Platform as a service (PaaS):*** The capability provided to the consumer is to deploy on to the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. Various types of PaaS vendors offerings can be extensive and can include complete application hosting, development, testing and deployment environment as well as extensive integrated services that include scalability, maintenance and versioning.

  Advantages: Focus on high value rather than infrastructure, leverage economies of scale, provides scalable go-to-market capability.

  Risks: Exit strategy, pricing model, upgrade issues.

  Examples: force.com, Microsoft Azure, web and e-mail hosting.
- ***Infrastructure as a Service (IaaS):*** The capability provided to the consumer is to provision processing, storage, networks and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating system and application.

  Advantages: Scalable, rapid start-up, peak levelling

Risks: Pricing model, potential lock-in, security and privacy, proliferation

Examples: Amazon EC2, Rack space.

1.2 Deployment Models of Cloud

1) 1. Public Cloud

Public cloud or external cloud describes cloud computing in the traditional main stream sense, whereby resources are dynamically provisioned on a fine-grained, self-service basis over the Internet, via web applications/web services, from an off-site third-party provider who bills on a utility computing basis [3].

2) Private Cloud

Some vendors have used the terms to describe offerings that emulate cloud computing on private networks. These (typically virtualization automation) products offer the ability to host applications or virtual machines in company's own set of hosts. These provide the benefits of utility computing –shared hardware costs, the ability to recover from failure, and the ability to scale up or down depending upon demand.

3) Community cloud

Community cloud may be established where several organizations have similar requirements and seek to share infrastructure so as to realize some of the benefits of cloud computing. With the costs spread over fewer users than a public cloud (but more than a single tenant) this option is more expensive but may offer a higher level of privacy, security and/or policy compliance. Examples of community cloud include Google's "Gov Cloud".

4) Hybrid cloud

The term "Hybrid Cloud" has been used to mean either two separate clouds joined together (public, private, internal or external), or a combination of virtualized cloud server instances used together with real physical hardware. The most correct definition of the term "Hybrid Cloud" is probably the use of

physical hardware and virtualized cloud server instances together to provide a single common service [4]. By integrating multiple cloud services users may be able to ease the transition to public cloud services Another perspective on deploying a web application in the cloud is using Hybrid Web Hosting, where the hosting infrastructure is a mix between Cloud Hosting and Managed dedicated servers – this is most commonly achieved as part of a web cluster in which some of the nodes are running on real physical hardware and some are running on cloud server instances. A hybrid storage cloud uses a combination of public and private storage clouds. Hybrid storage clouds are often useful for archiving and backup functions, allowing local data to be replicated to a public cloud.

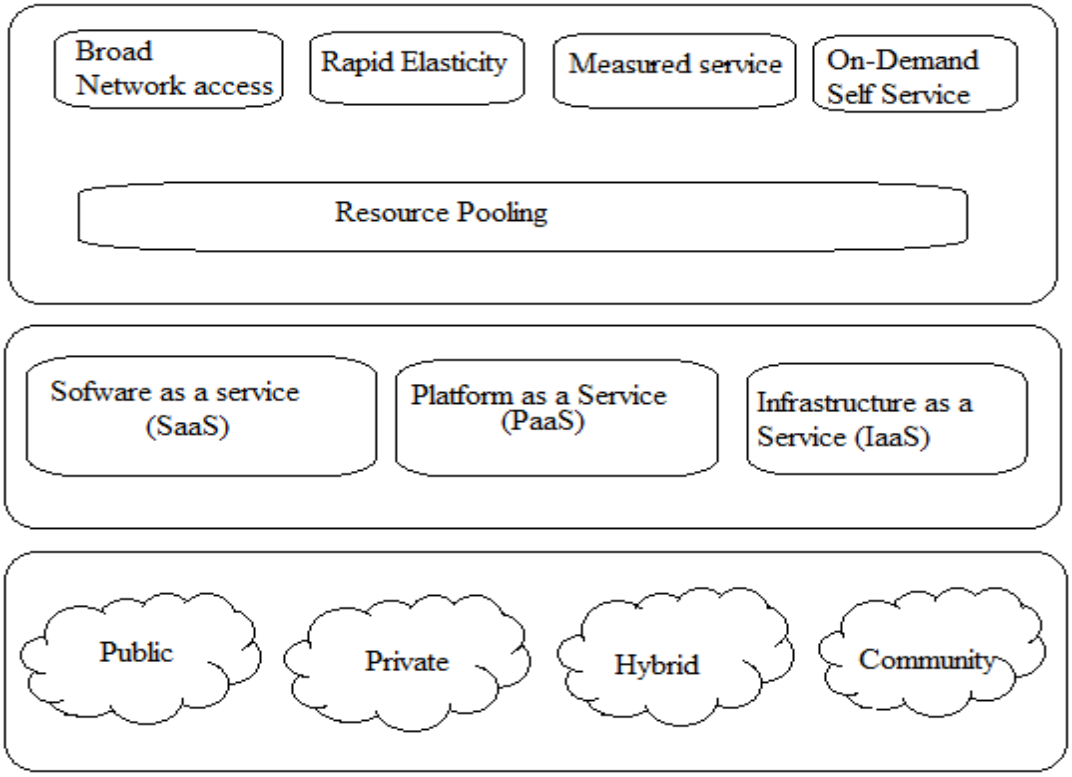

Figure 1.1. NIST Visual Model of Cloud Computing Definition

2. Architecture of cloud Computing

Cloud computing architecture refers to the components and subcomponents required for cloud computing [7]. These components typically consist of a front end platform (fat client, thin client, mobile device), back end platforms (servers,

storage), a cloud based delivery, and a network (Internet, Intranet, Intercloud). Combined, these components make up cloud computing architecture.

2.1) Front End Platform

These clients comprise servers, fat (or thick) clients, thin clients, zero clients, tablets and mobile devices. These client platforms interact with the cloud data storage via an application (middleware), via a web browser, or through a virtual session.

The zero or ultra-thin client initializes the network to gather required configuration files that then tell it where its OS binaries are stored. The entire zero client devices runs via the network. This creates a single point of failure, in that, if the network goes down, the device is rendered useless.

2.2) Back End Platform

It contain cloud server, cloud storage and cloud based delivery and network..

1) Cloud Storage

An online network storage where data is stored and accessible to multiple clients. Cloud storage is generally deployed in the following configurations: public cloud, private cloud, community cloud, or some combination of the three also known as hybrid cloud.

2) Cloud Based Delivery

It means that the service models of cloud such as Software as a service (SaaS), Platform as a service (Paas) and Infrastructure as a service (Iaas).

3. Comparing Cloud Delivery Models

Provided in this section are two tables that compare different aspects of cloud delivery model usage and implementation. Table 1 contrasts control levels and Table 2 compares typical responsibilities and usage.[8]

Cloud Delivery Model	Typical Level of Control Granted to Cloud Consumer	Typical Functionality Made Available to Cloud Consumer
SaaS	usage and usage-related configuration	access to front-end user interface
PaaS	limited administrative	moderate level of administrative control over IT resources relevant to cloud consumer's usage of platform
IaaS	full administrative	full access to virtualized infrastructure-related IT resources and, possibly, to underlying physical IT resources

Table 1 - A comparison of typical cloud delivery model control levels.

Cloud Delivery Model	Common Cloud Consumer Activities	Common Cloud Provider Activities
SaaS	uses and configures cloud service	implements, manages, and maintains cloud service monitors usage by cloud consumers
PaaS	develops, tests, deploys, and manages cloud services and cloud-based solutions	pre-configures platform and provisions underlying infrastructure, middleware, and other needed IT resources, as necessary monitors usage by cloud consumers
IaaS	sets up and configures bare infrastructure, installs, manages, and monitors any needed software	provisions and manages the physical processing, storage, networking, and hosting required monitors usage by cloud consumers

Table 2 - Typical activities carried out by cloud consumers and cloud providers in relation to the cloud delivery models.

4. Faults in Cloud Computing

In cloud computing processing is done on remote computer hence there are more chances of errors. In order to minimize failure impact on the system and application execution, failures should be anticipated and proactively handled. Fault tolerance techniques are used to predict these failures and take an appropriate action before failures actually occur. There are various faults which can occur in cloud computing [1] .

1) Memory Threshold

This is the fault in which some memory and threshold value is given by the cloud server to the client. If the client is accessing the files beyond this limit then it consider as a fault.

2) Credential fault

In this fault unauthorized attacker tries to accessing the files from the cloud by modifying the existing files.

Based on fault tolerance policies various fault tolerance techniques can be used that can either be task level or workflow level

Conclusion

Cloud computing is the computing with cloud means it is a distributed computing in the network where applications and programs run on the many connected computers at the same time.

The cloud also focuses on maximizing the effectiveness of the shared resources. Cloud resources are usually not only shared by multiple users but are also dynamically reallocated per demand

This paper contain the overview of cloud computing and faults occur in the cloud.

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