

Availability Oriented Data Allocation Strategies In Cloud Computing

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Abstract— Cloud computing is a revolutionary model that offers storage, servers and networks as a service. It enables users to outsource their data and trust the service provider that provides them with all the services and storage. The services provided are infrastructure-as-service (IaaS), Platform-as-service (PaaS), Software-as-service (SaaS). However, we are doing in a service-limited environment where users compete for services to complete their tasks. At times, availability of services decreases to an extent that users are not able to complete their tasks for long times which at last turns into task failures. In this study, we will present a scenario for increasing the availability of services in cloud. We will mainly focus on classification of data with ensured security and making them available to the nearest data centers. This study aims on increasing the availability of services in cloud according to the classification and replication strategies that have been defined.

Keywords—PaaS, SaaS, IaaS, data allocation, data replication, cloud computing

I. INTRODUCTION

Cloud Computing

Cloud computing is a new paradigm that combines concepts and technologies and creates a platform for cost-effective business applications and IT infrastructure. The adoption of Cloud computing has been increasing steadily for some past few years in the technology market. By adopting cloud computing, IT (information technology) industries got benefited as cloud provides with less maintenance costs and infrastructure costs. Cloud computing, thus, may be defined as a multitenant environment that provides you with the resources and services abstracted from the underlying infrastructure. Services and resources are provided “on demand” and “at scale” in cloud environment. These terms used in definition could be elaborated further as :

Multi Tenant Environment: it's a type of environment that provides consumers with the resources from single implementation that saves the provider's costs.

On Demand: It means that resources can be provided when required, released when they are not required and estimated when only used

At Scale: services provides with the infinite resources so that they are able to meet all the requirements they have demanded.

In simple words, cloud computing is the provision of computing resources through a reliable network. Enterprises have been trying to reduce the costs of computing and for that particular reason IT (information technology) started consolidating their IT operations and later on adapting virtualization technologies. In order to reduce more there is a better technology and it is Cloud computing. Cloud computing claims to take enterprises at new level and will provide them with more reduced costs through improved utilization, reduced administration, and faster deployment cycles.

A. Architectural Considerations

In architectural considerations, we define the infrastructural models that are requiring evaluating the cloud computing architectures. There are several types of cloud deployment models that are differentiated on the basis of infrastructure's provider and physical location. As these models are deployed on cloud they are mostly called deployment models. They are four types of deployment models:

- *Public cloud* – The resources of public cloud are made available to the general public by the provider itself. Public clouds are those which are mostly stand-alone clouds and are present off premises and run by third party companies or organizations. Providers they try to make their infrastructure as such so that they are able to provide cloud resources at a scale to support general public. Public cloud uses third party companies and their example is Amazon, Microsoft and Google.
- *Private cloud* – private cloud computing resources are only available to finite group of consumers, typically it may be an organization. The cloud infrastructure runs in the organization's physical data center or it may be third party co-location. Private clouds are designed and managed by an IT department within an organization. It is built specifically to provide services internally to an organization. Private clouds may be in an existing data center. This model gives a high level of control over the cloud services and the cloud infrastructure.
- *Hybrid* – Hybrid cloud may be defined as that cloud which comprise of both private and public cloud. For carrying out day to day operations it may consider as private cloud and we need to scale out it may be considered as the public cloud. Hybrid itself means it's a combination of two and here it combines public and

private. As in private cloud the number of client accessing the service will be less so it will be able to carry out the operations on daily basis. Thus, combines the property of both public and private and forms a hybrid cloud.

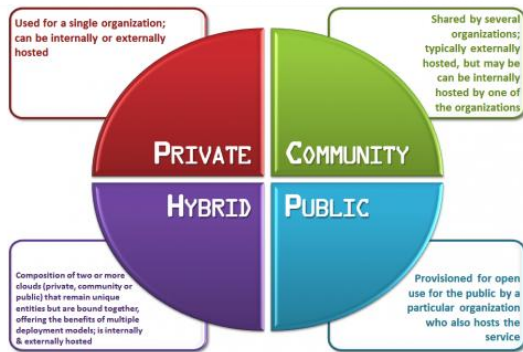


Figure 1. Types of clouds

B. Cloud Service Layers Or Models

Cloud service layers or models are of three types and each one is defined on the basis of services they provide to the users. Cloud service models are mainly divided into three types such as:

- **Infrastructure as service (IaaS)** - IaaS delivers hardware resources such as CPU, disk space or network components as a service. These resources are usually delivered as a virtualization platform by the cloud provider and can be accessed across the internet by the client. The client has control of the virtualized platform and is not responsible for managing the underlying infrastructure. IaaS is where compute, network and storage are delivered over the network on a pay-as-you-go basis. Servers, storage systems, networking equipment, data center space are pooled and made available so that handle workloads. The customer would deploy his own software on the infrastructure layer without the need of the server's. In IaaS we only need to pay when we are using the services and thus help in saving the infrastructure cost. For example Amazon (Amazon web services).
- **Platform as service (PaaS)**: PaaS comprises of those run time environments and software development frameworks over the network. Platform as service may be provided to the customer in the form of API. It's a layer of software platform and development environment which is encapsulated and then it is offered as service to the customers. The layer provides the storage of various applications which run on the infrastructure which is provided by the provider. PaaS providers offer a predefined combination of operating system OS and servers in order to manage requirements of the applications, such as LAMP (Linux, apache, MySql, PHP). In PaaS cloud providers offer an application platform as a service, for example Google App Engine, Amazon web services, force.com

- **Software as service (SaaS)** : It provides a complete application which consists of various software's and offered to the customer over internet. A single instance of the service runs on the cloud. On the other side, customer need not invest in software licenses as there is only single application that is to be managed and maintained. SaaS is delivered over the network on the basis of subscription and demand. Google and Microsoft are the providers of software as service in cloud computing.

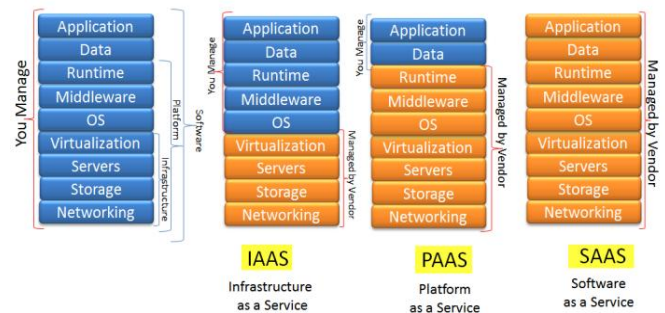


Figure 2 Types of services

C. BENEFITS OF CLOUD COMPUTING

Cloud computing changes the way that IT services are delivered to organizations. Instead of both owning and managing IT services for themselves, or using an outsourcing approach built around dedicated hardware, software, and support services, organization can use cloud computing to meet their IT requirements using a flexible, on demand and rapidly scalable model.

Some of the benefits of cloud computing are :-

- **Reduced cost** – the reduction takes place when we need not built the entire infrastructure that is required and is adopted from the parameters of cloud. In that particular case where we are not spending on the infrastructure and just simply adopting it. That can save many operational costs.
- **Flexibility** -Flexibility benefits can be deprived from rapid provisioning of new capacity, relocation or migration of workloads. In public settings, they provide cloud computing with all the timeline agilities.
- **Automation** - Cloud computing is based on the paradigm that services can be provisioned in much improved automated fashion. This attribute provides with significant efficiencies.
- **Sustainability** – The data centers which exist they provide with poor energy and efficiency due to their poor designs and utilization of their assets which is not endured in today's environment. In this case, cloud computing is far better than the traditional IT data centers.
- **Competency** – The benefits of cloud computing could only be achieved when government agencies are totally focus on its core objectives and missions. The objectives

and missions mainly comprises of the services provided to the citizens.

II. RELATED WORK

[5] Proposed the challenges that are faced by the service models in cloud. The three pre dominant models that are present in the cloud computing are mainly infrastructure as service, platform as service and software as service. Infrastructure as service provides with the use of servers, storage and virtualization to enable utility like services for user. Security becomes the major challenge in the infrastructure as service as rest of the top cloud services run on the top of this service layers. In software as service and platform as service the major challenge that arises is that at times it becomes critical to understand the cloud service models which determine the cloud services hosting are an appropriate business solution. This paper gives clear indication that services should be available at anytime and anywhere so that availability of services do not decrease [2] proposed an overview which presents the scenario of utilization of resources. They have provided the comparative study in their paper which gives us the overview of how the resources can be utilized and also provide with the set of criteria so that we can assess the performance of the proposed models in context to cloud computing. This paper gives us information regarding current scheduling algorithms and on that basis a comparative analysis of researches related to data allocation mechanisms. Cloud providers need to use efficient strategies to optimize data and resource allocation and achieve some specific goals which can be minimizing execution time

III. SCOPE OF STUDY

Cloud computing is a new model that has changed the entire IT Industries by providing them services whenever the clients require them. Cloud computing defines the use of new hardware and virtualization technologies to form shared infrastructure that will enable the services. In cloud computing, there are present three basic service models that provide you with the services. The three service models are Infrastructure as service, software as service, platform as service; these three models provide you with the specific services. The services are not available at times to the users at the time they require and due to that availability becomes an issue and the other issue accounts is the security. At times it becomes difficult to understand which service model should be used so that it solves the business solution and is quite appropriate which will provide the most utilization of services and reduced hardware. At present there seems to be lot of momentum behind the adoption of cloud computing despite there are many challenges to overcome. This provides us with the clear indication that the society wants data to be available whenever and from anywhere.

IV. PROBLEM FOUNDATION

The services provided by a cloud are infrastructure as cloud, platform as service, and software as service. The services provided are not always available to the users depending upon their allocation. Availability of services at times

becomes difficult because users are using them extensively and at times they are not even classified accordingly so that the user could properly specify what type of service they require. Depending upon the allocation there are chances that the particular service may not be available to the nearest location they want. The services are not properly allocated to the nearest data centers. The data is to be classified so that it is allocated to the data centers. The data is classified and according to the classification we provide with the encryption levels. The data is classified on the basis of how frequently it is used and how important the data is.

The encryption levels decide where to allocate the data. If the data is classified as important then it will be allocated to the private cloud and will be accessible to those who have been provided the access which is well defined in the definition of private cloud. The data which is rest defined may be allocated according to their classification

V. OBJECTIVES

- The main objective on working on this is to increase the availability of the services so that users are provided with the services whenever they require. The services are made available to them according to the data that they have classified.
- The datacenters are allocated with that data that they are demanded for the most and the same data is being replicated to the other clouds so that whenever they require the data they have been provided with it by allocating the data from the nearest data centers.
- The available data will be encrypted with the encryption levels according to the data that has been classified. The encryption level will provide you with the access to the data.

VI. CONCLUSION

Cloud computing is a revolutionary model that offers storage, servers and networks as a service. It enables users to outsource their data and trust the service provider that provides them with all the services and storage. The services provided are infrastructure-as-service (IaaS), Platform-as-service (PaaS), Software-as-service (SaaS). However, we are doing in a service-limited environment where users compete for services to complete their tasks. At times, availability of services decreases to an extent that users are not able to complete their tasks for long times which at last turns into task failures. In this study, we will present a scenario for increasing the availability of services in cloud. We will mainly focus on classification of data with ensured security and making them available to the nearest data centers. This study aims on increasing the availability of services in cloud according to the classification and replication strategies that have been defined.

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