A Study on Resource Oriented Cloud Computing

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Abstract— **Cloud computing is one of the important area in computer science. In cloud computing everything is provided as a service from vender to client, although we can say that cloud technology is an evolution in the way we access computing resources over internet with extreme powerful, usable and functional manner. Resources are important in every computing technology, so do in cloud computing. Resources are generally used to design architectures for computing technology and this architectural model are further implemented in society. This Paper is a brief discussion on a model based on resources, a resource oriented cloud model. The proposed model described in paper can help understand cloud technology; this model is also helpful in scaling cloud technology and making resources available with more reliability which ultimately results in increasing cloud performance.**

Keywords— Cloud **Services; Cloud Shared resources; Resource utilisation; architecture and availability.**

I. INTRODUCTION

Cloud computing architecture is made up of resources; these resources are shared resources although we can say that cloud is a pool of flexible shared resources which can be dynamically reconfiguring as per the users demand on real time. Cloud provides rapid delivery of computing resources as service. Cloud Structure is made up of resources like cloud servers which handle process and storage and client that ask for services. Information Technology is implementing in various organization day by day. Instead of paying high for IT hardware and software, it is now possible to rent (on demand) required infrastructure at cheap rates. Clouds are made up of computing resources in the form of services to client and can be access remotely [1]. The computing resources are available in flexible format and access by the client on demand.

These computing resources can be physical resources or virtual resources. The overall objective of cloud computing is to provide this resources to client in the form of cloud services. Some of the services offered by cloud computing is Software as a Service (SaaS), Hardware as a Service (HaaS), Infrastructure as a Service (IaaS), Application as a Service (AaaS), Desktop as a Service (DaaS), Backup as a Service (BaaS), Network as Service (NaaS). The services are provided according to the user requirements and users demand. Thus cloud computing provides computing resources to deploy and scale out quickly using some dynamic resource allocation.

II. HOW CLOUD COMPUTING WORKS

Cloud computing architecture is broadly divided in two parts one that runs on the server side and second that runs on the client end. The server controls the major task like resources allocation, data storage, and providing various services while in the other hand client computer ask for services offered by server and service provider.

The technology works totally in different manner, instead of booting up the hard disk and loading the operating system the client computer gets a log in windows to access the remote resources. Once you log in the operating system get started. This operating system is hosted by the remote servers. Cloud computing helps the user to easily upgrade his services, it not only support the software up gradation but also helps in hardware too. Cloud use large data centres and powerful server to provide the necessary interface [2].

Shared resources in cloud are of three types' computer, network and storage. They can be software computer resources or hardware computer resources similarly network software and network hardware and storage resources.
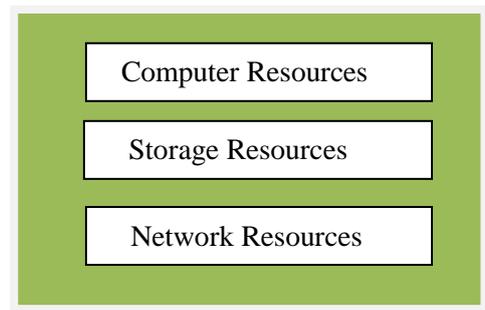

Fig. 1 Shared Resources in cloud

A question may arrive that what exactly resources are? The answer to the question is simple resources is a source to supply the required computing need for example server, client data centers etc are hardware resources, while software running at server and client end , applications and information are the software resources to build a cloud.

Utilizing these resources as basic building block cloud architecture is constructed and implemented. These resources can be provided as services accordingly as per the client requirement. The cloud computing works effectively due to its high scalable model, thus scaling mechanism can be increased by introducing a new cloud model which deals with resources not just with the services provided by cloud. Until now cloud is only consider as a services oriented model but this paper has found an area of cloud resources oriented model.
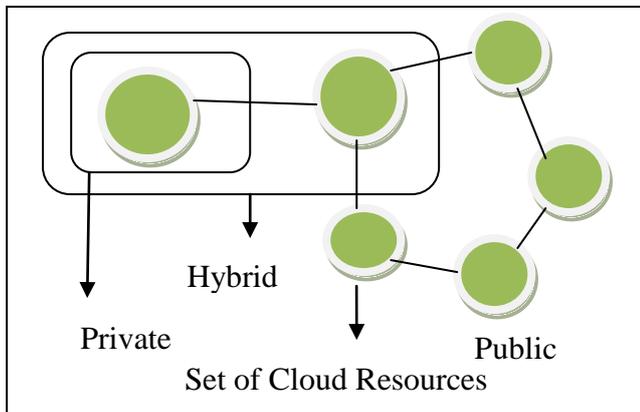
III. SHARED RESOURCES ARCHITECTURE

Fig. 2 Shared Resources Architecture

Cloud in cloud computing are categorized in three types they are public cloud, private cloud and hybrid cloud. Public cloud provides services like application, storage and also makes resources available to general public through the internet. Private clouds are special infrastructure dedicated to a single organization for services, resources and data storage. On the other hand Hybrid clouds are combination of one or more public and private cloud. Thus the resources, services and data storage can be shared within organization through internet with some privacy constraint in hybrid cloud.

The figure above explains the basic structure of different clouds. Cloud architecture provides standardization in using the computation resources, although the model is bifurcated according to the user demands but then also its functionality doesn't change [3],[4]. Some of the extreme benefits of using cloud model are as stated below:

- Virtualization: Virtualization is a process of creating virtual version of something such as an operating system, servers, a storage device, network resources etc. Virtualization in cloud computing is implemented on two different level first is the hardware level that is the lower physical level in this level it allow abstraction and isolation of lower level physical components which helps decrease IT hardware cost for small and large organization. The second implementation of virtualization occurs at the software layer. In software virtualization operating system and application software is slice up for acting as multiple systems. Cloud architecture adopts the virtualization nature in which resources get virtualized. The benefit

of adopting virtualization technology lead to decrease power and money, it also reduces hardware cost.

- Large Scale Management: Due to the dynamic nature of cloud computing, with its high end application structure it is well versed to manage large scale resources. Resources get automatically allotted and manipulated; it is also possible to scale down shared resources.

- Pay per Use: Cloud model is constructed on the basis of pay per use model. In such model the customer pay according to use. The customer has the rights to add or subtract a service as per his requirement.

- Scalable and High storage: Cloud computing provides an environment which is high scalable in terms of resources. Storage is yet another important issue which is under taken by every computing environment , as cloud are connected to data center they can provide high storage as per the users requirement.

- Everything as service: Cloud Computing provides almost every this as service, for example software as service, platform as a service, infrastructure as a service and lot more, if resources are provided as services than this completely helps in fulfilling users requirement.

IV. RESOURCES IN CLOUD

Cloud in cloud computing are made up of shared resources, this shared resources are none other than the same computing resources we use for computing, but with a slight change that the shared resources can be located at remote location and accessed using an internet connection . The resources can be software resources or hardware resources doesn't make any difference but in cloud they both act as services which is being access by the client computers.

V. RESOURCE ISOLATION

Resources are little bit complicate to manage and isolate in any network, cloud computing creates a set of virtual and physical resources. These set of resources in cloud are managed by cloud resources management software's and allotted accordingly using cloud resources allocation applications

The term resource isolation is about cutting down the network resource for better availability. Isolation in cloud can be implemented for better sharing of the network resources. Isolation is important for virtual system in network. [4]The virtual systems are difficult to manage and isolate, as they are not physically on the same system.

The figure below shows a data center with virtual severs, this server can be data server, application server etc which can be provided to client as service in clouds architecture, but for better performance and adaptability they need to be isolate in proper manner. Isolation also works for providing security to the system, using isolation one can define when the device has to plug in for service and one can pull of the machine for deactivating the service.

The isolation of virtual devices and network device make easer to identify these devices, as cloud is a set of large computing resources. It is fact that directly or indirectly network resources access cloud, although it is important to bifurcate and isolate such network resources in terms of cloud, the isolating reduce network traffic and increase the functionality of accessing this virtual and physical resources.
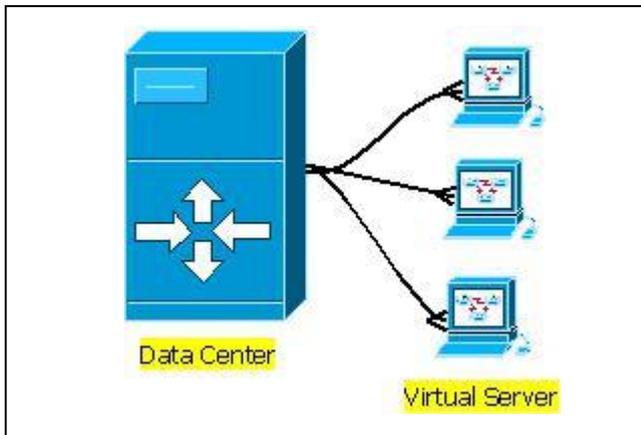

Fig. 3 Data Center and Virtual Server

VI. RESOURCES ORIENTED COMPUTING

Resource oriented computing purely deals with the resources in the computer network; a resource may be a piece of application, virtual servers etc [5], [6].

o Shared Resources as piece of information

In resources oriented computing model, a piece of information can be used as resources which can remotely access in the network. Databases are used to store this piece of information and on the other hand large database are stored in server computer. The computing of these resources can be done by taking cloud model as resources oriented model rather than by considering just as service oriented.

o Shared Resources as Devices

By an in-depth search on the different architecture of clouds model , like public private and hybrid cloud , all of them are full of resources , this resources are utilized in the network so cloud computing is not just about providing this resources as an service but and architecture created by some sort of resources . If these resources are divided into packages, than they might affect the performance of the cloud model. Cloud model get more efficient also if treated in terms of resources, so the concept of resources orientation matters up here. This are the following terms that make cloud resource model more important,

a. Performance is depending on cloud resources.
b. Scalability depends on cloud resources.
c. The usability of model depends on the resources structure, location, distance and type.
d. The drawback like latency and data drop can be rectified by managing the resources.

e. The resources oriented model can be standardize according to the clients demand.
f. The model helps high avaibility to the resources which helps performance enhancement.
g. The model help understand different cloud.

VII. RESOURCES AVAIBILITY

It is important to understand the resources avaibility in resources oriented cloud model [7]. The avaibility of the system is evaluated by comparing the information of resources scaling and the ratio of number of component available on demand asked by client. If shared resources are available in high scale. The most basic formula for availability can be expressed as follow:

$$A = MW\text{-}W$$

Were A= Availability
MW = Maximum Work
W = Work

The explanation of formula is simple, this formula is for calculating availability of the resources, suppose if we want to calculate availability, then it can be calculated by subtracting the work done by the resources with Maximum work done by a resources.

And to calculate Work done we can use the following formula:

$$Wd = Uptime \text{ - } Downtime$$

Wd is work done by the system which can be calculated by subtracting resources downtime with resources uptime

Finding work done helps improve the cloud availability,

Calculating and finding availability of the resources in cloud is for better performance which increasing the cloud reliability.

VIII. RESOURCES MANAGEMENT

Different techniques and algorithm are used for cloud resource management. The physical resources in cloud are managed by the data centre administrative [8]. The virtual resources are managed using some set of automated program and application which monitor the resources and its allocation in the network. Better resources management will lead to maximize the usability of cloud resources.

Managing the resources is to finding the ratio of using these resources, these resources can be basic computing resources as describe in the paper about network resources, storage resources and the computer resources.   Cloud computing provides an interface through which this computing resources can work in more appropriate manner, the cloud model not only helps in making resources flexible and dynamic but also helps in making computer resource more usable . Cloud computing uses some dynamic mechanism for resources allocation this mechanism helps in increasing the resource more usable.

The resources are isolated according to the type which helps in using the computer resource more and more usable, the usability of resources multiple time result in multiplying the maximum throughput. Terms like resources pooling are introduce in resources management, pooling is used for

grouping together of resources for maximizing utilization, better resources management and decreasing the risk factor.

IX. CONCLUSIONS

Cloud computing technology is a step ahead in handling computing resources. This technology provides a better, much more reliable platform for handling computing resources. This paper has discussed about resource oriented cloud model or after a brief discussion we can say a model of reliability. The paper also describes the ability of cloud computing to scale and utilize the shared resources remotely. Cloud computing provides a platform independent of infrastructure with much more flexible model and shared Resources are managed by its dynamic resource allocation system. Thus considering the cloud model in terms of resources orientation may help and organized the cloud system more simple and decrease its complicity.

ACKNOWLEDGMENT

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