



A Survey on Cloud Computing

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Abstract: Cloud computing is technology which hosts computing services in centralized places called datacenters and provides access to them through Internet. Cloud computing is very usable, like we have cable tv on which channel request can be made on demand. Data amount on cloud is instantly extendable to any volume, and charged according to use, with the service provider managing every aspect of the service except the device used to access it. In this paper we are explaining what is cloud computing, its functional and technical characteristics, need of cloud computing and its services.

Keywords: Cloud computing, cloud framework, functional and technical characteristics of cloud, cloud services, cloud deployment models.

I. Introduction

The cloud computing is a large group of computers interconnected to each other and cloud symbol represents a group of systems or complicated networks. In cloud computing we can communicate among the various systems in the network with the help of internet.

It is a computing paradigm, in which a large number of systems are connected in private or public networks, which generates dynamically expandable framework for data, application and file storage. By using this technology, the cost of application hosting, computation, delivery and content storage has reduced [8].

It is a marketing term used for technologies which provide computation, data access, software, and storage services which do not require physical location's knowledge of end-user and system's configuration to deliver the services [7].

Clouds can be of two types:

External clouds: These clouds are those computing services which are hosted by providers in very large datacenters that are offered to the general public [10].

Internal clouds: These are clouds which are for limited number of people. It is a proprietary cloud that provides internal computing services on demand through the Internet, but which may require networks, servers, and other infrastructure to host and provide the services [10].

II. Related Work

In [1] Pooja et. al. Cloud computing is a latest new computing paradigm which provide applications, data and IT services and provide then over the Internet. Different types of resources are provided by cloud computing which are in virtualized form. These resources can be utilised dynamically. There are different number of issues which can be researched out for the proper allocation and better utilization of the virtualized resources using scheduling. In the process of scheduling some intensive data or computing an intensive application, processing time and optimizing the transferring is crucial to an application program. Key role in cloud computing systems is the Task management. Task scheduling problems should be solved on first basis because these can relate to the efficiency of the whole cloud computing facilities. The main aim of this work is to study various problems, issues and types of task scheduling algorithms for cloud computing.

In [2] Citrex et al. This paper defines the technical characteristics, trends and value propositions of cloud computing. It demonstrates how Citrix enables enterprises and service providers to capitalize on cloud computing benefits. Specific strengths and capabilities of NetScaler include the ability to:

- Support any combination of public, private, and hybrid cloud computing configurations
- Support multi-tenant environments
- Consolidate, virtualized, migrate, dynamically scale, and otherwise manage and secure essential application delivery services
- Beneficial to organization because of high availability and disaster recovery features

In [3] Shachee Parikh et al. Cloud computing is the fastest new paradigm for delivering on demand services over internet. There are many tasks in the cloud computing that needs to be executed by the available resources to minimize response time, high performance, and increased utilization of resources and reduce task completion time etc.

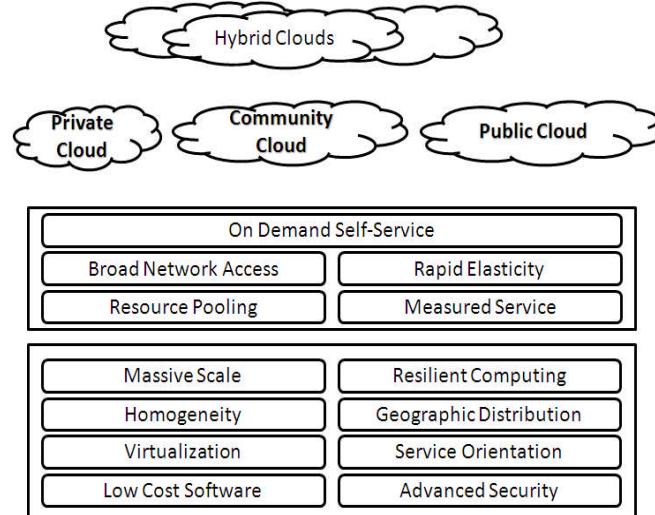
Scheduling theory for cloud computing is gaining a lot of attention with increasing popularity in this era of cloud computing. Service providers want to ensure that resources are utilized to their fullest and best capacity so that resource power is not left unused. Author proposed a priority based scheduling algorithm to addresses these

major challenges of scheduling of task in cloud computing. They grouped the incoming tasks on the basis of data and requested resources by the process and according to prioritization demanded by process. Task selection was done on the basis of a priority formula. This algorithm was compared with sequential scheduling it gives better results in terms of task completion time.

III. Cloud Framework

Cloud computing deployment model is the one that enables the consumers to choose the applications, platforms and other services for their requirement and for provisioning smooth flow of business interactions [5]. According to the above mentioned business scenarios cloud service providers provide the cloud in following deployment models as in Figure 1.

Figure 1: Cloud Framework [9]



IV. CLOUD DEPLOYMENT MODELS

Cloud Computing technology and services can be implemented in different ways according to their characteristics and purpose. Its different types of Cloud deployment can be categorized in four ways as follows.

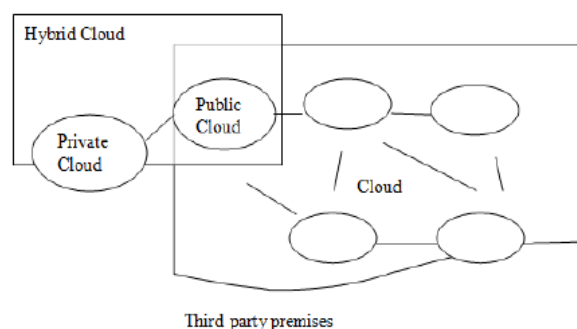
1. Public Cloud: In a public cloud, cloud service provider make a cloud which is based on standard model of cloud computing. In this type of cloud service provider generate resources like storage and applications which are available to general public[6]. This type of clouds service provider may provide services for free of cost or can charge on pay-per-use system.

2. Community cloud: Community cloud shares infrastructure between several organizations from a specific community with common concerns (security, compliance etc.). This type of cloud can be managed by internal means or by a third-party. It can be hosted externally or internally. The charges of cloud are divided among a few numbers of users than a public cloud. And Hence, only a little of the uses of cloud computing are realized [6].

3. Hybrid cloud: Hybrid cloud is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together, so that benefits of multiple deployment models can retain. It may also be called as multiple cloud systems that are connected in a way that allows programs and data to be moved easily from one deployment system to another [6].

4. Private cloud: Private cloud is infrastructure operated solely for a single group, whether that group is managed by internal means or by an extra party and hosted internally or by external means [6]. A cloud deployment model is shown in Figure 2.

Figure 2: Cloud deployment models [4]



V. Cloud Computing Functional and Technical Characteristics

Functional and technical characteristics of cloud computing are as follow.

- 1) **Agility** refers to the ability to adapt according to change [11]. This can be achieved through:
 - Virtualized resources, where the hard-coded links between hardware and software are eliminated, allowing the elements to be used in a highly efficient manner
 - Dynamic scalability, where the amount of service can be adjusted upward or downward on demand
- 2) **Applicability** means being able to serve the widest possible use cases [11]. This is delivered by:
 - Multi-tenancy, where one physical infrastructure can effectively be used to support multiple constituents
 - Wide accessibility, providing services to all devices and connections
 - Broad technology support, particularly for web services and Web 2.0
- 3) **Responsiveness** is concerned with the business and user experience [11]. It is achieved through:
 - Resilience, where services are always on
 - Performance, having less response time.
- 4) **Manageability** means the ability to have visibility and control over services and usage [11]. This is enabled by:
 - Programmatic management which leads to facilitate integration and automation
 - Rich web management capabilities which elongates all life cycle management functions
 - Self-service provisioning

VI. Why Cloud Computing Matters?

Public cloud computing offers highly scalable businesses, highly responsive web computing services without having to build the underlying infrastructure. Organizations which have to invest less capital amount and wants quicker time to value, they have to pay only for what they use, and can adapt according to change and investment protection since they can change directions without being tied to hardware and software investment costs.

The economy of scale achieved by sharing investments across multiple tenants brings additional benefits. Also, how that sharing is accomplished helps a lot to organizations. The ability to scale up quickly through virtualization technology helps to maximize the infrastructure utilization, and also it reduces unit costs, as well as cost charged by customer will also reduce. Cloud computing also provides advanced features and capabilities that to on affordable charges. Cloud computing puts provides high security, high availability and superior performance that to in minimum cost.

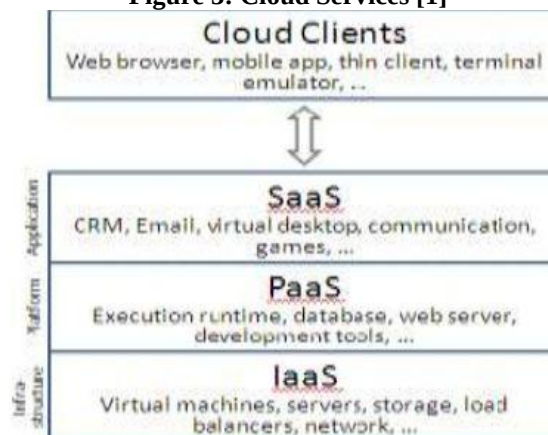
Private or internal cloud computing provides the same benefits as those listed above for public clouds, although it requires investment to build the underlying infrastructure.

VII. CLOUD SERVICES

Cloud computing can be thought as different layers or models which provide different services. Cloud contains three types of services as follows.

1. Infrastructure-as-a-Service (IaaS)- This type of cloud computing distributes a full computer infrastructure via the Internet. Most popular example of IaaS provider is Amazon Web Services which offers virtual server instances with unique IP addresses and block of storage on demand. In IaaS customers usually use the service provider's application program to start, access, and stop, modify and configure virtual servers and storage per requirement. Cloud computing provides services to organization to pay only as much as service they are using. It helps to bring flexible tools online as soon as required. [3]

Figure 3: Cloud Services [1]



2. Platform-as-a-Service(PaaS)- This type of cloud computing offers a product development tool or environment that users can access and have recourse to online, even in association with others and hosted on the provider's infrastructure. In PaaS, developers can use cloud's platform to create applications over the Internet.

PaaS service providers may use Application Program Interfaces (APIs), gateway software or website portals installed on the customer's premises. [3]

3. Software-as-a-Service (SaaS) - This type of cloud computing model offers users the hardware infrastructure, the software product and interrelates with the users through a front-end gateway or portal. Here a provider authorizes an application to clients either as a service on demand in a "pay-as-you-go" model or at no charge by a subscription. It is just like we have a sky drive in Hotmail. There we can save our word, PowerPoint document and when we need to edit them we can easily do it. [4]

VIII. Challenges Shaping the Course Of Cloud Computing

Although cloud computing holds a tremendous amount of promise, it does present challenges, including:

- Data security of data which is present on cloud.
- Fulfills the need of IT-organizations using cloud computing.
- The lack of mature tools for managing such elements, as well as hybrid configurations
- To efficiently migrate enterprise's data to the cloud server.
- A lack of interoperability and consistency between different cloud providers and services which could create a lock-in scenario, or complicate integration
- Reliability of cloud services especially given the relative immaturity of the market segment and many of its participants

These issues impact when and how organizations take advantage of cloud computing. The majority are pragmatically taking an evolutionary approach characterized by making their own cloud by using cloud computing principles augmented with tactical use of public cloud options to address a well defined subset of their computing requirements. When it comes to cloud computing, each organization is on its own path and timeline.

IX. Conclusion

In this paper, we have studied about cloud computing and its functional and technical characteristics like agility, applicability, responsiveness and manageability. Cloud computing is very useful for organizations which can't have high capital cost but want infrastructure storage or application immediately. In future, work can be done on some applications of cloud computing and more aspects of cloud computing can be explored.

References

- [1] P. Pooja, S. N. Sanghani. Literature Review: Various Priority Based Task Scheduling Algorithms in Cloud Computing, vol. 02, 2012.
- [2] "Cloud computing resources". <http://www.citrix.com/NetScaler/WhitePaper>.
- [3] P. Shachee, S. Richa, Double Level Priority based Optimization Algorithm for Task Scheduling in Cloud Computing, International Journal of Computer Applications, Vol 62 no.20, January 2013, pp-0975 – 8887.
- [4] Pinal Salot "A Survey Of Various Scheduling Algorithm In Cloud Computing Environment" IJRET | Feb 2013, Available @ <http://www.ijret.org/>.
- [5] C. Zenon, Venkatesh Mahadevan, Shahrzad Aslanzadeh and Christopher Mcdermid "Availability and Load Balancing in Cloud Computing" 2011 International Conference on Computer and Software Modeling IPCSIT vol.14 .2011
- [6] D. Kushal, A Smart Job Scheduling System for Cloud Computing Service Providers and Users: Modeling and Simulation, 1st Int'l Conf. on Recent Advances in Information Technology 2012.
- [7] S. Subramanian, K. Nitish, K. Kiran, et.al, AN Adaptive Algorithm For Dynamic Priority Based Virtual Machine Scheduling In Cloud, IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 6, No 2, 2012.
- [8] N. Ramkuma, S. Nivethitha, Efficient Resource Utilization Algorithm (ERUA) for Service Request Scheduling in Cloud, Ramkumar N et al. / International Journal of Engineering and Technology, Vol 5 No 2, 2013.
- [9] I. Ashutosh, C. Sumit and P. Utkarsh, An optimized algorithm for task scheduling based on activity based costing in cloud computing (NCICT) 2011, Proceedings published in International Journal of Computer Applications, 2011.
- [10] C. Monika, K. Sateesh, A Dynamic Optimization Algorithm for Task Scheduling in Cloud Environment, Vol. 2, Issue 3, 2012, pp. 64-2568.
- [11] S. Singh and K. Kant, Greedy grid scheduling algorithm in dynamic job submission environment, *International Conference on Emerging Trends in Electrical and Computer Technology (ICETECT)*, 2011, pp. 933-936.