A Study of novel technology computing services

Ramkumar Laksminarayanan
Sur College of Applied Sciences,
Sur, Oman
rajaramcomputers@gmail.com

Brijesh Jajal
Higher College of Technology
Muscat, Oman
jajalbr@yahoo.com

Binod kumar
Higher College of Technology
Muscat, Oman
binodkr75@gmail.com

Abstract—*This paper comprises of the methodologies used for computing, viz. Cloud computing distributed computing and Big data. A framework suggested in the paper aids the entrepreneurs using large volume of data to decide upon the strategy of implementation of the computing model.*

Keywords-cloud computing; distributed computing; big data; modern computing

I. INTRODUCTION

Several organizations have already implemented the cloud amidst many challenges to be faced in the same, since it is a paradigm in the infancy stage, though virtually presumed to be implemented in 1950s [1].

Distributed Computing which has given an opportunity to connect different cross platform servers available in different locations without the loss of performance and user experience. It does not have a clear distinction with the concurrent computing or parallel computing [2]. Distributed Computing is comprised of multiple computers on a network with a common functional goal. The concurrent processes performed on the processor of the distributed computing are able to perform as parallel as well as distributed [3].

Cloud Computing provides the opportunity to serve the distributed computing as a Service [4], the cost of infrastructure, platform and software are huge and the organization has to ensure for the optimal utilization of the resources, The best solution to this is infrastructure, platform and software requirement for distributed computing can be provided as a service. Henceforth, the process of providing the distributing computing as a service successfully provides the end user to avail the requirement of infrastructure, platform and software.

In both cloud computing and the distributed computing, the nature of the data storage and structure has changed a lot, due to the development of web technology and social networking sites. The form of data is formatted text, unformatted text, images and videos. When the scenario of the analysis to evaluate a solution comes into the process as van Neumann model which is an input, process and output. But the source of the input has drastically changed in the current era. Big Data is the new evolutionary model where we can gather input from different sources and perform analysis.

II. COMPUTING TECHNIQUES

A. Distributed Computing Aspect

We are having computer of much processing speed and data storage capacity and they are spread across large geographic areas with multiple computational power. So we need a collection of independent computers that appears to its users as a single coherent system. This motivation depends on the need to collect data from widely dispersed locations (e.g., web pages from servers, or sensors for weather or traffic) or to perform enormous computations that simply cannot be done by a single CPU. These are the primary motivations for the fields of distributed systems and parallel computing...

The available model classification of distributed computing is Message Passing, Client Server, N-Tier, Remote Procedure Call, Distributed Object Systems, Remote File System, Remote Database, Remote Device and Virtual terminal.

Distributed Computing has the classification of Distributed Database which has given the opportunity to utilize the different type of databases available in the different location. Considering the large volume of data utilized by commercial organizations, there is a crucial requirement for a database which is designed into the

distributed system with the characteristic of being homogenous or heterogeneous. Distributed solutions are framed by individual organization based on the requirement to handle different form of data.

B. Cloud Computing Aspect

As in distributed computing, the models can be utilized in the respective of infrastructure, platform and software in the form of cloud. The offering of cloud is in three different models viz., Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).

Infrastructure as a Service (IaaS). The IT infrastructures like processing, storage, networks and other fundamental computing resources can be used by the consumers as a service. In order to integrate/decompose physical resources IaaS uses Virtualization extensively. Amazon EC2 is an example for Ia as.

Platform as a Service (PaaS). To develop cloud services and applications PaaS provides a development platform supporting the full "Software Lifecycle". PaaS requires programming environment, tools, configuration management etc., to support the application hosting environment. Google App Engine is the example for Platform as a Service.

Software as a Service (SaaS). The Software usage is provided to a consumer as a Service. Based on the demand the consumer can choose his software to use. Cloud providers release their applications on a hosting environment, which can be accessed through networks from various clients like web browser, PDA, etc., by the application users. SalesForce.com, Google Mail, Google Docs are examples for SaaS.

Data storage in the cloud supports data storage in the form of the database, no SQL format, formatted text, unformatted text, videos and images.

Cloud computing concept and implementation has an impact on the use of Internet and services related to hardware, software and data. Cloud computing possesses many challenges in terms of security, reliability, software licensing, performance, cross platform interoperability, ownership and limitation of data transfer. [4]

Though the cloud computing is actually available as a service to most of the vendors like Oracle, there is a lack of overall structure of the system, which results only in to the change of some wording into the existing software and tools.

Cloud computing has an advantage of Optimized Service, since it is getting utilized with on-demand basis, similar to the public utilities. It actually also covers distributed and grid computing, with the scaled business models and offering the service only when required.

C. Big Data

The better utilization of distributing computing model and the cloud form of it can be done by the Big Data approach.

Big data is defined as large amount of data which requires new technologies and architectures so that it becomes possible to extract value from it by capturing and analysis process Big data due to its various properties like volume, velocity, variety, variability, value and complexity put forward many challenges [5].

This big data phenomenon ushers in a new era where human endeavors and scientific pursuits will be aided by not only human capital, and physical and financial assets, but also data assets. Research issues in big data and big data analysis are embedded in multi-dimensional scientific and technological spaces [6].

The big data analysis comes in the characteristics of the format of the content, the type of data (transaction data, historical data, or master data, for example), the frequency at which the data will be made available, the intent how the data needs to be processed (ad-hoc query on the data, for example), Whether the processing must take place in real time, near real time, or in batch mode. [7]

Big-data analysis methods have revolutionized how both government and commercial researchers can analyze massive databases that were previously too cumbersome, inconsistent or irregular to drive high-quality output. Integrating heterogeneous data sets introduces complexity in data standardization, normalization, and scalability. The variability of underlying data warehouse can be leveraged using virtualized cloud infrastructure for scalability to identify trends and create actionable information [8].

With the prevalence of service computing and cloud computing, more and more services are emerging on the Internet, generating huge volume of data, such as trace logs, QoS information, service relationship, etc. First, three types of service-generated big data are exploited to enhance system performance. Then, Big Data-as-a-Service, including Big Data Infrastructure-as-a-Service, Big Data Platform-as-a-Service, and Big Data Analytics Software-as-a-Service, is employed to provide common big data related services (e.g., accessing service-generated big data and data analytics results) to users to enhance efficiency and reduce cost.

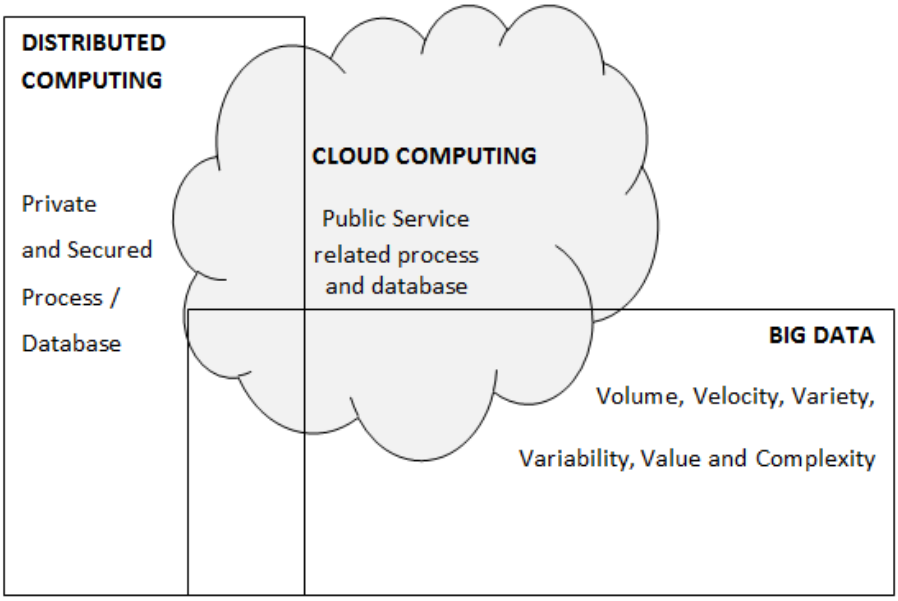
Two of the main problems that occur when studying Big Data are the storage capacity and the processing power.

III. CHALLENGES

In order to analyze and optimize the performance of the implementing Big Data in distributed computing and Big Data in cloud computing, the following criteria form a basis [9].

- Latency - the time taken for a message to be transmitted from the source to the destination.
- Bandwidth – In a given period of time the total amount of information that can be transmitted.
- Jitter - "the variation in the time taken to deliver a series of messages."

Big data in distributed computing depends on the private network and expected latency, bandwidth and jitter can be availed where in the cloud computing the whole process depends upon the private and the public network so the possibilities of expected latency, bandwidth and jitter is minimal.



CONCLUSION

In considering the growth of infrastructure, it becomes important for the organization to invest on the infrastructure and software need and specifically on data storage.

Another important factor required for implementation of analysis is not only the raw data, but the input demands to be gathered from different sources like social network, mobiles and image etc.

When the Big data analysis is provided as a service, there is lot of avenues to be considered in the aspect of latency, bandwidth and jitter, which leads to a new area of research.

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