



# BIG DATA IN CLOUD COMPUTING ENVIRONMENT

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## Abstract.

Now a day's Big data has been emerging from past few years .As a new technology, Big data provides Big amount of data and opportunity for analysis, research and decision-support applications to the digital world including different sector, Example Medical Science, Education, Business and different engineering area.

Cloud computing also emerging technology which provides is a virtual service which is used for computation, data storage, and data mining by creating flexibility and at minimum cost. It is pay & use model which is the next generation platform to analyse the various data which comes along with different services and applications without physically acquiring them.

In this paper, we try to understand and work on the integration of both Cloud Computing and Big Data placement together and achieve efficiency and faster outcome in Medical Science, Education, Business sector others.

**Keyword: Big data, Cloud computing, Health care, Business, Education.**

## 1 Introduction

### 1.1 Big data

Now in digitize world, the type of applications has evolved from batch, compute or memory intensive applications to streaming or even interactive applications in different sector (Business, education, Medical Science, and different engineering area.). As a result, applications are getting more complex and become long-running. Such applications might require frequent-access to multiple distributed data sources. During application deployment and provisioning, the user can face various issues such as (i) where to effectively place both the data and the computation; (ii) how to achieve required objectives while reducing the overall application running cost. Data could be generated from various sources, including a multitude of devices over Internet of Things (IoT) environments that can generate a huge amount of data, while the applications are running. An application can further produce a large amount of data. In general, data of such size is usually referred to as *Big Data* Figure-1. In general, Big Data is characterised by five properties.

These are *volume, velocity, variety, veracity* value.

### 1.2 Cloud Computing

Cloud-based technology offers different solutions over different levels of abstractions to build and dynamically provision user applications .The Cloud offers suitable frameworks for the clustering of Big Data as well as efficiently distributed databases for their storage and placement. However, the native Cloud facilities have a lack of guidance on how to combine and integrate services in terms of holistic frameworks which could enable users to properly manage both their applications and the data. While there exist some promising efforts that fit well under the term *Big Data-as-a-service (BDaaS)*, most of them still lack

adequate support for: data-privacy, query optimisation, robust data analytics and data-related service level objective management for increased (Big Data) application quality .

However, the additional dimension of Big Data management does raise significantly the complexity of finding enough and realistic solutions.

Big Data and cloud computing are complementary technological paradigms with a core focus on scalability, agility, and on-demand availability. Big Data is an approach for maximizing the linear scalability, deployment and execution flexibility, and cost-effectiveness of analytic data platforms. It relies on such underlying approaches as massively parallel processing, in-database execution, storage optimization, data virtualization, and mixed-workload management. Cloud computing complements Big Data by enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Big data and cloud computing are both the fastest-moving technologies emerging today. Cloud computing is associated with new paradigm for the provision of computing infrastructure and big data processing method for all kinds of resources. Moreover, some new cloud-based technologies have to be adopted because dealing with big data for concurrent processing is difficult. The current technologies such as grid and cloud computing have all intended to access large amounts of computing power by aggregating resources and offering a single system view. Among these technologies, cloud computing is becoming a powerful architecture to perform large-scale and complex computing, and has revolutionized the way that computing infrastructure is abstracted and used. In addition, an important aim of these technologies is to deliver computing as a solution for tackling big data, such as large scale, multi-media and high dimensional data sets.

The primary goal of this survey is to present the current state-of-affairs in Cloud computing with respect to the Big Data management.

## 2 Why Big Data Analytics in Cloud computing:

**2.1 Cost reduction:** Cloud computing offers a cost-effective way to support big data technologies and the advanced analytics applications that can drive business value. Enterprises are looking to unlock data's hidden potential and deliver competitive advantage. Big data environments require clusters of servers to support the tools that process the large volumes, high velocity, and varied formats of big data. IT organizations should look to cloud computing as the structure to save costs with the cloud's pay-per-use model.

**2.2 Reduce overhead:** Various components and integration are required for any big data solution implementation. With cloud computing, these components can be automated, reducing complexity and improving the IT team's productivity.

**2.3 Rapid provisioning/time to market:** Provisioning servers in the cloud is as easy as buying something on the Internet. Big data environments can be scaled up or down easily based on the processing requirements. Faster provisioning is important for big data applications because the value of data reduces quickly as time goes by.

**2.4 Flexibility/scalability:** Big data analysis, especially in the life sciences industry, requires huge compute power for a brief amount of time. For this type of analysis, servers need to be provisioned in minutes. This kind of scalability and flexibility can be achieved in the cloud, replacing huge investments on super computers with simply paying for the computing on an hourly basis.

## 3 The impact of Big Data integrated with Cloud on Health care Sector

In the coming decades, the healthcare industry is predicted to grow at an unprecedented rate, and so is the data associated with it. It is expected to produce peta bytes, exa bytes or even zetta bytes of data through the information collected from EHRs, laboratories, medical equipment and from the patient themselves. It will become more challenging for IT industries to analyze such enormous amount of data and turn all this into actionable medical sights. Embedding this Big Data to the healthcare sector and housing it on Cloud

offers an effective solution to these issues. Introducing Big Data in healthcare along with Cloud computing will provide a new direction to medical models. And no doubt, there will be an increase in profit with better business intelligence. With the involvement of Cloud, healthcare industry becomes capable of uploading more information, while Big Data analytics dig on insights related to this data, thereby giving a progressive future path to the healthcare sector. And doctors can analysis or research on disease. Let's have a look how cloud and Big Data together impact the healthcare sector:

### **3.1 Big Data Analytics making efficient use of medical data**

A lot of data is produced on a routine basis by hospitals, laboratories, retail, and non-retail medical operations and promotional activities. But most of it gets wasted because respective persons are not able to figure out what to do with that data. This is where Cloud-based Big Data comes into the picture. The big data analytics tools and repositories remove the hard thinking and generate reliable and calculative insights out of huge volumes of data within a matter of seconds. This means in the future we will need more doctors who are trained to work with big data. The focus is on providing the most relevant and updated information to doctors and medical practitioners in real time while they are consulting their patients.

### **3.2 Cloud-Based Big Data store and analyzing data from all possible resources**

Up till now the collection of data is limited to the major available resources in the healthcare sector. However, with the advent of Smartphone apps and wearable's, data is now everywhere. And this allows practitioners to know patients' health conditions in a more precise manner. Apps that act like pedometers to measure your steps, the calorie counter for your diet, the app for monitoring and recording heart rate, blood pressure and blood sugar levels, and wearable devices like Fitbit, Jawbone etc. are all sources of data now a days. In the near future, the patient will share this data with the doctor who can utilize it as a diagnostic toolbox to provide better treatment in less time.

## **4 The impact of Big Data integrated with Cloud on Education Sector**

Big Data has the future to change not just research, but also education. A late accurate significant similarity of many approaches taken by 35 charter schools in NYC has discovered that one of the top five policies connected with significant academic effects was the use of data to guide instruction. Other collaboration Technologies which the Big Data are based on them is the Cloud Computing. These technologies can improve educational services, giving young and adult students alike access to low-cost content, online instructors, and communities of fellow learners.

## **5 The impact of Big Data integrated with Cloud on Business Sector**

The world runs online. Whatever we do online, we leave data behind us. Whether we're just surfing the web, using social media, shopping, researching or something else, we leave a trail of data in our wake. A recent survey found that 42 percent of Americans use the internet several times a day, while 21 percent reported being online almost constantly. All this data, when collected and analyzed, gives great insights to various companies, which are leveraged to provide better services and products to consumers. This can lead to revenue increases.

But when such huge quantities of data are collected, it isn't feasible for companies to store them offline in their own servers. All these companies cannot have individual servers with huge computing power, while also taking care of security and maintenance. That's where cloud computing comes in. Cloud computing creates affordable and easy storage of data in cloud servers, and the data can be retrieved when requested. Companies that provide such cloud facilities, like Amazon and Google, take care of all work associated with the process and companies can just store data in the cloud.

When the combination of big data and cloud computing was first initiated, it opened the road to endless possibilities. Various fields have seen many drastic changes that were made possible by this combination. It changed the decision-making process for companies and gave a huge advantage to analysts, who could base their results on concrete data.

### **Offer scalable and cost-effective infrastructure**

The introduction of cloud computing platforms has cut down the costs that companies spend on managing and maintaining data. Depending on the budget and need for security., companies can now opt for private cloud options, where internal resources can be stored on the cloud and big data analysis can be implemented from it.

### **Increase productivity**

Companies can concentrate on more important things once they gain insights from big data. Leaving all the storage-related activities to cloud-based servers also allows for more time to work on major projects. This drastically increases employee productivity.

### **Ability for real-time data analysis**

Long gone are the days when data were available in a batch. Now, real-time data makes it possible to work efficiently by making use of the current data. Predictive analysis makes sure that companies can know what lies ahead. The faster the analysts can interpret the data and come to actionable conclusions, the better the results.

### **Quicker data processing**

In traditional systems, managing the data took a big chunk of time and companies had to spend extra time on data processing. But now, data processing takes just a few minutes. Any big data analytics platform like Apache Hadoop can be used to combine the unstructured data from social media and combine it with structured data like the original consumer details available.

Some major cloud servers offer physical transfers of data from their located data center to the cloud center, which is useful when companies are migrating to the cloud for the first time and have a large amount of data stored on physical servers.

### **Major advantage for small businesses**

In the past, only large-scale companies had the capacity and resources to make use of big data. Various cloud computing platforms have allowed small-scale companies to store their data at affordable costs and use the data as efficiently as larger organizations. Small-scale companies can purchase a cloud platform of their choice and start storing and analyzing data without any additional computing charges or responsibilities.

## **Conclusion**

Big Data and Cloud Computing has truly changed the way organizations process their data and implement it in their business. These technologies have impacted businesses in a good way because every decision made through analysis of big data leads to the success of a business. The future is bright as we can see more growth for cloud computing and big data analytics.

### **References Books**

- [1] Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi. MASTERING CLOUD COMPUTING Mc Graw Hill.
- [2] Dr.U.S. Panday, CLOUD COMPUTING, S.Chand

### **References Link**

- [3] <https://journalofbigdata.springeropen.com/articles/10.1186/s40537-019-0178-3>
- [4] <https://yourstory.com/mystory/3ddbfb1fb6-big-data-and-cloud-com>
- [5] <https://yourstory.com/mystory/3ddbfb1fb6-big-data-and-cloud-com>