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A Concise Review of Big Data and Cloud Computing Paradigms and Principles

Mr. P. Siva Satya Prasad , Ms. M. Uma Devi, Ms. Dadi Satya, Ms. Mavuri Divya, Ms. Palnati Manikya Manjari, Mr. Puramsetti Ravi Kiran

Pragati Engineering College, India

ABSTRACT:

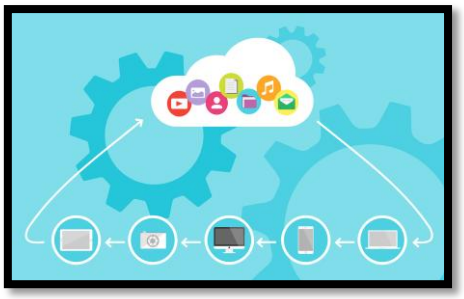
Big data is one of the most important new technologies right now. Big Data is a term that refers to the inadequacy of existing data architectures to manage large data sets efficiently. The 4Vs of big data — volume, velocity, variety, and veracity – make traditional data warehouses difficult to manage and analyze. It's critical to consider big data and analytics in tandem. The term "big data" refers to the recent proliferation of various forms of data from many sources. Analytics is the study of data in order to uncover intriguing and relevant trends and patterns that may be used to guide choices, improve processes, and even launch new business models.Cloud computing appears to be an ideal platform for storing huge data workloads. Working with big data in the cloud, on the other hand, poses the additional issue of balancing two opposing design philosophies. Big data systems (such as Hadoop) are built on the shared nothing principle, where each node is independent and self-sufficient. Cloud computing is founded on the notions of consolidation and resource sharing. Businesses and educational institutions can have a better future path by combining big data and cloud computing technology.

Keywords : Cloud Computing, Virtual machine, Grid computing, Cloud service, IaaS, PaaS, SaaS, IoT.

Introduction

Big data is a term that refers to a collection of large and complicated data sets and volumes, as well as data management capabilities, social media analytics, and real-time data. The term "big data" refers to huge data sets measured in terabytes or petabytes. Big data is the term for this phenomenon. Social media data, e-commerce data, weather station data, IoT Sensors data, and so on are examples of sources where big data is generated.Cost savings, better decision-making, greater sales insights, increased productivity, and improved customer service are just a few of the benefits.

Cloud computing is the supply of computing services over the internet, including servers, storage, databases, networking, software, analytics, intelligence, and more (Internet). Cloud computing is a viable replacement for on-premises datacenters.Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform, and IBM Cloud Services are examples of cloud computing suppliers.Backing up and restoring data, enhanced cooperation, excellent accessibility, reduced maintenance costs, and on-demand self-service are just a few of the benefits**.**



Paradigm

Big Data is a paradigm shift. The vast majority of people are concerned about how their personal data is used. Because of the internet's ubiquity, Big Data Analytics tends to intrude on our daily life. For example, Big Data research could entail looking into a customer's social contacts, buying habits, location monitoring, communication, and even seemingly benign activities like power usage at home. A combination of all of these data can be used to uniquely identify an individual and serve as "digital DNA." The Big Data Analysis paradigm has been hampered by serious underlying data privacy issues. These issues are present in practically all ICT innovations, not only Big Data. It involves questions of confidentiality (who owns the data generated?). who owns the data analysis results?), and integrity (who guarantees the data's accuracy? Interoperability (who sets the standards for data exchange?) and False positive data analysis (who would be responsible for that?). as well as accessibility.
Variety of Big data – Structured, unstructured and semi structured data
Volume of Big data –Speed of data generation
Value of Big data – Extracting useful information and making it valuable
Velocity of Big data – Speed of data generation

Cloud computing is a computer paradigm in which users can access typically real-time scalable resources such as files, data, programs, hardware, and third-party services via the Internet using a Web browser. Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) are the three service models used in cloud computing (SaaS).
A management infrastructure must be provided by cloud architecture, which comprises functions such as:
:
Computational resources provisioning;

- Dynamic workload balancing
- Performance monitoring
- Multi-tenancy
- Resource pooling
- Elastic Scalability

Current Trends

Current Trends for cloud computing:

Current Cloud Computing Trends: As cloud computing technologies advance and more businesses adopt cloud-based services, it's critical to keep up with the latest developments. Let's have a look at some of the cloud computing trends for 2021.

1. A growing number of enterprises will use hybrid cloud services.
While a public cloud solution has advantages such as reduced costs, less maintenance, and nearly infinite scalability, it is not a viable option for organizations in regulated industries due to tight data security and compliance requirements.

2. "Distributed Cloud's" Ascension
A distributed cloud solution distributes public cloud services over multiple physical locations to enhance performance and compliance, and it's a great fit for enterprises with specific geographic needs.

3. No-Server Computing
Although serverless computing is a relatively new cloud service, demand for it is predicted to increase by 25% by 2025. Because all resources are allotted by the cloud service provider, it is especially useful for software developers who no longer have to manage and maintain network servers.

4. The Multi-Cloud Revolution

More enterprises will create multi-cloud strategies in the future, with little to no reliance on a single cloud provider. In order to accelerate market launches and time to market for multi-cloud products and services, providers will attempt to form partnerships that combine their mutual capabilities.

Current Trends on Big Data:

Operational Big Data Technologies and analytical Big Data Technologies are the two types of Big Data Technologies.

1. The Benefits of Cloud Computing

When used appropriately, AI and IoT enable speedier data generation, which is beneficial to organizations. IoT applications will require scalable cloud-based solutions to manage the ever-increasing volume of data. Many firms have already implemented Hadoop on Cloud, and the remainder should follow suit in order to keep their competitive advantage.

2. Hadoop will continue to evolve with new features.

Hadoop, one of the most popular big data platforms, will be enhanced with enterprise-level capabilities. Hadoop will become versatile enough to work in new sectors and corporations will be able to exploit its capabilities without any security issues once Hadoop's security projects like Sentry and Rhino become reliable.

3. Performance will be determined by real-time speed.

Organizations now have the data sources as well as the ability to store and handle large amounts of data. The speed with which they can deploy analytics solutions will be the true determining element in their success. Big data technologies such as Spark, Storm, Kafka, and others are being fine-tuned with speed in mind, and businesses will soon be able to use this real-time functionality.

4. The Digital Revolution

The ability of an organization to mix automation and digitization leads to digital transformation. Big Data is emerging as one of the primary drivers of digital transformation as the global corporate scene grows more competitive, smart, and data-centric. Businesses all across the world use large amounts of unstructured data to uncover hidden patterns in their business models, making Big Data even more significant.

Future Directions

Cloud computing is strong and expansive, and it will continue to grow and give several benefits in the future. Cloud computing is very cost-effective, and businesses can use it to expand. Cloud computing has a bright future ahead of it, with benefits for both the host and the customer.

The volume of data in Big Data will continue to grow and migrate to the cloud. The majority of big data experts think that the amount of data generated in the future would expand dramatically. IDC estimates that the global datasphere will reach 175 zettabytes by 2025 in its Data Age 2025 research for Seagate.

Conclusion

Big Data, low-cost commodity technology, and new information management and analytic tools have combined to create a watershed moment in data analysis history. Because of the convergence of these tendencies, we now have the capabilities to analyze massive data sets fast and cheaply for the first time in history. These abilities are neither hypothetical nor straightforward. They are a significant step forward and a clear chance to achieve massive benefits in efficiency, productivity, revenue, and profitability. The Age of Big Data is here, and if both business and technology professionals continue to collaborate and deliver on the promise, these are truly transformative times.

Cloud computing is a relatively young technological advancement with the potential to have a significant global influence. It delivers numerous advantages to its users and enterprises. For example, one of the advantages it offers organizations is that it lowers operational costs by spending less on maintenance and software upgrades and allowing them to focus more on their core business. There are, however, other obstacles that cloud computing must overcome. People are increasingly concerned about the security and privacy of their personal information. There are no international norms or rules governing the use of cloud computing data. Data protection regulations exist in Europe, but none exist in the United States, despite the fact that it is one of the most technologically advanced countries on the planet. Users are also concerned about who has access to and control of their data. Cloud computing, on the other hand, will change the future if there are global norms and regulations.

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