



CLOUD COMPUTING

COLLINS JOSEPH MUNYAO MWAURA

C025-01-0638/2020



WHAT IS CLOUD COMPUTING ?

- Cloud computing is a technology that allows individuals and organizations to access and use computing resources (like servers, storage, databases, networking, software, analytics, and more) over the internet, which is often referred to as "the cloud." This model enables users to avoid the upfront cost and complexity of owning and maintaining their own IT infrastructure, and instead, they can simply rent or subscribe to the computing resources they need from a cloud service provider.
- Traditionally, companies owned and maintained their physical IT infrastructure, including servers, storage, and software. This approach required a dedicated IT team for installation, maintenance, and updates while Cloud-based solutions offer a compelling alternative. Instead of owning the infrastructure, companies access servers, storage, and applications remotely over the internet. This pay-as-you-go model allows businesses to only pay for the resources they use, resulting in significant cost savings.



EVOLUTION OF CLOUD COMPUTING

1. Early 2000s - The Concept Emerges

1. Brief mention of the transition from dedicated server models to an on-demand model.
2. The term "cloud computing" starts gaining traction, symbolizing the shift towards internet-based computing.

2. 2006 - Commercialization Begins

1. Introduction of Amazon Web Services (AWS), providing a suite of cloud services including storage and computation.
2. Google Docs launches, offering cloud-based productivity tools for the masses.

3. 2010 - The Cloud Expands

1. Widespread adoption by companies of all sizes, driven by the scalability, efficiency, and cost-effectiveness of cloud solutions.
2. Emergence of Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) models.

4. 2016 - Cloud and AI Integration

1. Major cloud service providers begin integrating artificial intelligence and machine learning capabilities, offering advanced analytics and improved efficiency.

5. 2020 and Beyond - The Era of Hybrid and Multi-Cloud

1. Growth in the adoption of hybrid and multi-cloud strategies to optimize service delivery.
2. Focus on enhancing security, compliance, and workload management across various cloud environments.



KEY FEATURES OF CLOUD COMPUTING

1. Scalability: On-Demand Resources for Dynamic Needs

- Traditional computing often involves significant upfront investments in hardware and software. These resources may become underutilized or overloaded as business needs fluctuate. Cloud computing eliminates this rigidity.

2. Cost-Effectiveness: Pay-As-You-Go Model for Budget Optimization

- Traditional computing requires significant upfront capital expenditure for hardware, software licenses, and ongoing maintenance costs. Cloud computing offers a more flexible and cost-effective approach.

3. Accessibility: Global Reach and Anytime, Anywhere Access

- Traditional computing restricts access to applications and data to physical locations with the on-premise infrastructure. Cloud computing breaks down these geographical barriers.



TYPES OF CLOUD SERVICE

1. Infrastructure as a Service (IaaS): The Building Blocks

- IaaS provides the fundamental building blocks of IT infrastructure – servers, storage, networking equipment, and virtualization software. Users have full control over the operating system, applications, and data deployed on these resources.

2. Platform as a Service (PaaS): The Development Playground

- PaaS offers a complete development stack, including operating systems, programming languages, databases, and development tools. Developers can focus on building applications without managing servers, storage, or network configuration.

3. Software as a Service (SaaS): The Ready-to-Use Applications

- SaaS provides access to pre-built, ready-to-use applications like customer relationship management (CRM), enterprise resource planning (ERP), or email services. Users simply pay a subscription fee to access the software and its features.



IMPACT ON IT INDUSTRY

Transforming Business Operations:

- **Increased Agility and Scalability:** Cloud computing empowers businesses to scale resources (storage, processing power) up or down on-demand. This agility allows companies to adapt to changing market conditions, launch new products and services faster, and optimize costs.

Revolutionizing IT Infrastructure:

- **Shift from On-Premise to Off-Premise:** Cloud computing has led to a significant decline in on-premise data centers. Businesses are increasingly relying on cloud providers for their IT infrastructure, reducing the burden of maintenance and upgrades.

Evolving Software Development Practices:

- **Microservices Architecture:** Cloud computing facilitates the adoption of microservices architecture, where applications are broken down into smaller, independent services. This improves development agility and enables faster deployment of new features.

CASE STUDIES

Case Study 1: Scaling Up a Dream - The Boutique Bakery Chain

Before Cloud:

- **The Challenge:** "Sugar Rush," a charming bakery chain with three locations, struggled to manage its operations as it grew. Their on-premise server couldn't handle increasing customer data, online ordering, and inventory management. Scaling infrastructure was complex and expensive.

After Cloud:

- **The Solution:** Sugar Rush migrated its operations to a cloud-based solution. They adopted a cloud-based point-of-sale (POS) system, inventory management software, and customer relationship management (CRM) tools.

The Sweet Outcomes:

- Improved scalability – Sugar Rush can easily add new locations and resources as needed.
- Enhanced data accessibility – Real-time inventory tracking across all locations allows for optimized ordering and reduced stockouts.
- Data-driven decision making – Cloud-based analytics provide insights into customer behavior and sales trends, enabling data-driven marketing strategies



CONT....

Case Study 2: Bridging the Gap - The Global Fashion Brand

Before Cloud:

- **The Challenge:** "Global Fashion Inc.," a multinational clothing retailer, faced communication and collaboration hurdles between its headquarters and international offices. Legacy file-sharing systems were cumbersome and lacked real-time collaboration features.

After Cloud:

- **The Solution:** Global Fashion adopted a cloud-based collaboration platform with features like file sharing, document editing, and video conferencing.

Stitching Together Success:

- Seamless collaboration – Teams can work on documents simultaneously, regardless of location.
- Improved communication – Real-time project updates and discussions streamline communication.
- Enhanced version control – Cloud-based storage eliminates version confusion and ensures everyone works on the latest version.

CHALLENGES AND CONSIDERATIONS

Security Concerns:

- **Data Breaches:** Cloud-based data storage raises security concerns. Businesses must ensure their chosen cloud provider implements robust security measures like encryption, access controls, and intrusion detection systems.
- **Data Privacy:** Data privacy regulations like GDPR and CCPA require careful consideration. Businesses need to understand where their data is stored and how it's managed by the cloud provider to ensure compliance.

Strategies for Security Mitigation:

- **Choose a Reputable Cloud Provider:** Select a provider with a strong track record of security and compliance with relevant regulations.
- **Implement Strong Authentication Protocols:** Enforce multi-factor authentication and access controls to prevent unauthorized access to sensitive data.
- **Encrypt Data at Rest and in Transit:** Encryption safeguards data both within the cloud storage and during transfer.



CONT...

Vendor Lock-In:

- **Challenge:** Over-reliance on a single cloud provider can make it difficult and expensive to switch in the future. Vendor lock-in can restrict your options and limit your negotiating power for pricing and services.

Mitigating Strategies:

- **Hybrid Cloud Approach:** Consider a hybrid cloud strategy, where you utilize a combination of public cloud services and your own on-premise infrastructure. This reduces dependency on a single vendor.
- **Maintain Data Portability:** Ensure your chosen cloud provider offers data portability features, allowing you to easily migrate your data to another provider if needed.



THE FUTURE OF CLOUD COMPUTING

1. The Rise of Edge Computing: A Powerful Ally

- Edge computing brings processing power closer to the source of data, often at the network's "edge." Imagine smart devices in factories or self-driving cars – edge computing allows them to process time-sensitive data locally before relaying it to the cloud for further analysis.

2. Quantum Computing: Disruption on the Horizon

- Quantum computing harnesses the bizarre properties of quantum mechanics to perform calculations beyond the reach of traditional computers. While still in its infancy, quantum computing has the potential to disrupt cloud services.

3. AI and Machine Learning: Powering the Intelligent Cloud

- Artificial intelligence (AI) and machine learning (ML) are already embedded in many cloud platforms. Looking ahead, we can expect even deeper integration



CONCLUSION

- Cloud computing has fundamentally reshaped the IT landscape, propelling businesses towards greater agility, scalability, and cost-efficiency. Gone are the days of cumbersome on-premise infrastructure; the cloud offers a dynamic and adaptable environment that caters to the ever-evolving needs of modern businesses.
- As we delve into the future, cloud computing remains a key driver of innovation. Emerging trends like edge computing, quantum computing, and the continued integration of AI/ML promise to further revolutionize how businesses operate and interact with data.
- The question isn't whether to embrace cloud computing, but how. By understanding the different service models, mitigating potential challenges, and staying informed about future trends, you can leverage the immense power of cloud computing to propel your business towards success.



Thank you
so much!

