



## CLOUD COMPUTING

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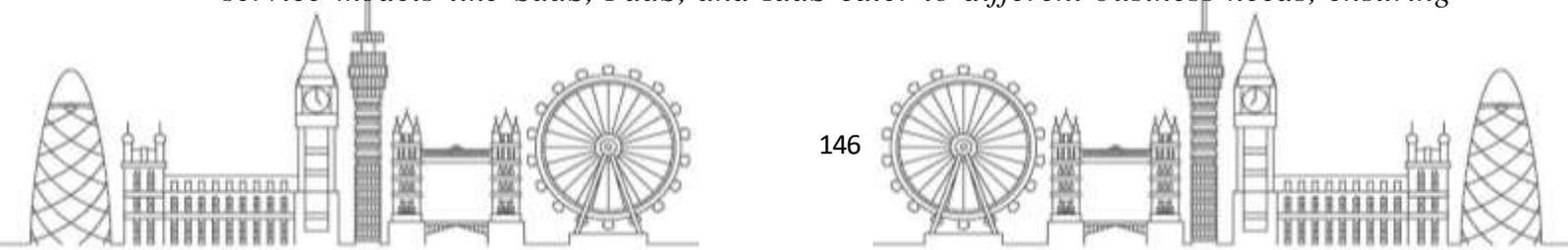
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**Annotatsiya:** *Bulutli hisoblash texnologiyasi internet orqali turli xizmatlarni, jumladan, saqlash, tarmoqlash, dasturiy ta'minot va virtual hisoblash imkoniyatlarini taklif qiluvchi inqilobiy texnologiyadir. Ushbu texnologiya korxonalariga ma'lumotlarni saqlash, ularga kirish va ularni qayta ishlash imkonini beradi, shu orqali keng qamrovli ichki IT infratuzilmasiga bo'lgan ehtiyojni yo'q qiladi, xarajatlarni kamaytiradi va operatsion yuklarni yengillashtiradi. Bulutli hisoblash tashkilotlarga kengayuvchan, xavfsiz va moslashuvchan yechimlarni taklif etadi, global kirish imkoniyati, hamkorlik va ilg'or tahlillarni ta'minlaydi. SaaS, PaaS va IaaS kabi asosiy xizmat modellari turli biznes ehtiyojlariga mos kelib, samaradorlik va unumdorlikni oshiradi. Mustahkam shifrlash va ofatlarni tiklash imkoniyatlari bilan bulutli hisoblash ma'lumotlar xavfsizligi va ishonchliligini oshiradi hamda zamonaviy korxonalar uchun afzal tanlov hisoblanadi.*

**Kalit so'zlar:** *Bulutli hisoblash, Ma'lumotlar xavfsizligi, Kengayuvchanlik, Xarajat samaradorligi, Global kirish imkoniyati, Ofatlarni tiklash, Hamkorlik*

**Abstract:** *Cloud computing is a revolutionary technology that offers a variety of services over the internet, including storage, networking, software, and virtual computing. By enabling businesses to store, access, and process data online, it eliminates the need for extensive on-premise IT infrastructure, reducing costs and operational burdens. This technology provides scalable, secure, and flexible solutions for organizations, allowing global accessibility, collaboration, and advanced analytics. Key service models like SaaS, PaaS, and IaaS cater to different business needs, ensuring*





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*efficiency and productivity. With robust encryption and disaster recovery capabilities, cloud computing enhances data security and reliability, making it a preferred choice for modern enterprises.*

**Keywords:** *Cloud Computing, Data Security, Scalability, Cost Efficiency, Global Accessibility, Disaster Recovery, Collaboration.*

### Introduction to Cloud Computing

To begin understanding cloud computing, let's consider an example of a person named Saurish, who owns a small business. His company has 20 employees who perform various jobs such as accounting, taxation, etc. To carry out these tasks efficiently, they require desks, chairs, computers, database services, software, backup systems, servers, and a network to stay connected with each other and their clients. On top of this, Saurish needs an IT employee to install and maintain this setup, troubleshoot issues, and ensure the safety and security of company data.

As the company grows, Saurish will need to hire more employees, acquire more space to accommodate them, manage larger amounts of data, and tackle increasing risks and threats. This growing demand adds significant stress and financial burden. Saurish has to ensure the availability of resources for all employees, provide timely access, and maintain a robust IT infrastructure, all of which requires considerable expenditure.

To alleviate these challenges, cloud computing offers a solution. With this technology, Saurish can store all his business data and tools in a secure place called "the cloud." He can access everything he needs through a web browser. All of his company's work, including applications, media, and data, can be saved on the internet. Through cloud computing, he can use services like hardware, software, databases, networking, and applications over the internet, whenever required.

The best part? He doesn't have to worry about the physical location or functioning of the hardware and software. He can access a shared pool of computing resources from anywhere at any time. Moreover, he only pays for the resources he uses, drastically reducing IT infrastructure costs and overall expenditures.

Cloud computing is a cutting-edge technology designed to deliver services over a network or the internet. Simply put, it allows users to store and access various types of data, including music, files, documents, videos, and photos, on the internet instead of on a local disk or other storage devices. Users can also access applications, tools, and storage space without needing physical infrastructure at their end.

Using cloud computing, data and programs are stored online instead of on a hard drive, enabling access from anywhere with an internet connection. Each user is provided with a unique user ID and password to ensure secure access to their data. Cloud computing services are available on-demand and can be free or offered on a "pay-per-use" basis. The "pay-per-use" model means users or organizations only pay for the resources they consume, further reducing expenses.[1]





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### What Is Cloud Computing?

Cloud computing is a broad term that refers to the delivery of computing services -such as servers, databases, storage, networking, software, data analytics, security solutions, organizational systems, virtual computers, and much more-over the internet. The term "cloud" originates from a symbol used in old flowcharts and diagrams to represent the internet. This symbol suggested that while resources are available, their exact location or workings are abstracted from the user.

Through internet connections and web-based interfaces, users can set up and configure exactly what they need. Cloud computing thus becomes a mindset for utilizing shared resources economically, accessible from nearly anywhere. Essentially, any computer with a web interface can tap into a vast pool of computing power, applications, and files.[2]

Figure 1.1 Flow chart origins of the cloud.

### Security in Cloud Computing

An organization's primary concern is often the security of its data. Many companies express doubts about the security options provided by the cloud. However, when a company relies on on-premise data security, the protection of data depends on internal staff and the available security mechanisms. In such setups, the risk of data theft remains high, particularly when the number of personnel with access to sensitive data increases.

To mitigate these risks, organizations can opt for cloud services, where the likelihood of theft is significantly lower compared to on-premise data centers. Cloud services also provide encryption options, which secure data both at rest (stored data) and in transit (data being transferred). Moreover, cloud servers are safeguarded against environmental factors like climate issues, pests such as rats, and other physical hazards.

Encryption ensures that data is inaccessible to unauthorized users, including hackers. Additionally, cloud-based services allow for customizable security settings tailored to individual users. A cloud provider's full-time focus is on maintaining robust security, which is much more efficient than traditional in-house systems where security is just one of many IT concerns. Modern cloud services also include advanced features such as management and monitoring tools, secure data transmission, encryption services, and access control mechanisms. These features ensure that only authorized users can access data, based on pre-defined access control lists.[3]

### Cloud Service Models

Cloud computing operates based on three foundational service models, which define how businesses can utilize cloud technology. These models are often visualized as a pyramid and include:

- 1.SaaS (Software as a Service)
- 2.PaaS (Platform as a Service)
- 3.IaaS (Infrastructure as a Service)





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Each model offers distinct advantages and caters to different business needs. Understanding the benefits and drawbacks of each can help organizations decide which model best suits their requirements. Let's clarify these models with an analogy:

**SaaS:** This is like hailing a cab to get from one place to another. You don't need to own the car, worry about maintenance, or understand how it operates—you simply pay for the ride and use the service. Similarly, SaaS provides ready-to-use software applications over the internet, such as email or CRM systems, without requiring businesses to handle the underlying infrastructure.

**PaaS:** Imagine renting a car that is fully assembled and functional, allowing you to drive yourself to your destination. PaaS offers a platform with all the necessary tools and components, such as development frameworks, so developers can build applications without managing the underlying hardware.

**IaaS:** This is like receiving the parts of a car to assemble and customize it to your needs. IaaS provides fundamental computing resources such as servers, storage, and networks, enabling businesses to build their platforms and systems from scratch.[4]

### Benefits of Using Cloud Computing

#### 1. Cost Efficiency

Regardless of the chosen service model, cloud computing ensures that organizations pay only for the resources they actually use. This prevents over-utilization or over-provisioning of resources, allowing IT teams to focus on strategic tasks.

#### 2. Enhanced Security

A cloud host's primary responsibility is ensuring data security. This specialization makes it more efficient than in-house systems, which must divide resources across multiple IT functions. Cloud services also reduce the risk of internal data theft—a surprisingly common issue in traditional setups.

#### 3. Rapid Resource Provisioning

In a cloud environment, new IT resources are just a click away. This reduces provisioning time from weeks to minutes, enabling quicker development, experimentation, and deployment.

#### 4. Scalability and Flexibility

Cloud computing allows businesses to scale resources up or down based on demand. This eliminates the need for expensive physical infrastructure, helping organizations meet workload demands efficiently.

#### 5. Global Accessibility

Cloud services enable data access from anywhere, as long as there is an internet connection. This ensures high productivity, supports mobile access, and benefits employees who work remotely or travel frequently.

#### 6. Built-in Analytics





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Many cloud solutions come with integrated analytics tools, providing insights into organizational data. These tools help businesses track performance, generate reports, and make data-driven decisions.

### 7.Simplified Collaboration

Cloud-based platforms enhance collaboration by enabling secure, real-time sharing of data. Some services even include social features that foster employee engagement and interaction.

### 8.Data Consistency

Cloud computing centralizes data storage, ensuring consistency and reducing errors caused by multiple versions of the same document.

### 9.Disaster Recovery

Cloud services enable rapid recovery from disasters, including natural calamities and hardware failures. Unlike local systems, cloud-based data remains secure and retrievable even if office hardware is compromised.

### 10Automatic Updates

Cloud-based applications receive automatic updates, eliminating the need for manual system upgrades. This saves IT teams time and reduces operational costs.

### 11.Competitive Advantage

Access to the latest cloud applications gives businesses an edge over competitors, without the time and expense of manual installation and updates.[5]

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### Conclusion

Cloud computing has emerged as a game-changing innovation, offering businesses cost-effective, secure, and scalable solutions to their IT needs. Unlike traditional on-premise systems, the cloud provides a shared pool of resources accessible anytime and anywhere. The three primary models-SaaS, PaaS, and IaaS-cater to diverse requirements, making it a versatile tool for organizations of all sizes.

The benefits are numerous: cost efficiency, enhanced data security, global accessibility, built-in analytics, simplified collaboration, and seamless disaster recovery. The automation of updates and rapid provisioning of resources further enhances operational efficiency. As businesses increasingly adopt cloud technology, it ensures competitive advantages and flexibility in a fast-paced digital world.





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While concerns over data security remain, cloud providers continue to offer advanced encryption and access control measures, making the cloud a reliable solution for storing and managing data. Ultimately, cloud computing represents a transformative step towards efficient, collaborative, and resilient IT systems that drive growth and innovation.

