# Cloud Computing

- **Cloud Computing** is model for enabling network users on **demand access to share pool** of configurable computing resources that can be **rapidly provisioned** and release to the clients without **direct service provider interaction.**

- **Cloud Computing** is a general term used to describe a **new class of network based computing** that takes place over the Internet- Using different resources such as servers, storage, databases, software and applications are provided as a service to users on-demand. Users can access these resources an a pay-as-you-utilized them.

- A collection / group of integrated and networked hardware, software and Internet infrastructure- Platform. Using the Internet for communication and transport provides hardware, software and networking services to clients.

- These platforms hide the complexity and details of the underlying infrastructure from users and applications by providing very simple graphical interface or Applications Programming Interface.

# Cloud Computing

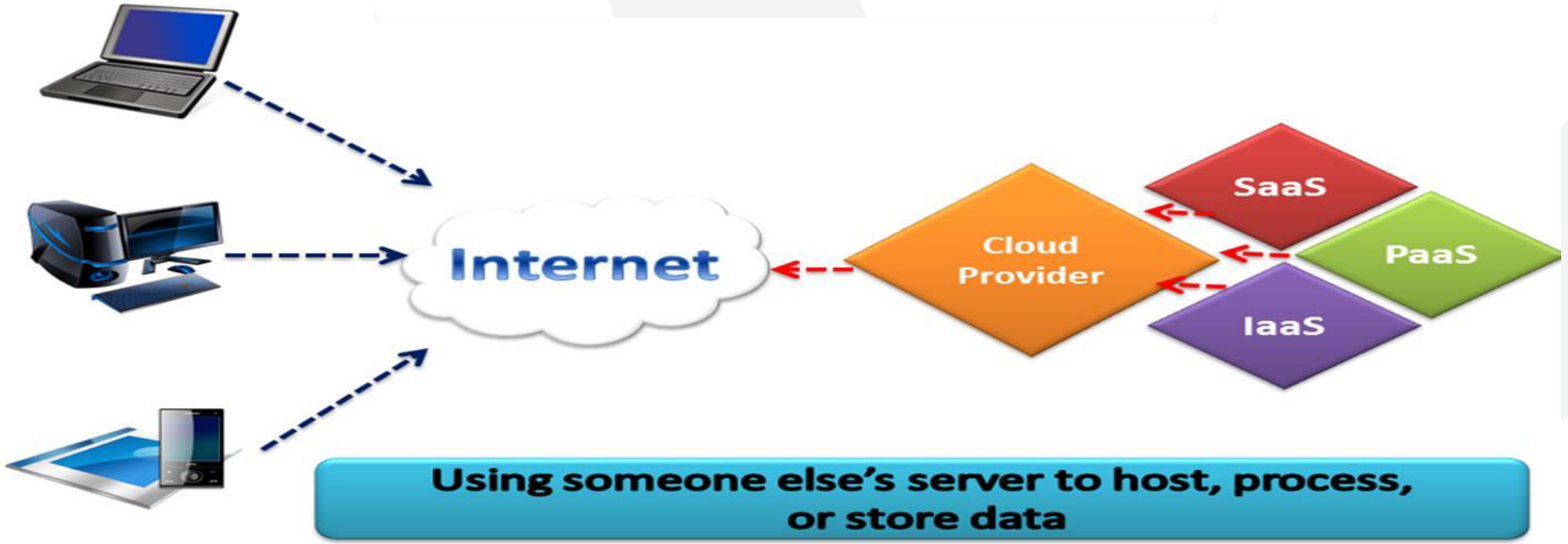
**Characteristics :**

- On-demand self-service, Scalability, Flexibility
- Broad network access, Reliability
- Resource pooling, Security, Collaboration
- Rapid elasticity, Automation, Real-time analytics
- Measured service, Compliance and Governance
- Multi-tenancy, High performance Computing

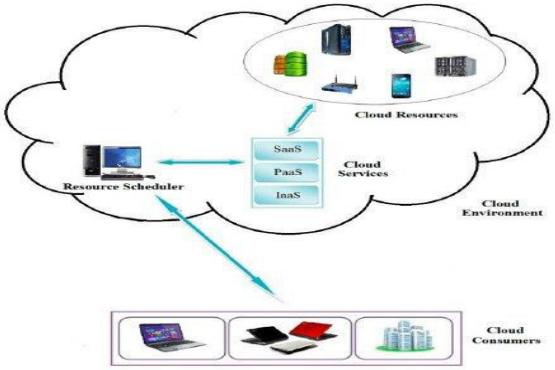
**Applications :**

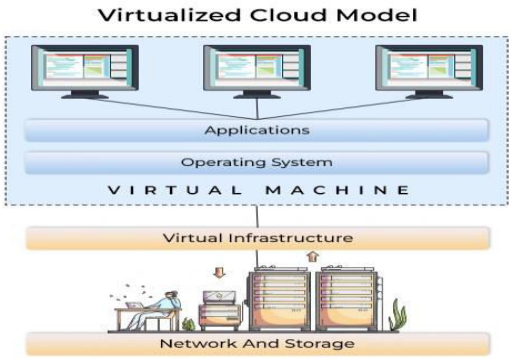
- Data Storage and Management
- Web and Mobile applications
- Big data analytics
- Internet of Things
- Artificial Intelligence and Machine learning
- Online Education and learning platforms
- Social media and collaboration tools
- Gaming and virtual reality
- Cyber security and threat intelligence
- CRM, SCM, FM and Accounting, Health care and Medical Research

# Cloud Computing



# Cloud -Essentials




**Abstraction:**

- Cloud computing abstracts the details of system implementation from users and developers.
- Applications run on physical systems that aren't specified, data is stored in locations that are unknown, administration of systems is outsourced to others, and access by users is ubiquitous.

**Virtualization:**

- Cloud computing virtualizes systems by pooling and sharing resources.
- Systems and storage can be provisioned as needed from a centralized infrastructure, costs are assessed on a metered basis, multi-tenancy is enabled, and resources are scalable with agility.

- To help clarify how cloud computing has changed the nature of commercial system deployment, consider these three examples:

**Google:**

- Google has built a worldwide network of datacenters to service its search engine. In doing so Google has captured a substantial portion of the world's advertising revenue.
- That revenue has enabled Google to offer free software to users based on that infrastructure and has changed the market for user-facing software.

**Azure Platform:**

- Microsoft is creating the Azure Platform. It enables .NET Framework applications to run over the Internet as an alternate platform for Microsoft developer software running on desktops.

**Amazon Web Services:**

- One of the most successful cloud-based businesses is Amazon Web Services, which is an Infrastructure as a Service offering that lets you rent virtual computers on Amazon's own infrastructure.

# Cloud Computing

- **Cloud computing** is the result of evolution and adoption of existing technologies and paradigms: **Autonomic computing, Client–Server model, Grid computing, Mainframe computer, Utility computing, Peer-to-peer and Virtualization**.

- **Goal of Cloud Computing:** To allow users to take **maximum benefits** from all of these technologies, without the need for deep knowledge about or expertise with each one of them.

- To **reduced costs**, and help the users **focus on their core business** instead of being restricted by IT obstacles.
- **Service Models : Saas, Paas, Iaas, Caas, Naas.**

**Deployment models:**

- **Private cloud** : Enterprise owned or lease
- **Public cloud** : Sold to the public, mega-scale infrastructure
- **Hybrid cloud** : Composition of two or more clouds
- **Community cloud** : Shared infrastructure for specific community

**SaaS: (Software as a Service)**

- Google Apps, Microsoft Office 365, Google, AWS, ORACLE, SAP, Zoom

**PaaS: (Platform as a Service)**

- Google App Engine, Salesforce- Heroku, Openshift-RedHat, AWS Elastic Beanstalk, Amazon Web Services(AWS)

**IaaS:(Infrastructure as a Service)**

- Amazon EC2, Google computer engine, HP Cloud, Oracle infrastructure, Rackspace Open Cloud, Relia Cloud, IBM Cloud, Vmware cloud an AWS, Microsoft Azure, Digital Ocean

**Caas: (Container as a Service)**

- Google Kubernetes, Docker Swarm, AWS Elastic Container Service(ECS), Google cloud Container, Azure Container Instances (ACI)

**NaaS : (Network as a Service)- SDN, NFV, Cloud Networking, WAN Optimization, Security as a service(SECaaS)- Use cases**

- AWS network services, Google, Microsoft Azure, CISCO Cloud, VM ware NSX cloud.

# Cloud Computing

# Cloud Computing-Benefits

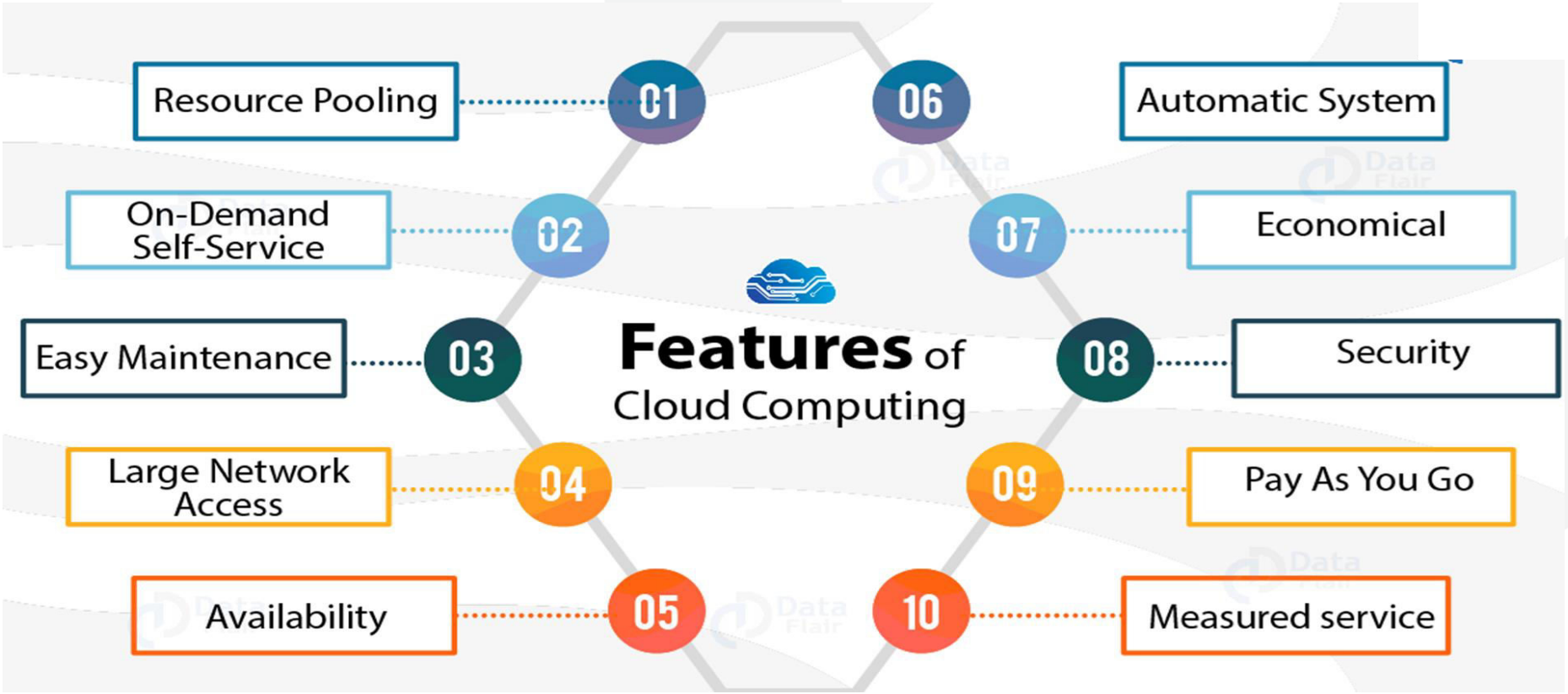


- Environmental Friendly
- Software Integration
- Cost Proficient
- More secure
- Greater Flexibility
- Infinite storage
- Rapid Development
- Backup and Recovery
- Document Control
- Fewer maintaince issues

# Cloud Computing-Limitations

- Doesn't work well in low speed connections
- Outsourcing data storage increases potential for attacker
- Supplier stability
- Accessibility
- Security of stored data
- Enable piracy and Copyright infringement
- Requires constant Internet connections
- Unreliable services due to due to inadequate ICT or Power Infrastructure
- Risk of Vendor Locking

# Cloud Computing-Features



# Cloud Computing-Challenges



| Percentage | Cloud Usage / Issues |
|---|---|
| 97% | Many organizations uses cloud services- Public, Private, Hybrid |
| 65% | Cloud strategy aspects |
| 10% | Anticipate decrease in cloud investment |
| 53% | Unauthorized access |
| 44% | Hijacking of accounts |
| 49% | Insecure Interfaces or APIs |
| 33% | External Sharing of data |