



Cloud Computing Introduction

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Overview

- **The roots of Cloud Computing.**
- **Defining the Cloud Computing and characteristics.**
- **Cloud models types.**
- **How Cloud Computing Works.**
- **Cloud Computing and SOA.**
- **Enterprise Cloud drivers and adoption trends.**
- **Cloud reference architectures.**

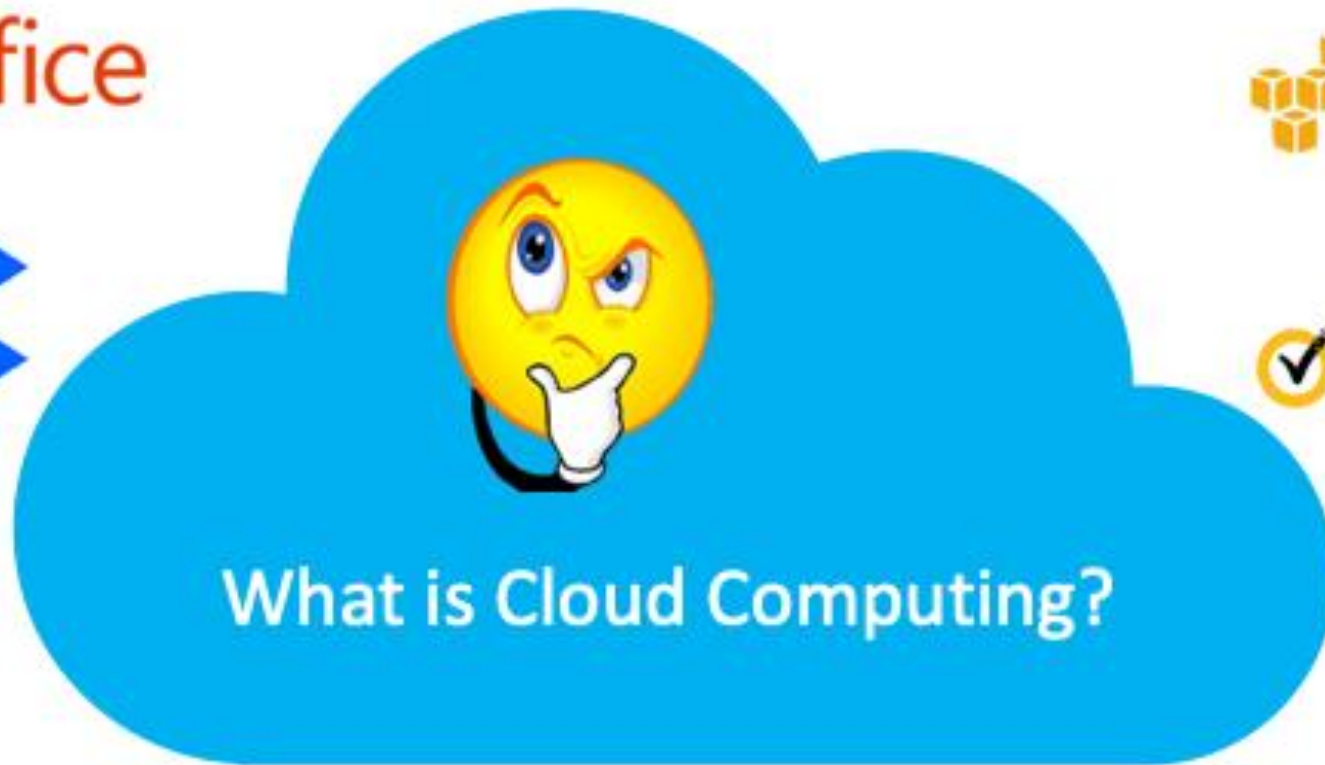
History of Cloud

- On the first milestone (المعالم) of cloud technology, **Salesforce.com** appeared in **1999**. It pioneered the technique of delivering enterprise application via a simple website.
- The next development was in **2002** by Amazon's Web Service (**AWS**). They provided cloud-oriented services including storage, computing power & human intelligence via Amazon Mechanical Turk.
- Then in **2006**, Amazon launches their EC2 (**Elastic Compute Cloud**) - a commercial web service that let small organizations and sole proprietors to rent computers on which they run their computer applications.

Note : EC2/S3 became the 1st accessible cloud technology infrastructure service.

History of Cloud

- In **2009**, another significant milestone engraved the name of Google with Web 2.0. Google and others started to offer browser-based application via Google apps and other apps.
- Then came Microsoft's Azure - both Microsoft and Google deliver services in a way that is reliable and easy to consume.



What is Cloud Computing?



Defining Cloud Computing

- **Cloud computing:** refers to applications and services that run on a distributed network using virtualized resources and uses the standard internet protocols for accessing.
- It is the latest generation technology with a high IT infrastructure that provides us a means by which we can use and utilize the applications as utilities via the internet.
- Cloud computing makes IT infrastructure along with their services available "on-need" basis.
- The cloud technology includes - a development platform, hard disk, computing power, software application, and database.

Affect of Cloud on Human lives

- The application became cheaper, easier to find and use.
- The new application becomes more comfortable to develop & create based on a standard modular part.
- Cloud will provide new social services by connecting through social networks.
- Allows us using of proprietary operating systems in our daily computing.
- Connection to the cloud can be done whenever we want.

Advantages of cloud

- **Low Cost:** To run cloud technology, users don't require high power computer & technology as because the application will run on the cloud and not on users' PC.
- **Storage capacity:** The Cloud storage capacity is unlimited & generally offers a huge storage capacity of 2000-3000 GBs or more based on the requirement.
- **Low cost of IT infrastructure:** the investment will be less if an organization uses Cloud technology; even the IT staffs and server engineers are also not required.

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- **Increase computing power:** Cloud servers have a very high-capacity of running and processing tasks as well as the processing of applications.
- **Reduce Software Costs:** Cloud minimizes the software costs as users don't need to purchase software for organizations or every computer.
- **Updating:** Instant software update is possible & users don't have to face the choice problem between obsolete & high-upgrade software.

Disadvantages of Cloud

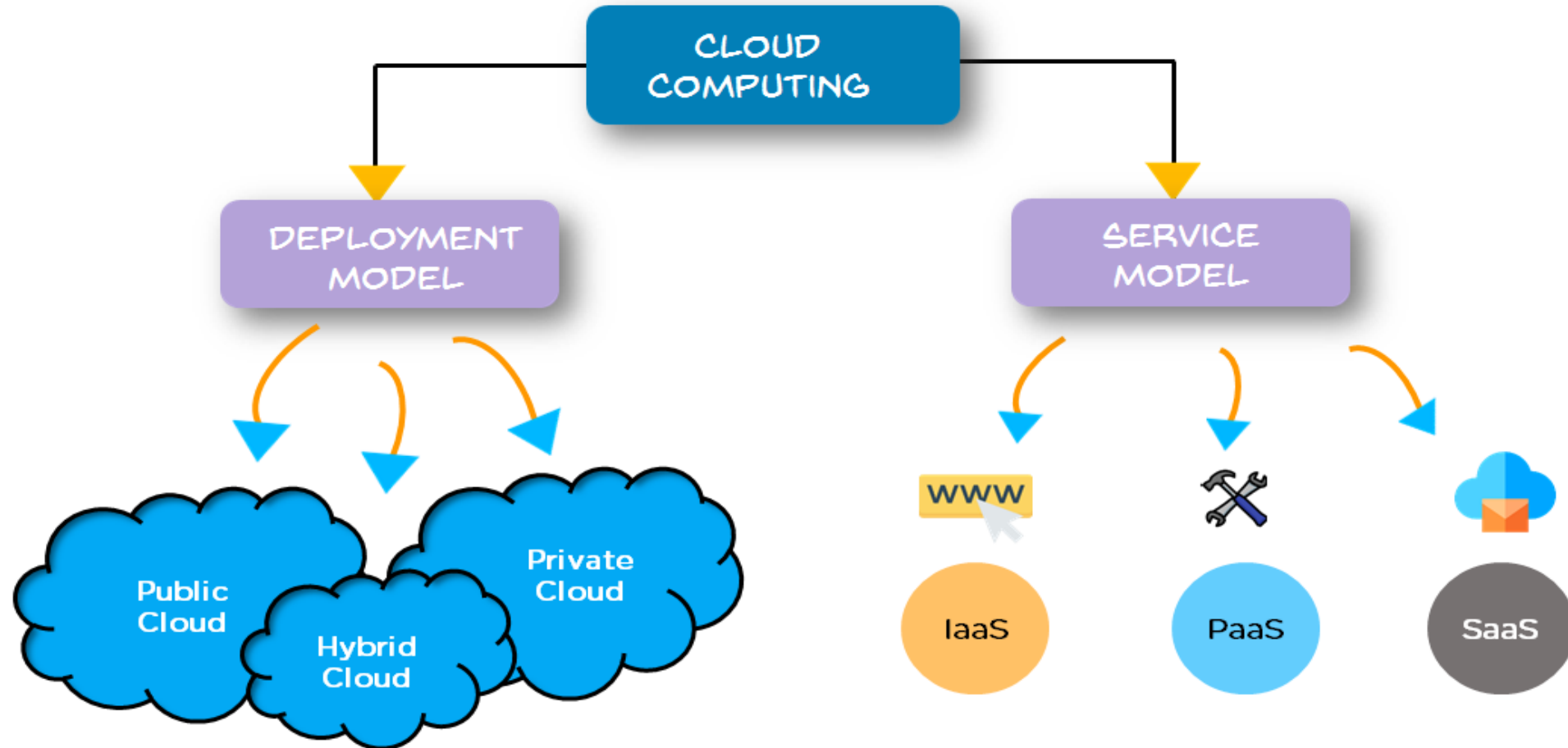
- **Internet speed:** Cloud technology requires high-speed internet connection as web-based applications often require large bandwidth amount.
- **Constant Internet Connection:** Its impossible to use cloud infrastructure without the internet. To access any application or cloud storage, a constant internet connection is required.
- **Security:** Data storage might not be secure. With cloud computing, all the data gets stored in the cloud & hence unauthorized user may gain access to user's data in the cloud.

Cloud models types

1- Deployment Model: refers to the management of the cloud's infrastructure. Cloud hosting deployment model designates the exact category of the cloud environment, its size and accessing mechanism. It also tells the nature and purpose of the cloud.

2- Service model: Cloud computing is a broad term which holds a more extensive range of services. It is composed of a particular type of services; cloud computing platform allows its users to access.

Cloud models types



How Cloud Computing Works

- Cloud uses a network layer to connect different devices to provide access to resources that are residing in the centralized data center of the cloud.
- Cloud technology users can use the data center through the company's network or internet facilities.
- This technology not only facilitates desktop and laptop users but the mobile users can also access their business systems based on their demand.

How Cloud Computing Works

- The cloud has to be divided into different layers.
- These layers are the front-end and back-end layers.
- **Front-end** layer is that part of the cloud which users can interact with.
- **For example**, when we log in to our Gmail account, we see the UI (user interface) where everything works on event-driven buttons and graphics.
- Similarly, a software also runs in the front end of the cloud.
- **The back-end** comprises of hardware as well as software that delivers the back-end data from the database to the front end.

How Cloud Computing Works

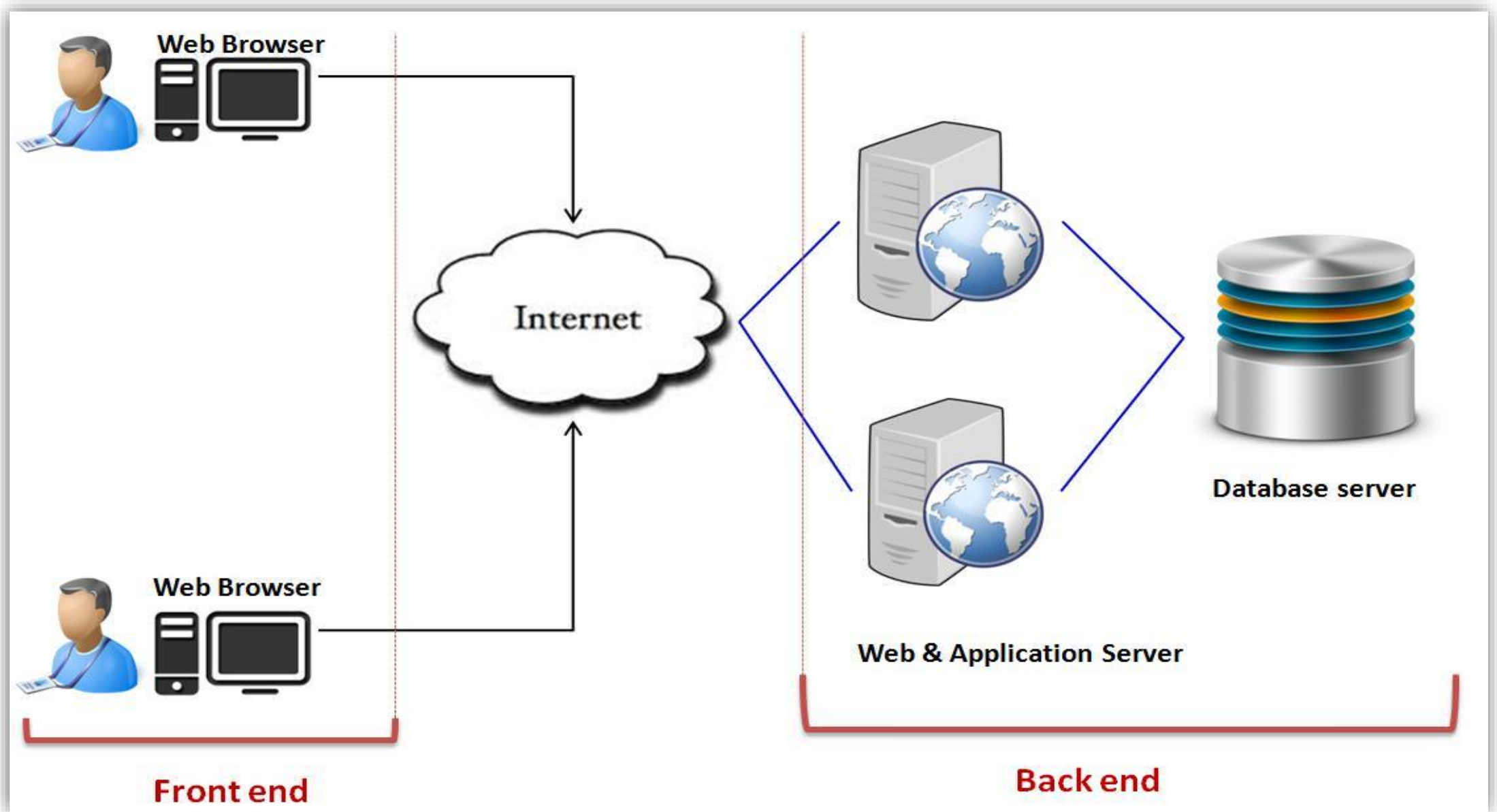
- The only thing that the users have to think is the cloud computing interface software of the system, which works merely (مجرد) as a **web-browser** in the front end of the user.
- The **front-end** includes the cloud computing system or network that is used for **accessing** the cloud computing system.
- The **back-end** is used by service providers that include various servers, computers, virtual machines & data storage facilities that are combined to form the cloud technology.

How Cloud Computing Works

- So, the **back-end** has two principal responsibilities:

- 1- Provides traffic control mechanisms, security postures and governing the protocols.

- 2- To employ those internet protocols that are connected to the networked computer for **communication**.



Service Oriented Architecture (SOA)

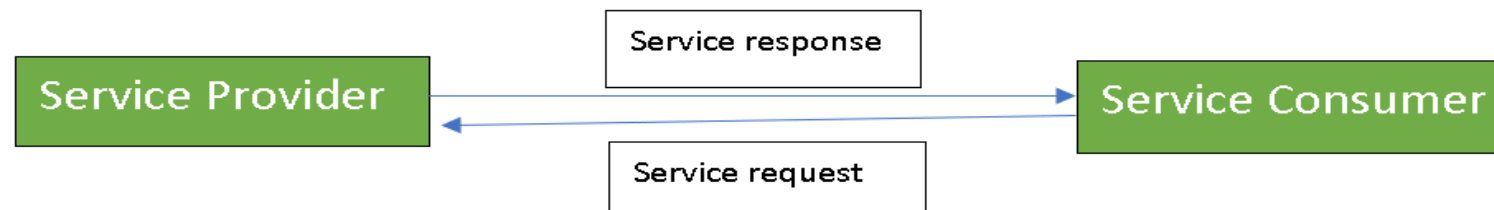
- **SOA** describes a standard method for **requesting services** from distributed components and after that the results or outcome is managed.
- **SOA** provides a **translation and management layer** within the cloud architecture that removes the barrier (الحاجز) for cloud clients obtaining desired services.
- Multiple networking and messaging protocols can be written using SOA's client and components and can be used to communicate with each other.
- **SOA** provides access to reusable Web services over a TCP/IP network, which makes this an important topic to cloud computing going forward.

SOA Architecture

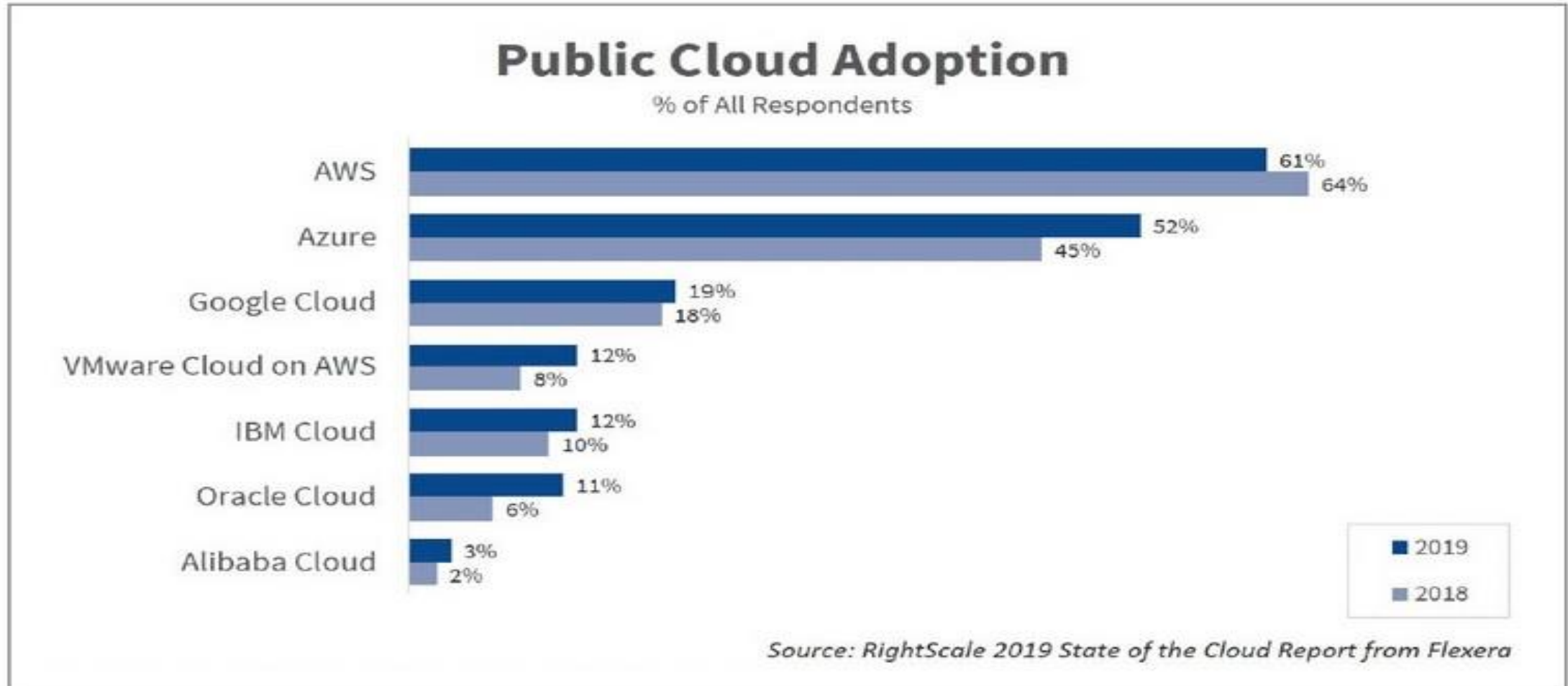
- There are two major roles within **Service-oriented Architecture**:

1- **Service provider**: The service provider is the maintainer of the service and the organization that makes available one or more services for others to use.

2- **Service consumer**: The service consumer can locate the service metadata in the registry and develop the required client components to bind and use the service.



Cloud Computing Trends: 2019

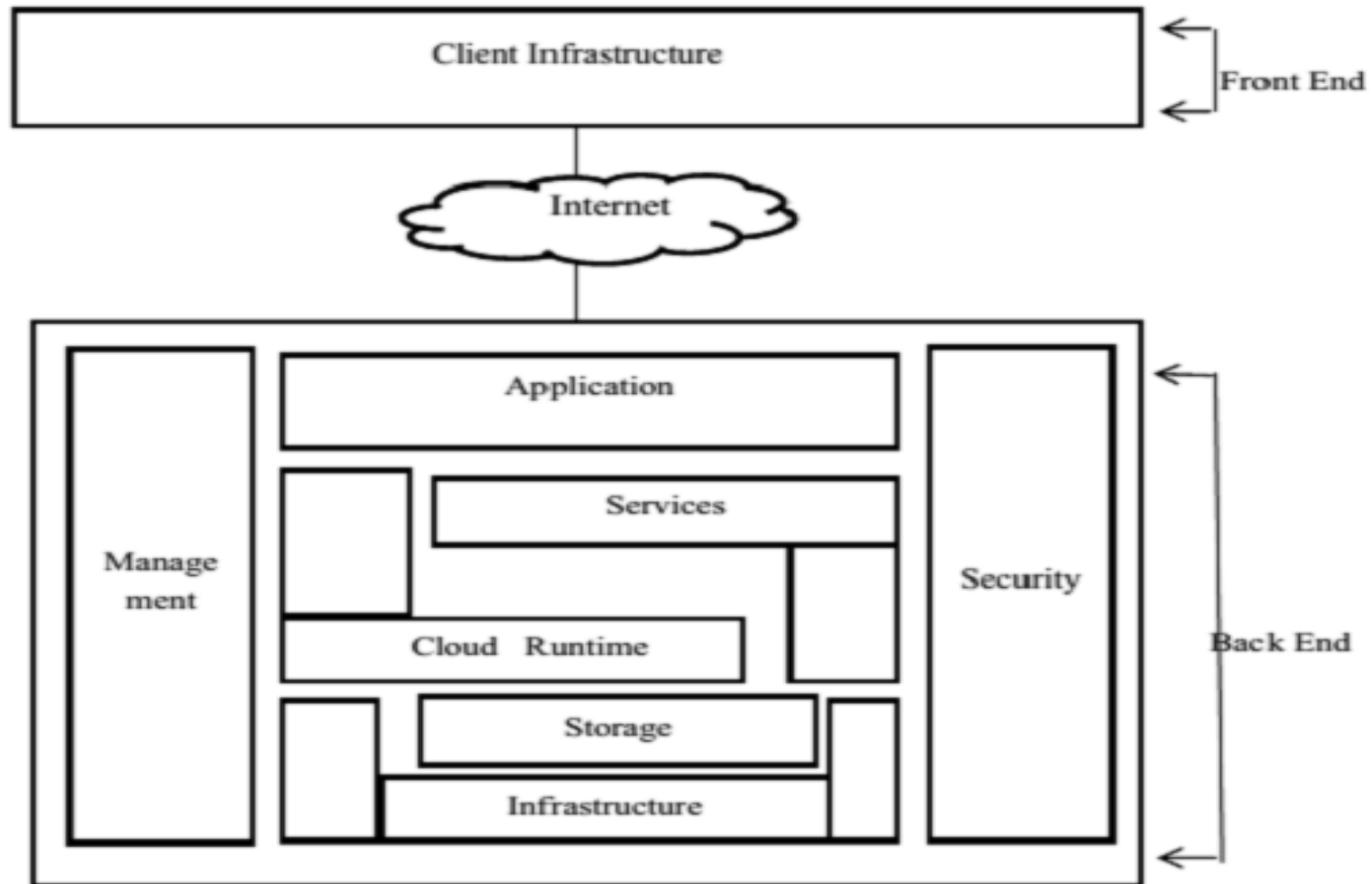


Discount Types Used by Cloud Provider

AWS	AZURE	GOOGLE
AWS Reserved Instances 47%	Enterprise Agreement 30%	Committed Use Discounts 10%
AWS EDP (Enterprise Discount) 26%	Azure Reserved Instances 23%	Ad hoc negotiated discounts 5%
AWS Spot Instances 26%	Azure Hybrid Benefit 15%	
Ad hoc negotiated discounts 12%	Azure Low Priority VMs 9%	

Source: RightScale 2019 State of the Cloud Report from Flexera

Cloud reference architectures



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