

# Cloud Computing



# Cloud Computing

- ▶ cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale.
- ▶ You typically pay only for cloud services you use, helping lower your operating costs, run your infrastructure more efficiently and scale as your business needs change.



# Top benefits of cloud computing

- ▶ Cloud computing is a big shift from the traditional way businesses think about IT resources. Here are seven common reasons organizations are turning to cloud computing services:

- ▶ **Cost**

Cloud computing eliminates the capital expense of buying hardware and software and setting up and running on-site datacenters—the racks of servers, the round-the-clock electricity for power and cooling, the IT experts for managing the infrastructure. It adds up fast.

- ▶ **Speed**

Most cloud computing services are provided self service and on demand, so even vast amounts of computing resources can be provisioned in minutes, typically with just a few mouse clicks, giving businesses a lot of flexibility and taking the pressure off capacity planning.



# Top benefits of cloud computing

- ▶ **Global scale**

The benefits of cloud computing services include the ability to scale elastically. In cloud speak, that means delivering the right amount of IT resources—for example, more or less computing power, storage, bandwidth—right when it is needed and from the right geographic location.

- ▶ **Productivity**

On-site datacenters typically require a lot of “racking and stacking”—hardware setup, software patching, and other time-consuming IT management chores. Cloud computing removes the need for many of these tasks, so IT teams can spend time on achieving more important business goals.

- ▶ **Reliability**

Cloud computing makes data backup, disaster recovery and business continuity easier and less expensive because data can be mirrored at multiple redundant sites on the cloud provider’s network.





# Top benefits of cloud computing

## ► Performance

The biggest cloud computing services run on a worldwide network of secure datacenters, which are regularly upgraded to the latest generation of fast and efficient computing hardware. This offers several benefits over a single corporate datacenter, including reduced network latency for applications and greater economies of scale.

## ► Security

Many cloud providers offer a broad set of policies, technologies and controls that strengthen your security posture overall, helping protect your data, apps and infrastructure from potential threats.



# Types of cloud computing

- ▶ Not all clouds are the same and not one type of cloud computing is right for everyone. Several different models, types and services have evolved to help offer the right solution for your needs.
- ▶ First, you need to determine the type of cloud deployment or cloud computing architecture, that your cloud services will be implemented on. There are four different ways to deploy cloud services: on a public cloud, private cloud, hybrid cloud and community cloud.

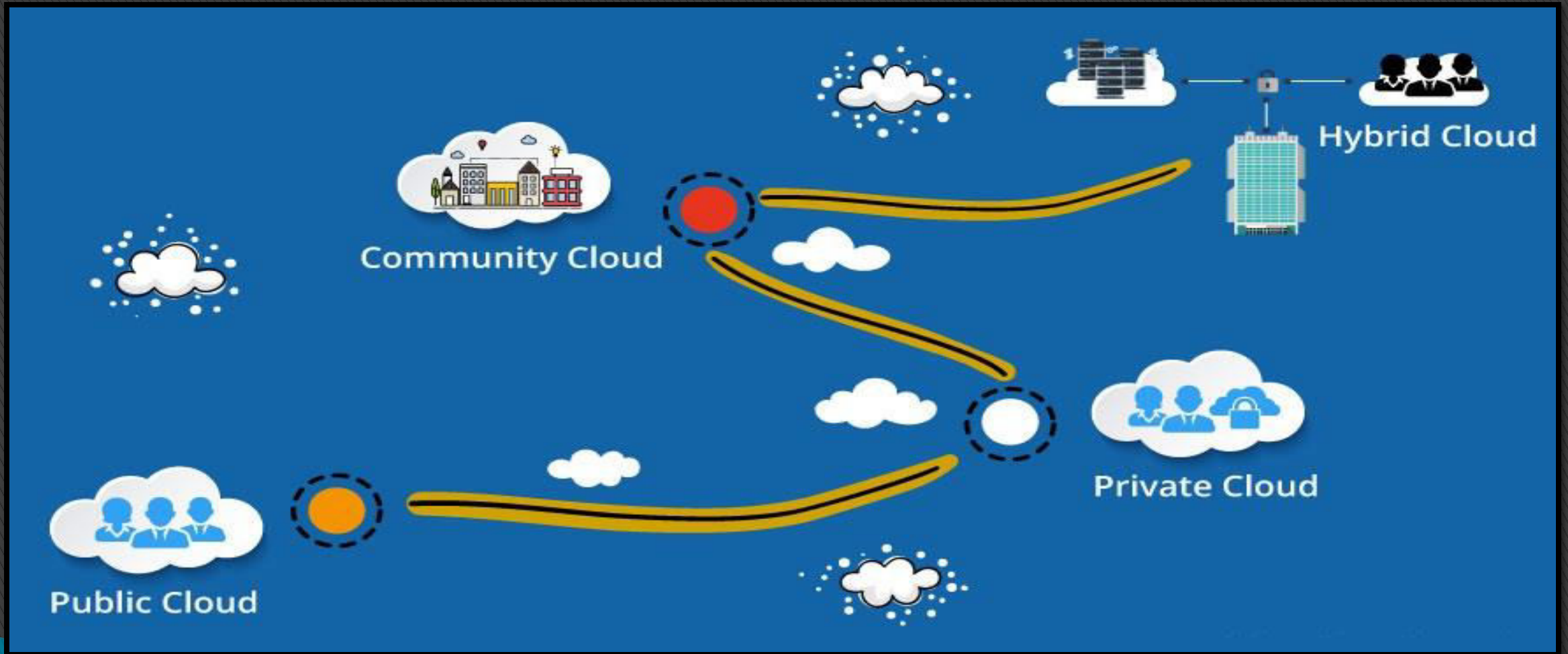


# Types of cloud computing

- ▶ There are the following 4 types of cloud that you can deploy according to the organization's needs–
  - Public Cloud
  - Private Cloud
  - Hybrid Cloud
  - Community Cloud



# Types of cloud computing





# Public cloud

Public cloud is open to all to store and access information via the Internet using the pay-per-usage method.

In public cloud, computing resources are managed and operated by the Cloud Service Provider (CSP).

Example: Amazon elastic compute cloud (EC2), IBM SmartCloud Enterprise, Microsoft, Google App Engine, Windows Azure Services Platform.



# Private cloud

Private cloud is also known as an internal cloud or corporate cloud. It is used by organizations to build and manage their own data centers internally or by the third party.

A private cloud refers to cloud computing resources used exclusively by a single business or organization. A private cloud can be physically located on the company's on-site datacenter. Some companies also pay third-party service providers to host their private cloud. A private cloud is one in which the services and infrastructure are maintained on a private network.



# Hybrid cloud

Hybrid Cloud is a combination of the public cloud and the private cloud. we can say:

**Hybrid Cloud = Public Cloud + Private Cloud**

Hybrid cloud is partially secure because the services which are running on the public cloud can be accessed by anyone, while the services which are running on a private cloud can be accessed only by the organization's users



# Community Cloud

Community cloud allows systems and services to be accessible by a group of several organizations to share the information between the organization and a specific community. It is owned, managed, and operated by one or more organizations in the community, a third party, or a combination of them.





# Cloud Service Models

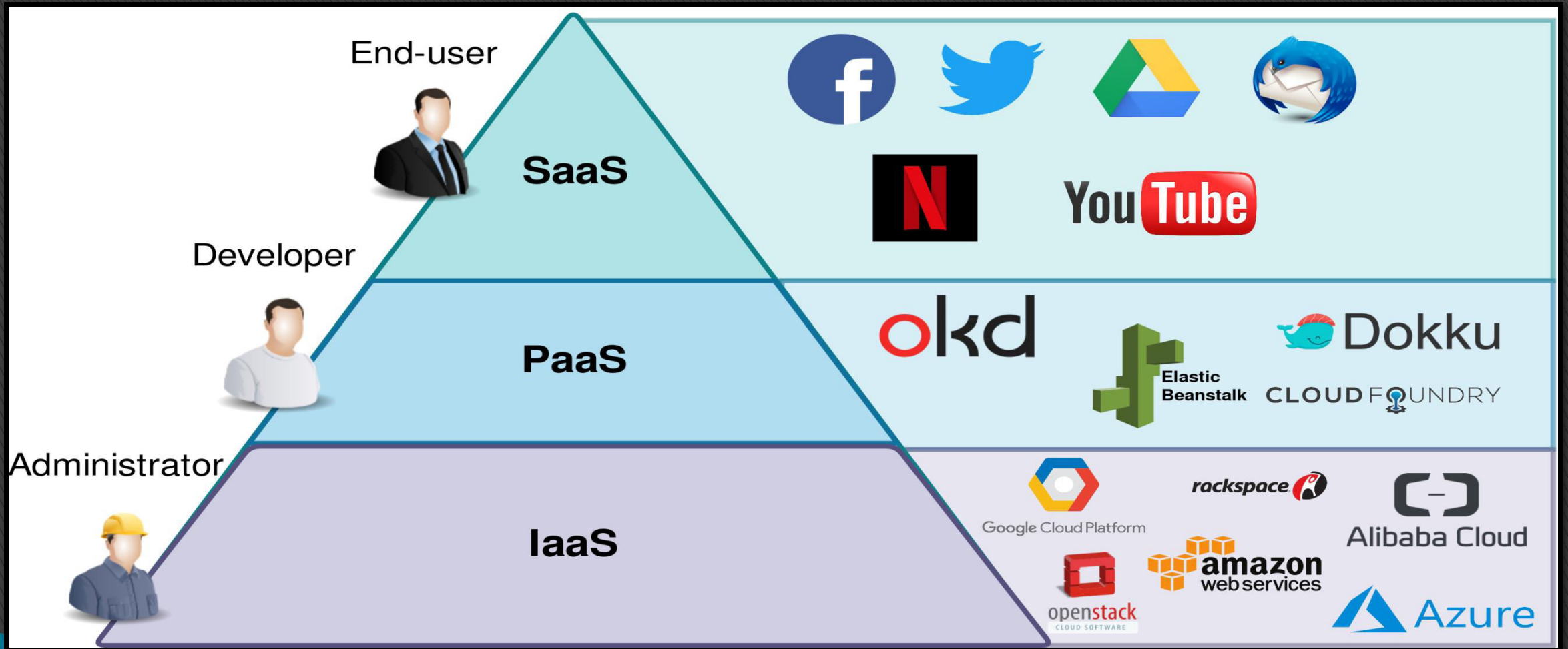
- ▶ Most cloud computing services fall into three broad categories: infrastructure as a service (IaaS), platform as a service (PaaS), server less and software as a service (SaaS). These are sometimes called the cloud computing stack because they build on top of one another. Knowing what they are and how they are different makes it easier to accomplish your business goals.



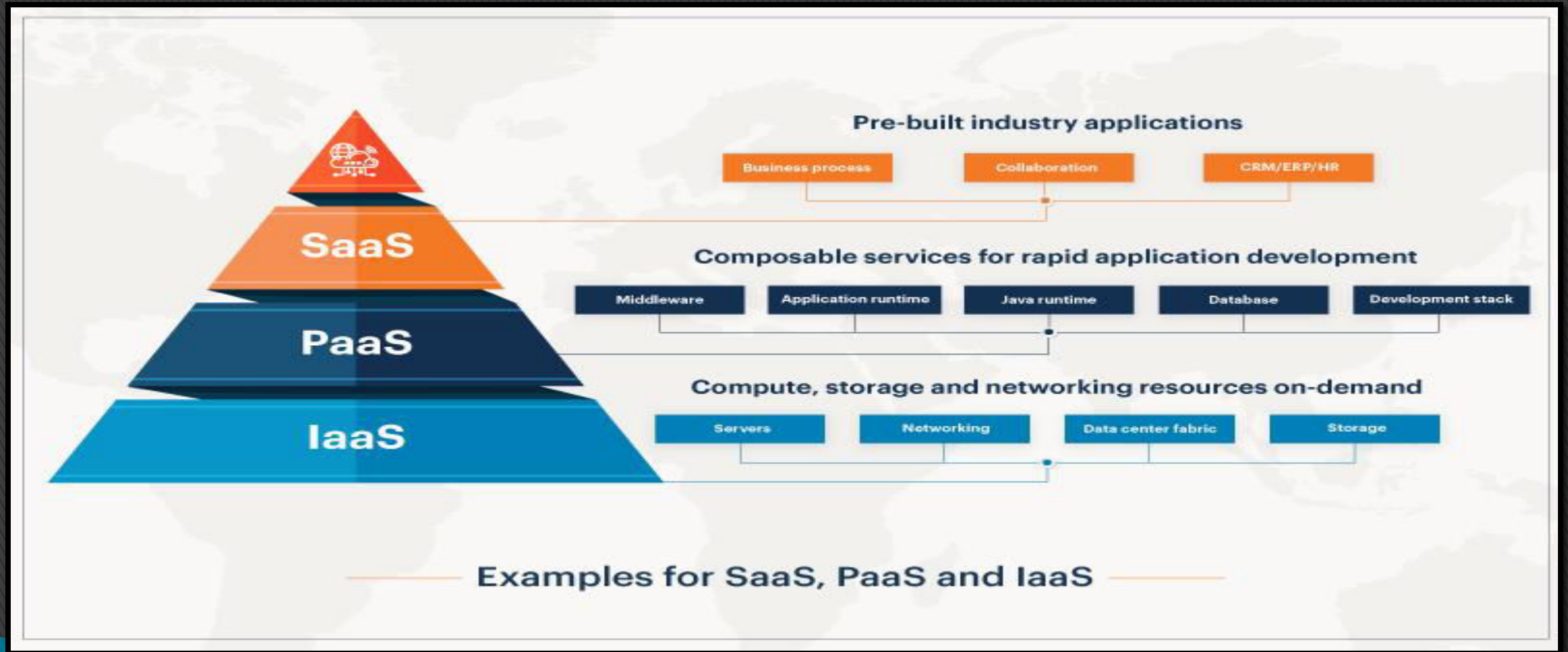
# Cloud Service Models



# Cloud Service Models

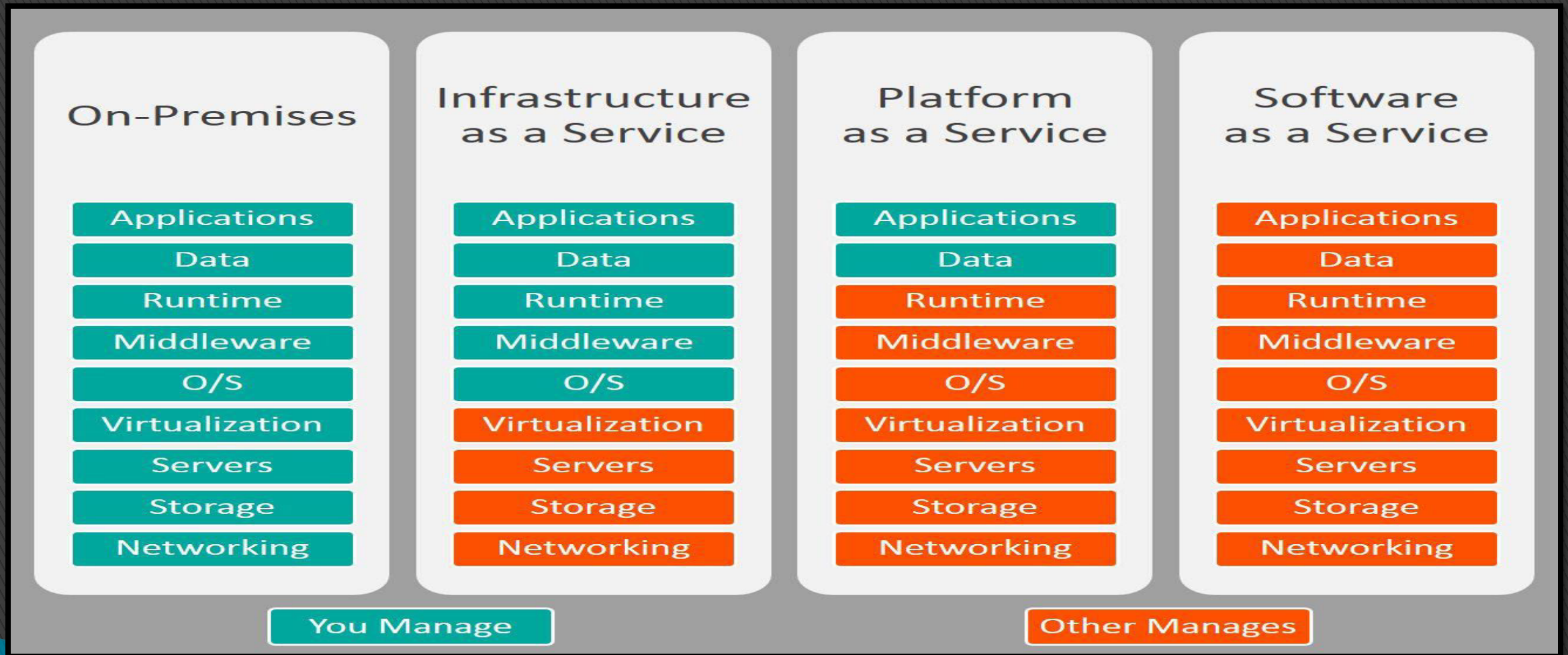


# Cloud Service Models





# Cloud Service Models Comparison



# Infrastructure as a service (IaaS)

IaaS	Paas	SaaS
It provides a virtual data center to store information and create platforms for app development, testing, and deployment.	It provides virtual platforms and tools to create, test, and deploy apps.	It provides web software and apps to complete business tasks.
It provides access to resources such as virtual machines, virtual storage, etc.	It provides runtime environments and deployment tools for applications.	It provides software as a service to the end-users.
It is used by network architects.	It is used by developers.	It is used by end users.
IaaS provides only Infrastructure.	PaaS provides Infrastructure+Platform.	SaaS provides Infrastructure+Platform +Software.

# Infrastructure as a service (IaaS)

- ▶ The most basic category of cloud computing services. With IaaS, you rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems—from a cloud provider on a pay-as-you-go basis.



# Platform as a service (PaaS)

- ▶ Platform as a service refers to cloud computing services that supply an on-demand environment for developing, testing, delivering and managing software applications. PaaS is designed to make it easier for developers to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network and databases needed for development.





# Software as a service (SaaS)

- ▶ Software as a service is a method for delivering software applications over the Internet, on demand and typically on a subscription basis. With SaaS, cloud providers host and manage the software application and underlying infrastructure and handle any maintenance, like software upgrades and security patching. Users connect to the application over the Internet, usually with a web browser on their phone, tablet or PC.



# How do I choose a cloud service provider?

- ▶ Once you have decided to make the move to cloud computing, your next step is to select a cloud service provider. It is vital to assess the reliability and capability of a service provider that you plan to entrust with your organization's applications and data. Some things to consider:
- ▶ Business health and processes
- ▶ Administration support
- ▶ Technical capabilities and processes
- ▶ Security practices



# Business health and processes

- ▶ **Financial health.** The provider should have a track record of stability and be in a healthy financial position with sufficient capital to operate successfully over the long term.
- ▶ **Organization,** governance, planning and risk management. The provider should have a formal management structure, established risk management policies and a formal process for assessing third-party service providers and vendors.
- ▶ **Trust.** You should like the company and its principles. Check the provider's reputation and see who its partners are. Find out its level of cloud experience. Read reviews and talk to customers whose situation is similar to yours.
- ▶ **Business knowledge and technical know-how.** The provider should understand your business and what you are looking to do and be able to match it up with their technical expertise.



# Administration support

- ▶ **Service Level Agreements (SLAs).** Providers should be able to promise you a basic level of service that you are comfortable with.
- ▶ **Performance reporting.** The provider should be able to give you performance reports.
- ▶ **Resource monitoring and configuration management.** There should be sufficient controls for the provider to track and monitor services provided to customers and any changes made to their systems.
- ▶ **Billing and accounting.** This should be automated so that you can monitor what resources you are using and the cost, so you don't run up unexpected bills. There should also be support for billing-related issues.





# Technical capabilities and processes

- ▶ **Ease of deployment, management and upgrade.** Make sure the provider has mechanisms that make it easy for you to deploy, manage and upgrade your software and applications.
- ▶ **Standard interfaces.** The provider should use standard APIs and data transforms so that your organization can easily build connections to the cloud.
- ▶ **Event management.** The provider should have a formal system for event management which is integrated with its monitoring/management system.
- ▶ **Change management.** The provider should have documented and formal processes for requesting, logging, approving, testing and accepting changes.
- ▶ **Hybrid capability.** Even if you don't plan to use a hybrid cloud initially, you should make sure the provider can support this model. It has advantages that you may wish to exploit at a later time.



# Security practices

- ▶ **Security infrastructure.** There should be a comprehensive security infrastructure for all levels and types of cloud services.
- ▶ **Security policies.** There should be comprehensive security policies and procedures in place for controlling access to provider and customer systems.
- ▶ **Data backup and retention.** Policies and procedures to ensure integrity of customer data should be in place and operational.
- ▶ **Physical security.** Controls ensuring physical security should be in place, including for access to co-located hardware. Also, data centers should have environmental safeguards to protect equipment and data from disruptive events. There should be redundant networking and power and a documented disaster recovery and business continuity plan.



