
# Introduction to Cloud Computing

# Basics of Cloud Computing

# Learning Objectives

By the end of this lesson, you will be able to:

- Describe the evolution of cloud computing
- Define cloud computing
- List the benefits and risks of cloud computing
- Identify the various types of cloud models and services
- Illustrate the real-world applications of cloud computing

# History of Cloud Computing

# Earlier Terms for Cloud

Centralized computing

Grid computing

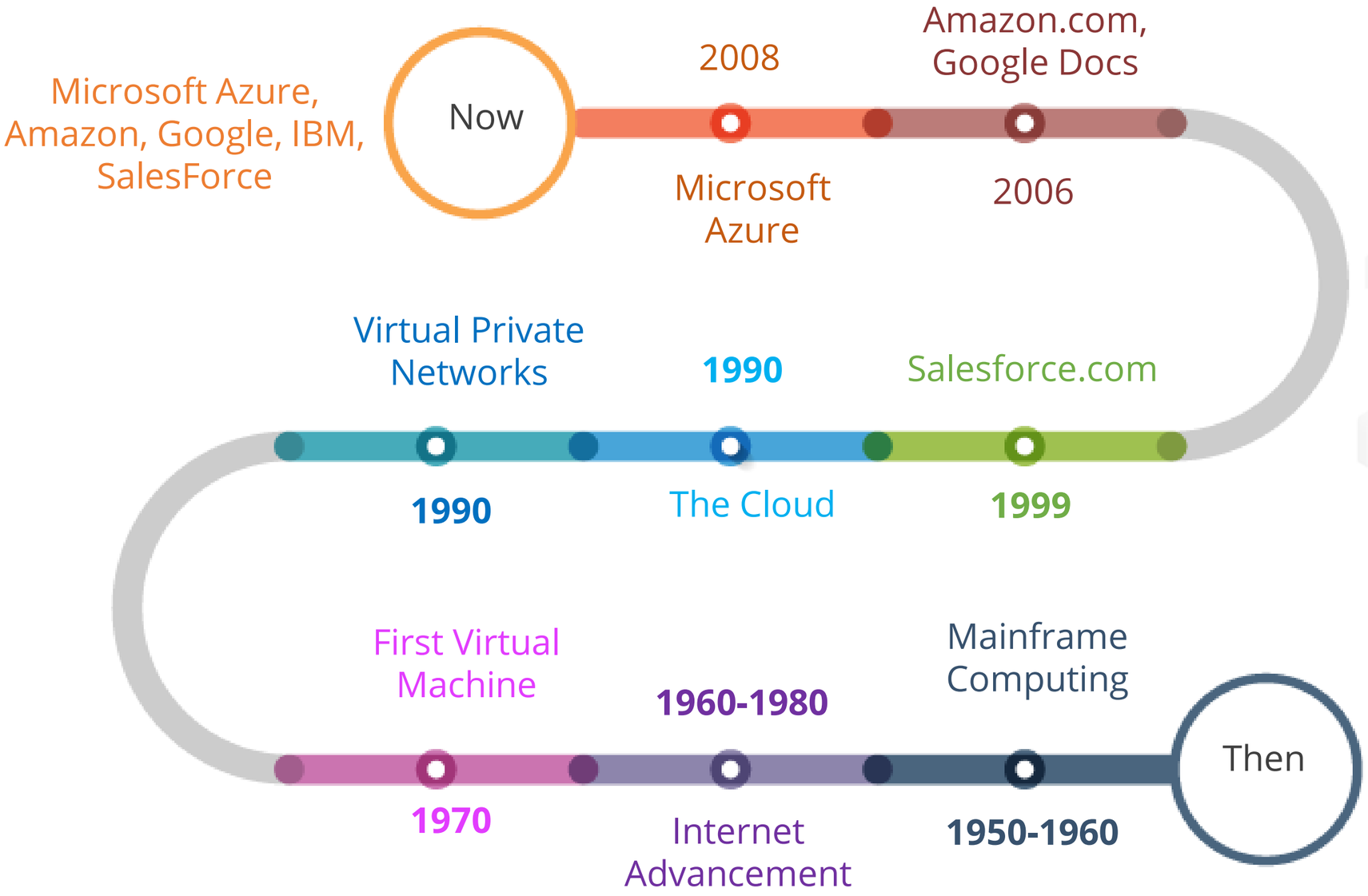
Distributed computing

On-demand computing

Hosting

Application Service Provider (ASP)

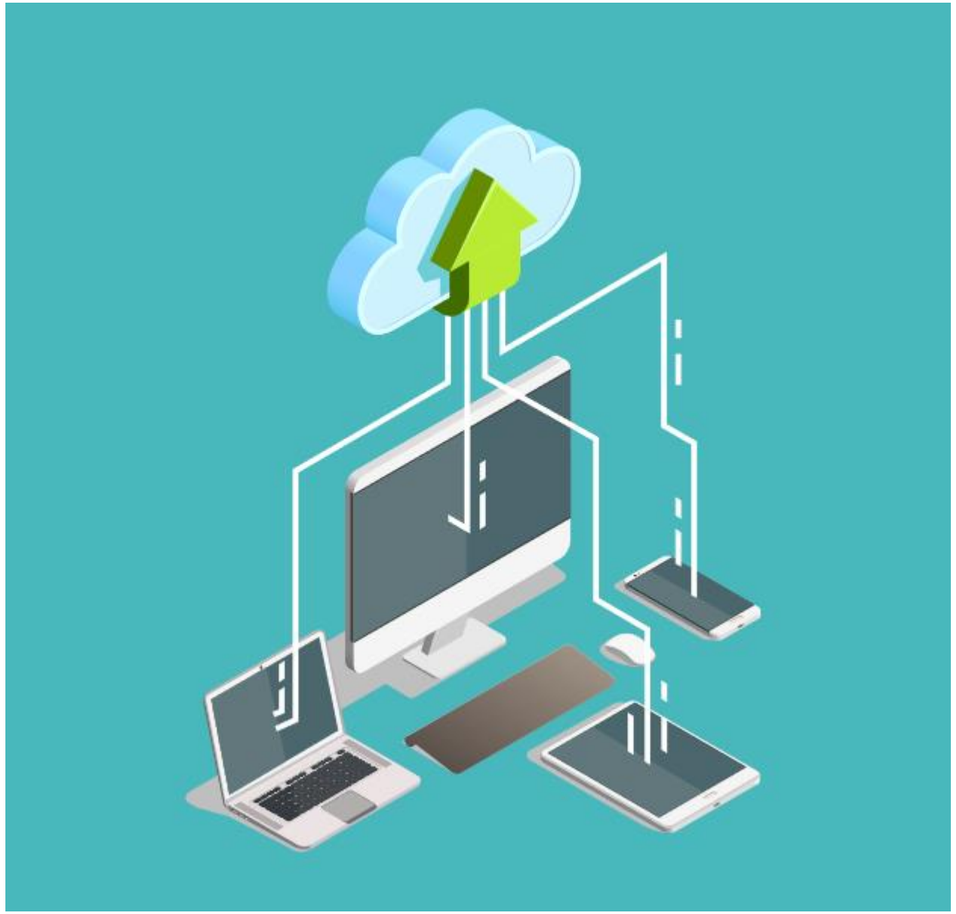
# Evolution of Cloud Computing



# Definition of Cloud Computing

# What Is Cloud Computing?

Cloud computing is on-demand computing resources, delivered to you over the Internet.



# Definition of Cloud Computing

National Institute of Standards and Technology (NIST) defines cloud computing as a model that enables ubiquitous and convenient on-demand network access to a shared pool of configurable computing resources (for example, networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

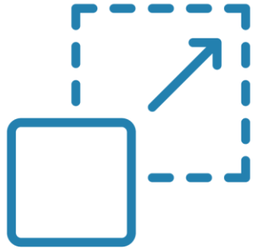
This cloud model is composed of:

- Five essential characteristics
- Three service models
- Four deployment models

# Characteristics of Cloud Computing

# Benefits of Cloud Computing

Cost-effective



Scalable

Elastic

Metered

Reliable

Secure

Self-serviced

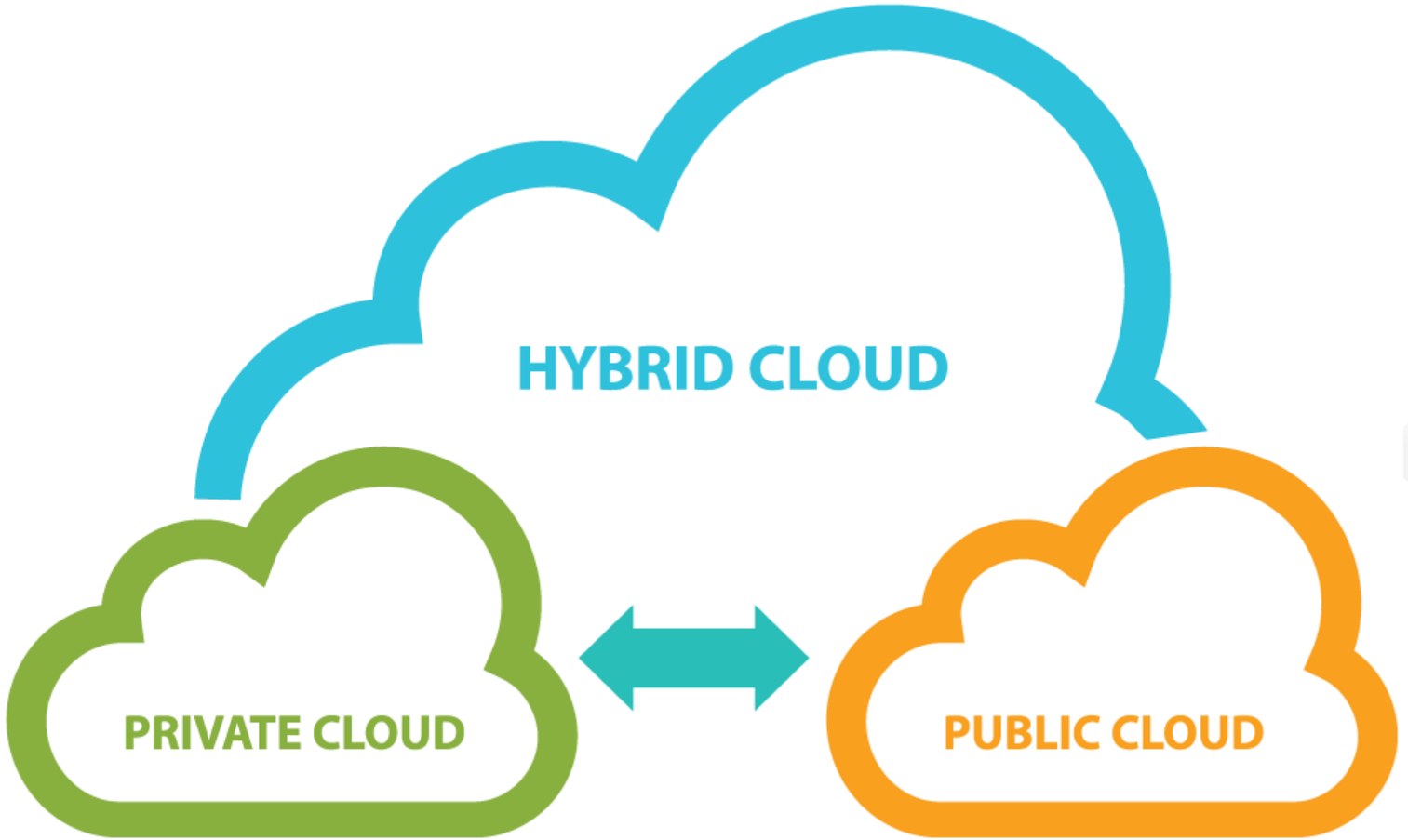
# Risks of Cloud Computing

# Risks of Cloud Computing


- Trust in the cloud service provider
- Slow data access
- Legal or regulatory compliance
- Loss of customization or control
- Unknown costs

# Types of Cloud Computing

# Types of Cloud Computing



# Public Cloud

# Public Cloud


**Description:**

- Is owned by a cloud service provider
- Provides resources and services to multiple organizations and users , typically over the Internet

**Characteristics:**

- Multiple end users
- Public access
- Commonly available
- Connectivity over the Internet
- Requirement of minimal skill

**Example:**

Microsoft Azure

# Private Cloud

# Private Cloud


**Description:**

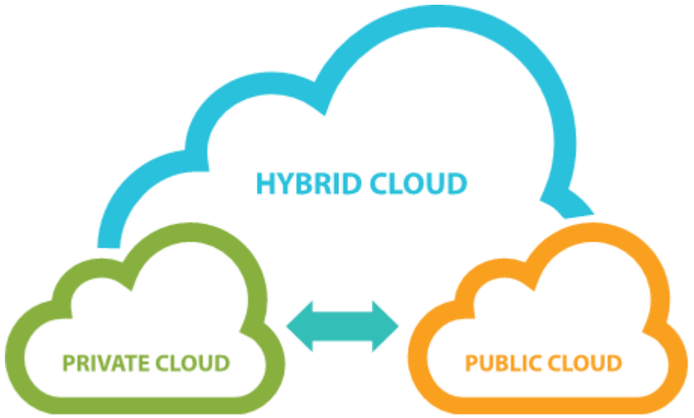
- Is owned and operated by the organization that uses it
- Is created in the organization's datacenter
- Provides self-service access to computing resources to internal users

**Characteristics:**

- Organizational ownership
- Owned datacenters
- Internal users
- Connectivity over private network
- Private access
- Requirement of highly skilled personnel

# Hybrid Cloud

# Hybrid Cloud




**Description:**

- Combines both public and private clouds
- Allows users to run applications in the cloud or on-premise, as required

**Characteristics:**

- Hybrid resource location
- Similar to public cloud in efficiency and cost
- Organizational control and management
- Requirement of skilled technical personnel

**Example:**

Hosting a website in the public cloud and linking it to a highly secure database hosted in a private cloud

# Comparison of Cloud Models

## Public Cloud

1. No CapEx
2. High agility
3. Consumption-based model

## Private Cloud

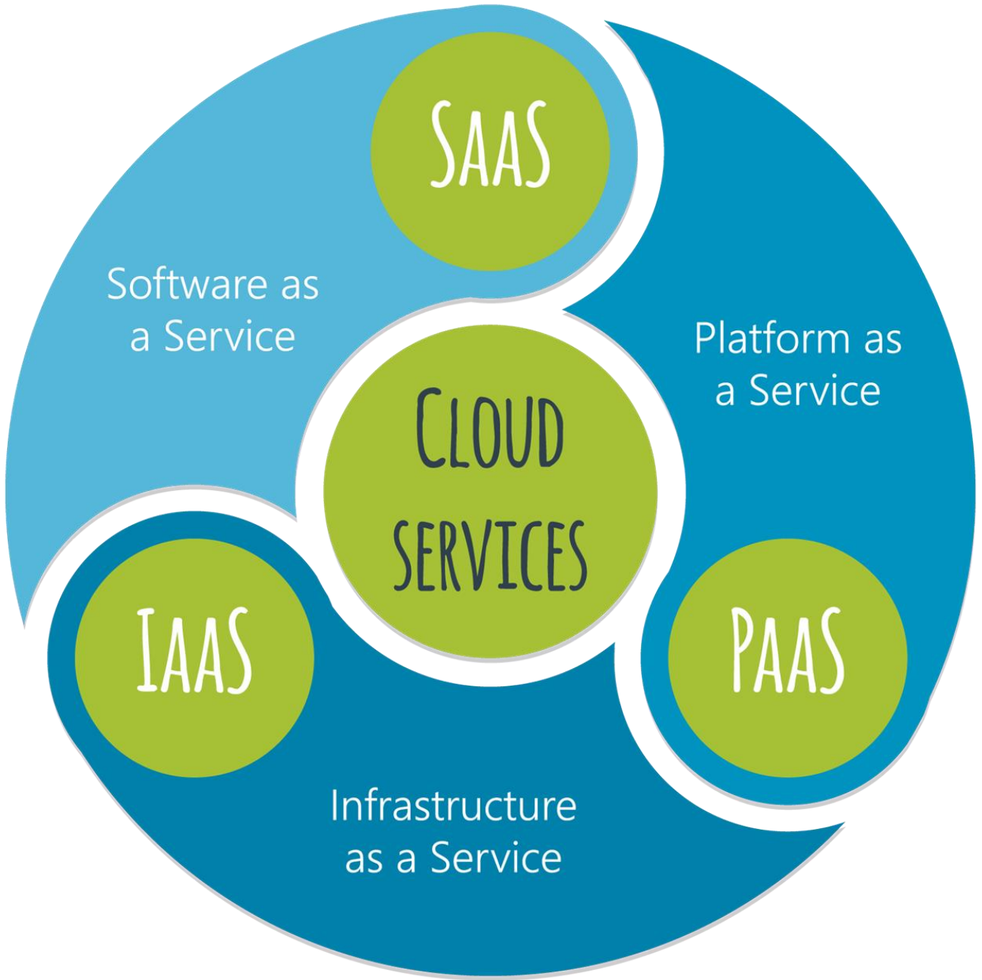
1. High control
2. Control over security

## Hybrid Cloud

1. Provision for flexibility
2. Compliance, as required

# Types of Cloud Services

# Types of Cloud Services



# IaaS

# IaaS

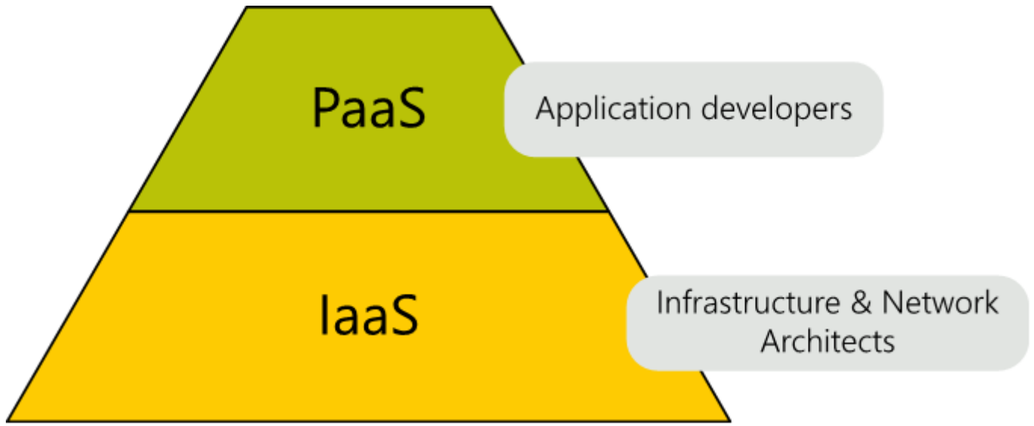

IaaS is an instant computing infrastructure provisioned and managed over the internet.

**You can rent the following from a cloud provider on a pay-as-you-go basis:**

- IT infrastructure servers
- Virtual machines (VMs)
- Storage
- Networks
- Operating systems

# PaaS

# PaaS



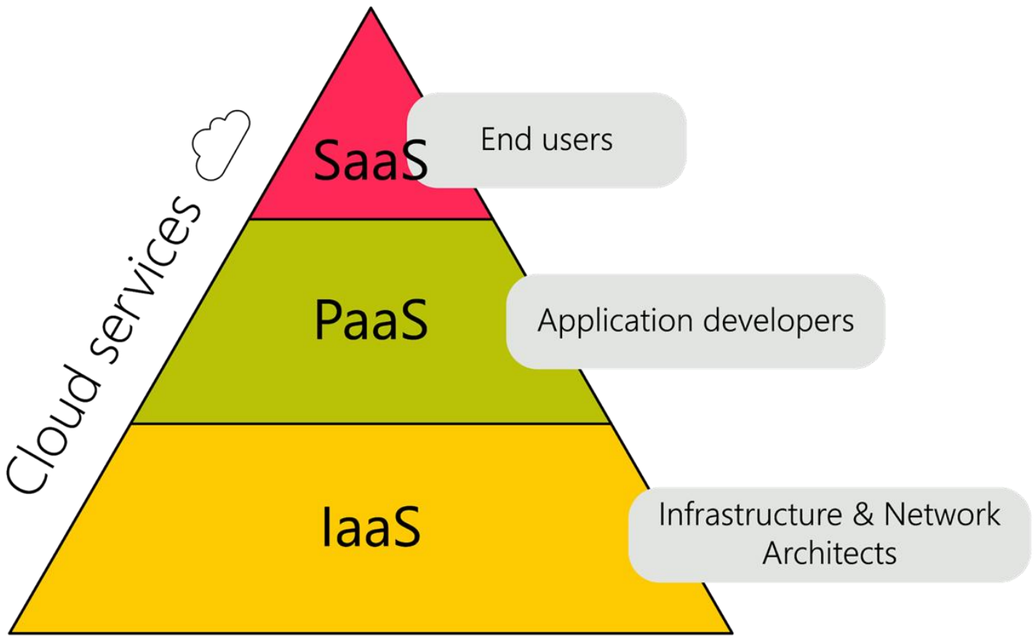

PaaS provides an environment to build, test, and deploy software applications.

**Common usage scenarios:**

- Development framework
- Analytics or business intelligence

# SaaS

# SaaS




SaaS is centrally hosted and managed by the cloud service provider for the end customer.

**Common usage scenarios:**

- Email
- Calendars
- Office tools such as Microsoft Office 365
- Skype
- Microsoft Dynamics CRM Online

# Comparison of Cloud Services

## IaaS

1. Provides control to configure and manage hardware
2. Requires users to manage operating systems, data, and applications

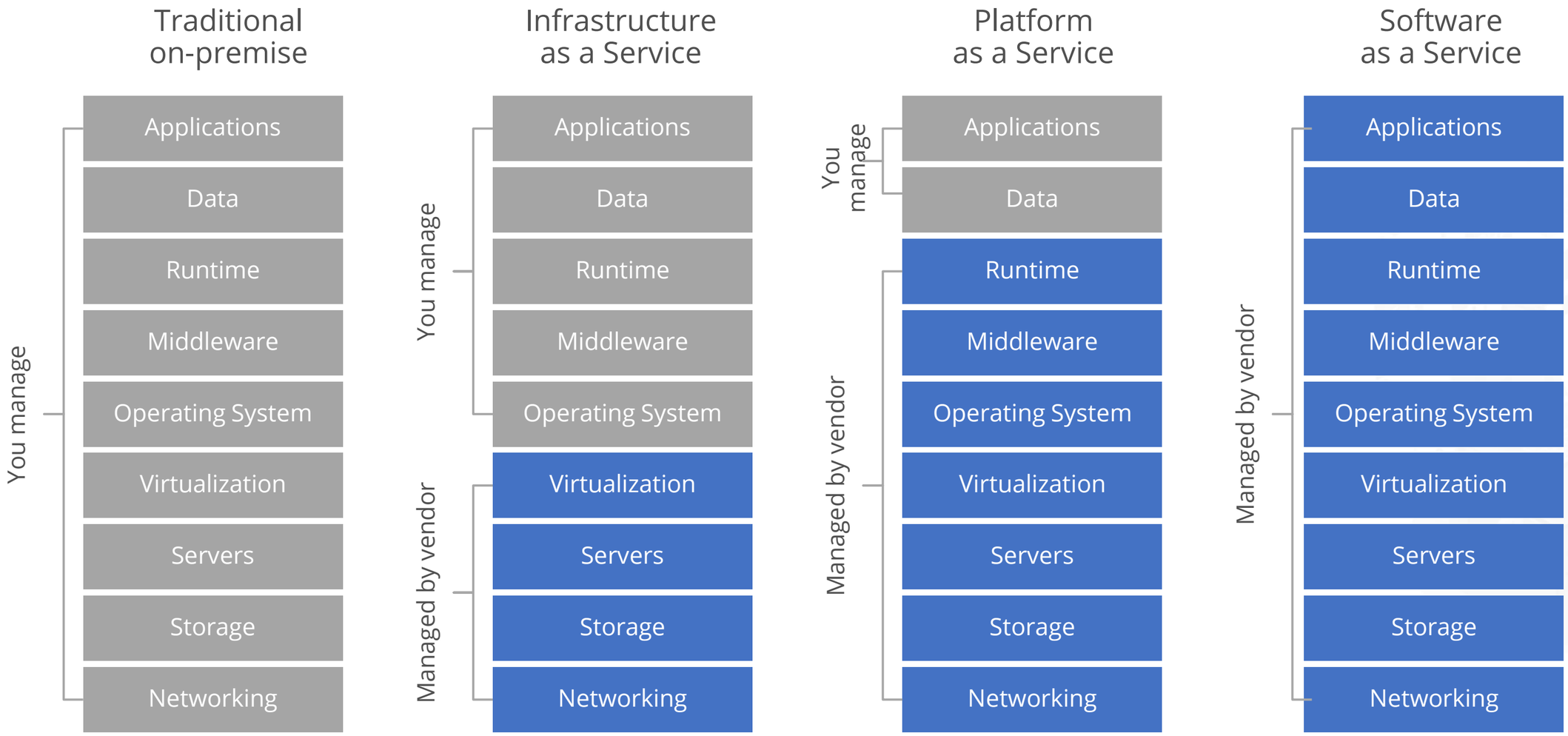
## PaaS

1. Helps focus on application development
2. Enables working with distributed teams
3. Requires users to manage only the applications and data

## SaaS

1. Enables payment for software on a subscription model
2. Allows users to use the software without worrying about its management

# Comparison of Cloud Services: Management



# Cloud Computing in Action

# Manufacturing Industry

Cloud computing can help provide:

- High performance virtual machines for analysis and simulation
- Design workstations, accessible from any location
- Remote data collection, analysis, modeling, and sharing
- Actionable insights from IoT

# Operational Costs

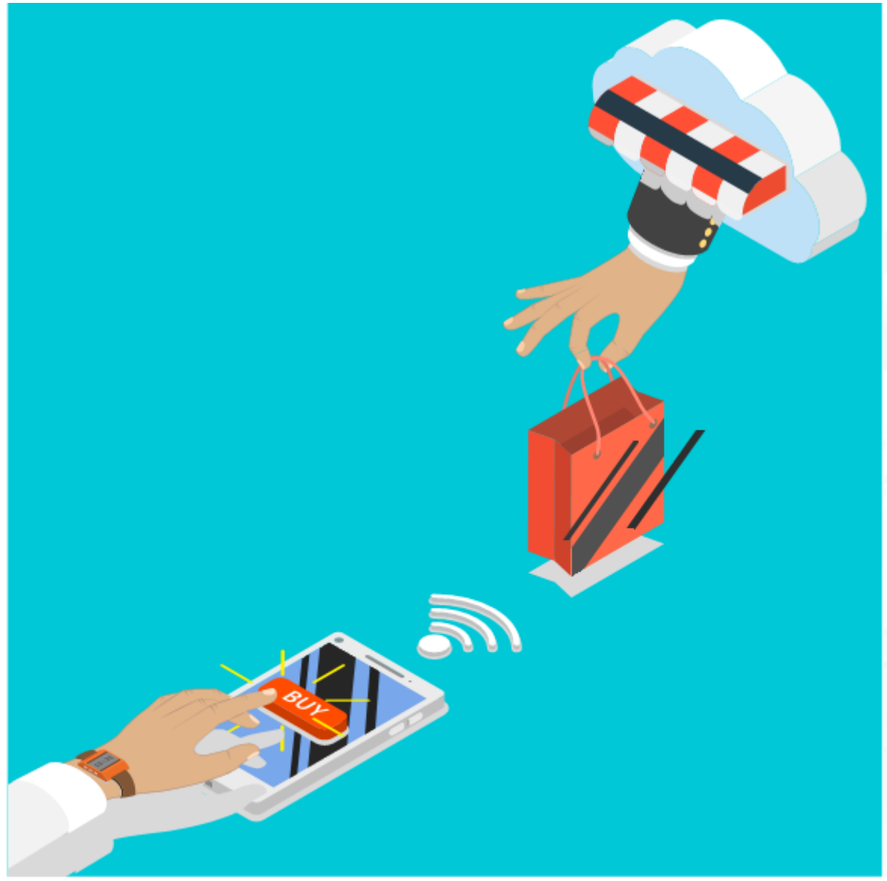
Cloud computing can help finances by:

- Providing cost-effective subscription models
- Reducing infrastructure and upgrade costs
- Enabling faster releases with automatic upgrades
- Improving usability of services such as reporting and predictive analysis
- Shortening planning cycles
- Enabling growth

# Retail Industry

Cloud computing can help retail businesses by providing:

- Computing resources to create custom applications
- Scalability options
- Speed
- Built-in redundancy



# Key Takeaways

- Cloud computing is a model for enabling ubiquitous and convenient on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.
- Cloud computing is a cost-effective, scalable, elastic, current, reliable, secure, metered, and self-serviced solution.
- Private, public, and hybrid clouds are the three types of cloud models.
- Cloud services are of three types:
  - Infrastructure as a Service (IaaS)
  - Platform as a Service (PaaS)
  - Software as a Service ( SaaS)
- Manufacturing and retail industries have used cloud computing to help improve and scale their businesses.