CCGC 5001 - Virtualization

Module 1: Virtualization Fundamentals

Module objectives

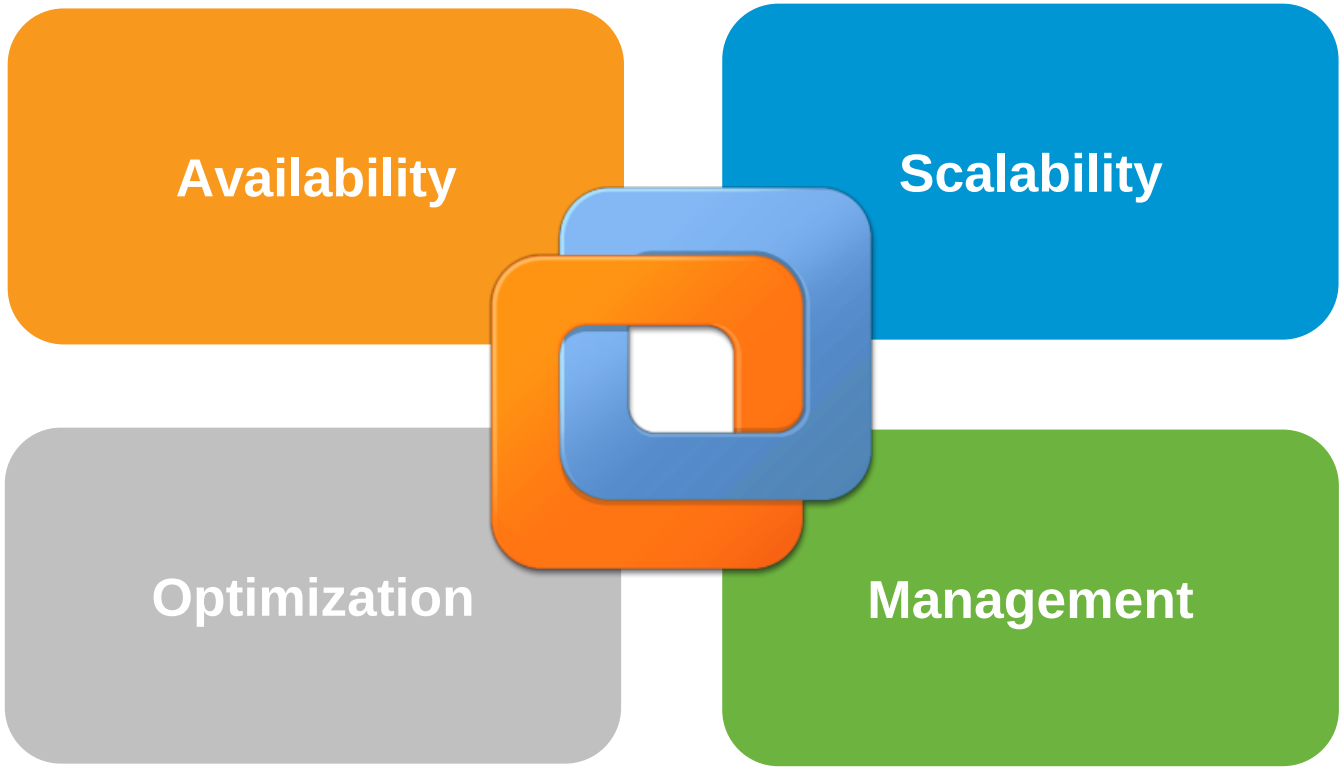
At the end of this module, you should be able to:

- Define virtualization
- Explain the business value of virtualization
- Explain virtual machine structure, layout, and operation
- Identify and describe cloud deployment and service models

Virtualization definition

- Virtualization is the process of creating a software-based, or virtual, representation of something, such as virtual applications, servers, storage and networks
- Relies on software to simulate hardware functionality and create virtual computer system
- Allows to run multiple same or different Operating Systems which is completely isolated from each other – on a single server
- Virtualization is an abstraction of computer resources

Why do we need virtualization?



Business value

- Reduced capital and operating costs
- Minimized downtime of applications
- Increased IT productivity and efficiency
- Faster provisioning of applications and resources
- Simplified data center management

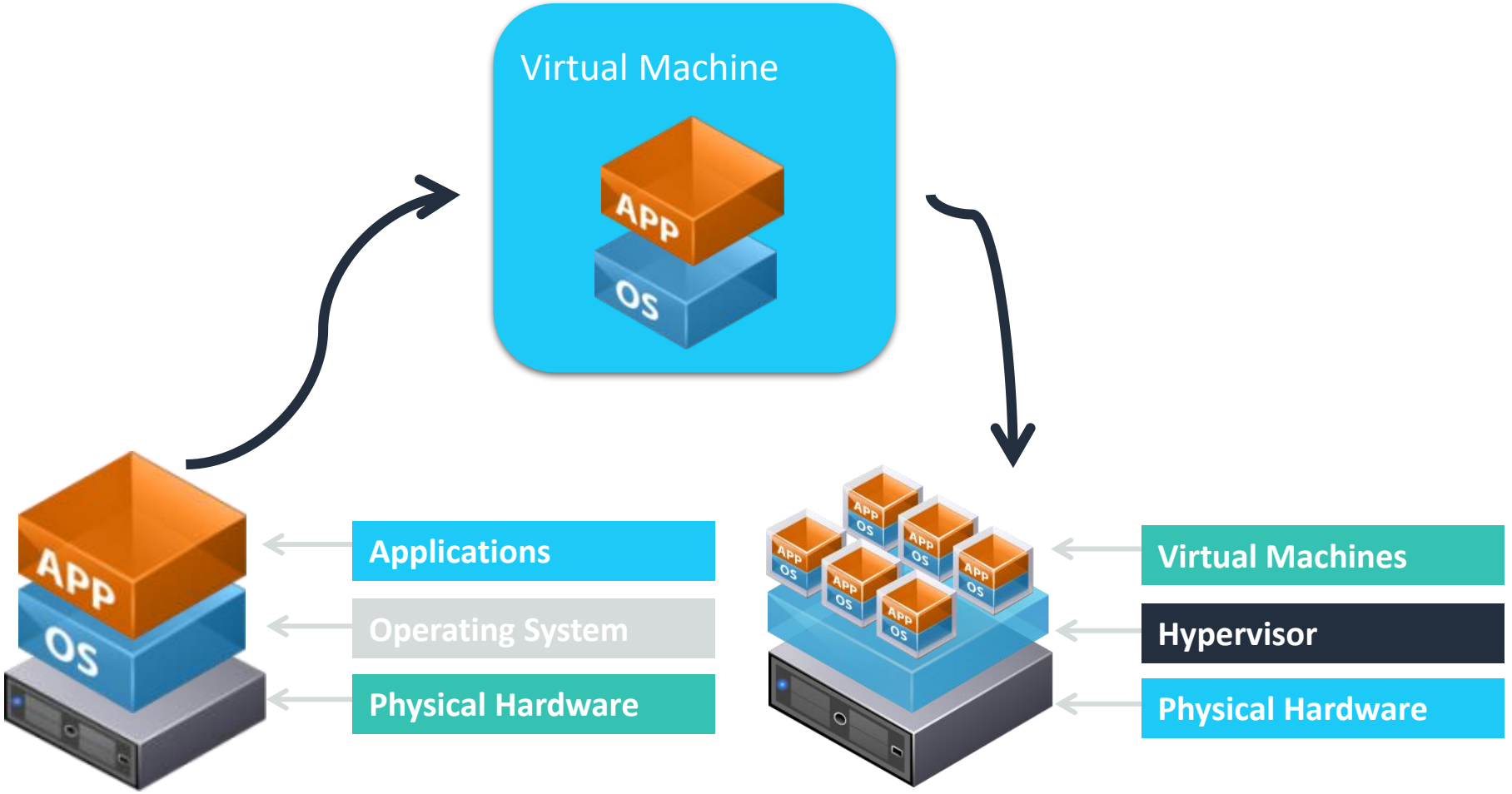
Virtual machine

A virtual machine is a software computer that, like a physical computer, runs an operating system and applications.

Virtual machine components:

- Operating system
- Virtual resources such as:
  - CPU and memory
  - Network adapters
  - Disk controllers
  - Parallel and serial ports

Virtual machine

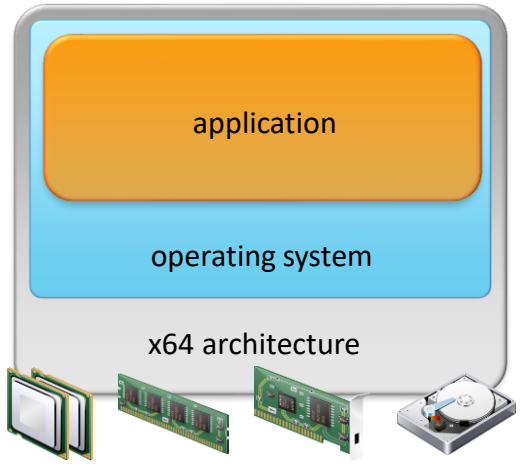


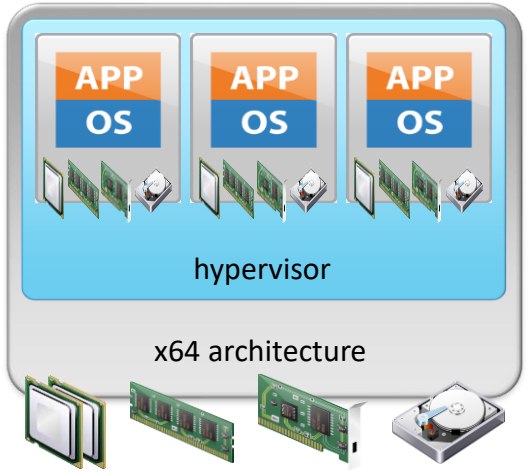
Virtual machine

Can run its own OS as though it were running on a dedicated computer

Supports multiple OSs on a single computer

Architecture





Physical:

- System interacts directly with the installed hardware
- Schedules processes to run, allocates memory to applications, sends and receives data on network interfaces and reads from and writes to attached storage devices

Virtual:

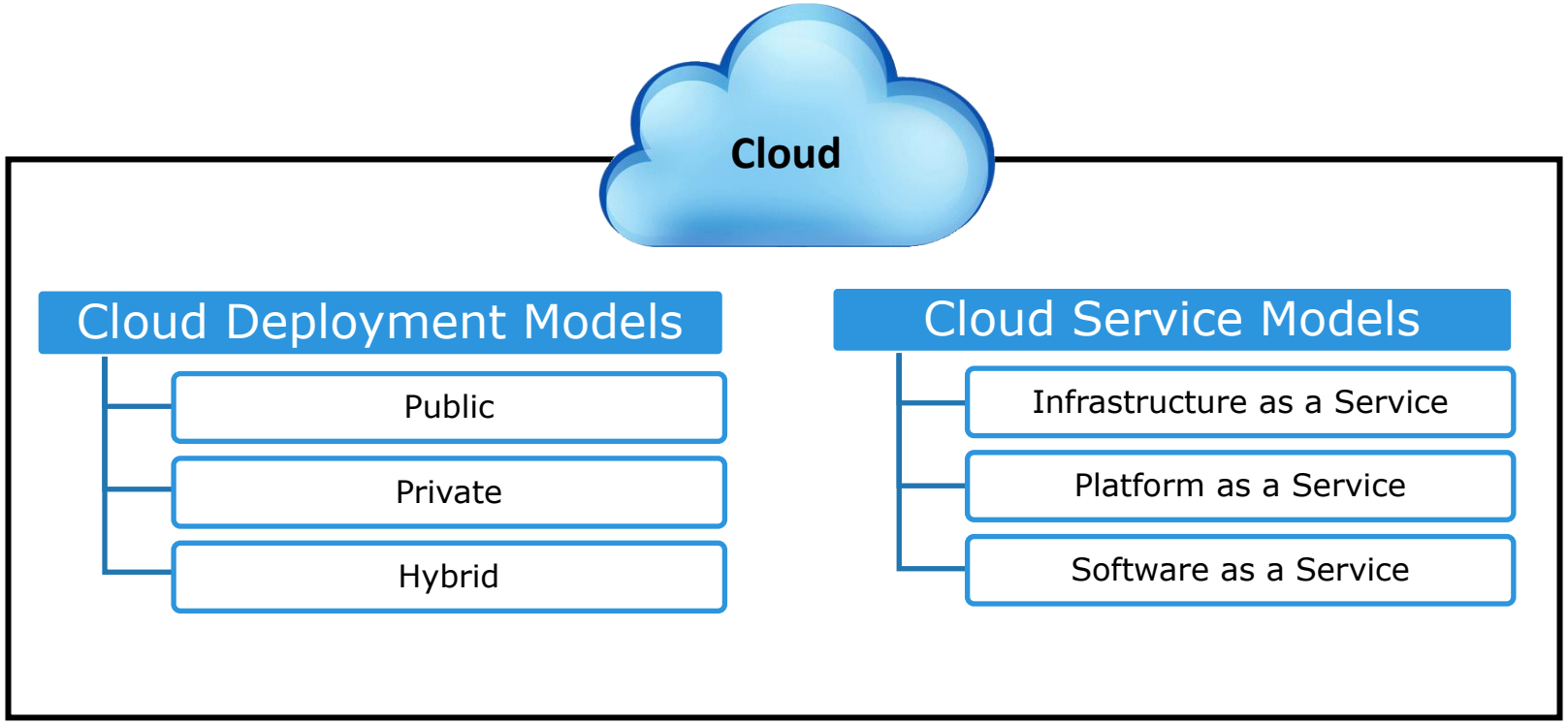
- Hypervisor provides physical hardware resources dynamically to VMs as needed
- Hypervisor enables VMs to operate with a degree of independence from the underlying physical hardware

VMs deployment

What is Cloud computing?

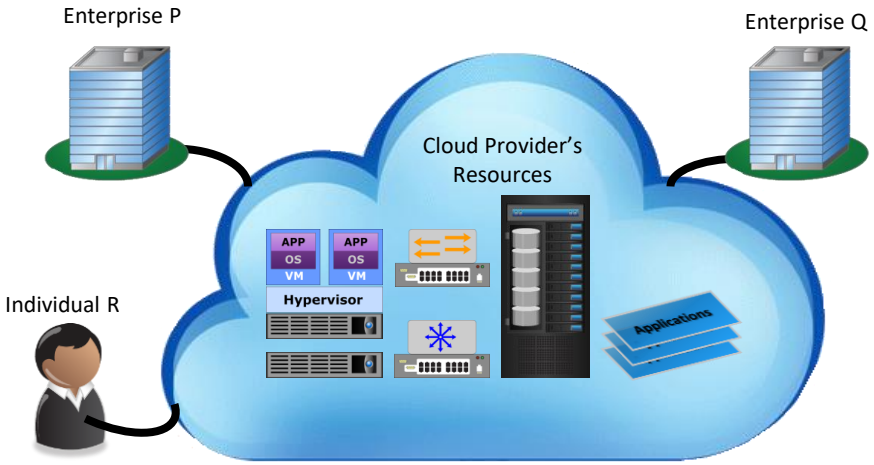
Cloud computing enables you to stop thinking of your infrastructure as hardware, and instead think of it (and use it) as software.

Cloud service and deployment models



Public cloud

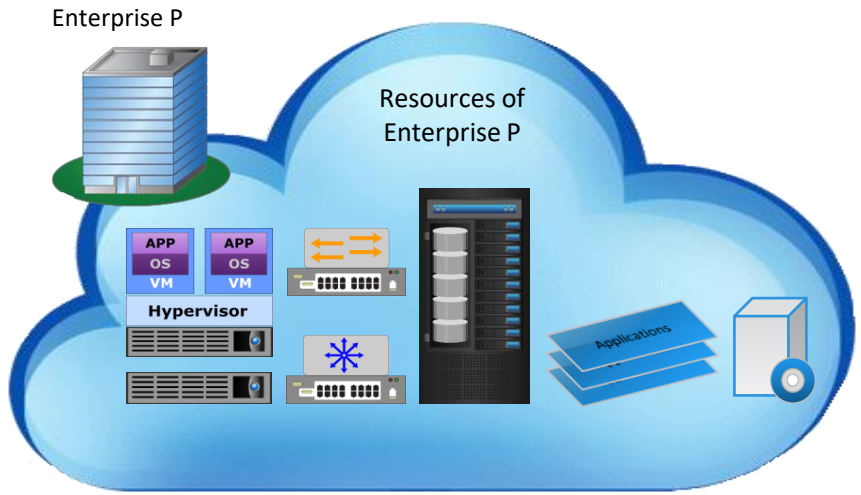
The cloud infrastructure is provisioned for open use by the general public.



Public Cloud

Private cloud

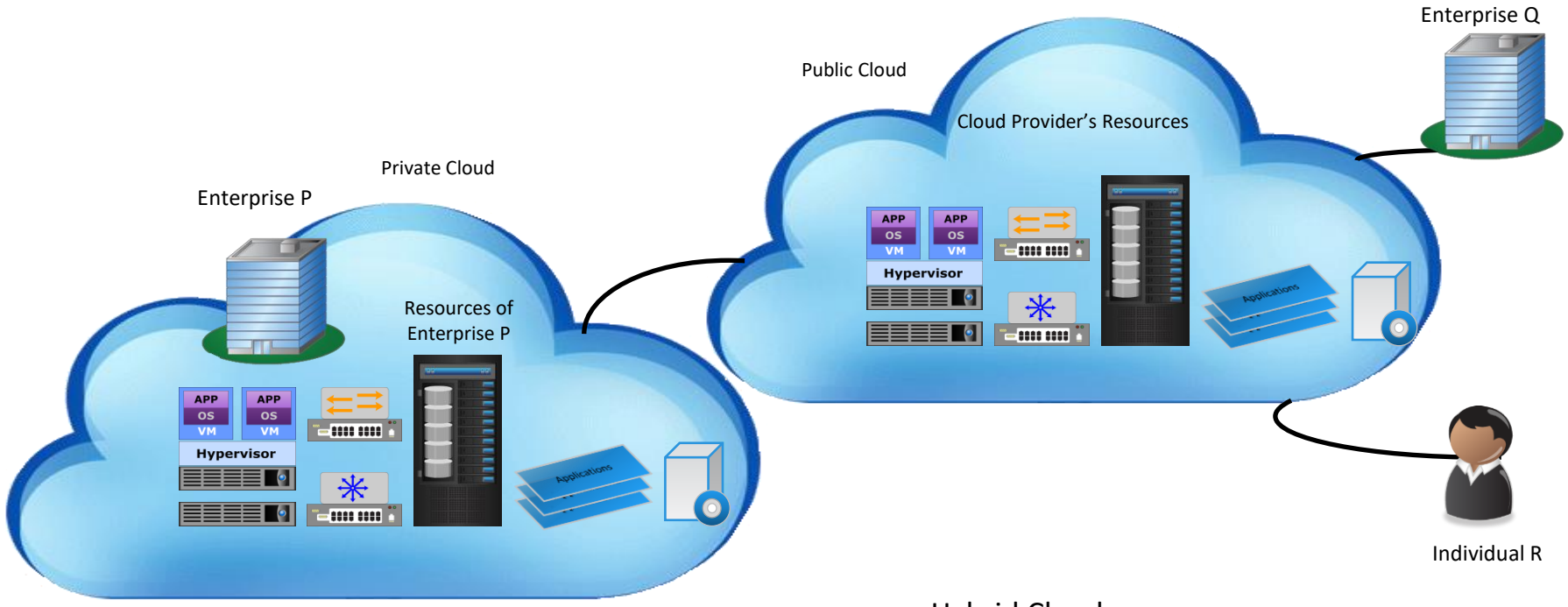
The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers - for example, business units.



On-premise Private Cloud

Hybrid cloud

The cloud infrastructure is a composition of two or more distinct cloud infrastructures such as private, community, or public.



Hybrid Cloud

Infrastructure as a service (Iaas)

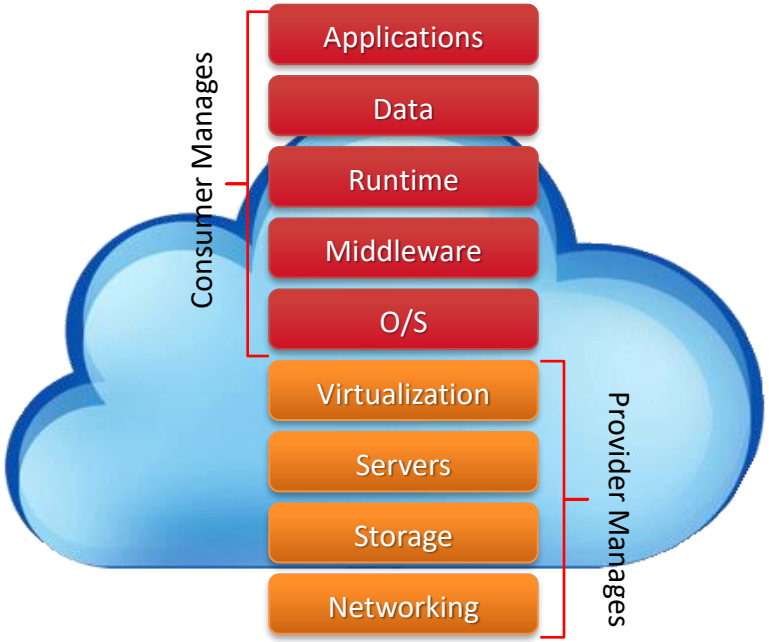
- Provides capability to the consumer to hire infrastructure components such as servers, storage, and network
- Enables consumers to deploy and run software, including OS and applications

IaaS Examples:

Amazon EC2, S3

Azure Virtual Machines

Google Compute Engine



Infrastructure as a Service (IaaS)

Platform as a service (Paas)

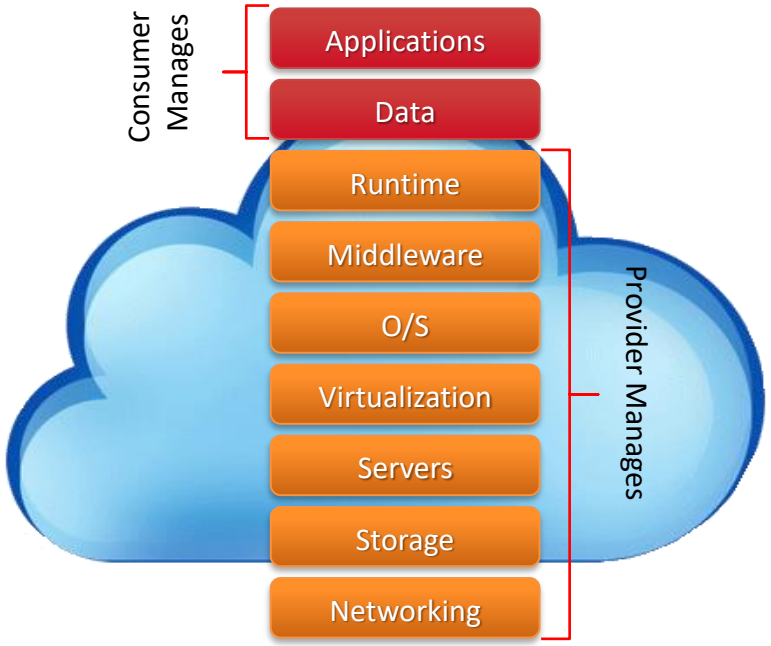
- Capability provided to the consumer to deploy consumer-created or acquired applications on the provider's infrastructure
- Consumer has control over
  - Deployed applications
  - Possible application hosting environment configurations

PaaS Examples:

Google App Engine,

AWS Elastic Beanstalk

Microsoft Azure



Platform as a Service (PaaS)

Software as a service (Saas)

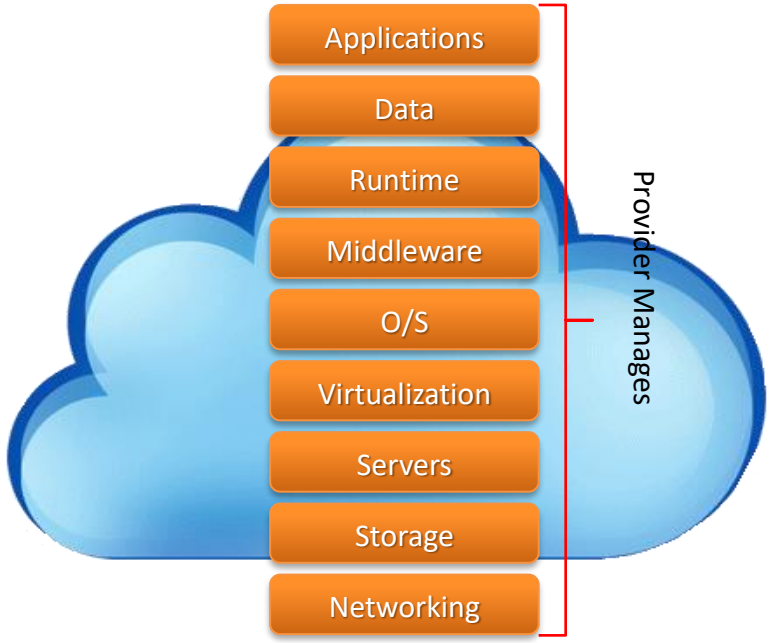
- Capability provided to the consumer to use provider's applications running in a cloud infrastructure
- Complete stack including application is provided as a service
- Application is accessible from various client devices, for example, via a thin-client interface such as a Web browser

SaaS Examples:

Salesforce.com

Google Apps

Microsoft Office 365



Software as a Service (SaaS)

Module summary

In summary, in this module, you learned:

- Virtualization technology and the benefits it brings to businesses
- Virtual machines and their architecture
- Cloud deployment and service models

Thank you