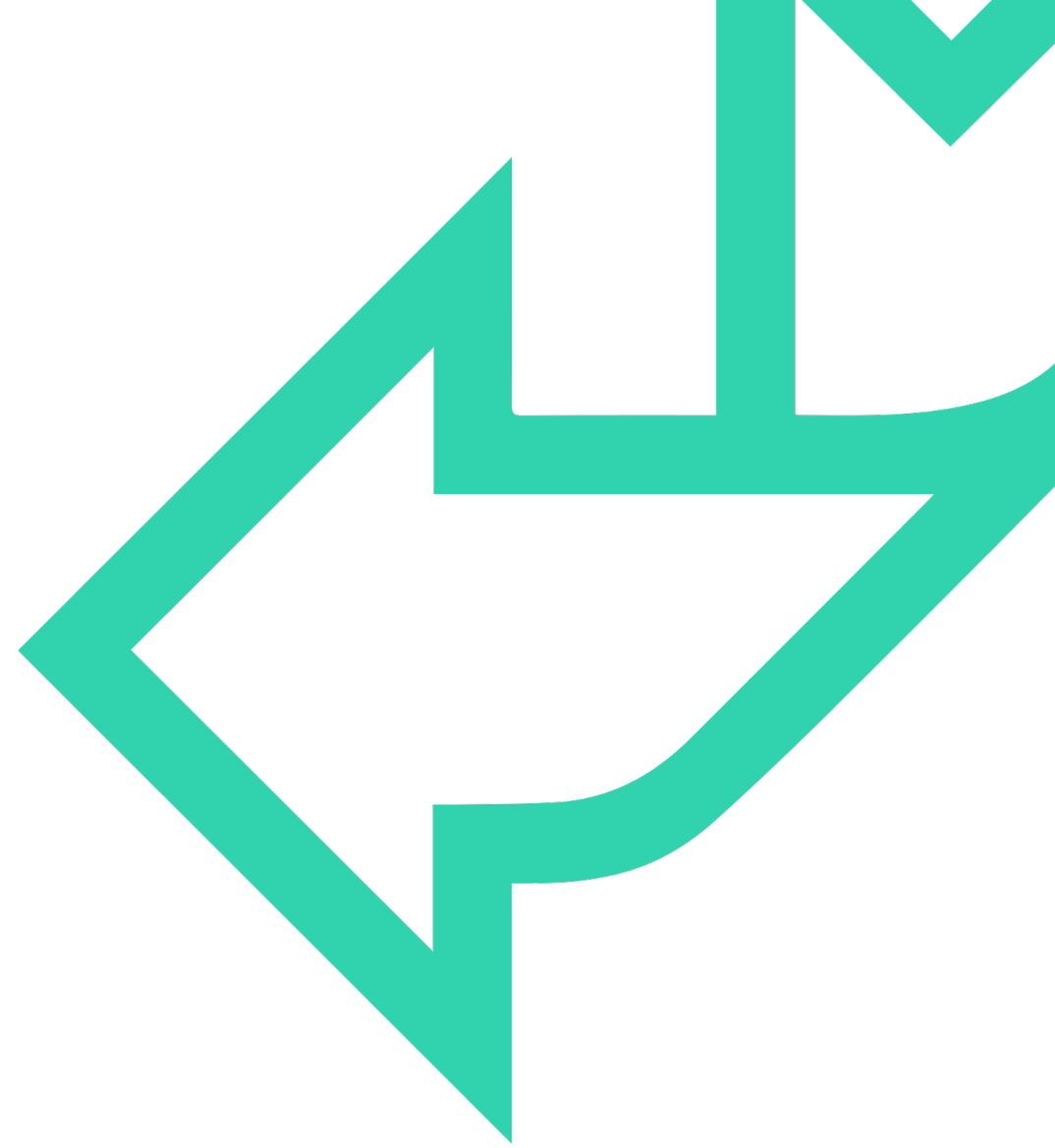# Introducing the Cloud

Module 5 – Continuous Integration

WHAT IS THE CLOUD?

NIST (National Institute of Standards and Technology) define the cloud as the below:

"Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

Characteristics of the cloud:

- On-demand self-service
- Consumption-based Pricing
- Broad network access
- Resource pooling
- Rapid elasticity
- Auto-scaling
- Measured service
- Fault Tolerance
- Economies of Scale

CLOUD CHARACTERISTICS

On-demand self service

All cloud providers have a dashboard through which the customers can control the services that the provider offers whenever they wish to control them i.e. *on-demand*.

Consumption based pricing

The **consumption-based pricing** model is a payment scheme where the customer pays according to the amount of resources used.

Broad network access

Broad network access refers to access to resources over *standard network mechanisms*. This would generally mean standard protocols like HTTP or TCP.

Resource pooling

Cloud services are provided to multiple tenants (users, applications) by a pool of interchangeable resources.
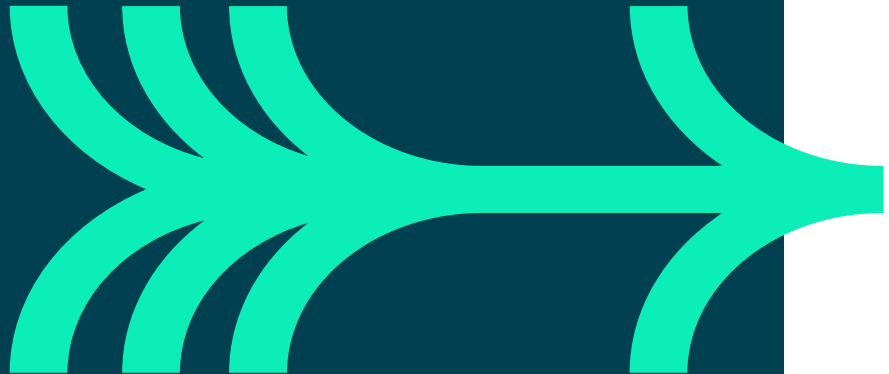
Rapid elasticity

Elasticity is a fundamental property of the cloud.

The ability to use exactly the resources you need, without either under-provisioning or excessively over-provisioning, is one of the key benefits of cloud services. This in turn allows the customer to scale in and out with demand.

CLOUD CHARACTERISTICS

Auto-Scaling

Auto-Scaling is a cloud computing feature that enables organizations to scale cloud services, such as server capacities or the number of virtual machines, up or down automatically, based on some defined situations such as traffic levels or utilization levels.

Measured service

If resources are being dynamically provisioned, it's essential that the customer should be able to monitor the performance and usage of those resources in real-time.

Fault tolerance

This is the ability for your application to function even if one or more pieces in any layer fails. In the cloud, fault tolerance can be achieved via auto-scaling, as well as utilising multiple geographical zones.

Economies of scale

Cost advantage experienced by companies when the level of output increases is known as *Economies of scale*. This advantage comes from the relationship between per-unit cost and the quantity produced.
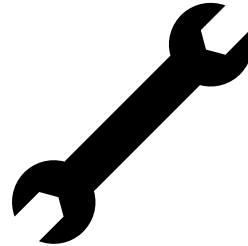
Benefits of the Cloud

Some of the benefits of using cloud computing are listed here. Whilst this is not a be-all, end-all list, these are some of the key reasons as to why we should use cloud computing.

Can you think of any others?
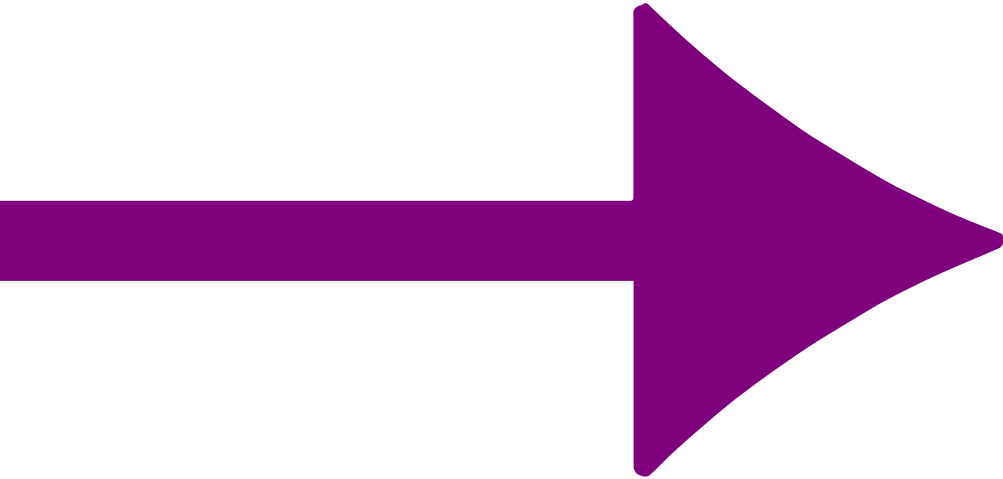
- High Availability

- Fault Tolerance

- Disaster Recovery

- Agility

CLOUD SERVICE TYPES

IaaS: Infrastructure as a Service

- Customer can provision computing, storage and network capacity
- Deploy and run arbitrary applications, including operating systems
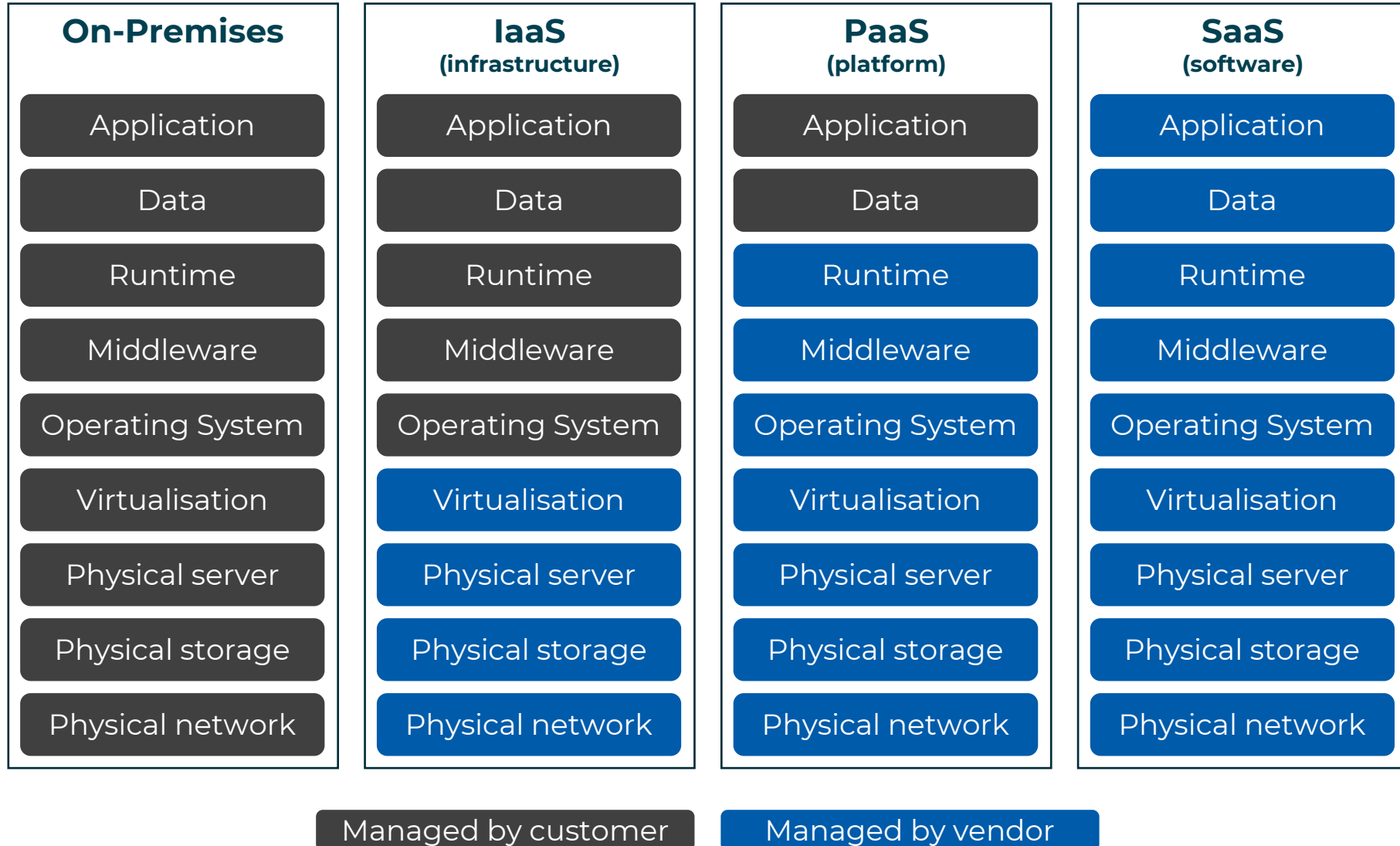
PaaS: Platform as a Service

- Typically built on top of IaaS
- Customer deploys custom apps, but has limited access to the hosting environment

SaaS: Software as a Service

- Typically built on top of PaaS
- Customer uses existing applications hosted in the cloud and has access to user-specific configuration settings, but not to any other configuration or deployment capabilities

Service type responsibilities

On-Premises	IaaS (infrastructure)	PaaS (platform)	SaaS (software)
Application	Application	Application	Application
Data	Data	Data	Data
Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware
Operating System	Operating System	Operating System	Operating System
Virtualisation	Virtualisation	Virtualisation	Virtualisation
Physical server	Physical server	Physical server	Physical server
Physical storage	Physical storage	Physical storage	Physical storage
Physical network	Physical network	Physical network	Physical network

Managed by customer   Managed by vendor

7

END OF SECTION