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Cloud Enabling Technologies

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Overview

In this module you will learn what technologies allow cloud services to work.

Fast wide-area networks

Wide Area Network (WAN) is a telecommunication network that is spread over a large area.

The most commonly known WAN is the internet.

Houses, villages, cities, countries and continents are all connected together.

In order to get the location-independence of the cloud, you need a fast WAN. Otherwise the users and the servers all need to be physically close, or connected by a dedicated network.

With a fast, wide-area network, we can support users in many different locations, and we can support high -availability disaster recovery solutions that would previously have been unworkable.

Disaster recovery

Disaster recovery is the strategy of backing up and having the ability to restore and maintain electronic records in a cloud environment.

This is important if you want to be prepared for a man-made or a natural catastrophe.

Cloud providers have these strategies in place for it's clients, of course that comes as an additional cost. You could be charged based on bandwidth, storage space or pay-per-use.

You could implement these strategies, but before implementation there are a few things to consider:

- Is the bandwidth fast enough to move the data between primary site and the cloud
- Can the data be encrypted in flight

Powerful, inexpensive server computers

In order to get the pool of interchangeable resources required by a cloud, we need to be able to buy lots of servers that are configurable, and they need to be reasonably powerful.

Building a data centre is a specialist skill, and there are standards and bodies of knowledge related to it.

<div><div></div><div>Infrastructure-as-a-Service (IaaS)</div></div> <div><div></div><div>Platform-as-a-Service (PaaS)</div></div> <div><div></div><div>Software-as-a-Service (SaaS)</div></div> <div><div></div><div>Public Cloud</div></div> <div><div></div><div>Private Cloud</div></div> <div><div></div><div>Hybrid Cloud</div></div> <div><div></div><div>Regions and Availability zones</div></div>
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AWS Intermediate
Linux
DevOps
Jenkins Introduction
Jenkins Pipeline
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IDE Cheatsheet

Data centres are becoming increasingly efficient and cheap, to the extent that it is possible to get a containerised **modular data centre** shipped to you.

When choosing a cloud provider, they should be able to document the standards to which their data center adheres.

TIA-942 and Uptime Institute are the two best-known examples.

Benefits of virtualization

Benefits can include:

- Elasticity/scalability
- Resource pooling on common infrastructure
- More efficient use of physical resources
- Granularity of monitoring and pricing
- No leakage of data from one guest to another

Noisy neighbours – one guest using all the bandwidth/CPU/etc and the servers all need to be physically close, or connected by a dedicated network.

Virtualization VS Multi-Tenanting

Virtualization is a type of multi-tenanting, in that it allows multiple users to share a single physical resource. It does this by separating the users at the hypervisor level.

- Namely, every customer has their own virtual machine, from the OS up

However, when we use the term multi-tenanting, we usually use it to refer to application-level separation of users within a single virtual machine.

- The virtual machine is hared by many customers
- Isolation is enforced by the application

Software-as-a-service is frequently multi-tenant, for Cloud services such as Gmail

- **My webmail provider almost certainly uses virtualisation, but when I log on, I don't get a virtual machine all to myself. Instead, the application prevents me from seeing other users email**

Containers

Subdivide a single virtual machine, which results in less overhead than creating multiple VMs:

- Does not require hardware support or emulation
- Containers are isolated at the user (as opposed to kernel) level

Docker is the best-known container technology [docker.com](#).

Package an application and its dependencies as a unit.

- Run on any Linux server: flexible and portable
- Windows support expected soon
- Integrated into many other cloud products

Tutorial

List all the cloud enabling technologies you have learned about in this module

► Show Solution

Can you implement disaster recovery for on-premises hosting?

► Show Solution

List out the benefits of virtualization

► Show Solution

Exercises

There are no exercises for this module.