* Hot Topic *

Cloud Computing

What is Cloud Computing?

↳ refers to the use of resources that are offerd as services over the internet and that are shared (eg. processing power of a single server shared between many users)

→ store files / use web-based email or programs that run on servers on the internet.

"in the cloud" = on internet

Involves:

1. Paying a subscription fee
2. access scalable computing resources or software
3. remotely, using the internet.

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- doesn't matter in what physical location data is stored or processed
- data + processing power will always be accessible everywhere as long as you have an internet connection.
- data + processing power will always be available no matter what device as long as has internet
- Size of the storage + processing resource are not fixed but scalable (shrink or expand to your needs)

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- need fast, reliable internet connection to access storage and processing resources
- The computers, services + resources do not belong to you + you have to pay a fee or be given access to use them

Examples of Cloud Computing

* Online Storage - File Syncing *

(dropbox, icloud, Onedrive, Google Drive)

→ used to store files on the internet

→ store files you want to:

- access from multiple devices
- share with others
- make a duplicate copy off site (like a backup) not as good as real backup service

→ accessible from any device with an internet connection.

→ most syncing services have a web interface (all you need is a browser to access files) as well as a custom app that integrates with your OS's file system + manages the syncing without you having to do anything.

does not offer incremental structure of security and ∴ should not be used to back up

→ don't install on public computer bc files would be available to everyone

→ works best when you download + install a local app + set it up so that a specific folder on your computer is automatically synched.

↳ any file / subfolder is updated / uploaded

Charge: usually offer a free version with limited storage - can upgrade to more by paying monthly subscription fee (per Gb)

see how it works

* Online Storage - Backup *

((arbonite, Acronis)

↳ meant to be used to backup data that you only access when disaster strikes

(not like syncing - virtual hard drive where you can access, add + delete)

→ automate a proper backup schedule

→ 1st back up drive (or specific folders)

↳ then incrementally add duplicates as files change (need to store more data but has less data traffic)

↳ have access to file history + have access even if deleted on computer.

→ data is encrypted (only you can access + decrypt) = increased security

Charge: subscription per user/comp not size

* Media Repositories *

↳ Sale online storage location (Itunes, Amazon, etc)

→ allow you to buy media and provide 'cloud access' to it.

↳ don't need to download, instead, just need to connect to the 'cloud'.

→ always have access to all your media, no matter what device or how much storage you have.

→ popular in countries where connectivity is cheaper + faster than SA.

→ difference between backup + syncing = don't keep an individual copy of files for each user.

↳ keep a single copy + control who has access based on contents of their music libraries.

Charge: yearly fee to have access to all your media in the cloud (limited amount of storage to free + pay more depending on size of library)

↗ unless you have v. fast broadband connection, work better for relatively low bandwidth media (music) as opposed to movies.

* Cloud Applications *

↳ Software where most of the processing is done online. (i.e by one or more servers online)

(Gmail + Facebook)

→ may have an installable front-end or 'interface' part of the program that is stored and run locally or it might run entirely as a page in a Web browser (even the app interface is created + managed in the cloud)

① Google Docs, Office 365 + iWork

↳ Office software that you can run from any machine.

→ OS doesn't matter as long as you have a browser + internet connection

* Apps for Office + iWork that can be installed locally are not examples of cloud computing *

Charges: GD = free
iW = free with Apple ID
Office = subscription fee

② 123D Catch (AutoDesk) / Microsoft Photosynth

↳ demonstrate the ability of online servers with higher processing power to do things that cannot be done on your local device

- 123D Catch - allows you to take photos of real-world objects + automatically convert to digital 3D objects that you can use in 3D software on your computer.
- Photosynth - allows you to upload photos taken @ any zoom, angle, etc of a location and have all photos of that location stitched together to create a panable + zoomable mega-panorama of the scene. You can also create a 3D view of the scene.

→ free

→ use power of multiple servers to achieve in minutes what would take days on your own device.

↳ examples of **Consumer** cloud apps.
= easy for anyone to see and try out.
Majority of cloud computing is business or service orientated.

③ General Business Apps

(Salesforce.com)

↳ Software written to fit a businesses specific needs.

→ business software (CRM, HR, accounting software, etc) have cloud-based alternatives to off-the-shelf or custom created solutions.

Software as a service

↳ rent software instead of buying a license to use it forever

→ business model - it has more to do with how you pay for the software than with the software itself.

→ before SaaS, you never owned software that you bought - you only paid a once-off fee for the right (or license) to use that software for the rest of your life. That license only applied to the version of the software that you bought and not to any future upgrades of the software.

→ SaaS means that you have the right to use the latest, most up-to-date version of a program for as long as you are paying a monthly subscription fee.

* Cloud-based apps *

↳ software runs on remote servers.

→ pay a monthly or yearly fee to access + use the software.

→ don't have to install locally

→ no specific hardware exp. fast internet connection.

↳ you have to be connected to the internet to use.

(Salesforce + any paid cloud-based app)

→ stop paying rent = no access

↳ login won't work

Renting
= paying a fee to access something for a fixed amount of time - cost depends on length of rental

* Downloadable, locally installed apps *

→ rent and download + run on your computer

↳ cheaper than buying and upgrading the software.

→ needs internet only once a month to check if the fee has been paid.

↳ charged by software creator.

→ don't pay = stop working or go to 'demo' mode (selected features)

→ have to install updates + make sure computer is strong enough to run

→ subscription = immediate access to latest versions when available.

→ don't need to be connected to internet to use + data can be stored locally

→ usually include some sort of cloud-based storage = access files on any device.

(Adobe Creative Cloud + Office 365)

* Integrated Products *

↳ combine cloud-based software + locally installed software

eg) Office 365

- install Office apps to up to 5 devices
- install mobile apps to up to 5 tablets
- use cloud versions on any computer with browser.
- access a specified amount of cloud storage to save documents + access from any version of office you choose to use.

* MMORPGs *

↳ massively multiplayer online role playing games

(World of Warcraft)

→ download + run on local computer but play online in a world managed by the gaming companies' servers

→ share world with all players

→ can only play if you pay the fee.

Cloud Computing's effect on Hardware

→ processing, storage + data communication

→ local hardware does not need huge amounts of storage or processing power - functions can be transferred to computing resources online.
↳ you can use same processing power and storage regardless of type + specs of device.

→ data communications + a fast, reliable broadband connection = important.

→ pay less for hardware but have higher running costs because of monthly fee for broadband + cloud service.

Virtualisation

→ exists only as an idea or perception - user sees only the effect it has.

→ CC relies heavily on virtualisation

→ Cloud services:

- split resources of powerful machines between many users (makes it appear that you have access to own storage or web server but actually sharing a single powerful server computer or large Network Attached Storage (NAS) with others)
↳ 'virtual server'

or

- combine the resources of many machines to create a super-powerful service that can - using virtualising tech - appear to be a single machine
↳ both present user with what appears to be a single computer but is a virtual machine.

Risks + Benefits

Renting = relying on service provider to:

- stay in business or warn you + allow you recover data if they don't
↳ + find alternative service provider
- keep your data safe from hackers
- good backup policies to ensure your data is safe if disaster strikes
- not 'oversell' their services (take on more customers than their resources can manage = low quality service)

Cloud computing software/resources:

- need a good internet connection
- only available as long as providing company exists (you can use locally installed software even if company goes bankrupt)
- only available as long as paying 'rent'

★ SLA (Service Level Agreement) ★
is a must when one party provides a service to another. Content depends on type of service

④ Outsources maintainance + upgrades of hardware
→ don't have to worry about buying hardware or repairing + maintaing
→ support or service staff keep running
↳ reduces cost of hardware

+

① Scalability
↳ ability to increase or decrease in size + power quickly + efficiently
→ all cloud services are virtual = instantly increase or decrease processing power or storage capacity depending on needs.
eg) Blog goes viral
↳ hosted by a cloud-based service + have 'virtual server'
- traffic increasing = 'virtual server' is provided with extra processors, bandwidth + memory
- traffic = normal = virtual server goes back to using only pot of processing pwer of a single CPU + sharing memory + bandwitch with other 'virtual servers'
↳ server provider monitors usage + will increase fee if higher usage persists.

② Ubiquity
↳ everywhere, all the time as long as you have an internet connection
→ not limited to time or location
→ always access storage + processing services you subscribed to.

③ Collaboration
→ software not limited to a single machine = multiple people can access + work together @ once

⑤ Outsources software installation + upgrades
→ big businesses = keeping software up to date is expensive + time consuming (OS, patches, drivers + apps)
→ cloud computing = on server + managed by service provider ∴ all update @ same time + work on same version
↳ company doesn't need to buy + install.