

# IT Technologies:

## Assignment 2-Group#24

There are a lot of fascinating developments going on in the IT world, many of which may fall by the wayside, but some of which are likely to change the way the world works. Historic examples of such developments include the Internet, smartphones, cloud computing and public-key cryptography.

In this section you should report on 4 of the areas below.

- Clouds, services, servers
- Cybersecurity • Blockchain and cryptocurrencies
- Machine Learning • Autonomous vehicles
- Natural Language processing and chatterbots
- Robots • Raspberry Pis, Arduinos, Makey Makeys and other small computing devices

For each of the areas covered, you should report on the following:

**What does it do? (600 words):**

**What is the state of the art of this new technology?**

**What can be done now?**

**What is likely to be able to do be done soon (say in the next 3 years)?**

**What technological or other developments make this possible?**

## Report on - Clouds, Services and Servers:

“Cloud computing is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.” (Source: <https://www.futureofeverything.io/future-of-cloud-computing/>)

The concept of cloud computing was developed in the 1960's, in 2006 Amazon Web Services introduced its Elastic Compute Cloud (EC2). In the 2010's development and releases of services like Microsoft Azure, IBM SmartCloud and Google Compute Engine occurred. (Source: [https://en.wikipedia.org/wiki/Cloud\\_computing](https://en.wikipedia.org/wiki/Cloud_computing))

Cloud computing is named as such because the information being accessed is found remotely in the “cloud” or a virtual space. Companies that provide cloud services enable users to store files and applications on remote servers and then access all the data via the Internet. This means the user is not required to be in a specific place to gain access to it, allowing the user to work remotely. In fact, the use of cloud services is becoming more and more prevalent amongst both individual users, as well as businesses. The growing number of cloud network services support this, some examples of cloud networks and providers include: MS OneDrive, CertainSafe, Google Drive, Dropbox, IDrive, Apple iCloud Drive just to name a few of the growing number of networks and providers. (Source: <https://au.pcmag.com/file-syncing-and-backup-1/3696/the-best-cloud-storage-and-file-sharing-services-for-2020>)

**The advantages, benefits and efficiencies provided to users of a cloud service include the following:**

**Cost effective** - Cloud computing eliminates the need for physical data centres and server rooms on location, so cost is reduced on hardware, software, IT services and the overheads involved for maintaining a functioning data centre such as electricity and cooling. Over time the cost saving can be quite substantial when using a cloud service over the conventional data centre. For individuals this allows them access to the cloud services without the cost involved with the running of conventional data centres and expenditure on expensive data storage hardware while allowing for access to the cloud service.

**Speed** - cloud computing services generally provide self service and on demand, where computing resources can be accessed for use in a matter of minutes, typically with just a few mouse clicks, giving individuals and businesses a lot of flexibility in accessing large amounts of data in a timelier manner - especially with deadlines looming.

**Global scale** - cloud computing services include the ability to scale elastically. Which means delivering the right amount of IT resources - for example, more or less computing power, storage, bandwidth - as required and from the right geographic location, allowing for effective service and troubleshooting for both businesses and individuals.

**Productivity** - on-site data centres typically require a lot of “racking and stacking” - hardware setup, software patching, and other time-consuming IT management chores. Cloud computing removes the need for many of these tasks, so IT teams can spend time on achieving more important business goals. For individuals this allows them access to the cloud services without the cost involved with the running of conventional data centres, allowing for the focus to be on productivity.

**Performance** - the biggest cloud computing services run on a worldwide network of secure data centres, which are regularly upgraded to the latest generation of fast and efficient computing hardware. This offers several benefits over a single corporate data centre, including reduced network latency for applications and greater economies of scale. Individuals are also able to access this to take advantage of the performance offered by a cloud service.

**Reliability** - with the movement away from physical storage such as server rooms and storage devices such as; hard drives; mobile phones; USB drives etc. Data is more readily accessible with the improved ability for data backup, disaster recovery, and business continuity through a cloud network. Dramatically reducing the likelihood of any data loss.

**Security** - many cloud providers offer a broad set of policies, technologies, and controls that strengthen your security posture overall, helping protect your data, apps, and infrastructure from potential threats. This benefits both individuals as well as business organisations. (Source: <https://azure.microsoft.com/en-us/overview/what-is-cloud-computing/#cloud-computing-models>)

**Disadvantages of this technology include the following:**

With all of the speed, efficiencies, and innovations that come with cloud computing, there are, naturally, risks.

Security has always been a big concern with the cloud especially when it comes to sensitive medical records and financial information. While regulations force cloud

computing services to shore up their security and compliance measures, it remains an ongoing issue. Encryption protects vital information, but if that encryption key is lost, the data disappears.

Servers maintained by cloud computing companies may fall victim to natural disasters, internal bugs, and power outages, too. The geographical reach of cloud computing cuts both ways: A blackout in California could paralyse users in New York, and a firm in Texas could lose its data if something causes its Maine-based provider to crash.

As with any technology, there is a learning curve for both employees and managers. But with many individuals accessing and manipulating information through a single portal, inadvertent mistakes can transfer across an entire system.

### **There are 4 types of cloud services: IaaS, PaaS, Serverless, and SaaS**

Knowing what they are and how they are different makes it easier to accomplish business and individual goals. Each service is stackable and progresses from the most basic IaaS to a completely virtual service (SaaS). Regardless of the kind of service, cloud computing services provide users with a series of functions including: email; storage, backup, and data retrieval; creating and testing apps; analyzing data; audio and video streaming; delivering software on demand.

#### ***Infrastructure as a service (IaaS)***

The most basic category of cloud computing services. With IaaS, you rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems

#### ***Platform as a service (PaaS)***

Platform as a service refers to cloud computing services that supply an on-demand environment for developing, testing, delivering, and managing software applications. PaaS is designed to make it easier for developers to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network, and databases needed for development.

#### ***Serverless computing***

Overlapping with PaaS, serverless computing focuses on building app functionality without spending time continually managing the servers and infrastructure required to do so. The cloud provider handles the setup, capacity planning, and server management for you. Serverless architectures are highly scalable and event-driven, only using resources when a specific function or trigger occurs.

#### ***Software as a service (SaaS)***

Software as a service is a method for delivering software applications over the Internet, on demand and typically on a subscription basis. With SaaS, cloud providers host and manage the software application and underlying infrastructure, and handle any maintenance, like software upgrades and security patching. Users connect to the application over the Internet, usually with a web browser on their phone, tablet, or PC. (Source: <https://azure.microsoft.com/en-us/overview/what-is-cloud-computing/#cloud-computing-models>)

The general consensus amongst IT professionals, CIO's and CEO's of the use of cloud computing and its future, is the adopting of hybrid IT solutions – the utilisation of public cloud and private cloud networks, with the gradual phasing out of physical on premises IT infrastructure.

“Traditional data centers and the traditional model of delivering IT services will become extinct. The days of building your own data center, owning your own equipment and installing/updating hardware will leave us rapidly. There will be some on premise solutions, but that will diminish dramatically.” (Source: David Hartley, Virtual CIO & Principal, Technology Advisory Services for UHY LLP, <https://www.futureofeverything.io/future-of-cloud-computing/>)

### **What is the likely impact? (300 words)**

**What is the potential impact of this development?**

**What is likely to change? Which people will be most affected and how?**

**Will this create, replace, or make redundant any current jobs or technologies?**

As has already been outlined, the development of cloud technology has changed the technological landscape of Information Technology.

Mike Smith (Founder of AeroComInc.com) foresees the following changes and developments in the industry:

“In the next 15 years, the biggest change we’ll see is 50% of small companies (with 1-500 employees), doing away with buying computer towers and servers and instead, adopting Desktop as a Service (DaaS), as the method for deploying workstations to employees. Companies will simply buy a monitor, keyboard, mouse and a thin client (which basically controls the keyboard, mouse & monitor), for each workstation. All of the desktop appearance, applications and compute functionality will be handled by a 3rd party cloud provider.

This will allow employees to essentially have the exact same computer appearance, regardless of the device or their location. It will also allow companies to more easily manage the deployment and security of computers and applications, across all devices and locations.

Furthermore, companies will never have to worry about having the latest version of any major productivity software, such as Office, Adobe, etc.” (Source: <https://www.futureofeverything.io/future-of-cloud-computing/>)

The most notable change will be the movement away from on-site physical servers and data centres and even the possible reduction in storage space and memory in personal devices – with data storage readily accessible via an internet connection.

Budding developers and application creation (and hosting) will become more prevalent, in particular with SaaS. With self service and access to computing resources at your fingertips, the engaging of IT service providers will decrease over time. Likewise, for the reliance on technical support with the need for IT field technicians becoming redundant with 3rd party cloud service providers footing the bill for service and maintenance for their data centres.

### **How will this affect you? (300 words)**

**In your daily life, how will this affect you?**

**What will be different for you?**

**How might this affect members of your family or your friends?**

In my daily life, this will enable me to access any data, photos, documents etc. that I have stored on a cloud service (e.g. Google Drive). In terms of IT itself, I will be looking more at the development side that the cloud service provides (SaaS) for applications – with the

potential to create an app that will benefit others and share it. As a student I currently have access to a Canvas, which allows students to access course content and announcements, submit assignments, and receive grades and feedback (Canvas is a rapidly growing, cloud-based service that helps improve student and faculty collaboration by integrating Web services such as Google Drive, Calendar, SMS, social media and RSS – Source: <https://www.internet2.edu/products-services/cloud-services-applications/canvas/> ).

At this stage I will adopt the use of cloud services more and more over time, there will be less of a need to buy hardware and storage/memory devices, with only the basic hardware with an internet connection allowing access to a cloud with a near unlimited amount of virtual memory (at a cost). The use of clouds for collaboration, sharing and accessing of various media will be more and more relied upon because of its convenience, both personally and by businesses and organizations (potential employers).

For both family and friends, once they realise the benefits (if they aren't already utilizing a cloud service) will adopt the use of a cloud service to share, access media, store data and conduct business with the advantages it presents. I am currently aware of a family member currently using O365 (which uses the Azure Cloud) for work purposes to access the full suite of MS Office products and in particular SharePoint. The use of cloud computing is the future of IT for all users, with the innovation it brings far outweighing the disadvantages with developments in the areas it currently lacks to improve it as a whole.

## **References:**

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