**Lab 6 Jamie Walsh 13-01-2019**

1. 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.
2. **Broad network access:** Cloud services are available over a public WAN such as the internet, or a local area VLAN.

**Measured service:** Cloud computing resources usage is metered, and this enables a pay-per-use model.

**Resource pooling:** Means that multiple customers are serviced from the same physical resources.

**On demand self-service:** Cloud computing resources can be provisioned without human interaction from the service provider.

**Rapid expansion:** Ability to quickly provision resources in the cloud as manufacturing organizations need them.

1. **Software as a Service (SaaS):** Allows the user to use the provider’s applications on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. Examples: Dropbox, Cisco.

**Platform as a Service (PaaS):** is a cloud computing model in which a third-party provider delivers hardware and software tools (usually those needed for application development), to users over the internet. Examples: Windows Azure, Google App Engine.

**Infrastructure as a Service (IaaS):** The hardware and software given to the user for storage, CPUs, networks, and other fundamental computing resources where the consumer can deploy and run useful systems and applications. Example: Google Compute Engine.

1. **Scalability:** The system is capable of handling a growing amount of work in response to growing requirements from the consumer.
2. **Cost Savings:** the underlying physical hardware that supports an IaaS service is set up and maintained by the cloud provider, saving the time and cost of doing so on the client side.
3. **Newest Technology:** Avoiding technology obsolescence, with high-performance IT services as their core business, IaaS providers are very likely to tap into the latest technologies.
4. **Pay-as-you-Use:** the service can be accessed on demand and the client only pays for the resource that they use.
5. **Mobility:** The service can usually be accessed from almost any location and from multiple devices.
6. **Management interface:** The ability to Provision cloud resources, i.e. create/destroy on demand, Manage attributes of provisioned services, e.g. size, cost, performance, etc.

**Different Types:**

Command-line interfaces: High stability.

Cloud-executable scripts: medium stability.

Graphical user interfaces: easy to use.

Network-accessible APIs: difficult to use.

1. **Advantages:** There is now a credible and measurable way to estimate the cost of fulfilling increased demand for a business internet/web services. Businesses can ‘test’ the market interest before committing significant spending.

**Disadvantages:** Weak Security Story, Lack of Industry Standardisation

1. Virtualisation is the separation of OS from hardware. Without this, cloud computing could not exist as cloud computing is the separation of applications from hardware using virtualisation.

**3 Types:**

**Virtualised Networks:** Isolates cloud tenant networks for individual management and security. The user has the impression that their network is the only network attached to their compute nodes.

**Virtualised storage:** the process of presenting a logical view of the physical storage resources to a host computer system, treating all storage media as a single pool of storage.

**Virtual Machine Manager:** Creates virtual hardware on which the virtual CPU and RAM run. Just like a real computer, only synthetic. Examples: USB interfaces, Network interface cards.

1. **Container virtualisation:** offers complete name spaced-isolation of running processes, the filesystem and the network subsystem for a subset of processes running on a server, inside a container, the running application cannot see out into the host server’s resources.

**Differences:** Containers pack a lot more applications into a single physical server than a VM by providing a way to virtualize an OS so that multiple workloads can run on a single OS instance.

1. **Good Idea🡪 Ease of use**: The cloud provider takes responsibility for installing and maintaining potentially complex software stacks and increases security.

**Bad Idea🡪 Cost:** If there is an existing on-premise or IaaS-deploy application stack it would require significant rework which is a high-cost process and not suitable if a business is trying to cut costs.

1. **Function-as-a-service:** is the on-demand execution of user-defined code fragments in response to some specified event, code executes in isolated, virtual environment to completion and then unloads.

An example of a use-case is Batch processing.