



Asm1-1644 - asm

Cloud Computing (Trường Đại học FPT)

# ASSIGNMENT 1 FRONT SHEET

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<b>Student declaration</b> I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.			
		<b>Student's signature</b>	Hiệp

## Grading grid

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⚙ **Summative Feedback:**

⚙ **Resubmission Feedback:**

**Grade:**

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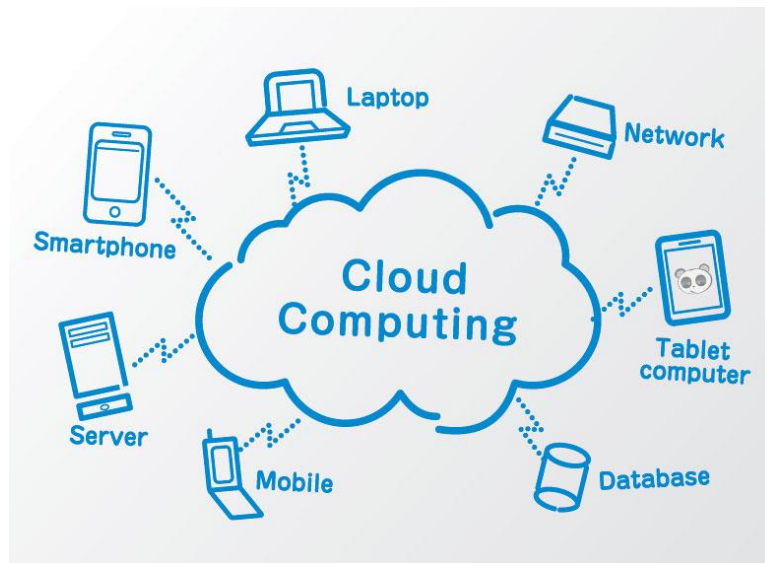
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# P1 Analyse the evolution and fundamental concepts of Cloud Computing.

## 1. Definition of Cloud Computing:

Cloud computing is on-demand access, via the internet, to computing resources—applications, servers (physical servers and virtual servers), data storage, development tools, networking capabilities, and more—hosted at a remote data center managed by a cloud services provider (or CSP). The CSP makes these resources available for a monthly subscription fee or bills them according to usage.



## 2. Benefits of cloud computing:

Compared to traditional on-premises IT, and depending on the cloud services you select, cloud computing helps do the following:

- **Lower IT costs:** Cloud lets you offload some or most of the costs and effort of purchasing, installing, configuring, and managing your own on-premises infrastructure.
- **Improve agility and time-to-value:** With cloud, your organization can start using enterprise applications in minutes, instead of waiting weeks or months for IT to respond to a request, purchase and configure supporting hardware, and install software. Cloud also lets you empower certain users—specifically developers and data scientists—to help themselves to software and support infrastructure.
- **Scale more easily and cost-effectively:** Cloud provides elasticity—instead of purchasing excess capacity that sits unused during slow periods, you can scale capacity up and down in response to

spikes and dips in traffic. You can also take advantage of your cloud provider's global network to spread your applications closer to users around the world.

The term 'cloud computing' also refers to the technology that makes cloud work. This includes some form of virtualized IT infrastructure—servers, operating system software, networking, and other infrastructure that's abstracted, using special software, so that it can be pooled and divided irrespective of physical hardware boundaries. For example, a single hardware server can be divided into multiple virtual servers.

### 3. P2P model:

In the P2P model, all end systems have equivalent capabilities and responsibilities and either party can initiate a communication session.

The participants share a part of their own hardware resources, For example, storage capacity, link capacity, CPU power. These shared resources are necessary to provide the service or content offered by the P2P network.

Thus, the participants are both resource providers and resource requestors and use similar networking programs to connect with each other.

Downlink and uplink data flow tend to be (but not necessarily) symmetric in P2P networks. This is because each connected host simultaneously operates as both client and server, thus receiving and transmitting on average the same amount of data.

The P2P paradigm does not have the notion of clients or servers, but rather equivalent peers, that act simultaneously as both clients and servers. However, with every contact session, we can always differentiate between requesting peers as "clients" and reacting peers as "servers".

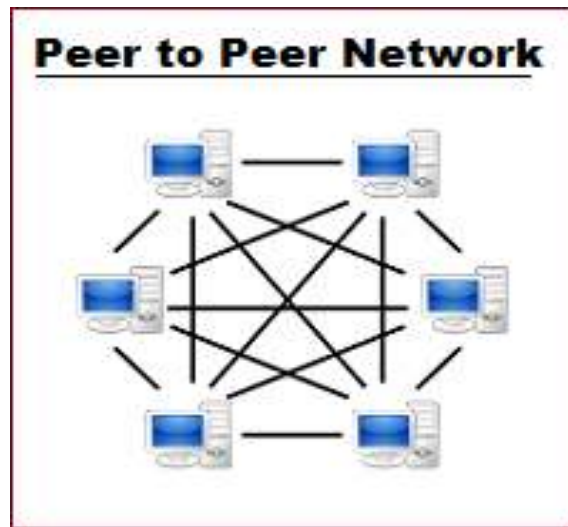
#### Benefits of P2P:

- No need for dedicated application and database servers
- Improved scalability and reliability (no single point of failure)

#### Shortcomings of P2P:

- Poor security
- Lack of centralized control

- Computers with shared resources may suffer from sluggish performance



#### 4. Client/server model

In the client/server model, all end systems are divided into clients and servers each designed for specific purposes

Clients have an active role and initiate a communication session by sending requests to servers

- Clients must have knowledge of the available servers and the services they provide
- Clients can communicate with servers only; they cannot see each other

Servers have a passive role and respond to their clients by acting on each request and returning results

Software roles

- TCP/IP uses different pieces of software for many protocols to implement "client" and "server" roles
- Client software is usually found on client hardware and server software on server hardware, but not always
- Some devices may run both client and server software

Web clients:

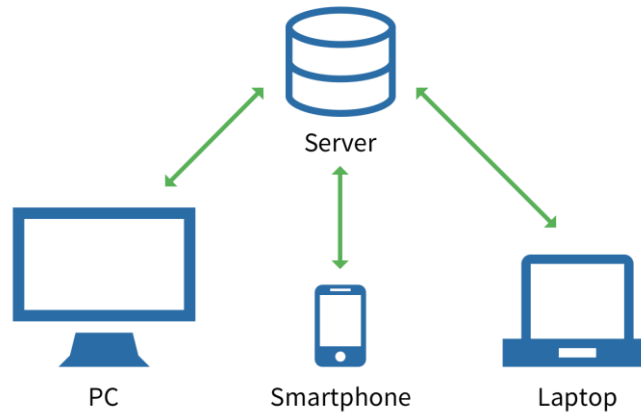
- Mozilla Firefox, Internet Explorer, Google Chrome, . . .

Web servers:

- Apache, Microsoft IIS, GWS, ...

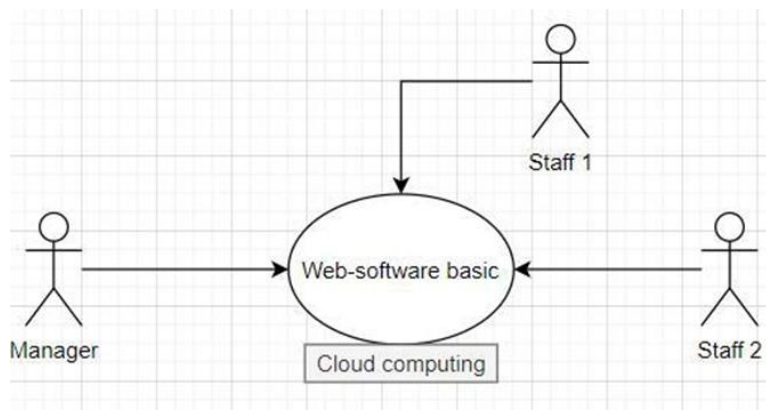
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## Client-Server Model



## P2 Design an appropriate architectural Cloud Computing framework for a given scenario.

### 1. Architectural Cloud Computing framework

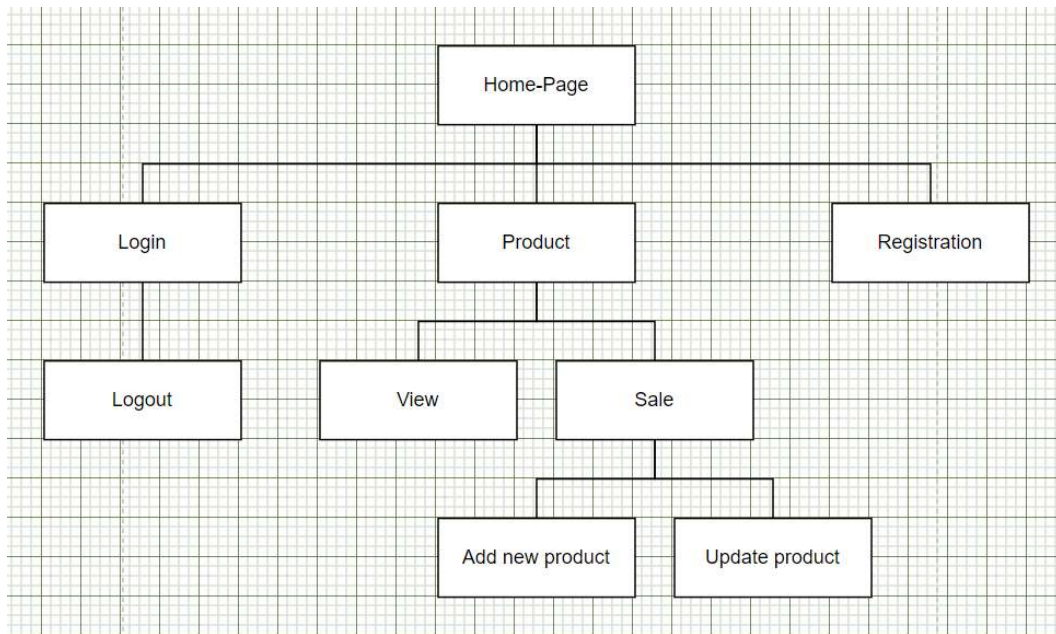


Architectural diagram reveals that workers and managers communicate with a cloud-installed program (Web). This would allow the company to address the problem: if every store has a different database, its goods and staff would be difficult to handle and sell.

### 2. Site map:

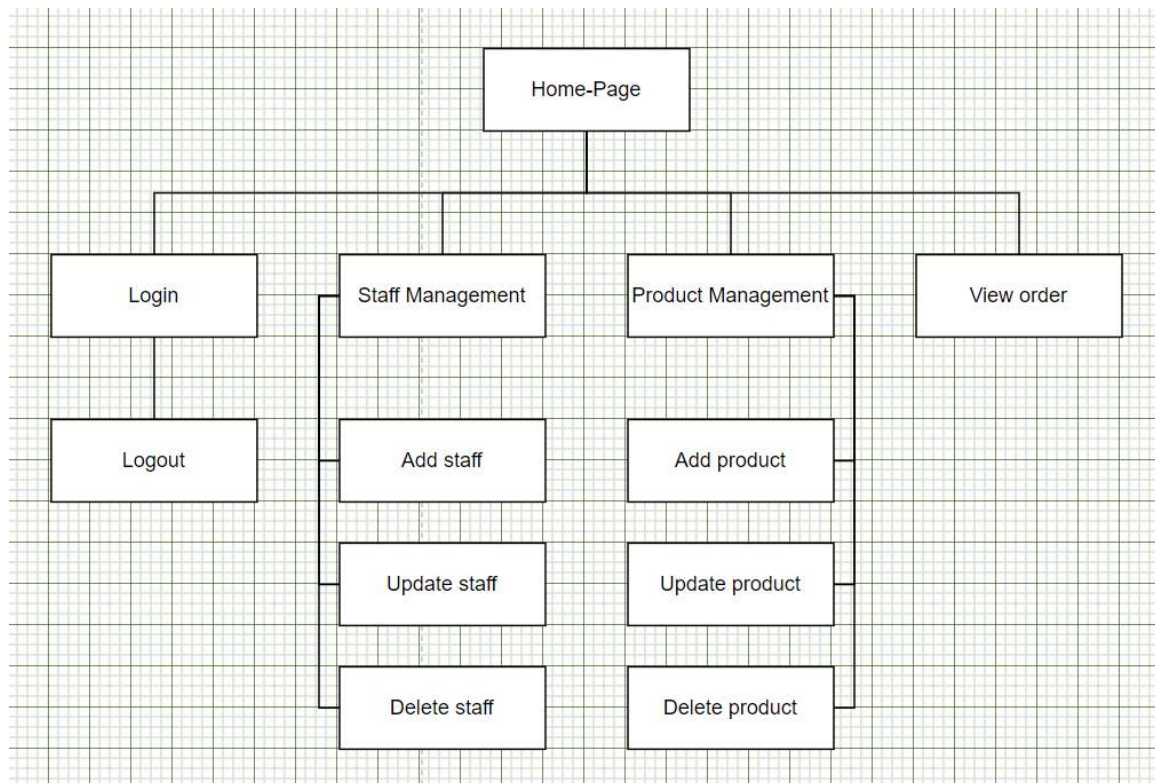
- Staff:





Operations such as logging into the website may be carried out by the employees. After the employee's own account (the Manager's account if the job is accepted), an employee can attach customer purchasing details or amend customer information when there is a shift of customer (for example, order number, inventory amount, consumer quantity, price) to the employee's account or introduce the new customer as a member of the company

- **Admin:**



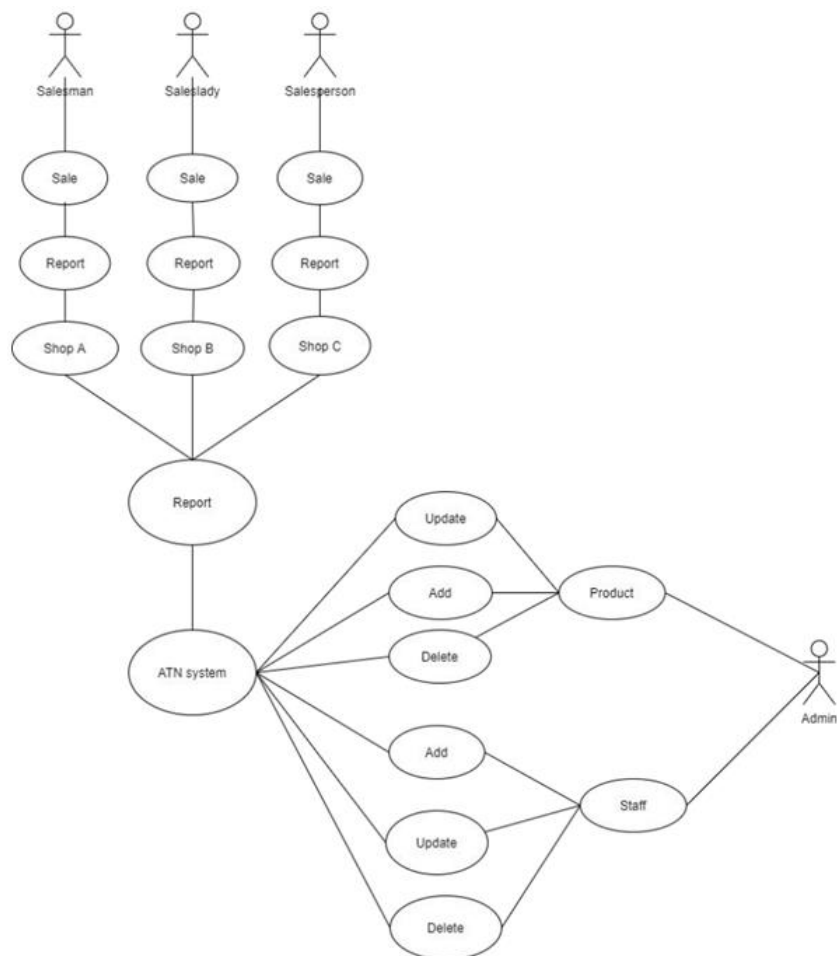
Login functions for website administrators may perform. After the administrator has successfully and properly logged in, they can do their job including:

- Admin can see the system's number of products.
- Personnel control, group control, inventory management are the other admin privileges. Sign into an employee page.
- Show sales reports information for each store. Adding, upgrading, deleting goods.
- Adding, modifying, and deleting employees. Logout.

### 3. Functions:

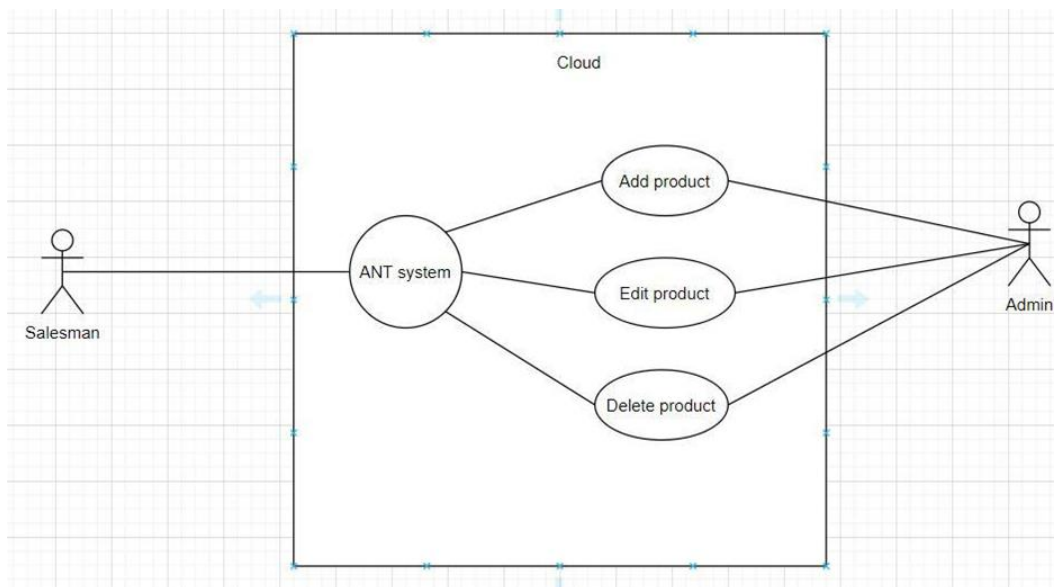
- **Functions belong to the employee:** Staff will sell goods in the entire ATN network and report on the details they need.
- **Functions belong to the admin:** Admin shall have the freedom to add products, edit and remove products.

### 4. The current management of ATN company.



There are some drawbacks to ATN's current management procedure: The workers have to report their profits to the store, the store has to report on the ATN program each month. This means that ATN takes a long time to handle sales activities. In fact, ATN can see in real time the stock update information under this policy, which is an immense restriction.

## 5. New management is proposed for ATN company.



Sales information is continuously updated online during the sale of goods through this management process. In addition, the workflow is greatly reduced due to both employees and executives leverage ATN system through the cloud.

## P3 Define an appropriate deployment model for a given scenario.

### 1. Types of Cloud deployment model:

#### 1.1. Public Cloud

Public Cloud is a type of cloud hosting that allows the accessibility of systems & its services to its clients/users easily. Some of the examples of those companies which provide public cloud facilities are IBM, Google, Amazon, Microsoft, etc. This cloud service is open for use. This type of cloud computing is a true specimen of cloud hosting where the service providers render services to various clients

Server infrastructure belongs to service providers that manage them and administer pool resources, which is why there is no need for user companies to buy and maintain their hardware. Provider companies

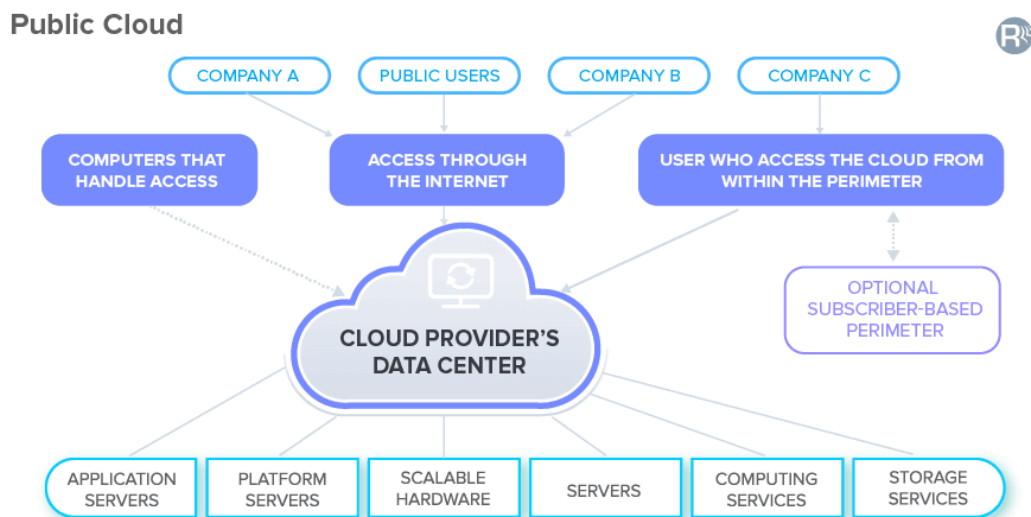
offer resources as a service both free of charge or on a pay-per-use basis via the Internet connection. Users can scale resources when required.

#### Advantages:

- Flexible
- Reliable
- High Scalable
- Low cost
- Place independence

#### Disadvantages:

- Less Secured
- Poor Customizable



## 1.2. Private Cloud

There is little to no difference between a public and a private model from the technical point of view, as their architectures are very similar. However, opposed to a public cloud that is available to the general public, only one specific company owns a private one. That is why it is also called an internal or corporate cloud.

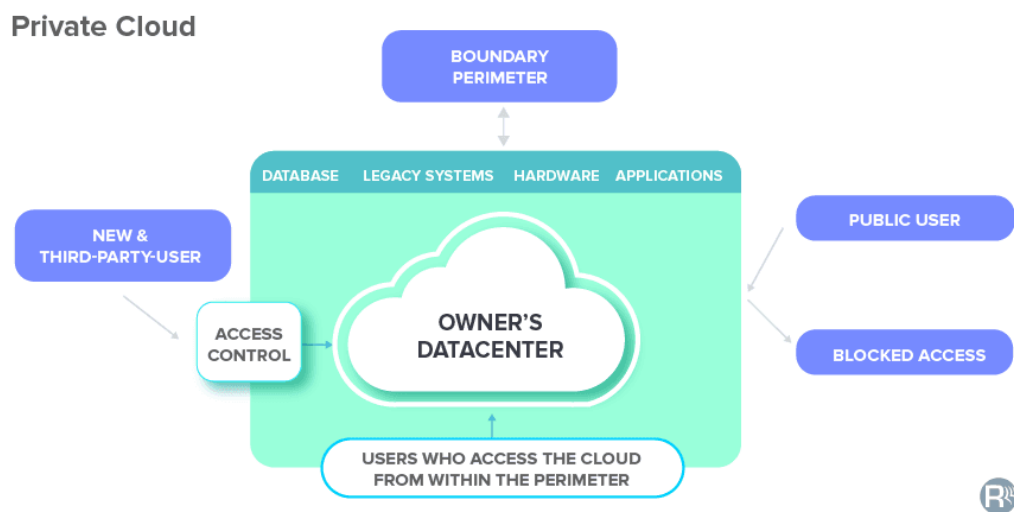
#### Advantages:

- Highly private and secured: Private cloud resource sharing is highly secured.

- Control Oriented: Private clouds provide more control over its resources than public cloud as it can be accessed within the organization's boundary.

#### Disadvantages:

- Poor scalability: Private type of clouds is scaled within internal limited hosted resources.
- Costly: As it provides secured and more features, so it's more expensive than a public cloud.
- Pricing: is inflexible; i.e., purchasing new hardware for up-gradation is more costly.
- Restriction: It can be accessed locally within an organization and is difficult to expose globally.



### 1.3. Community Cloud

A community deployment model largely resembles a private one; the only difference is the set of users. While a private type implies that only one company owns the server, in the case of a community one, several organizations with similar backgrounds share the infrastructure and related resources. Example of such a community is where organizations/firms are there along with the financial institutions/banks. A multi-tenant setup developed using cloud among different organizations that belong to a particular community or group having similar computing concern.

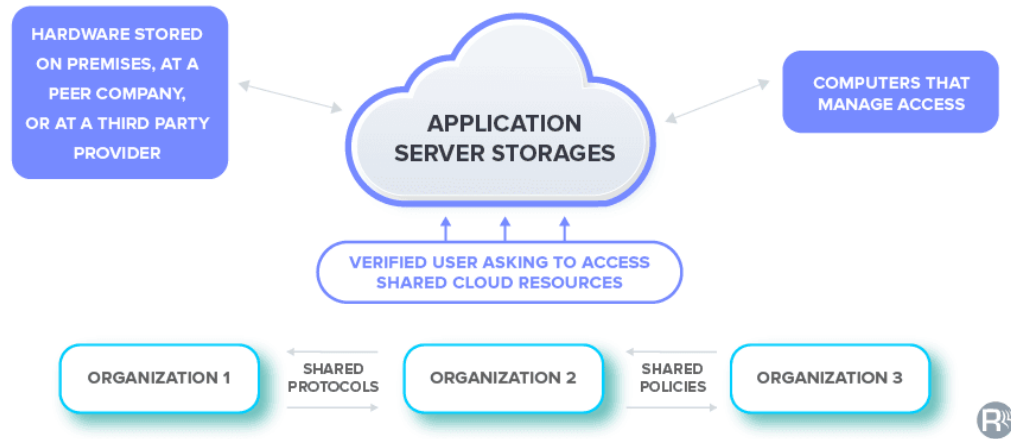
#### Advantages:

- Cost reduction
- Improved security, privacy and reliability
- Ease of data sharing and collaboration

#### Disadvantages:

- High cost if compared to a public deployment model
- Sharing of fixed storage and bandwidth capacity
- It is not widespread so far

### Community Cloud



## 1.4. Hybrid Cloud

Hybrid Cloud is another cloud computing type, which is integrated, i.e., it can be a combination of two or more cloud servers, i.e., private, public or community combined as one architecture, but remain individual entities. Non-critical tasks such as development and test workloads can be done using public cloud whereas critical tasks that are sensitive such as organization data handling are done using a private cloud. Benefits of both deployment models, as well as a community deployment model, are possible in a hybrid cloud hosting.

Hybrid cloud deployment model not only safeguards and controls strategically important assets but does so in the most cost- and resource-effective way possible for each specific case. Also, this approach facilitates data and application portability.

### Advantages:

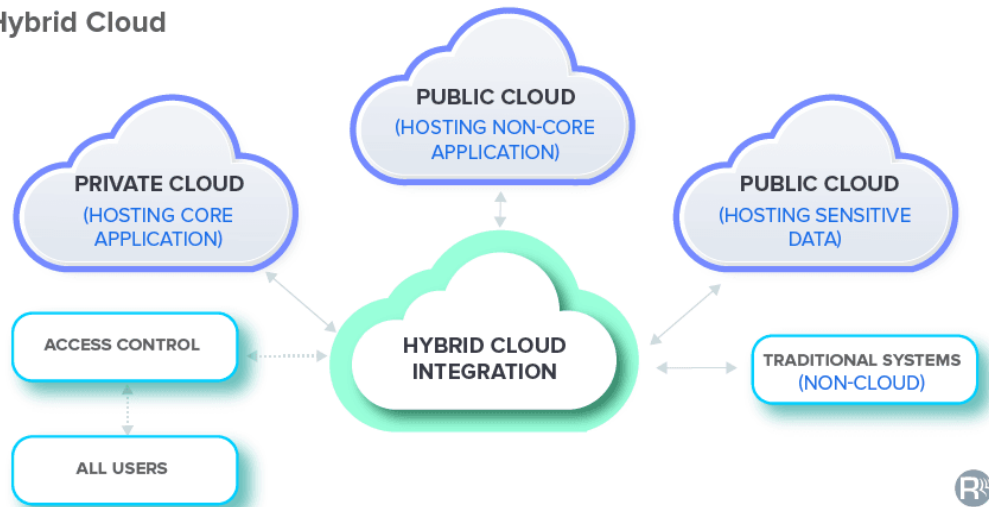
- Flexible
- Secure
- Cost Effective
- Rich Scalable

### Disadvantages:



- Complex networking problem
- Organization's security Compliance

### Hybrid Cloud



## 2. Cloud deployment model is proposed for the company ATN:

- If we are positive about ATN's development and long-term progress in future, we will develop and display private cloud implementation. Private cloud deployment meets the needs and only internal access to the database is provided, and the high security of private cloud deployment would give the company peace of mind with respect to data security. If opting to use a private cloud system, maybe the first thing to note is that the expense of participating in the software will be relatively high relative to other cloud implementations.
- There is also another alternative which is successful, with lower investment costs than utilizing public cloud implementations. The application management also focus on the provider and when the public cloud is used, as a result of the fact that many network salespeople in datacenters store and operate Private Cloud for the company. ATN can substantially reduce network security and maintenance. Nevertheless, the ATN will have no influence over the cloud with Public Cloud, but it is appropriate to use it for ATN management and extension.
- We can see that the public cloud is the perfect place to apply the ATN management model at the moment.

## **P4 Compare the service models for choosing an adequate model for a given scenario.**

### **1. Definition:**

#### **1.1. Software as a Service (SaaS):**

The product, which reflects most of the most common business service solutions in the cloud market is called the cloud application services. SaaS uses the internet to provide its users with third party software. Many SaaS apps run directly through a Web browser and need nothing from users to download or install.

#### **1.2. Platform as a Service (PaaS):**

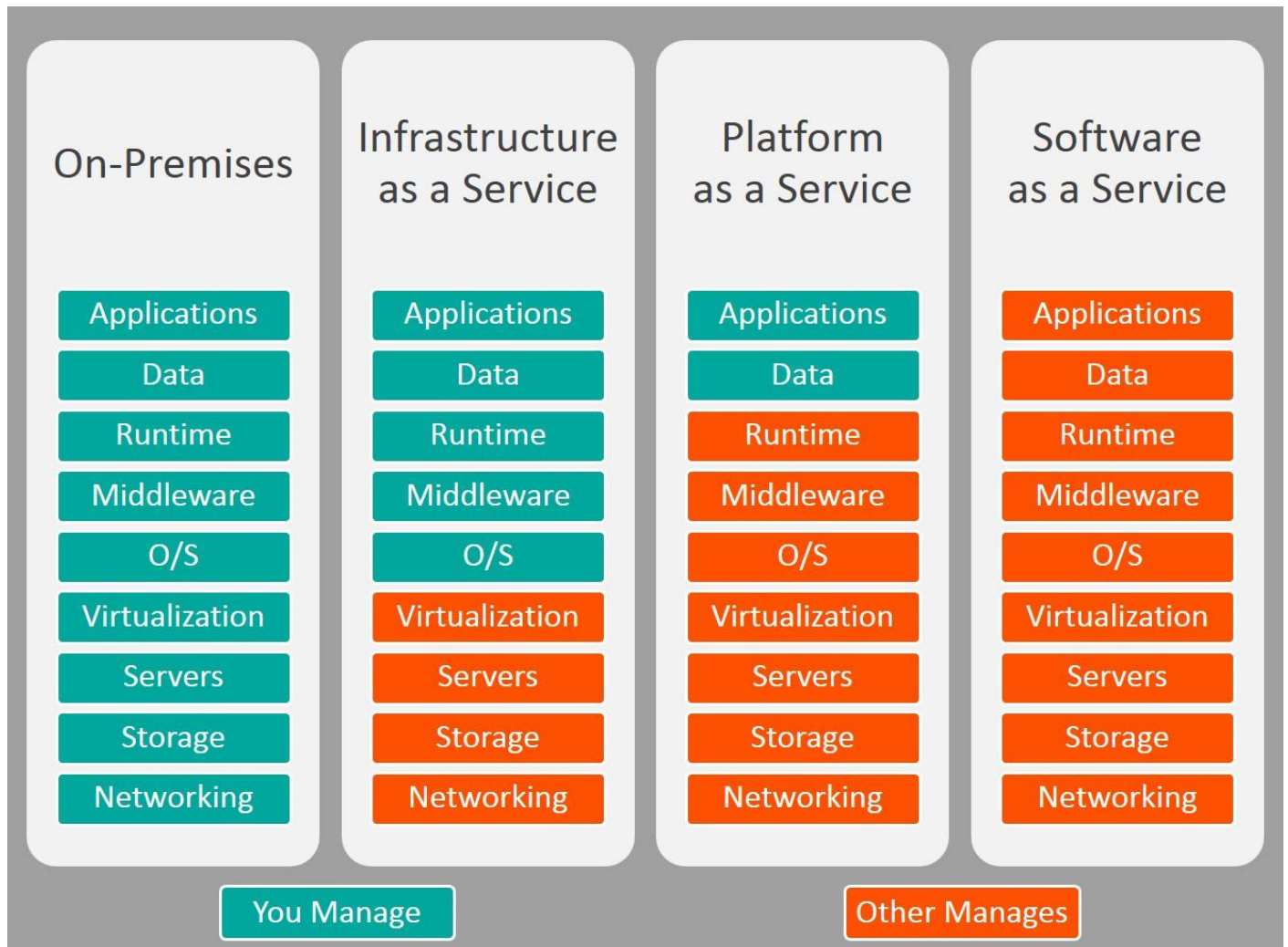
PaaS provides other devices with cloud modules though being used for primary applications. PaaS provides developers a structure for designing and creating custom applications. Both servers, storage and networking can be run by third party company or vendor, and applications can be managed by developers.

#### **1.3. Infrastructure as a Service (IaaS):**

IaaS consists of a machine resource which is highly scalable and automated. IaaS offers complete self-service services, which enable the company to access and track things including computers, networks, storage and other facilities, which enables the company to purchase resources on request instead of purchasing the entire object. Difficult.

### **2. The differences between the services:**





	IaaS	PaaS	SaaS
<b>Supplier</b>	<ul style="list-style-type: none"> <li>- Microsoft Azure</li> <li>- Google Compute Engine (GCE)</li> <li>- Amazon Web Services (AWS)</li> </ul>	<ul style="list-style-type: none"> <li>- Heroku</li> <li>- Google App Engine</li> <li>- OpenShift</li> </ul>	<ul style="list-style-type: none"> <li>- Google Apps</li> <li>- Dropbox</li> <li>- Salesforce</li> </ul>
<b>Distribution</b>	Distributing cloud infrastructure	Provides a platform for application creation.	Web-based distribution
<b>Benefit</b>	<ul style="list-style-type: none"> <li>- The most flexible paradigm for cloud computing.</li> <li>- Extra hardware can be bought on a use basis.</li> <li>- Resources can be bought if necessary</li> <li>- A perfect place to improve.</li> </ul>	<ul style="list-style-type: none"> <li>- Savings in rates.</li> <li>- Easy to scalable.</li> <li>- Easy hybrid model integration.</li> <li>- Strong disponibility</li> </ul>	<ul style="list-style-type: none"> <li>- Save time.</li> <li>- Cost savings.</li> </ul>

<b>Characteristics</b>	<ul style="list-style-type: none"> <li>- Services as a commodity are available</li> <li>- Costs vary according to consumption</li> <li>- Services are highly scalable</li> <li>- Multiple users on different hardware typically exist</li> <li>- Full control of the infrastructure of the organisation</li> <li>- Excellent versatility</li> </ul>	<ul style="list-style-type: none"> <li>- Resources can easily be expanded up or down with changes in your business.</li> <li>- Provides a range of software development, testing and delivery services.</li> <li>- Multiple users can concurrently access the same service application.</li> <li>- The incorporation of online infrastructure and databases</li> </ul>	<ul style="list-style-type: none"> <li>- Centrally based management facilities</li> <li>- Place on the remote server</li> <li>- Strength of internet access</li> <li>- The user is not responsible for software changes or hardware</li> </ul>
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#### In ATN's management system development project I will use Paas:

This can be shown that PaaS cuts costs dramatically and simplifies the projects' activities. Besides PaaS, our project delivery cycle provides us with great speed and flexibility. I therefore believe that PaaS is the best choice for this project.

### M1 Discuss why an organisation should migrate to a Cloud Computing solution.

Benefits of Cloud Computing:

#### ❖ Simple:

- All applications for employee data needed are stored in the cloud.
- IT team does not have to spend time upgrading hardware, installing software and configuring the device.
- There is no time for finding or transferring data for the same department.
- Allow to simultaneously upgrade programs and applications of everyone in the company and always work together on a common platform and version.

#### ❖ Easy to access Internet platform:

- Employees can work almost anywhere (with an Internet connection).
- You can use a variety of devices to access (phones, tablets, laptops,...) without being dependent on physical settings.

❖ **Security for important data:**

- Data will be stored digitally in the cloud infrastructure, avoiding loss of faulty data or hardware.
- Easy access to data recovery and backup to avoid losing important data.
- There are many Cloud system providers that have very good and reliable privacy and security encryption services.

❖ **Use cost effectively:**

- The technology upgrade requires the company to pay for the purchase and installation of hardware compatible with the original system (the amount of the cost depends on the size of the company).
- There is no cost to upgrade the original device (desktop, connected device, related software, etc.).
- There is no cost to set up a team to operate and test the system on a large scale.
- With the same model using cloud computing, it will save a lot of costs (about 30% or more).
- You can hire a third party or create your own system and run it yourself.
- For the resources that have been rented but not used (low demand), customers do not have to pay.

**Conclusion**

- After the report, I clarified the problems:
- An overview of Cloud Computing through development history and related basic concepts.
- An architectural Cloud Computing framework suitable for the case of ATN.
- Analysis and evaluation of company causes should apply Cloud Computing.
- Analyze and identify appropriate deployment model for ATN company.
- Compare service models to provide a suitable model for the company.
- Practical examples of the above deployment models.

Finally, I came to the conclusion that cloud computing is a new method that can meet the requirements of ATN company, but besides that the company needs to be aware, evaluate and prepare the plan.

Resources for problems that may occur during the operation and development of the project in the actual operation of the company.

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