**Assignment (2.4)**

**Brief**

**Group Presentation**

The objective of this assignment is to gain a deeper understanding of IaaS, PaaS, and SaaS and their differences and how they can be used in different use cases.

Work with your group to define your own business and your own IaaS / PaaS or SaaS based on discussed threats that might be happen to your business

1. Define your business

2. Define your Infra

3. Define your Platform

4. Define Your SaaS

* Choose a specific use case (e.g. web application development, big data processing, machine learning) and determine which type of service (IaaS, PaaS, or SaaS) would be the most appropriate for that use case, providing a detailed explanation of your reasoning.
* Create a sample project that demonstrates the use of one of the services (IaaS, PaaS, or SaaS) and compare it with the other services.
* Write a report summarizing your research, including a comparison and contrast of the different services, an analysis of the chosen use case, and any recommendations for improvement.

**Submission**

* Submit the URL of the GitHub Repository that contains your work to NTU black board.

1) Define your business

ABC company, operating in Ecommerce as an online retailer that frequently see spikes in traffic. The ability to scale up during periods of high demand and high-quality security are essential in today’s 24-7 retail industry.

2) Define your IaaS

Internet of Things (IoT), event processing**,**[artificial intelligence (AI)](https://www.ibm.com/topics/artificial-intelligence): IaaS makes it easier to set up and scale up data storage and computing resources for these and other applications that work with huge volumes of data.

3) Define your PaaS

API development and management: With its built-in frameworks, PaaS makes it easier for teams to develop, run, manage and secure APIs for sharing data and functionality between applications.

4) Define your SaaS

Choose a SaaS CRM solution, offloading all day-to-day management to the third-party vendor, but also giving up all control over features and functionality, data storage, user access and security.

**Choose a use case (Machine Learning) for IaaS**

ABC company is designing a new cloud-based application for managing E-Commerce projects. The company’s application required intensive machine learning to predict customers’ demands and purchasing patterns for certain products. It needed more control over its application’s infrastructure. Cloud provider presented ABC company with much more fine-grained control over its infrastructure. It was able to manage clusters of machine learning servers in Cloud’s data centers. ABC company can also optimize the management software to further reduce costs.

ABC Company was able to get the combination of power and price it desired to make its business thrive. An Infrastructure as a Service (IaaS) solution would be the most appropriate when it provides customers with indirect access to cloud infrastructure. Customers of IaaS manage the infrastructure via tooling and APIs. IaaS customers do not have direct physical access to the hardware but have more control than with SaaS or PaaS. This allows IaaS customers to virtually administrate the infrastructure.

**A sample project (Email Application) for IaaS and make comparison with other services**

Let’s say we want to implement an email application in ABC company. If we decide to manage our own infrastructure, we must do the following:

1. Purchase a physical server.
2. Install all the required software and operating systems on it
3. Write our email application code and install it on the server
4. Continuously maintain both hardware and software

On the other hand, if we switch to a cloud computing service, we can choose from the following options.

IaaS - We provision virtual cloud servers on [Amazon EC2](https://aws.amazon.com/ec2) with operating systems pre-installed on them. We have to install the application code and related software on the virtual machine.

PaaS - We use [AWS Lambda](https://aws.amazon.com/lambda/) to run application code without provisioning or managing infrastructure. For instance, we can simply write and upload the application code as a .zip file.

SaaS - We use [Amazon WorkMail](https://aws.amazon.com/workmail/) as a secure, fully managed business email and calendar service. we don't have to write your own application code or even worry about provisioning cloud servers and cloud storage infrastructure. Our team can directly create accounts in WorkMail and start sending and receiving email.

How to choose

The choice between IaaS, PaaS, and SaaS offerings depends on our application requirements. One option is not necessarily better than the other. It depends on why we are running the application, our performance and configuration requirements, and who and where our users are.

As we see the cons of using SaaS, namely, a lack of control over application management and configuration and difficult to port information from one SaaS to another and reliance on the provider for security and access to the application, we focus our options on choosing between IaaS and PaaS.

Whether ABC company goes with a PaaS or IaaS solution for their application depends on the balance of simplicity versus flexibility they want to have in their application.

Going with a PaaS solution will likely simplify the development of the application and

make it easier to integrate with cloud infrastructure. However, this will reduce the amount of control they have over the application. Using a PaaS solution, ABC’s product will have to conform to a more limited set of options. However, the infrastructure supporting ABC’s application will not require management.

If ABC company decides to go with the IaaS approach, they will have the opposite problem.

The infrastructure will be able to be tailored to the needs of the application.

IaaS approaches are heavily customizable. However, this greatly increases the complexity of application management and development. Moreover, ABC company will be responsible for doing much more configuration and management. These responsibilities will require more knowledge and training of ABC’s staff.

If ABC’s applications’ needs are met nicely by a PaaS option, and they are not interested in application management, the PaaS solution is an excellent choice. However, if ABC company is looking for a very customized solution, and they are willing to take on additional infrastructure management responsibilities, IaaS will be appropriate. ABC company will have to decide which of these options makes the most sense for this application.

In conclusion, companies use IaaS when they want more control over their application infrastructure. IaaS is for those who have specialized needs and expertise in infrastructure management.