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## Assignment-1

### Case Study

1. Amazon DynamoDB: The database Service Behind the Scale and Speed Customers Rely on from Amazon.com

#### Problem Definition

The primary problem in this case was the management and scalability of a mission-critical system, third, which processes over 4 billion workflows on peak days for Amazon.com.

The challenges included

- It sometimes got slow and couldn't process orders quickly
- As more and more people started shopping on Amazon, this system couldn't handle the increased workload efficiently. It was like trying to run a marathon in heavy boots.
- The existing architecture led to increased time spent on managing system operations, reducing the focus on building new features.

#### Why Cloud Services?

The decision to move to Amazon DynamoDB, a cloud-based NoSQL database service was due to following reasons

- DynamoDB reduced the time needed to scale the system for large events by 90% from 60 weeks to less than 6 <sup>weeks</sup> ~~days~~
- DynamoDB improves performance by reducing the processing delays from 1 second to 100 milliseconds.

Think of DynamoDB as a super-smart and super-fast computer system that Amazon rents from another company (Amazon web services). By using DynamoDB, Amazon didn't have to worry about managing complex computer systems themselves. It's like hiring a chef to cook for you instead of trying to become a chef yourself.



## Benefits of cloud in this Scenario

Switching to DynamoDB helped Amazon in several ways:

- It made their system work faster, so when you order something on Amazon, it gets processed quickly.
- DynamoDB can handle more work on Amazon grows, so even when lots of people shop on Amazon, the system don't get overwhelmed.
- Amazon didn't have to spend as much time and effort managing the computer systems, so they could focus on improving the shopping experience for customers.
- The system became more reliable, meaning it didn't break as often or slow down during upgrades.

## Any other Alternatives

Instead of Amazon DynamoDB, Amazon could have considered a few other options:

- They could have used other companies' cloud services like Google Cloud or Microsoft Azure.
- They might have chosen different types of computer systems instead of DynamoDB, like using their own computers or different databases.
- They could have completely changed how the system works, but that would have been much harder and taken a lot more time. DynamoDB was like a quick and effective fix to their problems.



## 2. Amazon Robotics Uses Amazon SageMaker and AWS Inference to Enable ML Influencing at Scale.

### Problem Definition

Amazon Robotics wanted to make their inventory handling process in Amazon warehouses more efficient. They had people manually scanning items, which was slow and caused problems. They needed a way for machines to do this job better (faster and accurately).

### Why Cloud Services?

They chose to use a service called Amazon SageMaker on Amazon Web Services (AWS) for a few reasons:

- AWS had powerful computers they could use
- SageMaker made it easy to build and use machine learning without setting up complicated computer systems.
- They could make their computer power grow or shrink as needed, so they didn't have to worry about running out of resources.

### Benefits of Cloud in that Scenario

Using AWS and SageMaker had several advantages:

- They saved nearly half of their costs on this project because they didn't need to buy and manage their own expensive machines.
- Their team could spend more time improving the smart computer program (machine learning model) instead of dealing with computer setup and maintenance.
- Whenever they needed more computer power, AWS could provide it quickly. It was like turning up the volume on a stereo when we want it louder.
- They could easily experiment with different ideas and adjust to changes in their work without big headaches.



### Any Other Alternative

While they chose AWS and SageMaker, they could have considered:

- Building and managing their own computer systems, but it would have been costly and complex.
- Trying other cloud services like Google Cloud or Microsoft Azure, but AWS had what they wanted.
- Using different tools for their smart computer program, but SageMaker made the job simpler.

In Summary, Amazon Robotics improved their warehouse operations by using AWS and SageMaker. This choice saved them money, allowed them to work more efficiently and made it easier to adapt to changes. Even though there were other options, this one worked really well for them.



### 3. Epiroc advances manufacturing innovation with Azure Machine Learning and Azure Data Factory.

#### Problem definition

Epiroc, a company making excavation equipment, wanted to ensure the steel they use in their products is of high quality. They had trouble sharing data and best practices among their manufacturing locations worldwide, causing inconsistencies and sometimes affecting product quality. Consistency was crucial for customer satisfaction, waste reduction, and operational efficiency.

#### Why cloud services?

They decided to use Microsoft Azure, a cloud service, for a few reasons

- Azure could handle their global needs and connect teams across the world.
- It helped them make sense of the tons of data they were collecting.
- Azure's speed and efficiency allowed them to setup a solution quickly.
- They saw the potential of using AI and ML to improve their processes and Azure had the right tools.

#### Benefits of cloud in that scenario

Using Microsoft Azure had these advantages

- They improved the quality of their materials, reduced product returns by 30% and saved time and money.
- Efficiency went up, waste went down and they could work consistently across the globe.
- Azure allowed them to set up the solution quickly and explore new ways to use AI and ML for innovation.

Any Other Alternative

While they chose Azure, they could have considered:

- Other cloud providers like Amazon or Google, but Azure suited their existing setup.
- Keeping everything on their own computers, but this might have been slower and less adaptable.
- Different AI tools, but Azure had everything they needed in one place.

Epimac and Microsoft Azure to ensure high-quality materials reduce waste, and boost innovation. Azure's speed and global reach made it a smart choice for their needs. While other options were available, Azure worked well for them.



4. Orca Security combines the power of GPT-4 with the security and scalability of Microsoft Azure

#### Problem definition

Orca Security wanted to help its customers quickly fix security vulnerabilities in their cloud systems. They integrated an AI tool from OpenAI, but faced privacy concerns and challenges in supporting their customers effectively.

#### Why cloud services?

Orca Security chose Microsoft Azure because:

- It offered strong data privacy and security features
- Azure allowed customers to store their data in compliance with various regulations.
- It ensured data security at all times and provided a 99.9% uptime guarantee.
- Moving to Azure was easy and required minimal changes.

#### Benefits of Cloud in that Scenario:

Using Azure had these benefits

- Azure addressed customers' privacy concerns and met regulatory requirements
- Azure ensured data protection, both in storage and during transfer
- Orca Security could offer their improved service to more customers.
- The AI-powered solution helped customers resolve security issues much faster.

#### Any Other Alternative

- Orca could have tried to address privacy concerns with OpenAI directly.
- They could have considered other cloud platforms, but Azure was the best fit.
- Orca Security could have built their own AI solution, but it would have been more resource-intensive.

Osca Security chose Azure to improve its security solution ensure privacy and compliance and speed up issue related resolution. Azure's privacy features, data security, and ease of migration made it the right choice for their needs despite other options.