Cloud Computing Overview

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1 Introduction

Cloud Computing is **the** driving force of tomorrow's tech industry. It deals with everything from servers and storage to intelligence and analytics. Proficiency in Cloud Computing can able you to further your opportunities in any STEM career.

To picture what cloud computing actually looks like, take the example of Google Drive. Users can create, access, and edit a variety of different documents from any device. Google stores all this data in their cloud service, Google Cloud Platform.

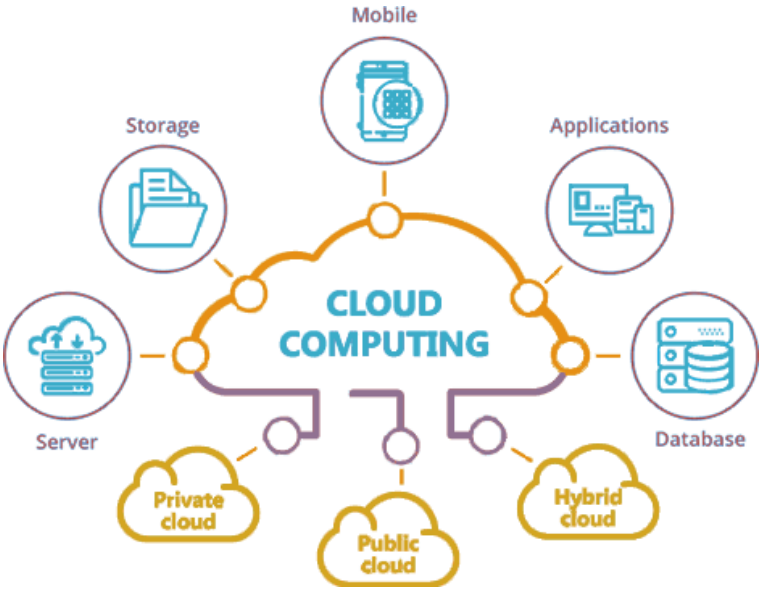

Figure 1: Graphic of Cloud Computing Components

2 History

Data storage has been a central part of new-gen companies since the tech industry boomed. Prior to cloud computing, storing data in servers was a hassle. Companies would charge flat prices for certain amounts of cloud storage, resulting in two scenarios. Either the individual would overpay and get more cloud storage than needed, or they would underpay and run out of server space. In addition, some websites would receive heavy loads on days like Black Friday and would have to beef up their servers, but for the rest of the year those servers would go to waste. Thus, Amazon released Elastic Compute Cloud in 2006.

Elastic Compute Cloud only charged users for whatever storage or servers they used, producing an efficient solution to the problem described above.

3 Benefits of Cloud Computing

- Security: Cloud computing servers all offer various encryptions and cybersecurity measures.
- Speed: The data servers are all self service, meaning immense amounts of raw computing power can be delivered at just a mouse click.
- Reliability: Mirroring and copying data is extremely easy in cloud computing, giving immediately relief if in need of a data backup.
- Cost: all the upkeep and expense of an on-site data center is eliminated when using cloud computing
- Scalability: The flexibility of cloud computing is its greatest asset, one can distribute computing resources at free will.

4 Types of Cloud Computing

Under the broad term of cloud computing, there are many different models. It is important to choose the right model for the application needed. There are three different types of cloud services: public, private, and hybrid cloud.

4.1 Public Cloud

Public clouds are hosted by third-party providers, like Amazon or Microsoft. With this deployment type, all software and hardware is managed by the cloud provider. To modify and tailor these services, you would use a regular web browser connected to your application.

4.2 Private Cloud

A private cloud is a data center used exclusively by one organization, giving them complete control over it. This type of cloud computing is maintained and hosted over a private network.

4.3 Hybrid Cloud

Hybrid clouds, as assumed from the name, are a combination of the previous two types. This allows programs and data to flow seamlessly between private and public clouds, giving an organization better optimization and flexibility.

5 Cloud Technology in the Real World

Cloud computing is everywhere in our day-to-day lives, you use it whenever:

- you visit any website
- you use a cloud file-sharing service
- you buy anything online a(Amazon etc.)
- you stream video or audio online
- you use social media

Figure 2: Companies that Use Cloud Computing

6 Lab and Account Setup

In the real world, there are 3 main types of cloud computing services: AWS (Amazon Web Services), Microsoft Azure, and Google Cloud Platform. For the purpose of our labs and for ease-of-access, we will mostly be using Qwiklabs this year. Qwiklabs gives you temporary access to Google Cloud Platform and Amazon Web Services to get hands-on experience with the cloud.

If you would like to try any of the other cloud services for a specific reason, don't hesitate to reach out to any of the officers.

6.1 Qwiklabs

The following are the instructions to setup a Qwiklabs account.

1. Go to qwiklabs.com
2. Press "Join" at the top right corner and enter your basic info – for company name you can put "Thomas Jefferson High School for Science and Technology" (if you already have a qwiklabs account, you can skip this step).
3. You're all set up! You should have 0 credits right now, limiting you to the basic, free tutorials, but you will attain more credits in the future for more interesting labs.

6.2 Azure (Optional)

These instructions are completely optional, no labs will require Microsoft Azure. However, it is recommended to explore some of the features in this service in your own time.

1. Go to https://tinyurl.com/azureEducate and click on "Activate now."
2. Sign into your Microsoft account (or make a free account using either your personal or school email address).
3. If prompted, enter a phone number you can access to for identity verification. If you do not have a phone number you can access, let one of the officers know and they will help you.
4. Enter your fcps email to verify your academic status.
5. Open the email sent to your fcps email and follow the link, enter the basic info and press "Sign up."
6. You will be redirected to the Microsoft Azure platform.