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CLOUD COMPUTING AND APPLICATIONS

SUBJECT: 805-182 COMPUTER:THE INTERNET AND SOCIETY 3(3-0-6)

SEMESTER 1/63

DR. NORRATHEP RATTANAVIPANON

FACULTY OF INTERNATIONAL STUDIES, PSU PHUKET

COURTESY: DR. JIRAWAT THAENTHONG



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- Cloud Computing?
- The Importance of Cloud Computing
- Cloud Computing Architecture
- Interesting Cloud Application
- Startup your Cloud Computing

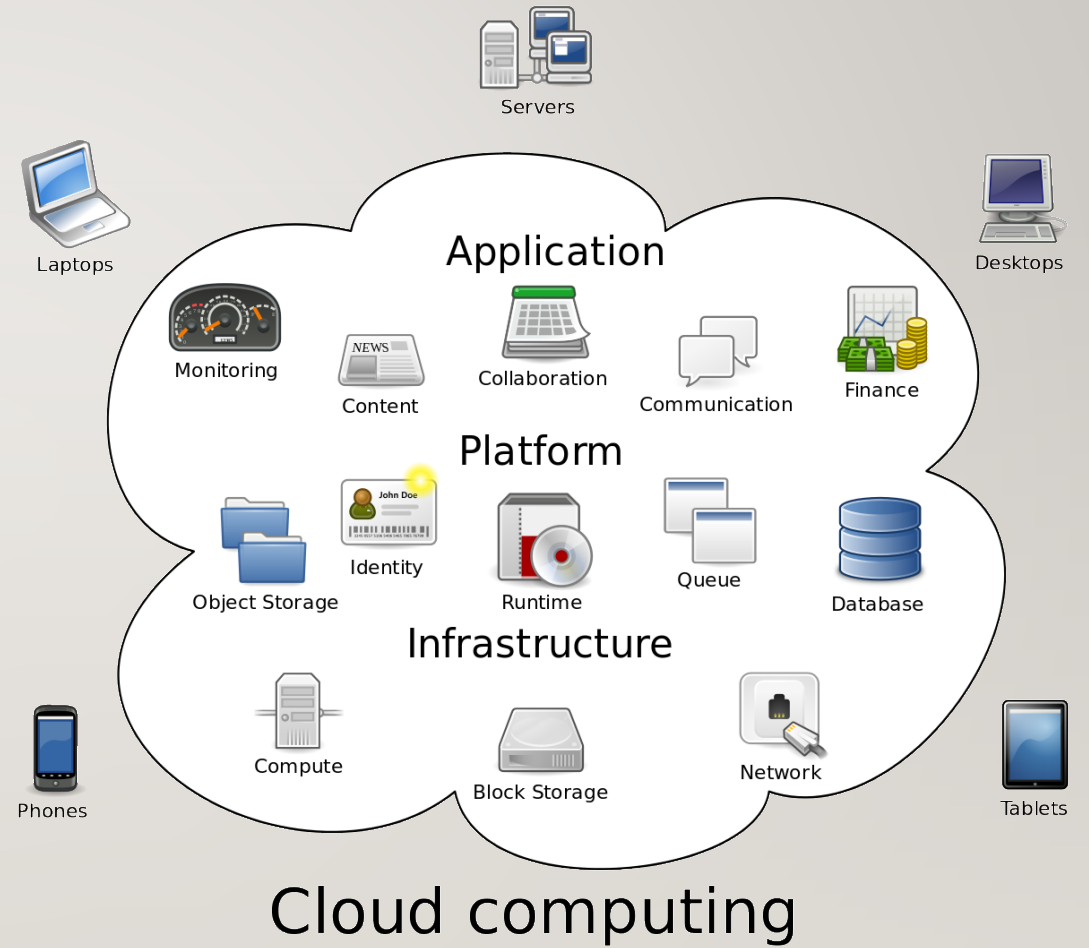
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WHAT IS “CLOUD” IN CLOUD COMPUTING?



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CLOUD COMPUTING



WHAT IS CLOUD COMPUTING?

Basic concept

- Computing or application performed on shared resources (e.g., CPU, storage)
- Rather than having local servers/computers to handle this computing/application
- To use cloud computing, only need a (simple) device with Internet access

6 EXAMPLE: MICROSOFT (MS) OFFICE

- Non-cloud (traditional) version: MS Office software
 - If you have multiple devices (PC, laptop, smartphone), install MS Office on all of them
- Cloud version: office.live.com or docs.google.com
 - No program installation
 - Access via web browsers
 - Can access on ANY device (even ones without MS Office installed)



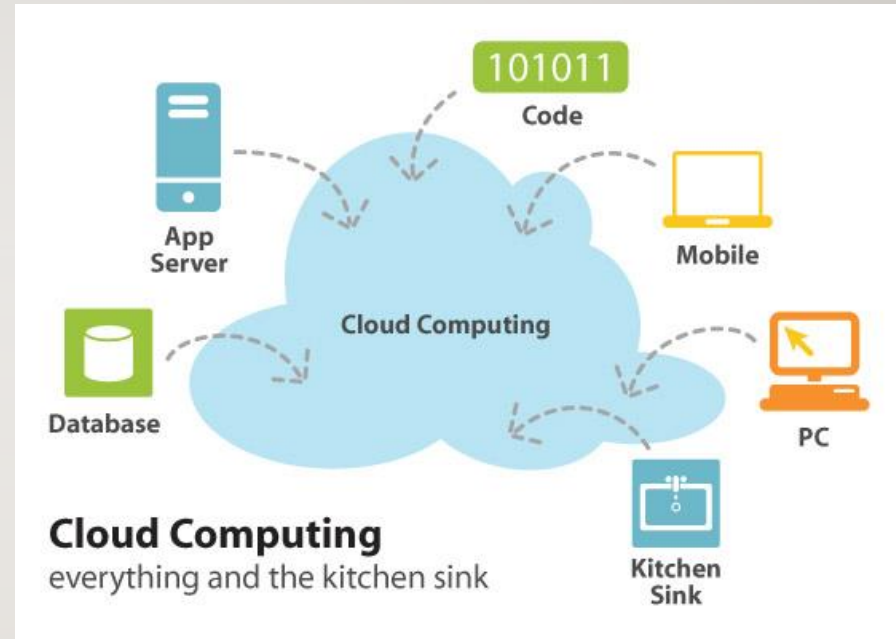
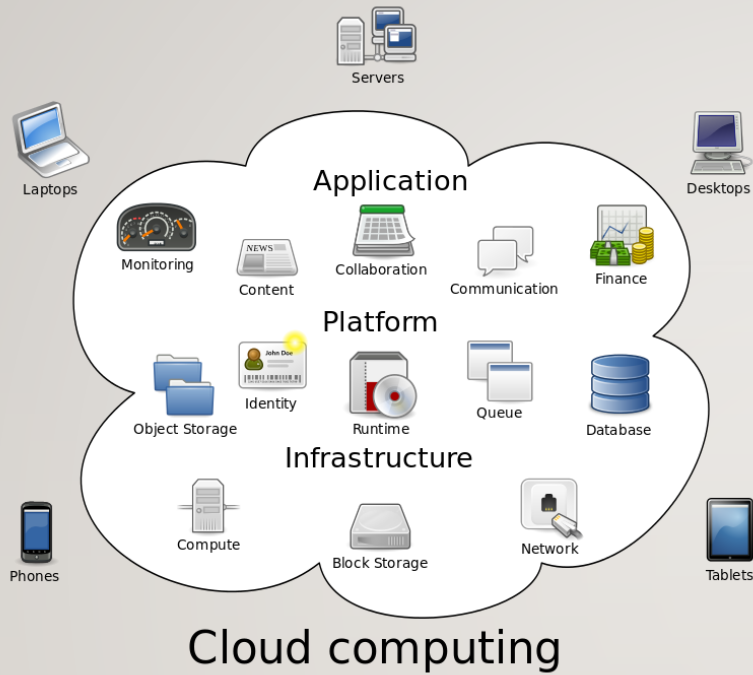
7 PHRASE: EVERYTHING BUT THE KITCHEN SINK

- Meaning: everything one can think of
- Example: We're only going on vacation for a week, but John will insist on taking everything but the kitchen sink.

Cloud Computing is “everything AND the kitchen sink”



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CLOUD COMPUTING IS “EVERYTHING AND THE KITCHEN SINK”

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TASK I: (10 MINUTES)

- List applications that provide service for users based on cloud computing.
 1. Email Providers, e.g., Gmail
 2. Social Media, e.g., Facebook
 3. Cloud Storage e.g., Alibaba Cloud, Dropbox, NetDisk
 4. Music Streaming, e.g., Spotify
 5. Financial app, stock trading apps

THE IMPORTANCE OF CLOUD COMPUTING

11 WHY IS CLOUD COMPUTING NEEDED?

- Mobile Computing
- Ubiquitous Computing

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MOBILE COMPUTING

- A concept where computers are available in remote or mobile environments.
- You bring a computing device with all the time
 - Smartphone, smartwatch, fitness tracker
- These devices don't have a lot of storage space. Mobile applications use cloud computing service to store data.



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UBIQUITOUS COMPUTING

- A concept where computers are available anytime everywhere
- Everything around you is a computing device. IoT is one example of ubiquitous computing
- To access data from anyplace anywhere, your data needs to be stored on the cloud.



14 MOBILE COMPUTING VS UBIQUITOUS COMPUTING

MOBILE COMPUTING

- Computers are available in mobile environments
- Everyone carries small computers, such as smartphones, smart watches, etc.
- **Benefit from Cloud Computing**

UBIQUITOUS COMPUTING

- Computers are available anytime everywhere (but can be non-mobile env)
- Computers are everywhere we go (we don't have to carry anything)
- **Benefit from Cloud Computing**



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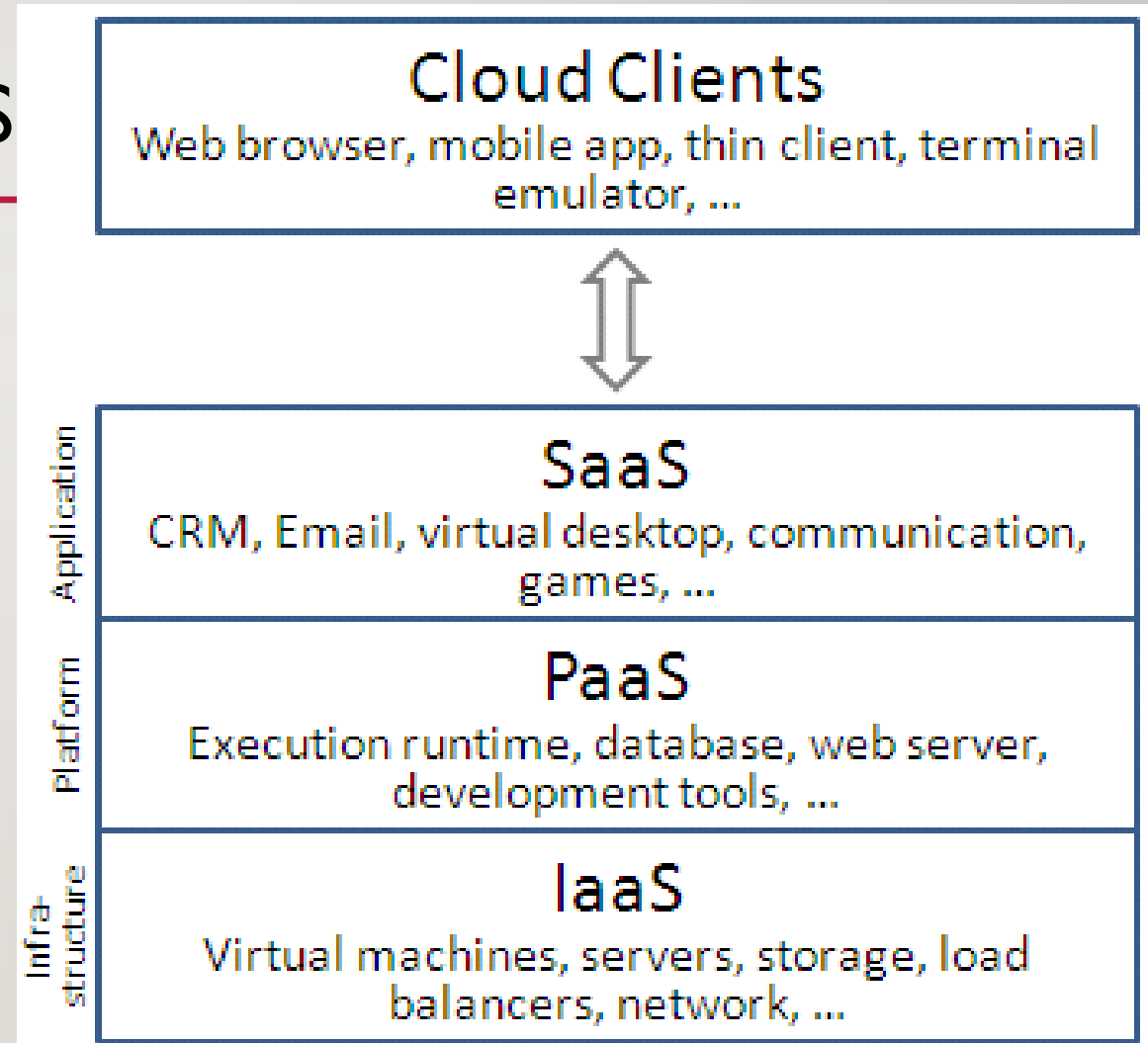
CLOUD COMPUTING ARCHITECTURE



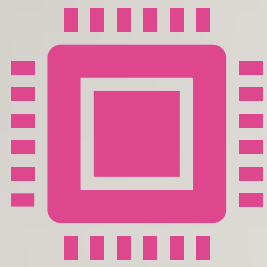
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CLOUD SERVICE MODELS

- **Infrastructure as a service (IaaS)**
- **Platform as a service (PaaS)**
- **Software as a service (SaaS)**



INFRASTRUCTURE AS A SERVICE (IAAS)



Designed for an organization/company/individual user who needs resources (e.g., CPU, Memory, Storage, etc.) for processing.



This model helps an organization to reduce the cost of IT implementation and personal

Reduce cost of buying servers.

Reduce cost of hiring system/IT administrators.

18 **INFRASTRUCTURE AS A SERVICE (IAAS)**

- Think about using IaaS as having your computer on the cloud
 - Renting a whole computer that can be accessed using the Internet
 - Choose to rent a cheap or more powerful computer depending on your application

(Using IaaS is equivalent to renting a virtual machine)



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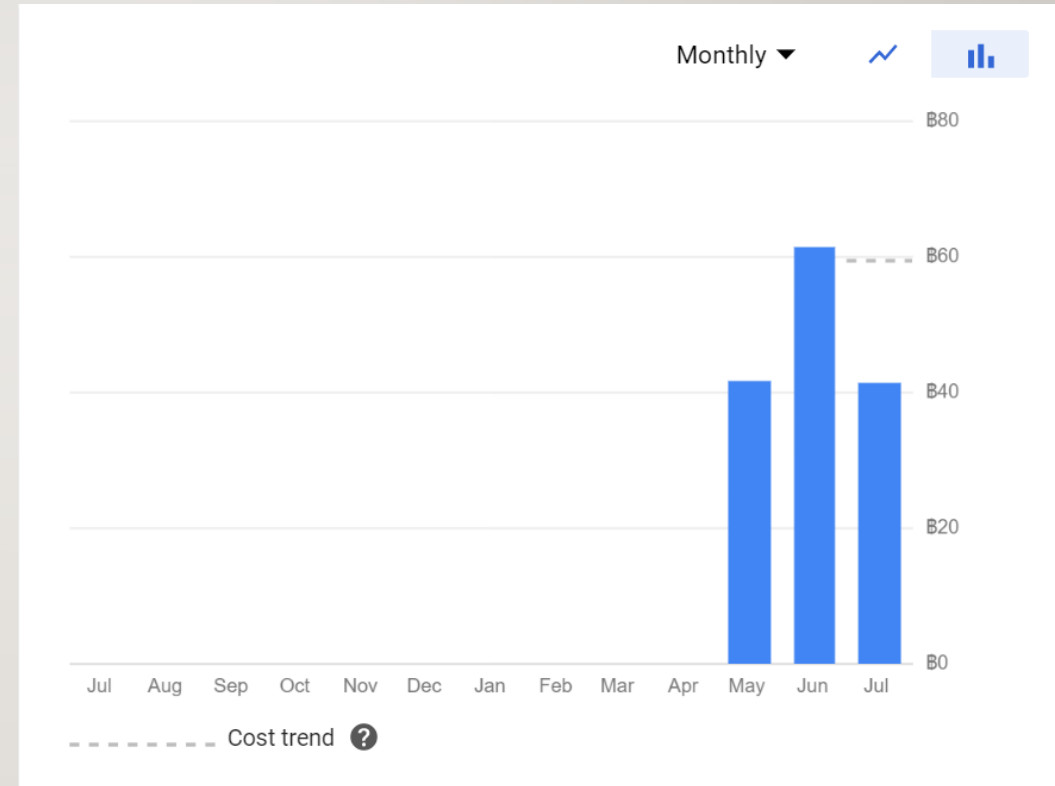
MY CASE STUDY OF USING IAAS: MY WEBSITES WWW.NORRATHEP.COM

- I want to create a small website for storing my personal information and teaching materials
- Two options:
 - a) Having a physical web server
 - b) Renting an IaaS cloud server
- For option a), it requires:
 - 1GHz CPU
 - 2 GB of RAM and 20 GB of storage unit
 - Ubuntu OS
 - Web server
 - 24/7 uptime and maintenance

- For option a): a real web server
 - You may need to pay at least \$200 + installation and admin cost.
- For option b): a cloud server
 - Rent a Google Cloud server with IaaS service model
 - Come with pre-installed OS and webserver
 - Guarantee 24/7 uptime
 - No maintenance required
 - You only need to pay ~\$2/month
 - Way cheaper than option a) 😊

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CLOUD SERVER COST FOR MY WEBSITE



8/12/2020

PLATFORM AS A SERVICE (PaaS)

- It is designed for developers/programmers.
- This service provides the ecosystem for software development, such as operating system, software, database, and tools.
- Reduce set up a time for the IT project team to launch a new application.
- Cost of PaaS should be cheaper than the IaaS model.
- With PaaS model, a company allow developers to work anywhere anyplace. They need only a PC/laptop and the Internet.

- Service Provider:
 - Google App Engine
 - Microsoft Azure
 - force.com
 - Amazon web services
 - IBM Bluemix
 - GitHub
 - Docker
 - Heroku
 - Etc.

SOFTWARE AS A SERVICE (SAAS)



It is the most favorite of cloud computing service, such as Facebook, Twitter, Line, Instagram, Google Apps, etc.



Web-based software or on-demand software



User need only the Internet connection to access cloud service. Think about you access Gmail service to read and send email.



It is the first step of cloud service model that the organizations should be used if they would like to transform the legacy system to the cloud computing system.

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EXAMPLE OF CLOUD APPLICATIONS BASED ON SAAS MODEL

1. Microsoft Office 365
2. Salesforce.com
3. G Suite
4. Dropbox
5. Adobe Creative Cloud
6. GitHub
7. Wordpress
8. Slack, a cloud-based collaboration platform for teams
9. Box, a cloud file-sharing services.
10. LinkedIn
11. Twitter
10. Cisco's WebEx (Web conference)
11. Skype
12. Outlook Web Access
13. Workday (HR & Financial Management)
14. Zendesk (a customer support, technical support service)
15. Zoho (The Operating System for Business)

24 CLOUD SERVICE PROVIDERS

THAILAND

1. TOT
2. CAT
3. True IDC
4. Government Cloud

INTERNATIONAL

1. Amazon (No.1)
2. Microsoft
3. IBM
4. Google
5. Salesforce
6. Etc.

CLOUD PROVIDERS IN CHINA?

Alibaba, Tencent, Baidu, Sinnet-AWS

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INTERESTING CLOUD APPLICATIONS



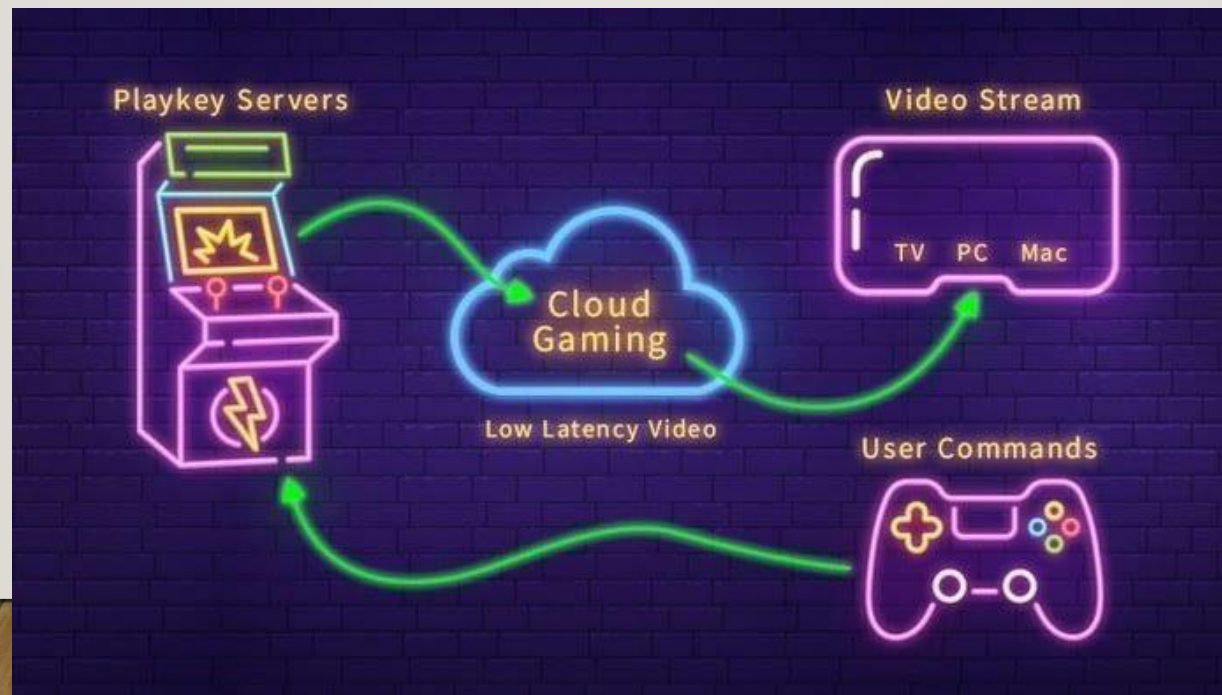
26 CLOUD GAMING

- Have you ever wanted to play a game that is either:
 - On a platform that you don't have its console(e.g., PS4, XBOX), or
 - Is not supported by your computer/smartphone (either not available or your device is too weak)
- Cloud gaming solves this problem for you



27 WHAT IS CLOUD GAMING?

- Online gaming that runs games on remote servers and streams directly to a user's device
- I.e., playing a game remotely from a cloud



28 BENEFITS OF CLOUD GAMING

- Heavy processing task (e.g., graphic rendering) is done in the cloud, not on your device
- This means, your weak device (without dedicated graphic cards) can play newest games!!
- Imagine you can play the newest PS4 game on your smartphone!



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CLOUD GAMING: JUST GETTING THERE

- Google Stadia
 - Launch date: Nov 2019
- Geforce Now
 - Launch data: Feb 2020
- Microsoft xCloud
 - Progress: beta testing. Release date: Sept 2020
- Tencent Start
 - Progress: beta testing. Release date: TBD
 - <https://www.oneesports.gg/industry-news/tencent-games-puts-out-beta-trial-for-cloud-gaming-service/>




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Q/A



31 IN-CLASS ASSIGNMENT (1-HOUR)

-
- Pick a specific cloud application (give me the app/website name!). **Each person in the team answers one of the following questions:**
 1. Explain how this application utilizes cloud computing in its functionality
 2. Traditionally, without cloud computing, how did this type of application work?
 3. How does this cloud application help reduce the cost on the user's side (compared to non-cloud version)?
 4. How does this cloud application help increase efficiency/performance on the user's side (compared to non-cloud version)?
 5. Give at least one competitor and explain a major difference between this app and its competitor
 6. Give one new feature you would like to see in this application. Explain your reason why you want this feature (if your team has 7 people, answer this question twice with different features)
 - Example of cloud apps: streaming media apps (e.g., Netflix, Spotify), storage apps (e.g., Dropbox, OneDrive), document apps (e.g., Google Drive, Office365), e-book apps (e.g., Audible, Douban Read), e-payment apps (e.g., Alibaba, SCB)
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32 LOGISTICS

- If you don't have a laptop/PC with you, please download Microsoft office app on your phone
- We are going to split into 8 groups
- Each group will consist of 6 students
- Randomly splitting based on Zoom's breakout rooms
- We will resume the class after one hour 😊



33 NEXT WEEK'S GROUP ASSIGNMENT

- Do the research and give a case study that benefits from using Big Data
- Present in class next week
- Suggested Topic:
 - What is the problem that this case study is trying to solve?
 - Describe how this case study uses Big Data to solve the problem in details
 - Explain 5V's (Volume, Variety, Velocity, Veracity, Value) in this case study's Big Data
 - Explain the benefits from using Big Data in this case study