2019 IAC Instructor Knowledge Program

How to Leverage Innovation Driven by Cloud Computing Systems

Chai Won KWON, Ph.D.

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NIA NATIONAL INFORMATION SOCIETY AGENCY

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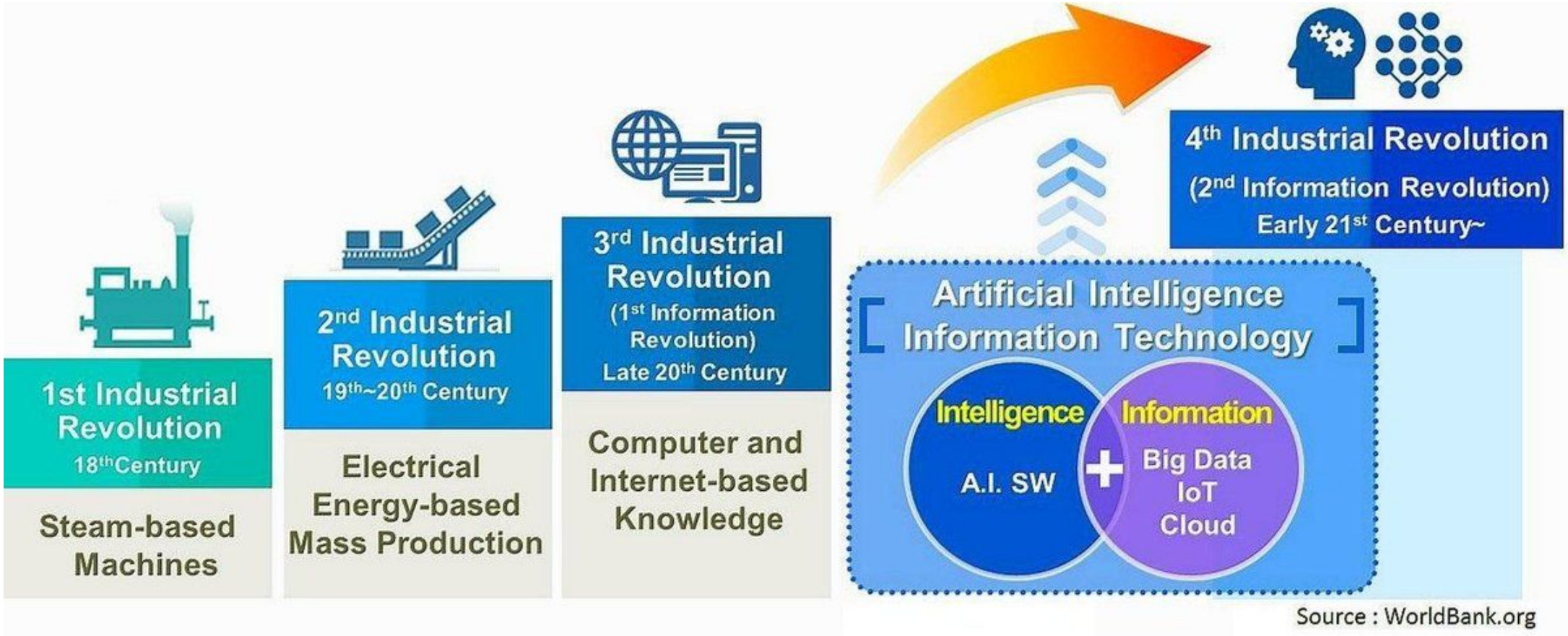
Contents

Industry 4.0 & Digital Transformation

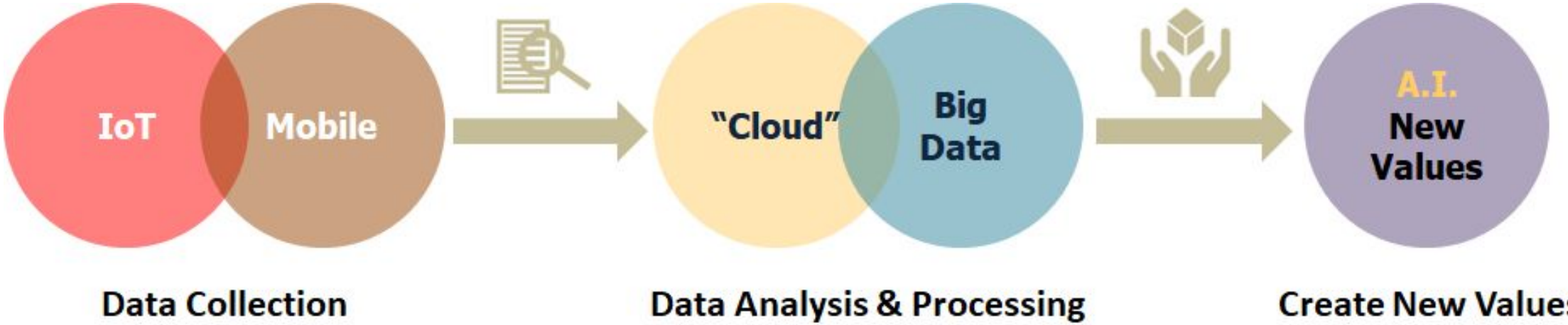
Cloud computing, big data and artificial intelligence are core components of the Industry 4.0



Worldbank

Cloud Computing as Digital Infrastructure

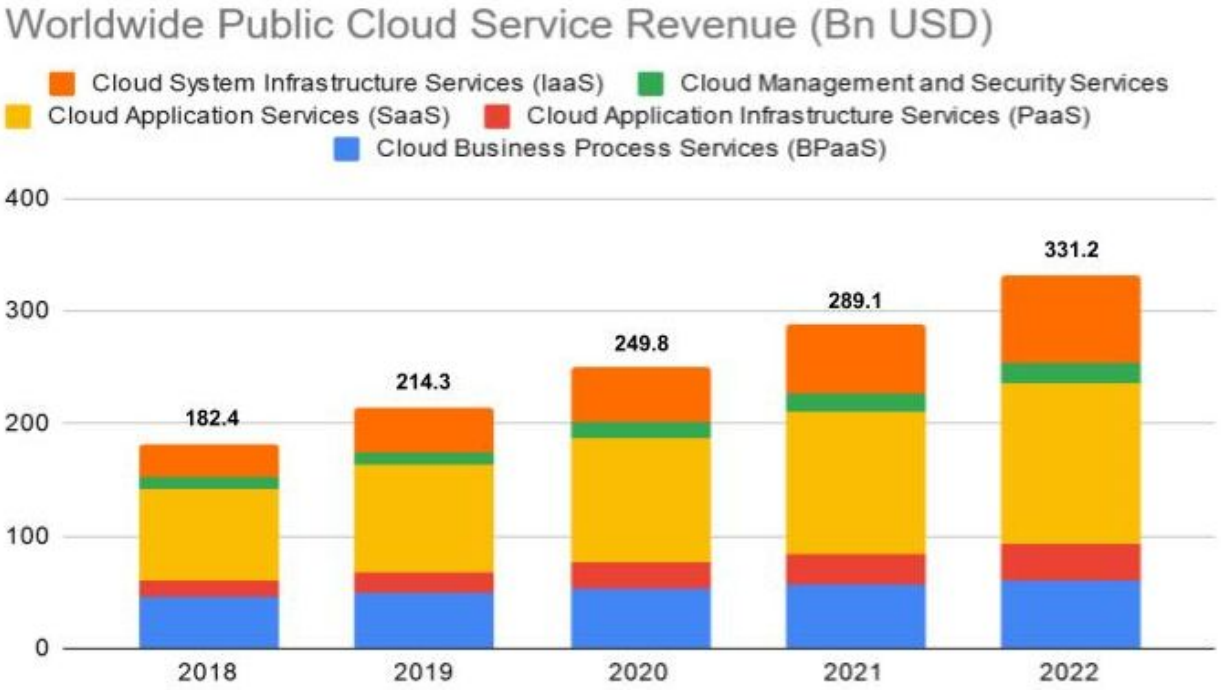
Cloud computing acts as an infrastructure for the data handling and processing toward the artificial intelligence to create new values.

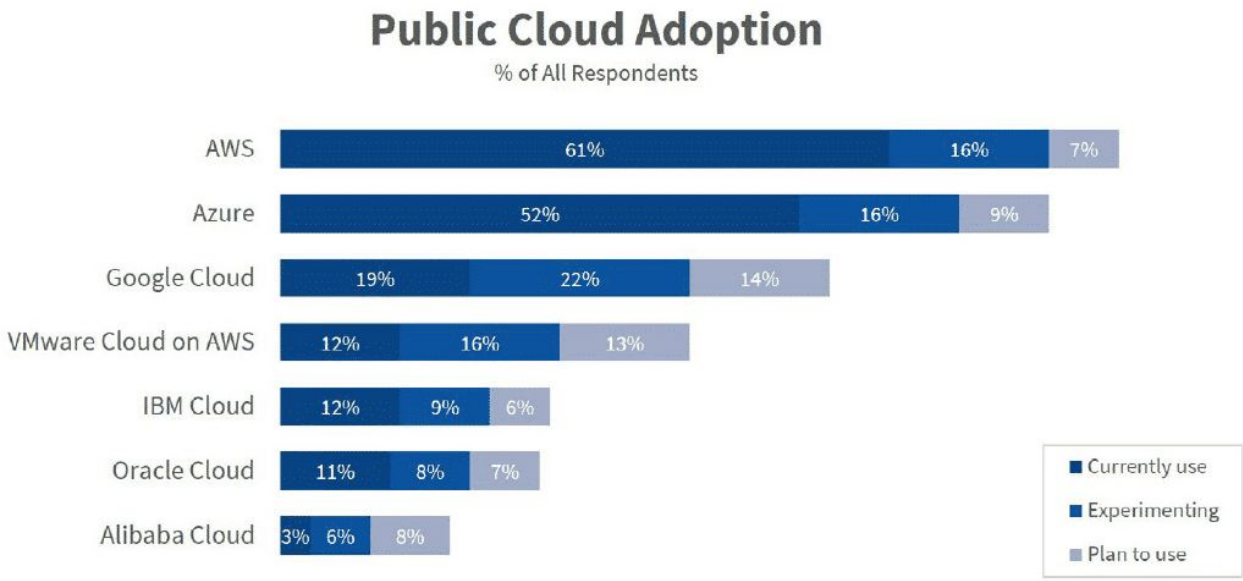


Modified from Korean Ministry of Science and ICT

Market Dynamics of Cloud Computing

Public cloud computing has already made big market of hundreds billion USD and still grows fast, which dominated by top 3 companies (AMG).





Gartner, RightScale & Flexera

Why Cloud Computing ?

- **Features of Public Clouds**

- On Demand
- IT Resources
- Online Access
- Pay-per-use

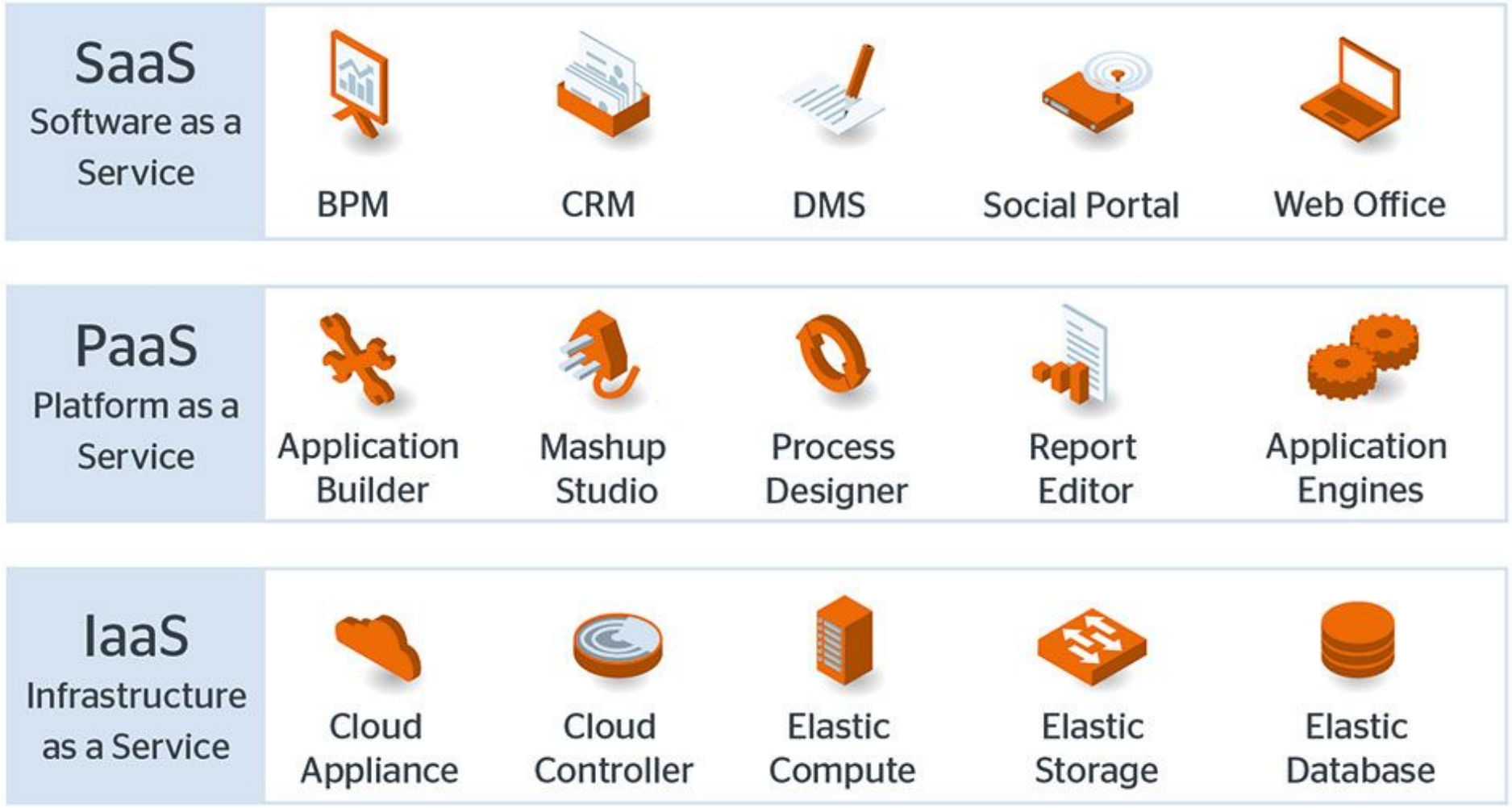
- **Public Cloud vs. On-Premises**

- No Upfront Investment
- Less Operational Overhead
- Less System Management
- Resource Pooling
- Scalability (Scale-Out)
- Agility
- Global Network Access
- On-Demand & Pay-Per-Use

- Intensive Upfront Investment
- More Operational Overhead
- More System Management
- Resource Pooling
- Fixed Capacity (Scale-Up)
- Long Delivery Time
- Limited Network Access

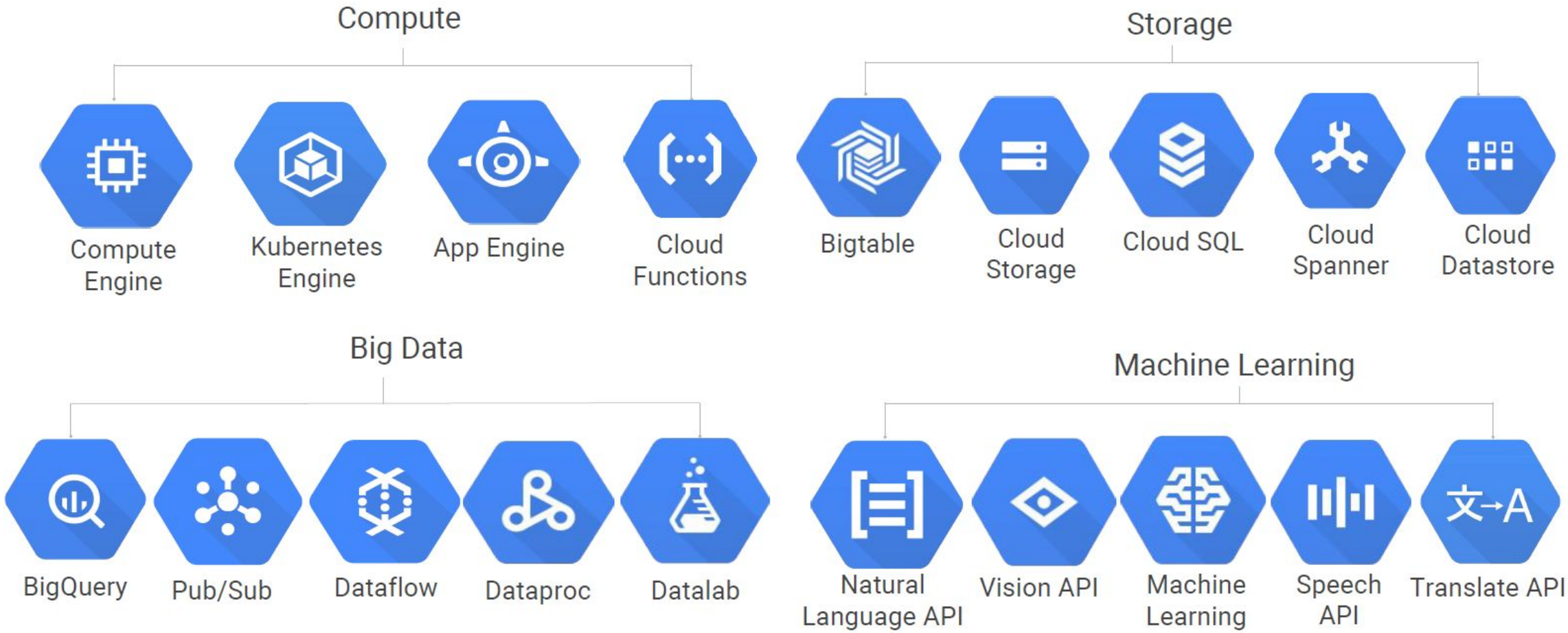
Amazon Web Services

Classification of Cloud Computing



https://www.jisc.ac.uk/reports/the-future-of-cloud-computing

Resources & Services



Google Cloud

Innovation Facilitated by Cloud Computing Infrastructure

- **Global Unicorn Case**

Learn from

“Instagram”

$1 Bn in 2 Years by 12 People

- **Korean Unicorn Cases**

Online Shopping Mall	Tourism & Hotel Booking	Mobile Game	Food Delivery	Real Estate Brokerage
coupang Color Your Days	yanolja	PUBG CORPORATION A BLUEHOLE COMPANY PLAYERUNKNOWN'S BATTLEGROUNDS	배달의민족	직방

Global Scalability

Cloud computing based start-ups can easily scale up to global level by virtue of the global datacenter infrastructure of IaaS providers.

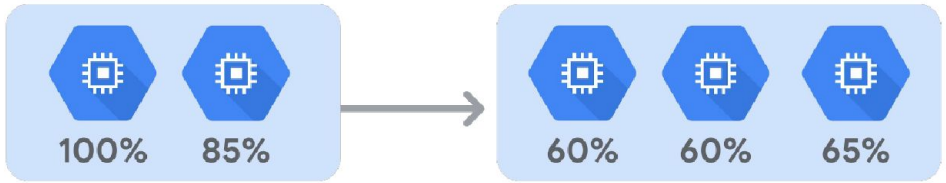
- **Amazon AWS**
  - **22 Regions**
  - **69 Zones**
  - **190 Countries**
- **Microsoft Azure**
  - **54 Regions**
  - **100 Zones**
  - **140 Countries**
- **Google GCP**
  - **20 Regions**
  - **61 Zones**
  - **200+ Countries**

As of Sep 2019
https://aws.amazon.com/about-aws/global-infrastructure/regions_az/
https://azure.microsoft.com/en-us/global-infrastructure/regions/
https://cloud.google.com/about/locations/

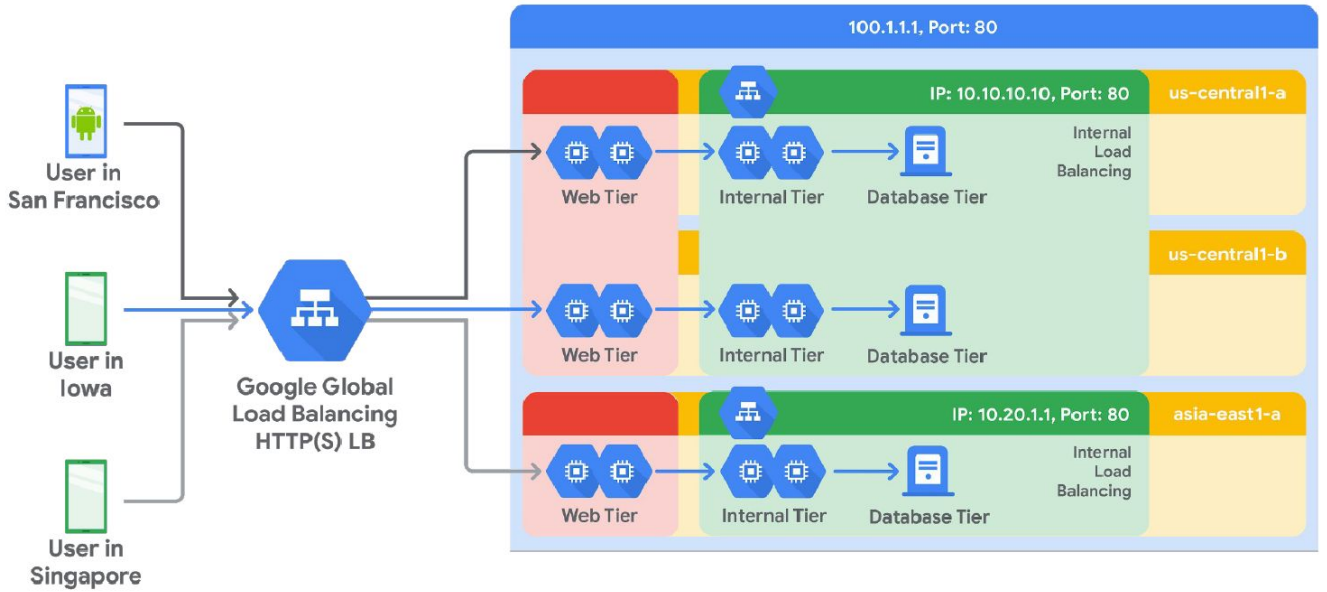
Auto Scaling & Load Balancing

The network traffic fluctuation issues can easily be treated by auto-scaling and load balancing technologies in the cloud computing

- Dynamically add/remove instances:
  - Increases in load
  - Decreases in load
- Autoscaling policy:
  - CPU utilization
  - Load balancing capacity
  - Monitoring metrics
  - Queue-based workload



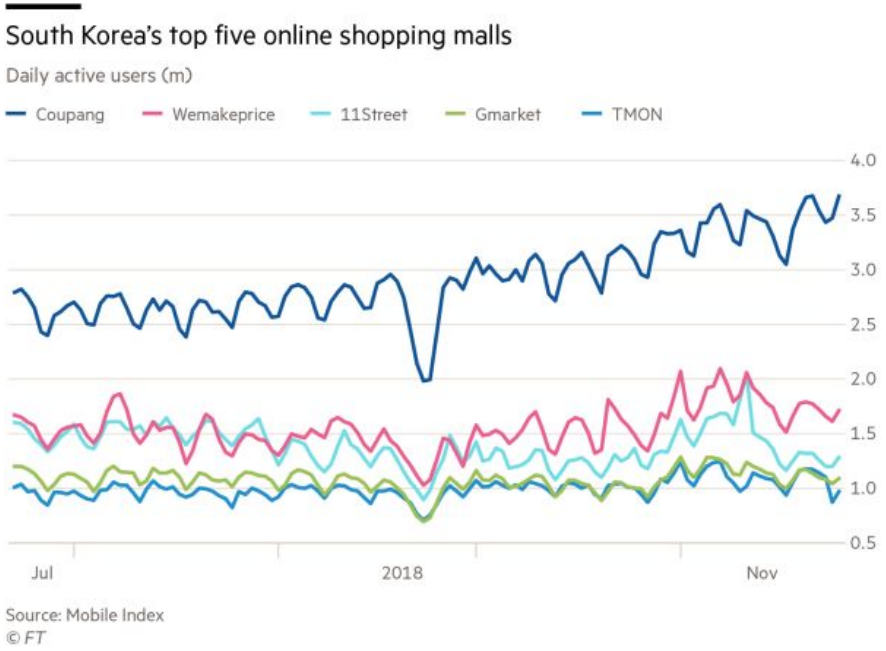
Target CPU utilization = 75%



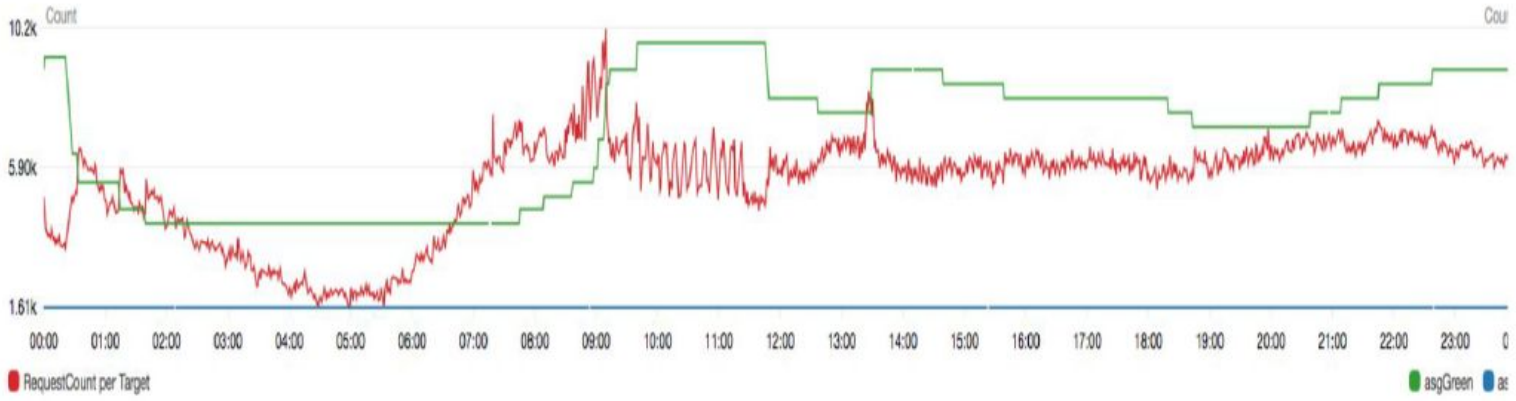
Google Cloud & Coursera

Cloud Computing as Digital Infrastructure

Online Shopping Mall Network Traffic Case



Coupang (2018)

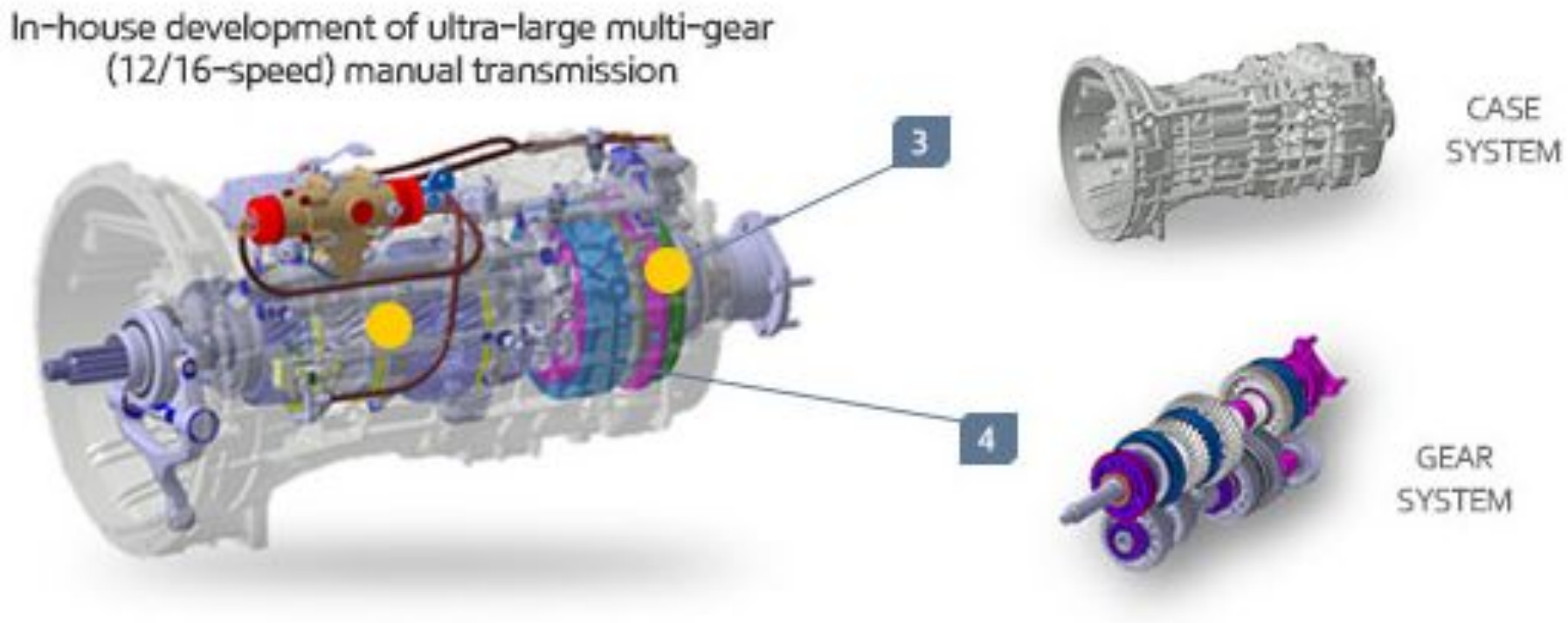


Financial Times (Jan 2,2019)

https://app.ft.com/content/815486c2-fde4-11e8-aebf-99e208d3e521

High Performance Computing R&D Case

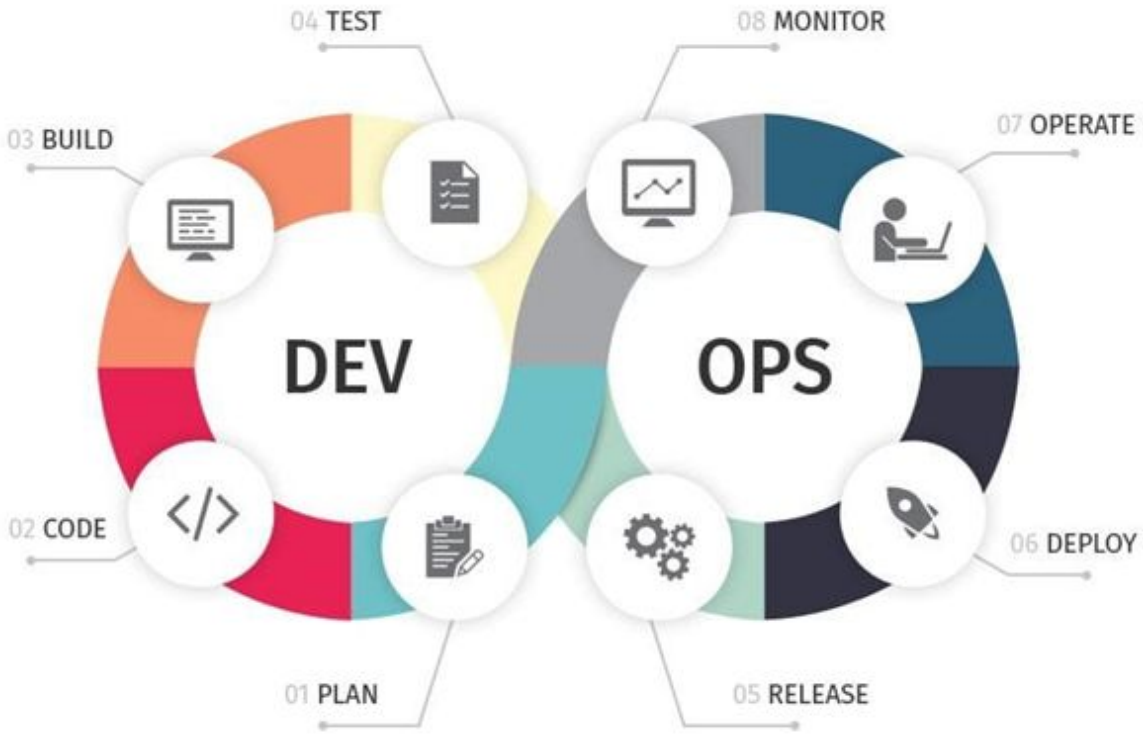
Due to the flexible scalability of the cloud computing, computation intensive R&D time can easily be shortened.

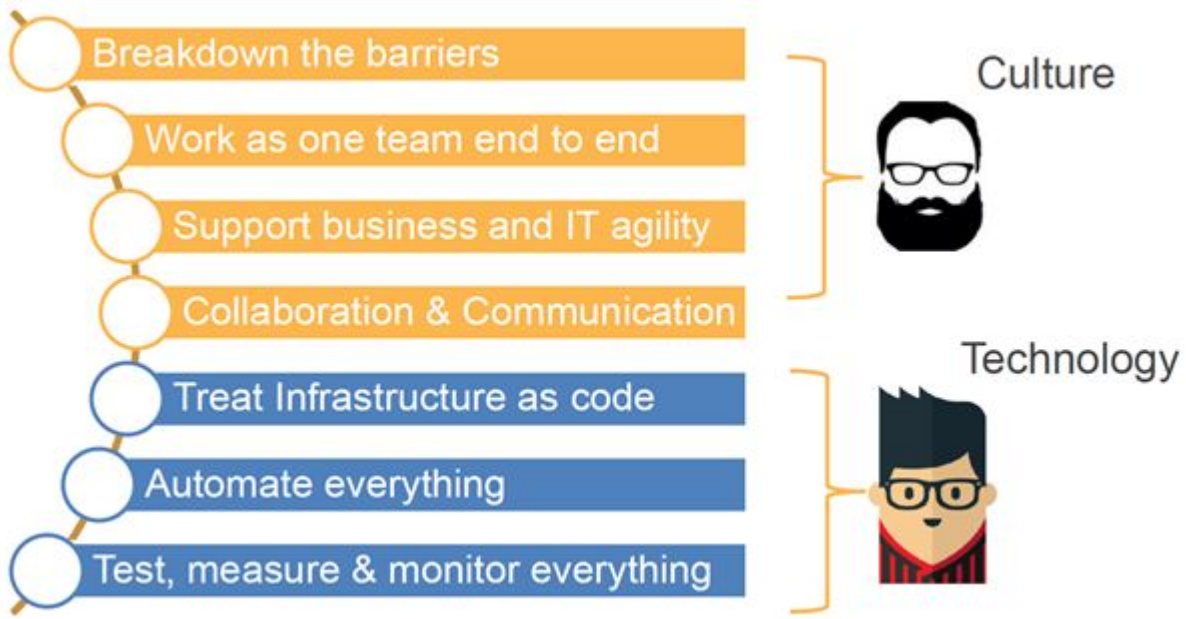


Hyundai Dynamo

DevOps Concept

The traditional silo organization structure should be transformed to ‘Agile’ and ‘DevOps’ style organization and culture to fully exploit the cloud computing innovation.





https://dev.to/ashokisaac/devops-in-3-sentences-17c4

Amazon Web Services

Question & Answer