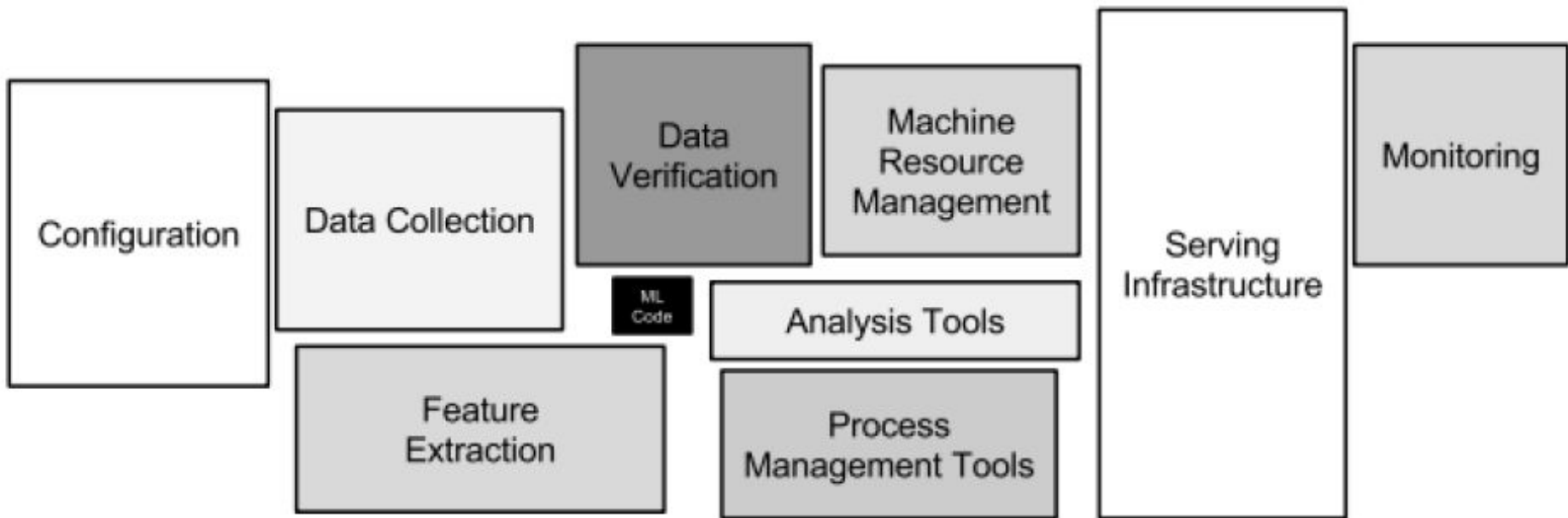# The Cloud

02476 Machine Learning Operations
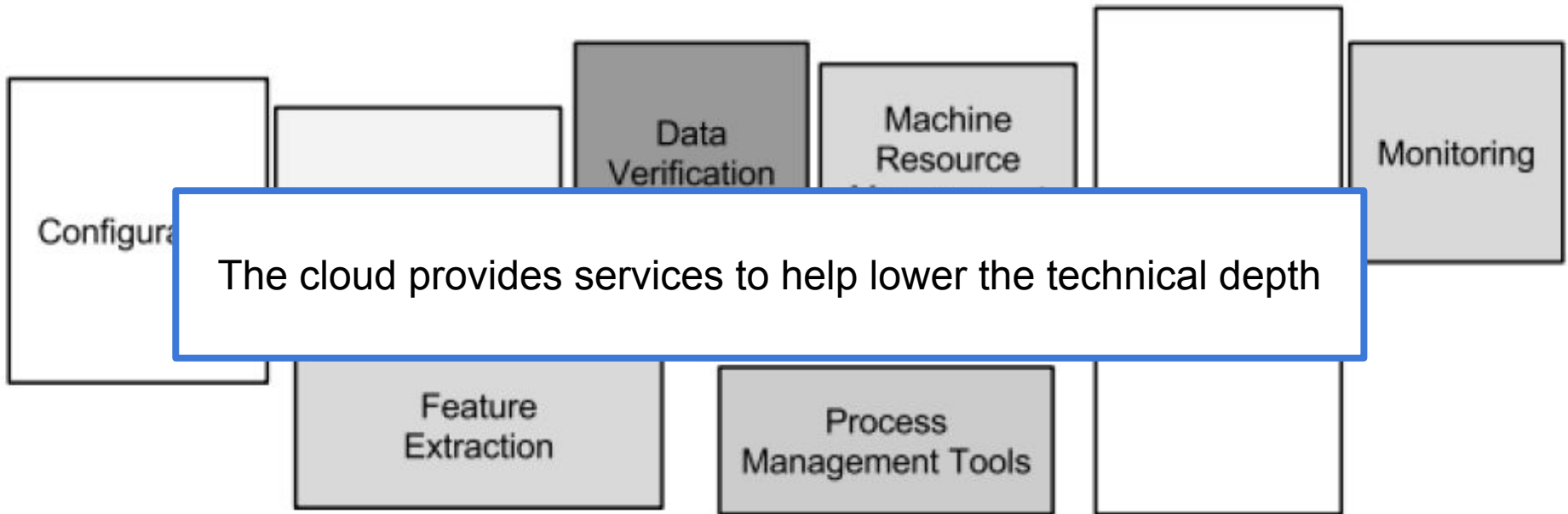Nicki Skafte Detlefsen

Technical depth in machine learning

A fraction of real world ML systems is composed of ML code, the rest is infrastructure.

Technical depth in machine learning

A fraction of real world ML systems is composed of ML code, the rest is infrastructure.

Configura...

Data Verification

Machine Resource...

Monitoring

Feature Extraction

Process Management Tools

The cloud provides services to help lower the technical depth

Conceptually: What is the cloud

It is to data scientists what advance calculus was to mathematicians in the early 17th century:

The power of infinity
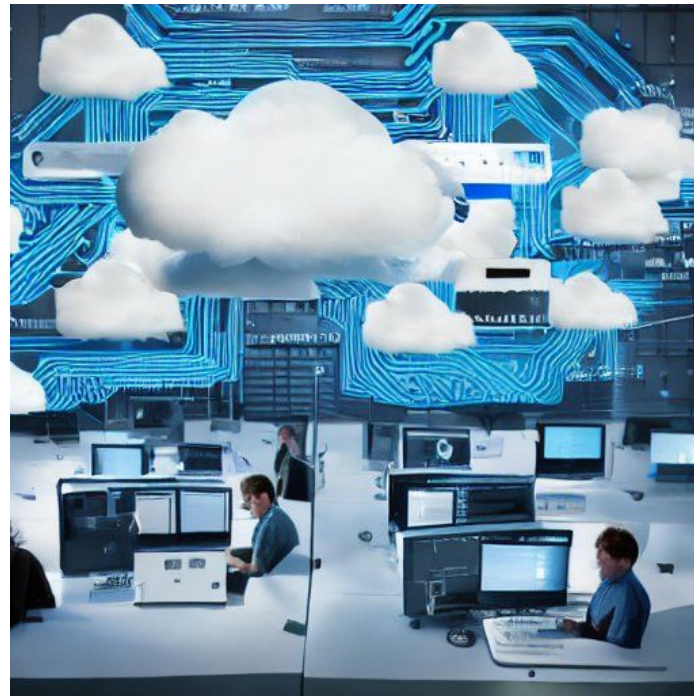
"Cloud computing", Stable diffusion v1

In practise

1. Big data centers of interconnected computers.

2. A software stack on top

Image credit: https://www.nytimes.com/2020/02/27/technology/cloud-computing-energy-usage.html

The advantage/disadvantage of cloud

Pros:

- Extensive collection of services
- Infinite scaling
- Documentation and help

Cons:

- It's expensive over longer time compared to alternatives
- It can be hard to get started
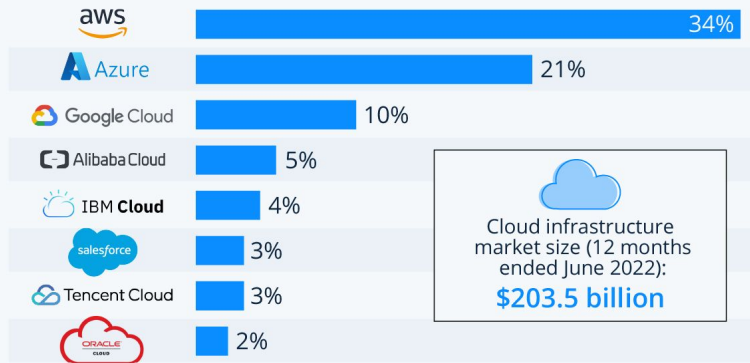- Different vendors do things differently

Cloud vendors

AWS are still the largest player in the cloud market.

However the others are growing faster.

Amazon Leads $200-Billion Cloud Market

Worldwide market share of leading cloud infrastructure service providers in Q2 2022*

Provider	Market share
aws	34%
Azure	21%
Google Cloud	10%
Alibaba Cloud	5%
IBM Cloud	4%
salesforce	3%
Tencent Cloud	3%
ORACLE CLOUD	2%

Cloud infrastructure market size (12 months ended June 2022): **$203.5 billion**

* includes platform as a service (PaaS) and infrastructure as a service (IaaS) as well as hosted private cloud services
Source: Synergy Research Group

statista

Cloud vendors

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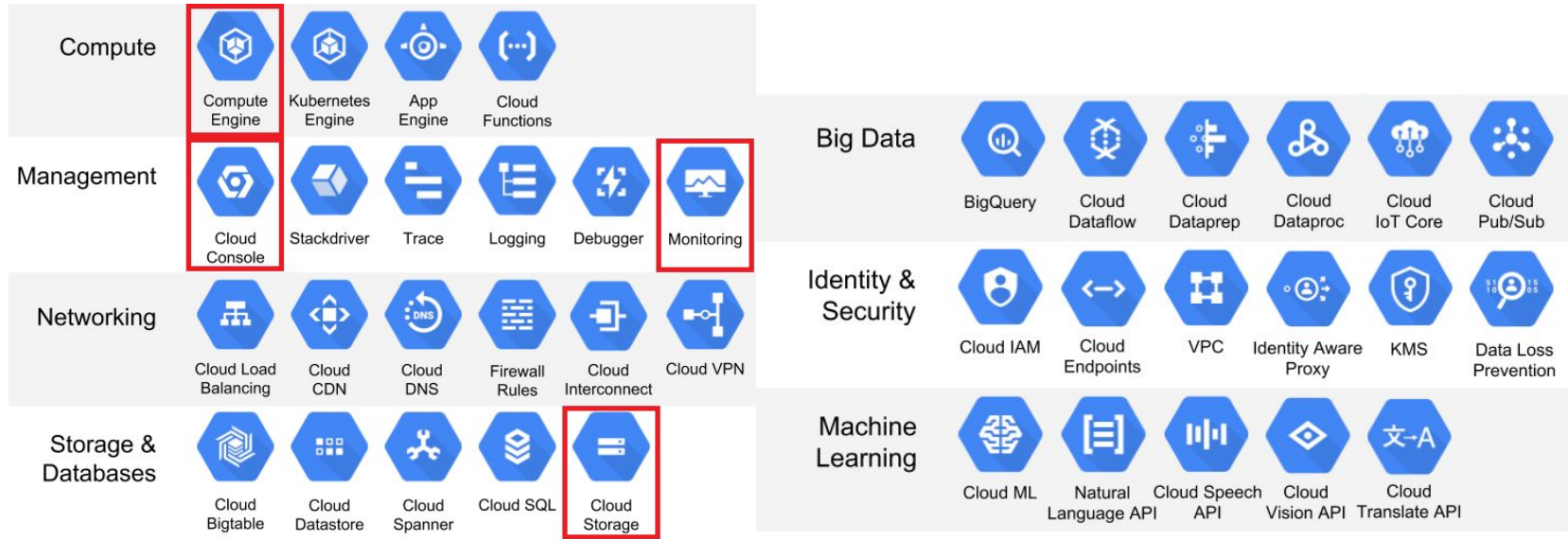We are going to take a look at GCP.

(because they gave me credits)
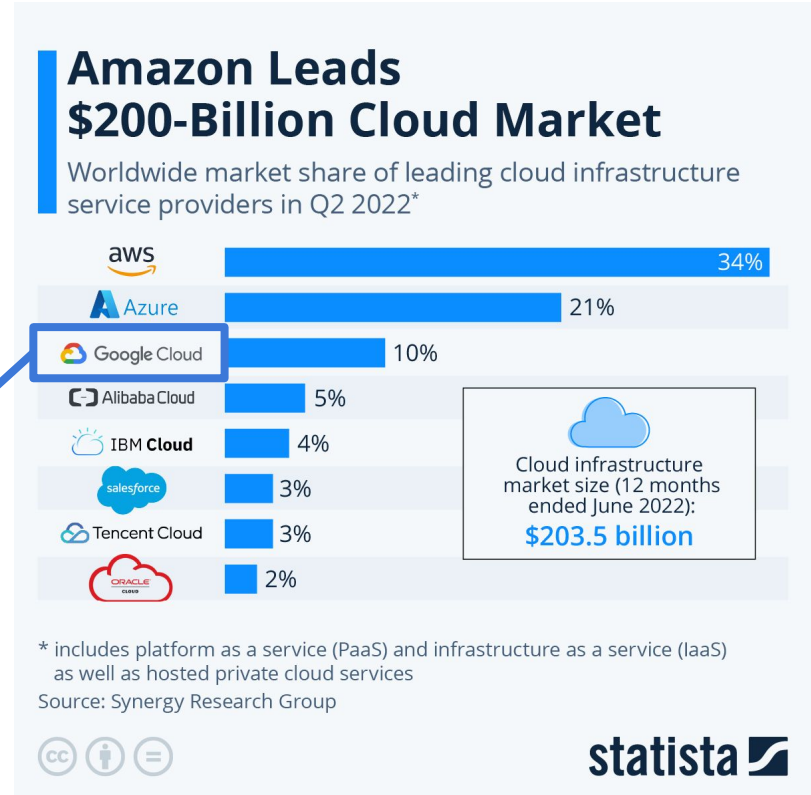
What does the cloud consist of

Each cloud vendor have a number of services

Depending on your application, only a subset is of interest

The important services for ML

Engine   General compute

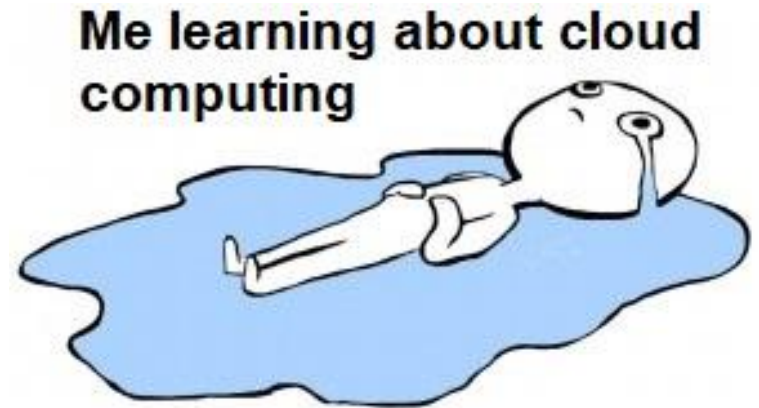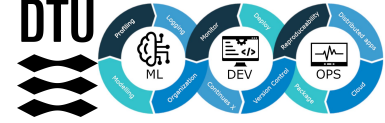Storage   General storage

Functions/Run   Deployment

Vertex   Training of AI

A word of warning

Working in the cloud is...hard.

- Everything taking longer because extra layer of communication
- Syntax can be hard to remember
- A lot of services to be confused about

The only way to learn is to use it.

If you can, start simple and then scale up

Me learning about cloud computing

Lets take a look

https://console.cloud.google.com

Meme of the day

Me signing up for my 4th GCP account to get the $300 of free credits

@AaronNBrock

Image credit: https://www.reddit.com/r/googlecloud/comments/sbotrh/googlers_plz_ignore_this_meme/