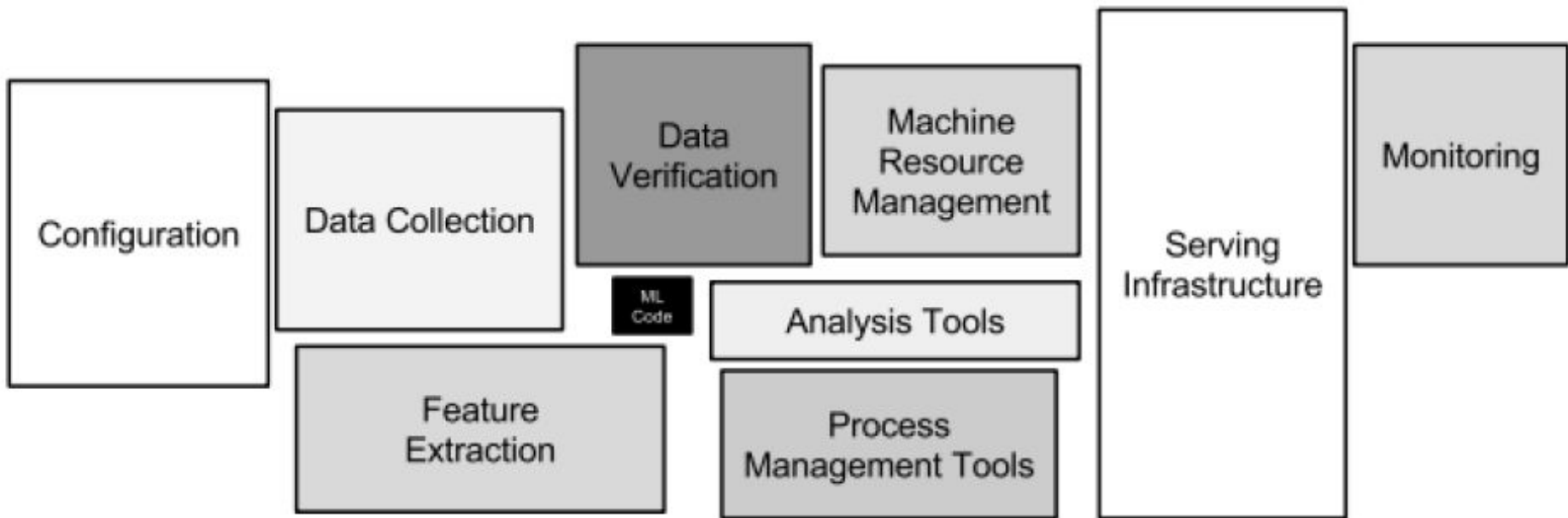

The Cloud

02476 Machine Learning Operations
Nicki Skafté Detlefsen

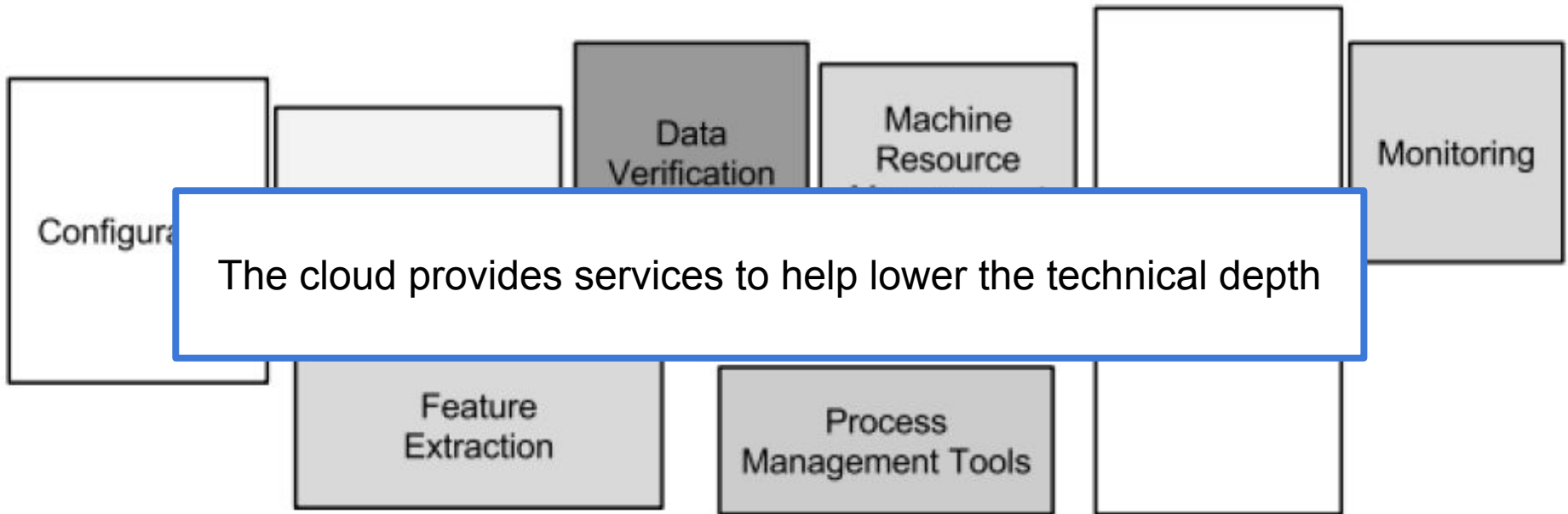
Technical depth in machine learning

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



Technical depth in machine learning

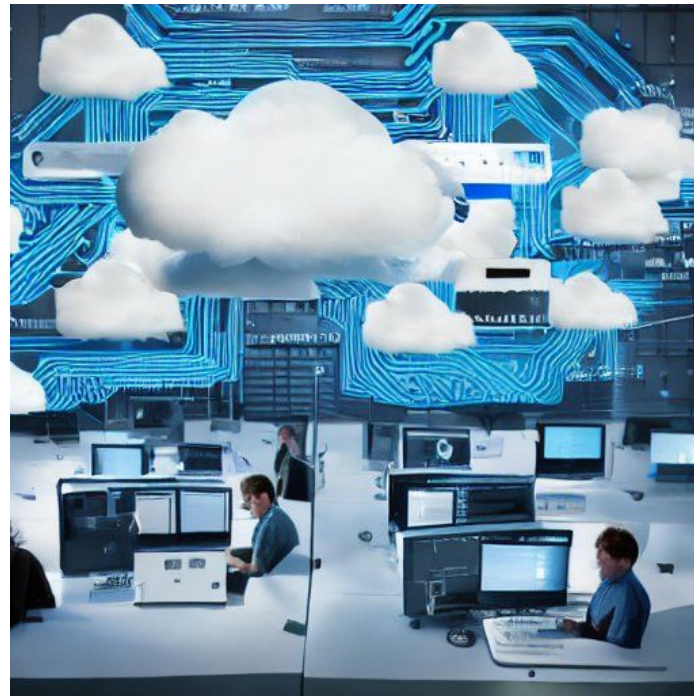
A fraction of real world ML systems is composed of ML code, the rest is infrastructure.



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



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

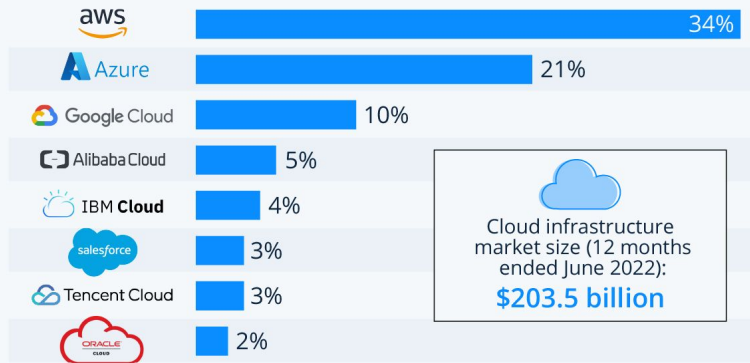
Cloud vendors

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*



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



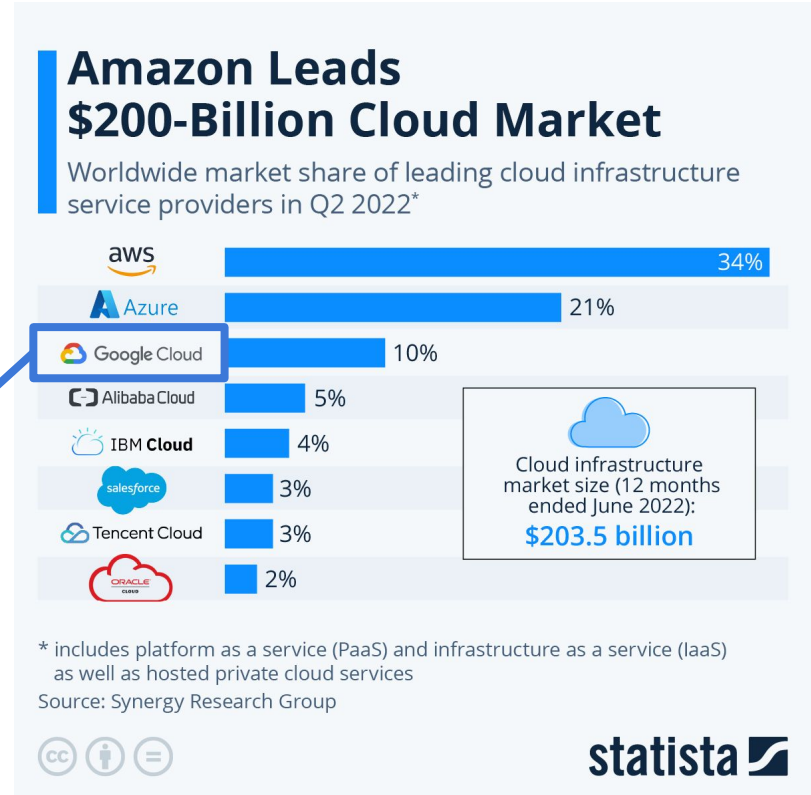
Cloud vendors

AWS are still the largest player in the cloud market.

However the others are growing faster.

We are going to take a look at GCP.

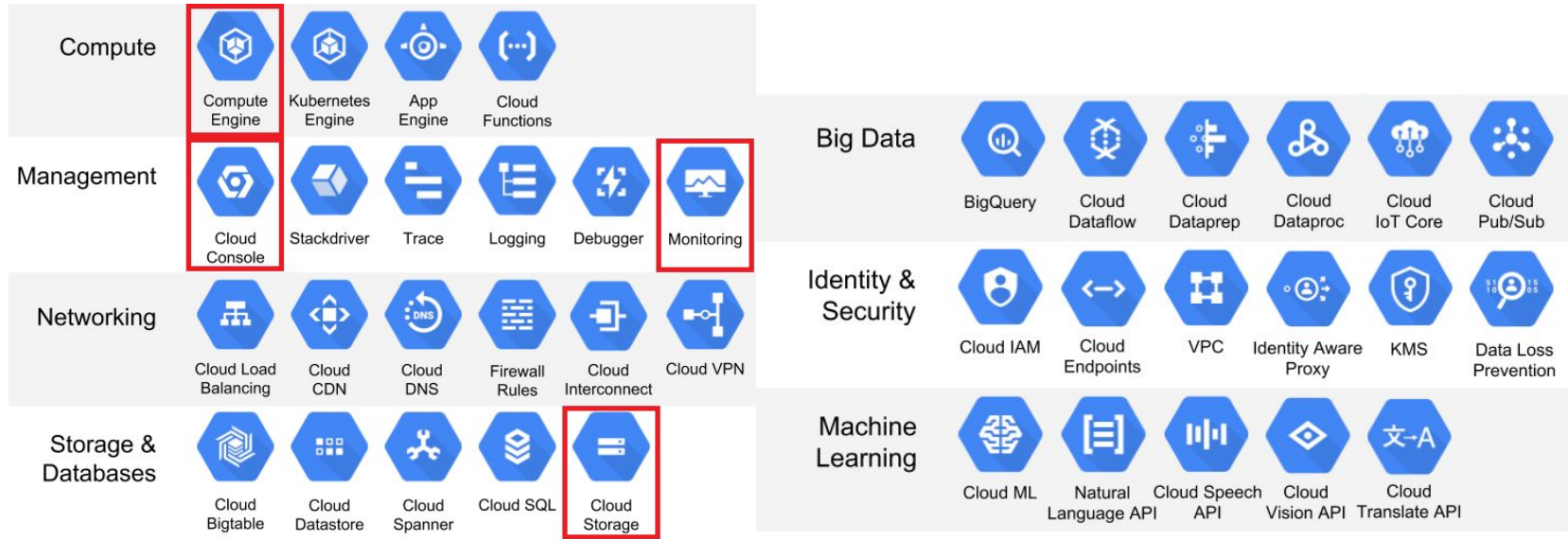
(because they gave me credits)



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

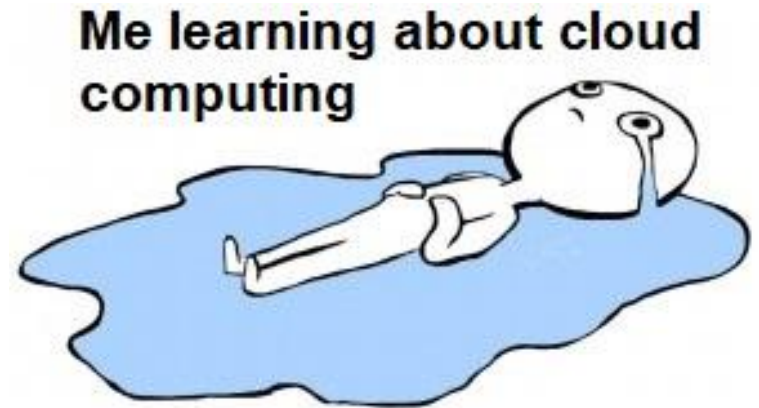
A word of warning

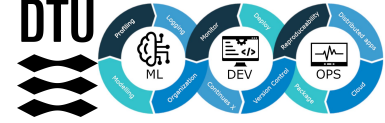
Working in the cloud is...hard.

- 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





Lets take a look

<https://console.cloud.google.com>

The screenshot shows the Google Cloud Platform console dashboard for a project named 'My First Project'. The interface is organized into several sections:

- Project info:** Displays project details such as Project name (My First Project), Project number (1063505572188), and Project ID (promising-flash-335109). It includes a link to 'ADD PEOPLE TO THIS PROJECT' and 'Go to project settings'.
- Resources:** Lists various cloud resources including BigQuery (Data warehouse/analytics), SQL (Managed MySQL, PostgreSQL, SQL Server), Compute Engine (VMs, GPUs, TPUs, Disks), Storage (Multi-class multi-region object storage), Cloud Functions (Event-driven serverless functions), and App Engine (Managed app platform).
- Trace:** Shows 'No trace data from the past 7 days'.
- RPI APIs:** A chart showing 'Requests (requests/sec)' over time. The chart area is empty with the message 'No data is available for the selected time frame.' and a link to 'Go to APIs overview'.
- Google Cloud Platform status:** Provides information about Google Cloud SQL, including a global issue regarding MySQL instance migration to 5.7. It includes a link to 'Go to Cloud status dashboard'.
- Monitoring:** Offers options to 'Create my dashboard', 'Set up alerting policies', and 'Create uptime checks'. It also has a link to 'Go to Monitoring'.
- RPI Error Reporting:** States 'No sign of any errors. Have you set up Error Reporting?' and provides a link to 'Learn how to set up Error Reporting'.
- News:** A section for staying updated on the latest news.

The left sidebar contains navigation options like Home, Recent, All products & services, and a list of pinned services including Billing, IAM & Admin, APIs & Services, Marketplace, Compute Engine, Cloud Storage, VPC network, Cloud Run, SQL, Kubernetes Engine, and BigQuery.

Meme of the day

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

