# What is data engineering?

INTRODUCTION TO DATA ENGINEERING

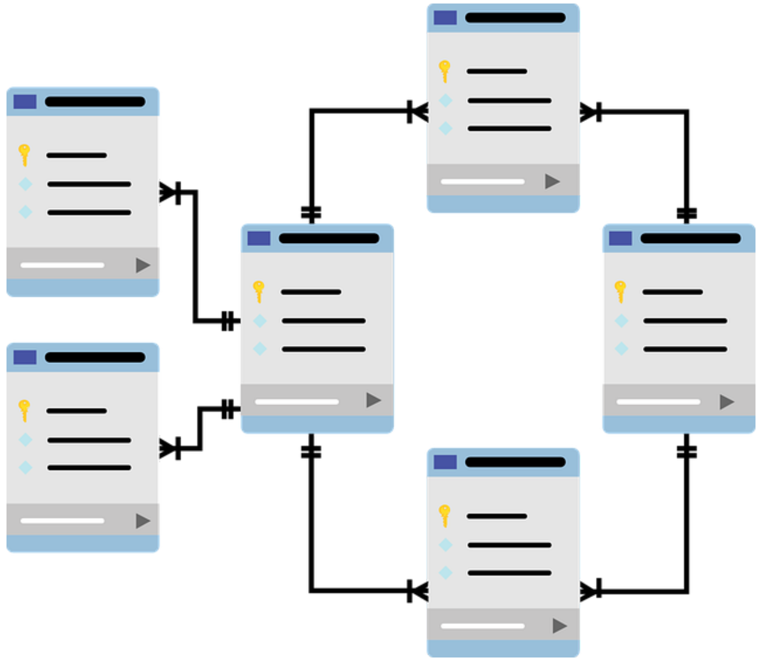
**Vincent Vankrunkelsven**
Data Engineer @ DataCamp

# What to expect

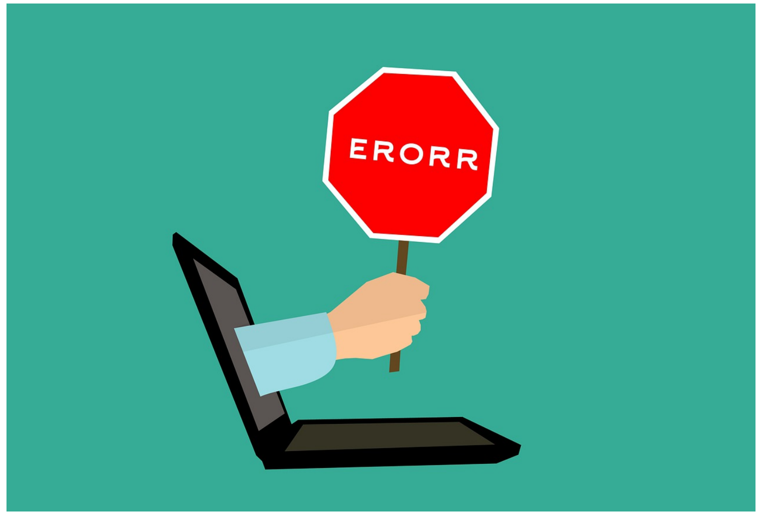
- Chapter 1
  - What is data engineering?
- Chapter 2
  - Tools data engineers use
- Chapter 3
  - Extract
  - Transform
  - Load
- Chapter 4
  - Data engineering at DataCamp!

# In comes the data engineer

- Data is scattered
- Not optimized for analyses
- Legacy code is causing corrupt data



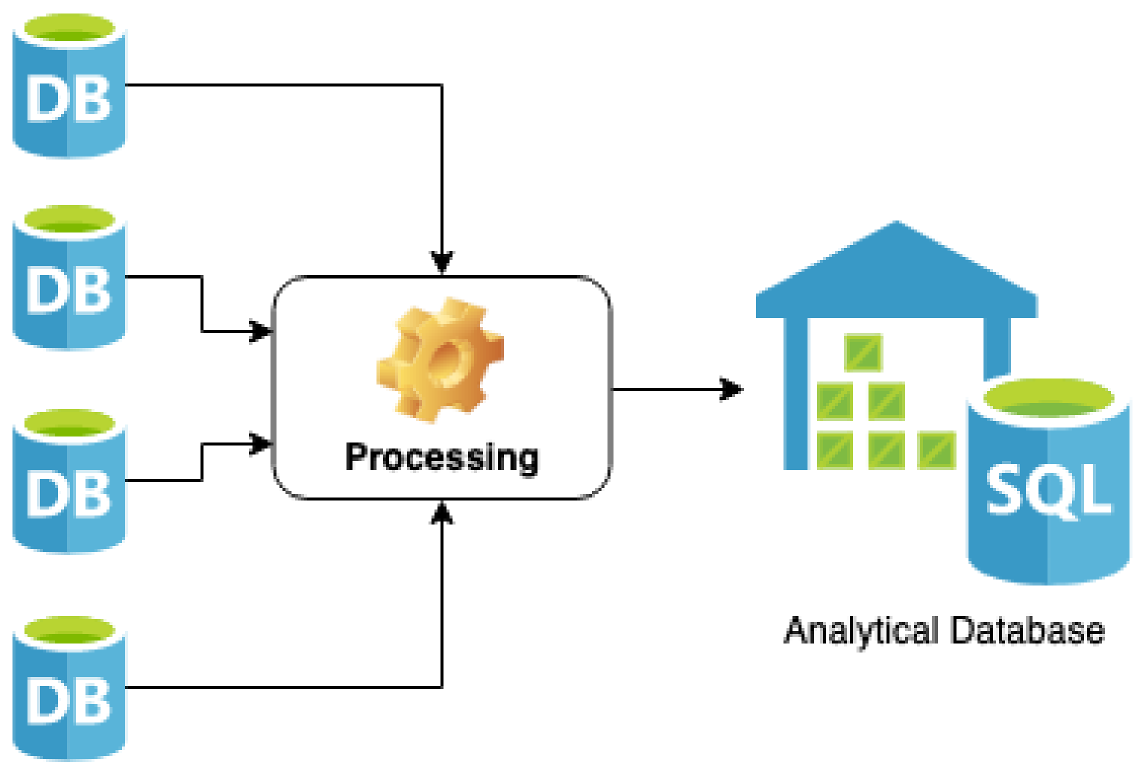
**Data engineer** to the rescue!



# Data engineers: making your life easier

- Gather data from different sources
- Optimized database for analyses
- Removed corrupt data

**Data scientist**'s life got way easier!



# Definition of the job

> An engineer that develops, constructs, tests, and maintains architectures such as databases and large-scale processing systems

- Processing large amounts of data
- Use of clusters of machines

# Data Engineer vs Data Scientist

## Data Engineer

- Develop scalable data architecture
- Streamline data acquisition
- Set up processes to bring together data
- Clean corrupt data
- Well versed in cloud technology

## Data Scientist

- Mining data for patterns
- Statistical modeling
- Predictive models using machine learning
- Monitor business processes
- Clean outliers in data

# Let's practice!

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# Tools of the data engineer

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# Databases

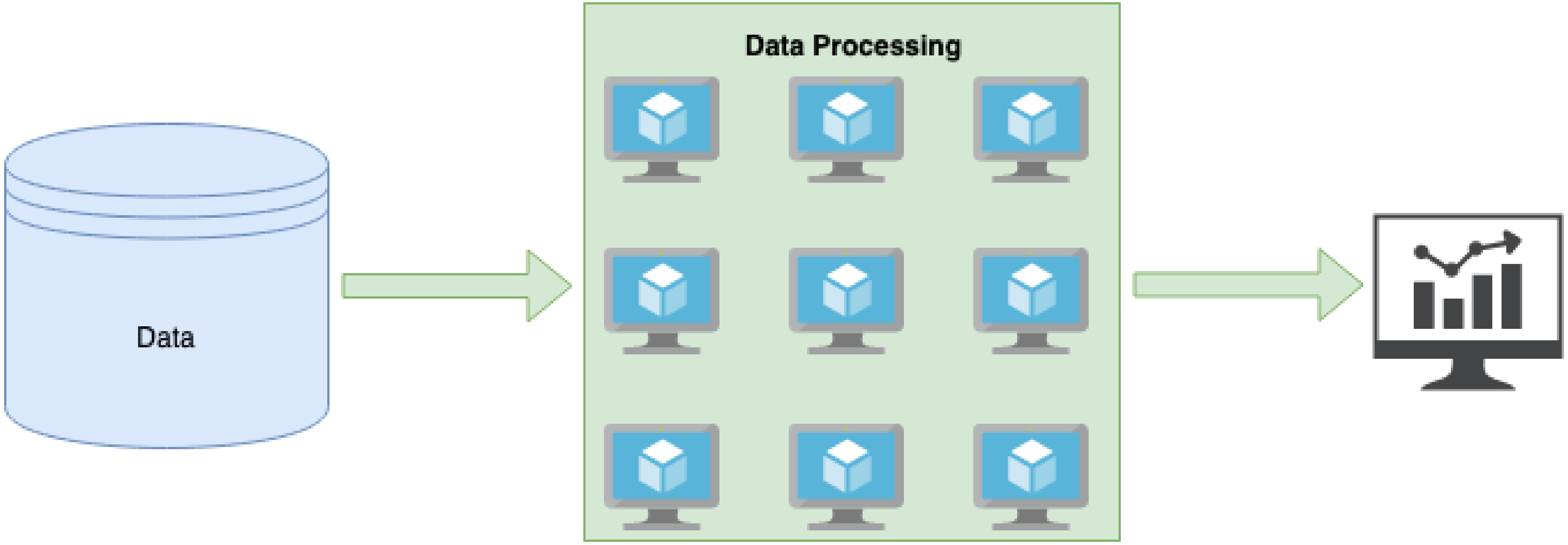
- Hold large amounts of data
- Support application

- Other databases are used for analyses

| Product |
|---|
| name |
| price |
| stock_amount |

# Processing

- Clean data
- Aggregate data
- Join data



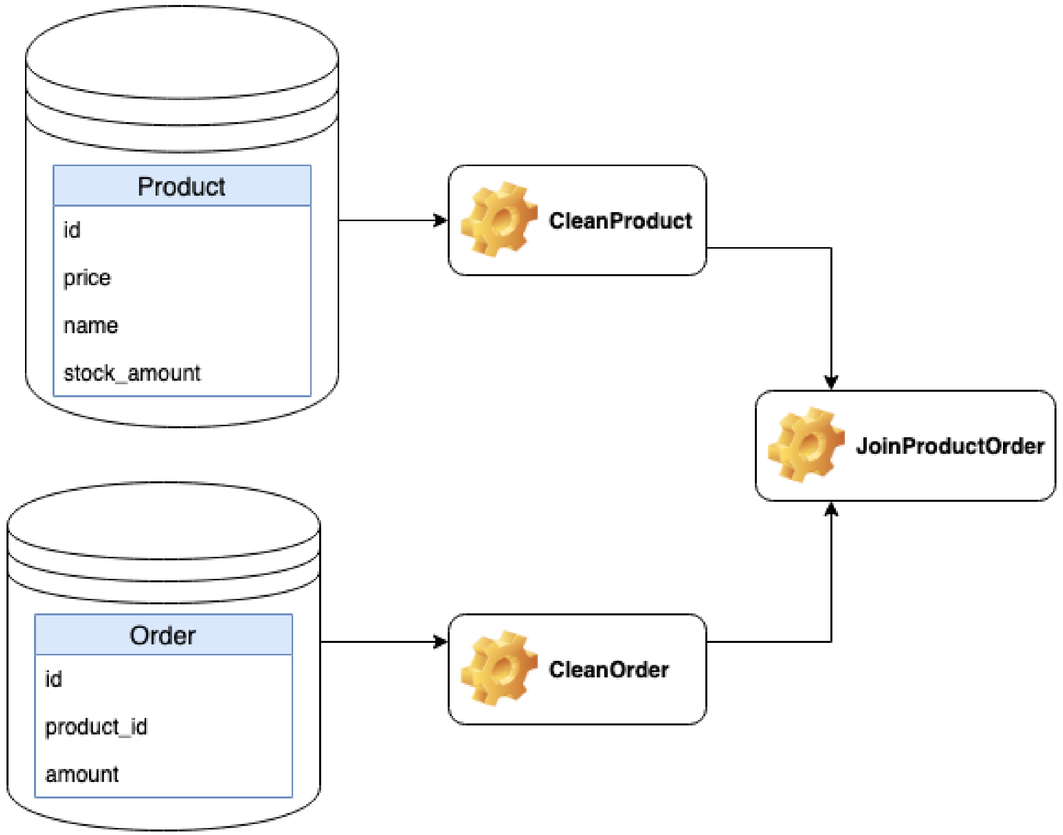
# Processing: an example

```
df = spark.read.parquet("users.parquet")

outliers = df.filter(df["age"] > 100)

print(outliers.count())
```

**Data engineer** understands the abstractions.

# Scheduling

- Plan jobs with specific intervals
- Resolve dependency requirements of jobs



`JoinProductOrder` needs to run after `CleanProduct` and `CleanOrder`

# Existing tools

## Databases

MySQL®

PostgreSQL

## Processing

APACHE Spark™

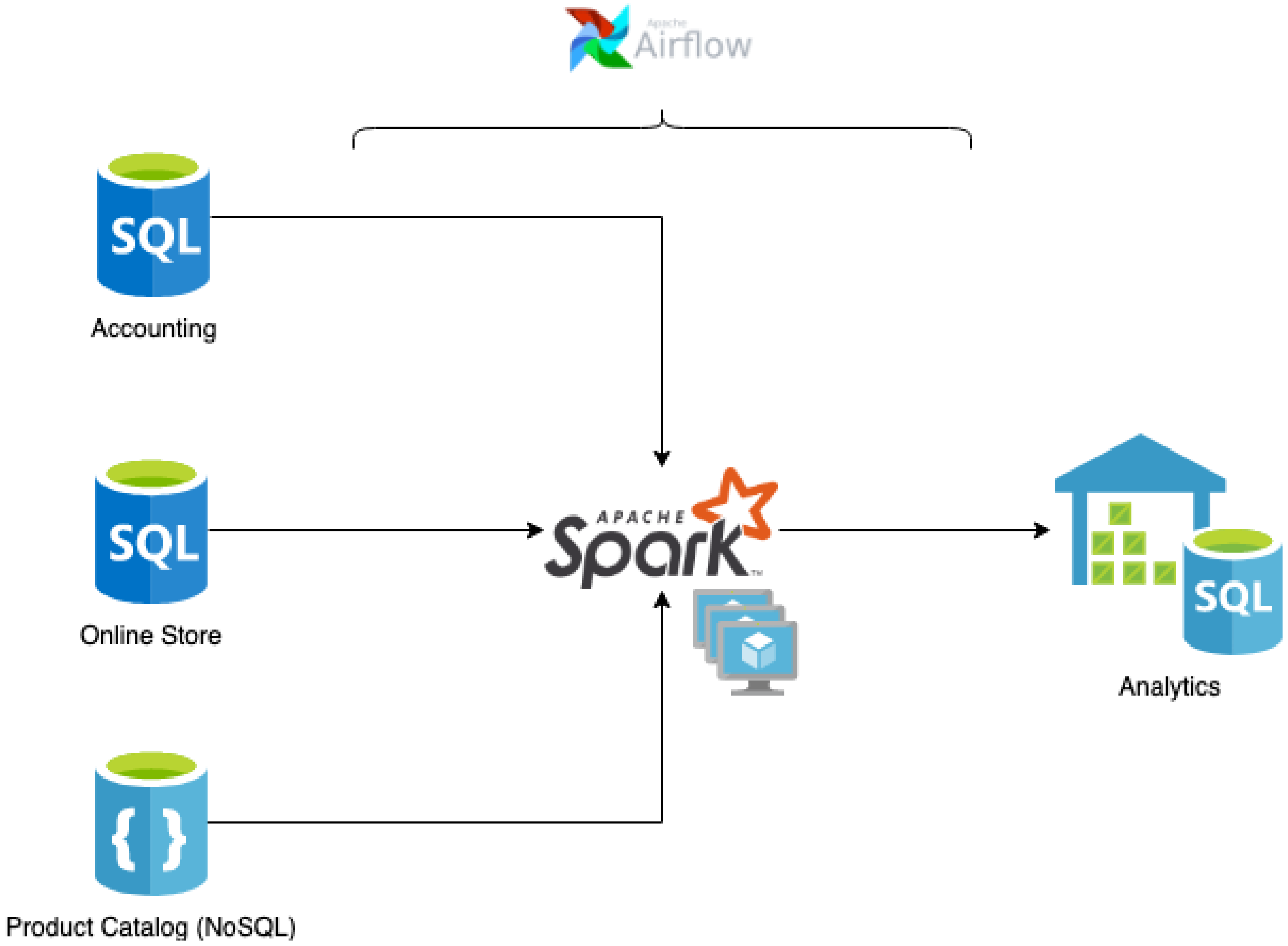
HIVE

## Scheduling

Apache Airflow

OOZIE

# A data pipeline



# Let's practice!

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# Cloud providers

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# Data processing in the cloud

*Clusters of machines required*

**Problem**: self-host data-center

- Cover electrical and maintenance costs
- Peaks vs. quiet moments: hard to optimize

**Solution**: use the cloud

# Data storage in the cloud

*Reliability is required*

**Problem**: self-host data-center

- Disaster will strike
- Need different geographical locations

**Solution**: use the cloud

# The big three: AWS, Azure and Google

amazon web services

32% market share in 2018

Azure

17% market share in 2018

Google Cloud

10% market share in 2018

- Storage
- Computation
- Databases.

# Storage

*Upload files, e.g. storing product images*

**Services**

- AWS S3
- Azure Blob Storage
- Google Cloud Storage

# Computation

*Perform calculations, e.g. hosting a web server*

**Services**

- AWS EC2
- Azure Virtual Machines
- Google Compute Engine

# Databases

*Hold structured information*

**Services**

- AWS RDS
- Azure SQL Database
- Google Cloud SQL

# Let's practice!

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