Amazon Web Services

UNDERSTANDING CLOUD COMPUTING



Hadrien Lacroix
Curriculum Manager at DataCamp

datacamp

Disclaimer

How this chapter should be understood:

- overview of **main cloud providers**
- overview of their **market position**
- overview of their respective **main services**
- overview of their **strengths**
- examples of **customers**
- **case study**

How this chapter should *not* be understood:

- **not** an ever-lasting ground truth
- **not** an exhaustive view
- **not** a comprehensive customer analysis

The cloud infrastructure market

Includes

- **PaaS** (Platform as a Service) = $32B
- **IaaS** (Infrastructure as a Service) = $40B
- **Private cloud** = $43B

Does not include

- SaaS (Software as a Service)
- Cloud data centers
- Other cloud services

AWS's position on the cloud infrastructure market



- Q4 2019 market share: **32.4%**
- Q4 2019 revenue: **$9.8B**
- Annual growth: **33.2%**

AWS cloud services

Personal cloud

Amazon drive



AWS cloud services

Personal cloud

Amazon drive



Amazon photos



AWS cloud services

Personal cloud

Amazon drive



Amazon photos



Professional cloud



File storage

AWS S3



AWS cloud services

Personal cloud

Amazon drive



Amazon photos



Professional cloud

aws

File storage

AWS S3



Computation

AWS EC2



AWS cloud services

Personal cloud

Amazon drive



Amazon photos



Professional cloud



File storage

AWS S3



Computation

AWS EC2



Databases

AWS RDS



AWS data services

- **Redshift** (analytics - data warehousing)
- **Kinesis** (real time data movement and analytics)
- **SageMaker** (predictive analytics and machine learning)

AWS' strength

First mover

- AWS launched in **2006** (Google Cloud in **2008**, Microsoft Azure in **2010**)

--> breadth of services (computing, storage, databases, analytics, networking, mobile, developer tools, management tools, IoT, security and enterprise applications, analytics, machine learning or robotics)

AWS customers



AWS customers



AWS customers



AWS case study

Company: NerdWallet

Problem: Takes too long to deploy machine learning models

Solution:

- Amazon Sagemaker (cloud machine learning platform gathering machine learning processes)



AWS case study

Improvements:

- Reduce training times to days
- Reduce training costs by 75%
- Modernized data science engineering practices



[1] https://aws.amazon.com/solutions/case-studies/

Let's practice!

UNDERSTANDING CLOUD COMPUTING

Microsoft Azure

UNDERSTANDING CLOUD COMPUTING



Hadrien Lacroix
Curriculum Manager at DataCamp

datacamp

Azure's position on the cloud infrastructure market



- Q4 2019 market share: **17.6%**
- Q4 2019 revenue: **$5.3B**
- Annual growth: **62.3%**

Azure cloud services

Personal cloud

OneDrive



Azure cloud services

Personal cloud

Professional cloud

Microsoft Azure

OneDrive



File storage

Azure Blob Storage



Azure cloud services

Personal cloud

Professional cloud

Microsoft Azure

OneDrive



File storage

Azure Blob Storage



Computation

Azure Virtual Machines



Azure cloud services

Personal cloud

OneDrive



Professional cloud

Microsoft Azure

File storage

Azure Blob Storage



Computation

Azure Virtual Machines



Databases

Azure SQL Database



Azure's data services

- **Data Lake Storage** (store data before cleaning)
- **Stream Analytics** (real-time analytics)
- **Machine Learning** (train and deploy machine learning models)

Azure's strength

Integration

- Integration with Microsoft products

--> benefits from customer loyalty, top-of-mind choice

Azure customers



Azure customers





Azure customers



Azure case study

Organization: Ottawa Hospital

Needs: Cost effective and secure disaster recovery solution (continue vital operations after a disaster)

Solution:

- Microsoft IaaS (secure, scalable environment)
- Azure Storage (medical imaging data)
- Azure Site Recovery (automatically deploy recovery processes)



Azure case study

Improvements:

- New secure, up-to-date, policy compliant disaster recovery site in under 3 months
- Compliant with data privacy regulations
- Saved ~50% on disaster recovery costs



[1] https://customers.microsoft.com/

Let's practice!

UNDERSTANDING CLOUD COMPUTING

Google Cloud

UNDERSTANDING CLOUD COMPUTING



Hadrien Lacroix
Curriculum Manager at DataCamp

datacamp

Google Cloud's position on the cloud infrastructure market



Google Cloud

- Q4 2019 market share: **6%**
- Q4 2019 revenue: **$1.8B**
- Annual growth: **67.6%**

Google Cloud services

Personal cloud

Google Drive



Google Cloud services

Personal cloud

Google Drive



Google Photos



Google Cloud services

Personal cloud

Google Drive



Google Photos



Professional cloud



File storage

Google Cloud Storage



Google Cloud services

Personal cloud

Google Drive



Google Photos



Professional cloud

Google Cloud

File storage

Google Cloud Storage



Computation

Google Compute Engine



Google Cloud services

Personal cloud

Google Drive



Google Photos



Professional cloud

Google Cloud

File storage

Google Cloud Storage



Computation

Google Compute Engine



Databases

Google Cloud SQL



Google Cloud data services

- **Big Query** (data warehouse)
- **Dataflow** (batch and stream data processing)
- **AutoML** (machine learning model training and development)

Google Cloud's strength

Multicloud

- Google Cloud Anthos

--> Run hybrid multicloud solutions: manage and deploy across several cloud providers

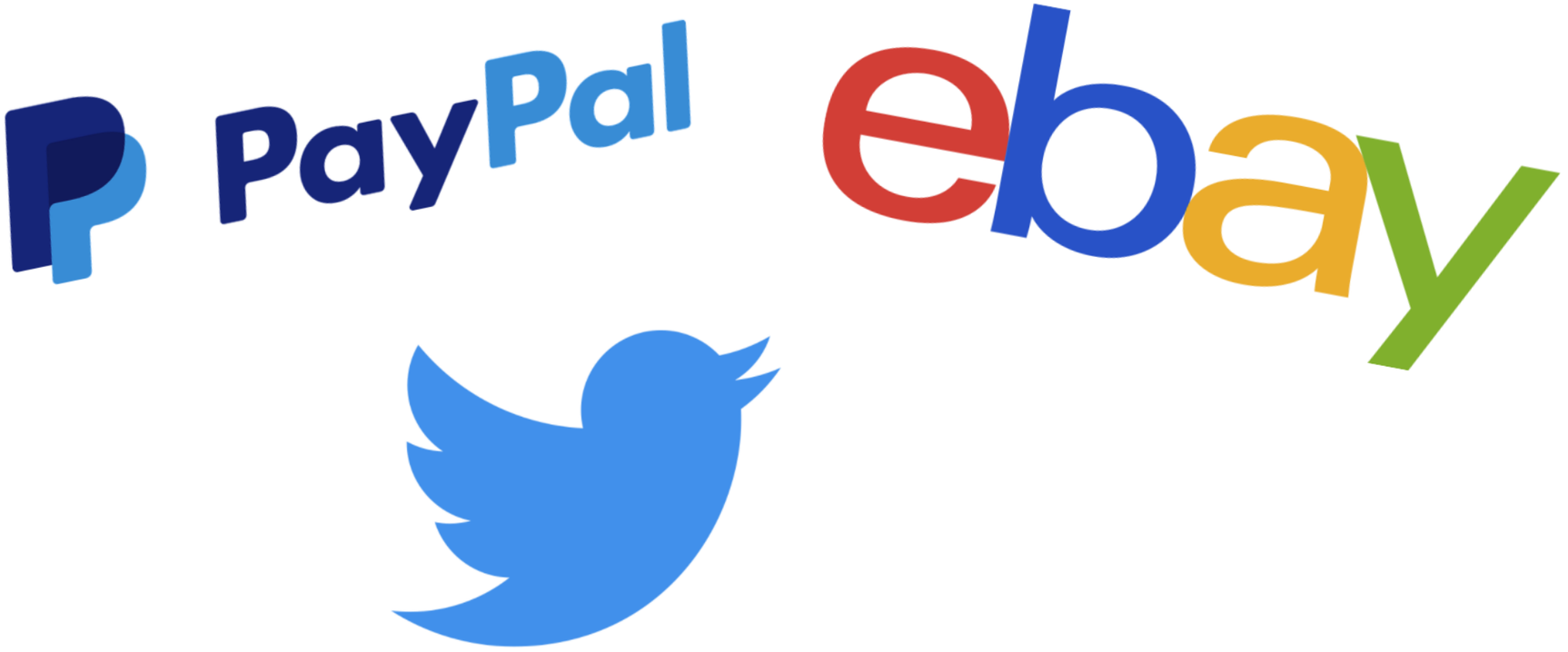
Google Cloud customers



Google Cloud customers



Google Cloud customers



Google Cloud case study

Organization: Lush

Needs: Improve e-commerce platform availability and stability during peak loads

Solution:

- Migrate entire global infra to Google Cloud
- Google Cloud Compute Engine (quickly test and provision environments during migration)
- Customer and product data on Google Cloud SQL



Google Cloud case study

Improvements:

- No outage during Boxing Day
- 40% reduction in hosting costs
- Later deployed an image recognition app to provide information on their product and reduce plastic packaging on Google Cloud AI platform

LUSH

[1] https://cloud.google.com/customers/lush/

Let's practice!

UNDERSTANDING CLOUD COMPUTING

Other actors and final thoughts

UNDERSTANDING CLOUD COMPUTING



Hadrien Lacroix
Curriculum Manager at DataCamp

datacamp

Alibaba's position on the cloud infrastructure market



- Q4 2019 market share: **5.4%**
- Q4 2019 revenue: **$1.6B**
- Annual growth: **71.1%**

Alibaba Cloud services

Personal cloud



Alibaba Cloud services

Personal cloud

∅

Professional cloud

Alibaba Cloud

File storage

Object Storage Service



Alibaba Cloud services

Personal cloud



Professional cloud

Alibaba Cloud

File storage

Object Storage Service



Computation

Elastic Compute Service



Alibaba Cloud services

Personal cloud

∅

Professional cloud

Alibaba Cloud

File storage

Object Storage Service



Computation

Elastic Compute Service



Databases

ApsaraDB RDS



Alibaba Cloud data services

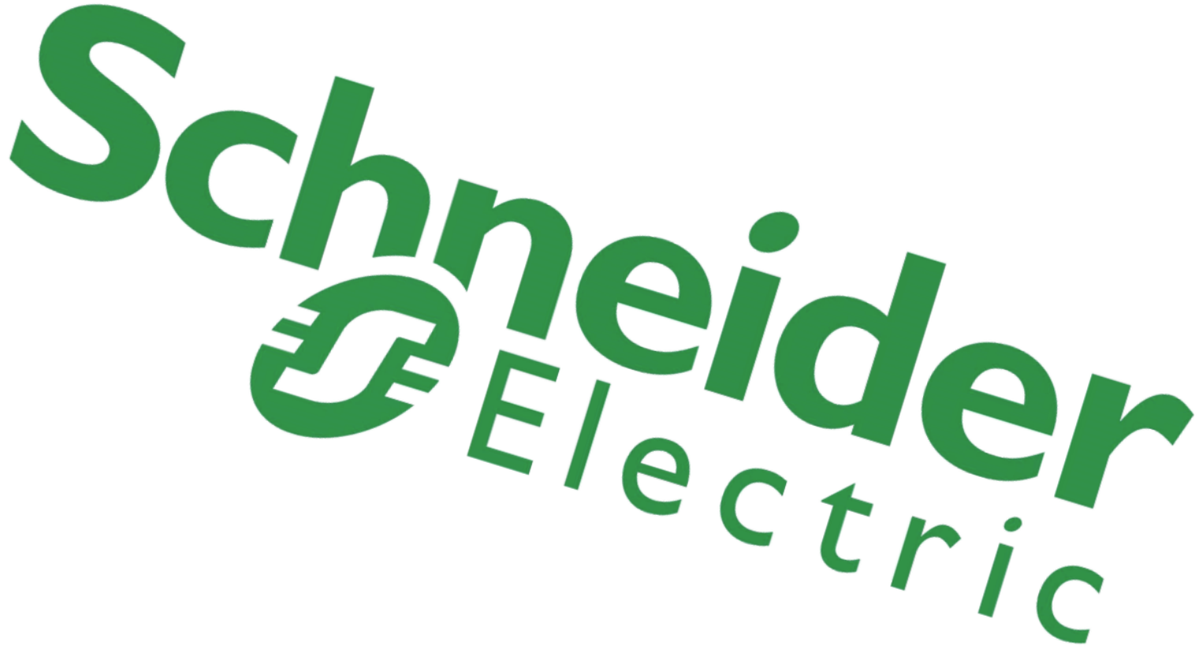
- **E-MapReduce** (big data processing)
- **QuickBI** (analytics and visualization)
- **Machine Learning Platform for AI**

Alibaba Cloud customers



Alibaba Cloud customers





Alibaba Cloud customers



IBM's position on the cloud infrastructure market



- Q4 2019 market share: **1.8%**
- Q4 2019 estimated revenue: **$530M**

IBM Cloud services

Personal cloud



IBM Cloud services

Personal cloud

∅

Professional cloud

IBM Cloud

File storage

IBM Cloud Object Storage



IBM Cloud services

Personal cloud

∅

Professional cloud

IBM Cloud

File storage

IBM Cloud Object Storage



Computation

IBM Cloud Virtual Server



IBM Cloud services

Personal cloud

∅

Professional cloud

IBM Cloud

File storage

IBM Cloud Object Storage



Computation

IBM Cloud Virtual Server



Databases

IBM Cloud DB2



IBM Cloud data services

- **Watson Knowledge Catalog** (find, curate, categorize and share data)
- **SPSS Statistics** (analytics with SPSS)
- **Watson Machine Learning** (train and deploy machine learning models)

IBM Cloud customers



IBM Cloud customers



IBM Cloud customers



Oracle's position on the cloud infrastructure market



- Smaller market share
- Exact numbers not published

Oracle Cloud services

Personal cloud



Oracle Cloud services

Personal cloud



Professional cloud

ORACLE

File storage

Object Storage



Oracle Cloud services

Personal cloud

∅

Professional cloud

ORACLE

File storage

Object Storage



Computation

Virtual Machines



Oracle Cloud services

Personal cloud

∅

Professional cloud

ORACLE

File storage

Object Storage



Computation

Virtual Machines



Databases

MySQL Database Service



Oracle Cloud data services

- **Autonomous Database** (data marts, data lakes, and batch data processing)
- **Analytics Cloud** (automated data preparation, visualization, forecasting and reporting)
- **Machine Learning** (train and deploy machine learning models)

Oracle Cloud customers

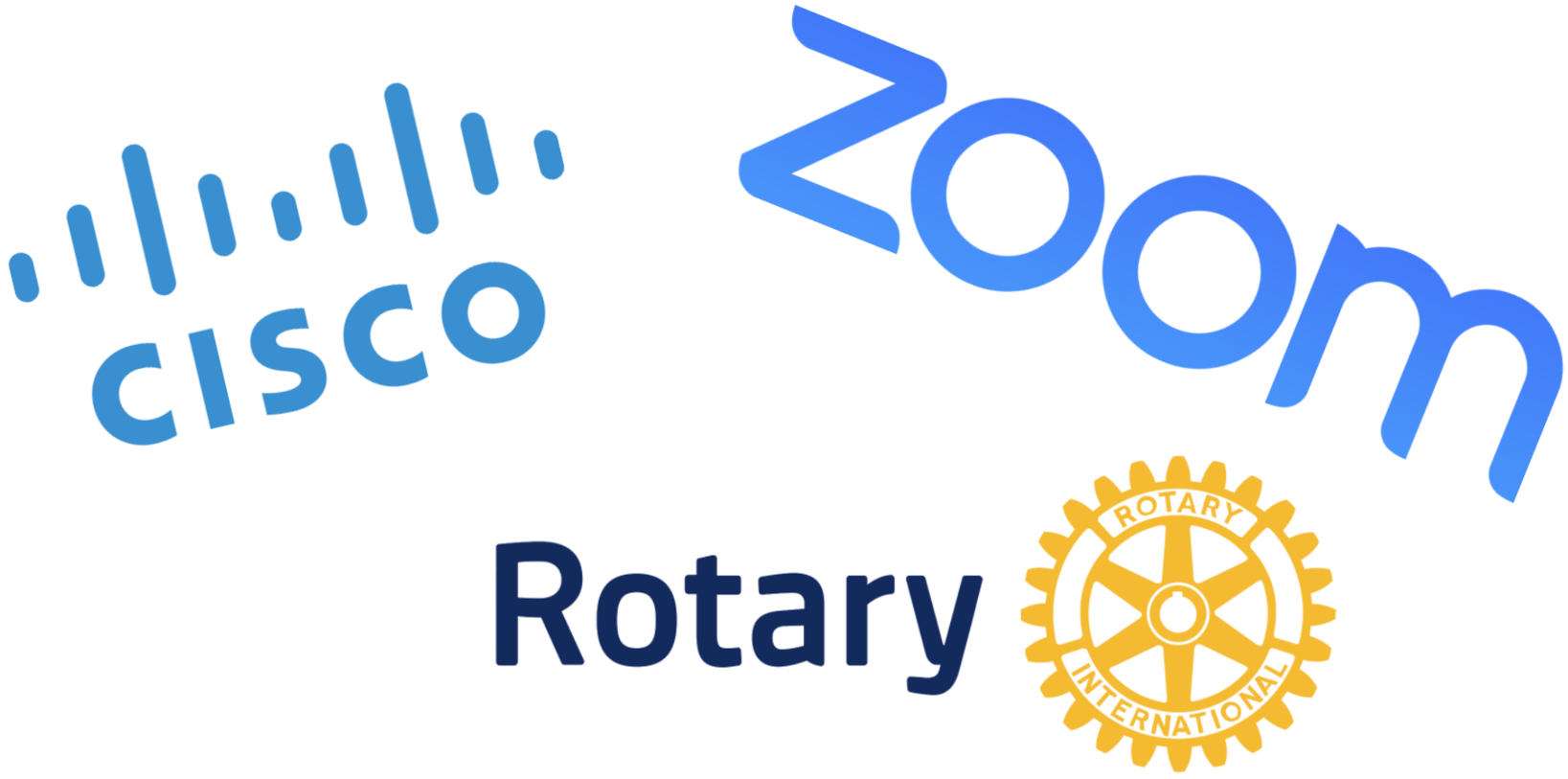


Oracle Cloud customers





Oracle Cloud customers



Keep in mind!

- Fierce competition: **things will move**
- Including SaaS tells a **different story**

Making your case

- Best provider is the one meeting your **needs:**
  - **Current** infrastructure costs
  - Cost of running a **data center, physical hardware, storage**
  - Cost of **applications** (deprecate, migrate, rebuild)
  - Cost of **hiring** cloud specialists
  - **Benefits** for company and customers
  - **Risks** (regulation, security, disaster, vendor lock-in)

Future of the cloud

- **Growing** amount of **data**
- **AI** needs computing **resources**
- **Smart cities** need an underlying **infrastructure**
- **Serverless** architectures are more and more popular

Let's practice!

UNDERSTANDING CLOUD COMPUTING

Congratulations!

UNDERSTANDING CLOUD COMPUTING



Hadrien Lacroix
Curriculum Manager at DataCamp

datacamp

Chapter 1 - Introduction to cloud computing

- How cloud computing **works**
- Why it is **powerful**
- Main **service models** (IaaS, PaaS, SaaS)

Chapter 2 - Cloud strategies

- **Deployment models** (private, public, and hybrid)
- **Regulations**
- Cloud **roles**

Chapter 3 - The cloud infrastructure market

- Market's **major players**
- Their **offerings**
- Their **customers**

Next steps

- **Explore** further to find the right service for you
  - Talk with cloud expert
  - Explore the cloud provider websites
  - Get in touch with cloud providers

- **DataCamp's** cloud-focused **courses**

Thank you!

UNDERSTANDING CLOUD COMPUTING