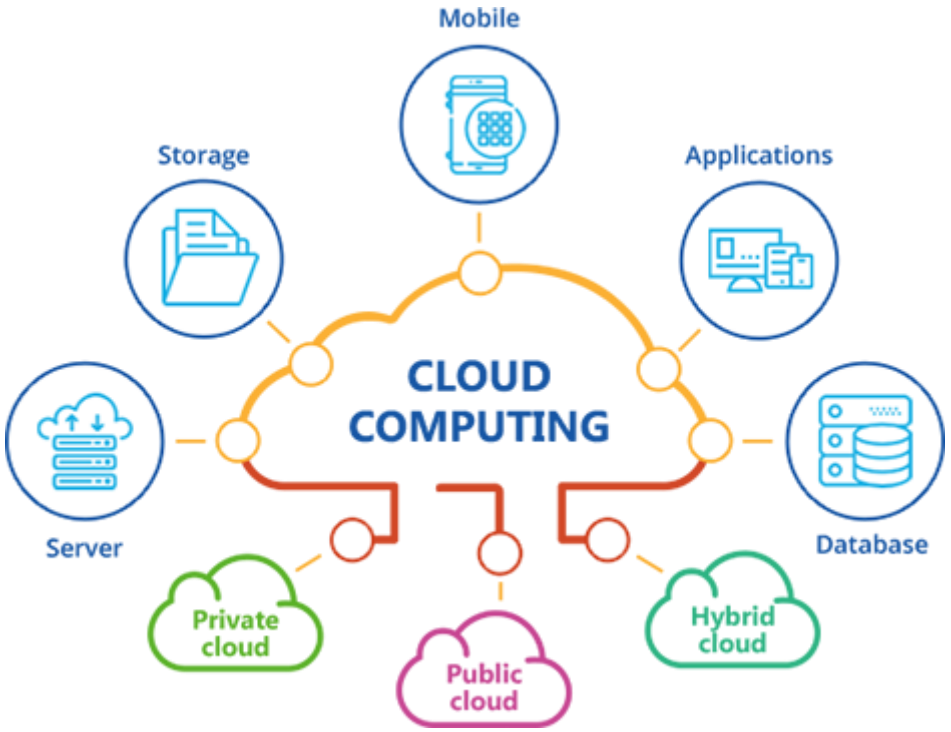
Proseminar Softwareentwicklung in der Wissenschaft



*

Giorgi Narimanashvili

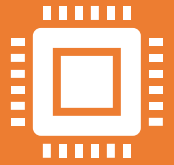
Proseminar SIW-20

*medium.com

Structure

- What is Cloud Computing?
- Advantages
- History of Cloud Computer
- Examples of Cloud Computing
- Cloud Architecture
- Cloud Service Models
- Cloud deployment Models
- Cloud computing Statistics
- AWS

Cloud Computing



Delivery of computing services such as servers, storage, databases, software, networking-over the Internet

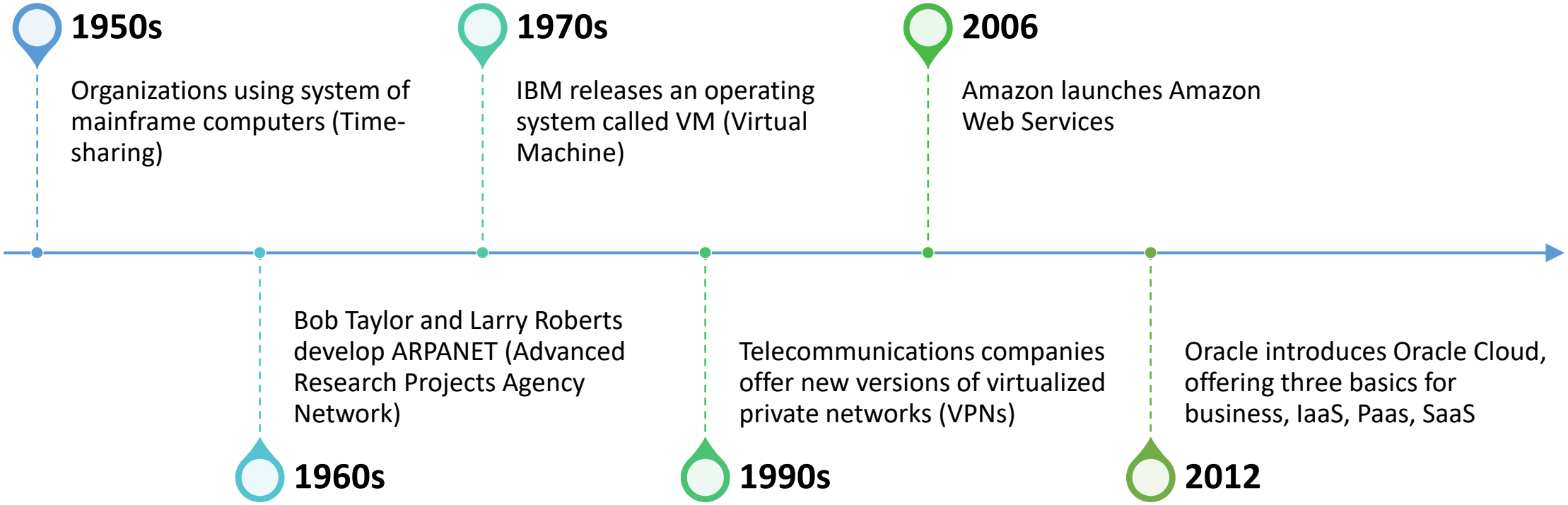
On-demand delivery of IT resources

Consists of hardware and software resouces

Advantages

- **Cost reduction**
- **Global scale**
- **Performance**
- **Security**
- **Speed**
- **Productivity**
- **Reliability**

History of Cloud Computing



Examples of Cloud Computing

- Data backup
- Disaster recovery
- Email
- Virtual desktops
- Software development and testing
- Big data analytics
- Social Networking

Examples of Cloud Computing

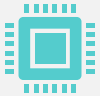
Healthcare companies – Personalized treatments for patients

Financial services companies- Real-time fraud detection and prevention

Video games developers-Online gaming

Cloud Architecture

Defines the components and the relationship between them

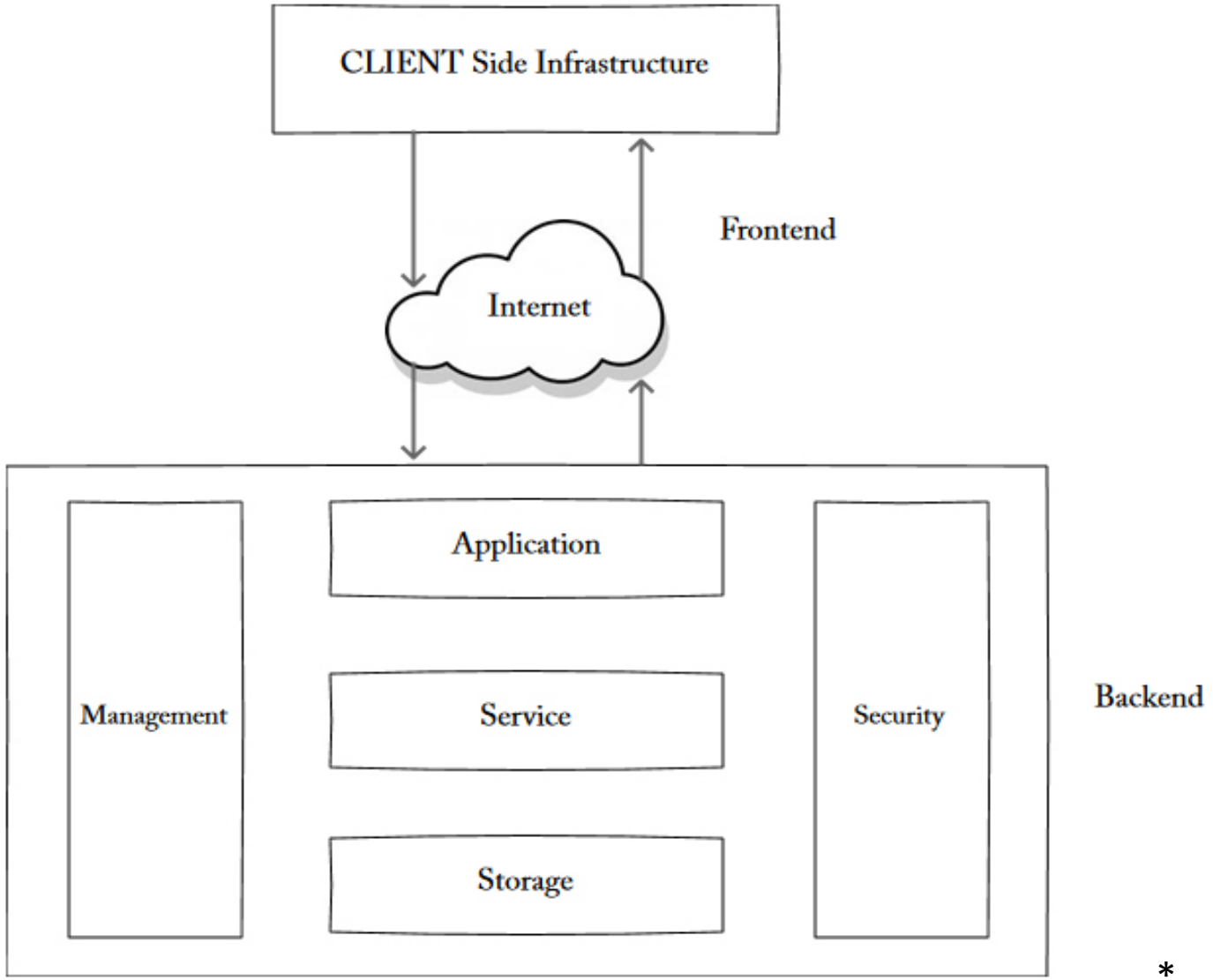


Front-end platform (fat client, thin client, mobile device)

Back-end platform (servers, storage)

Cloud based delivery

Network (internet, intranet, intercloud)

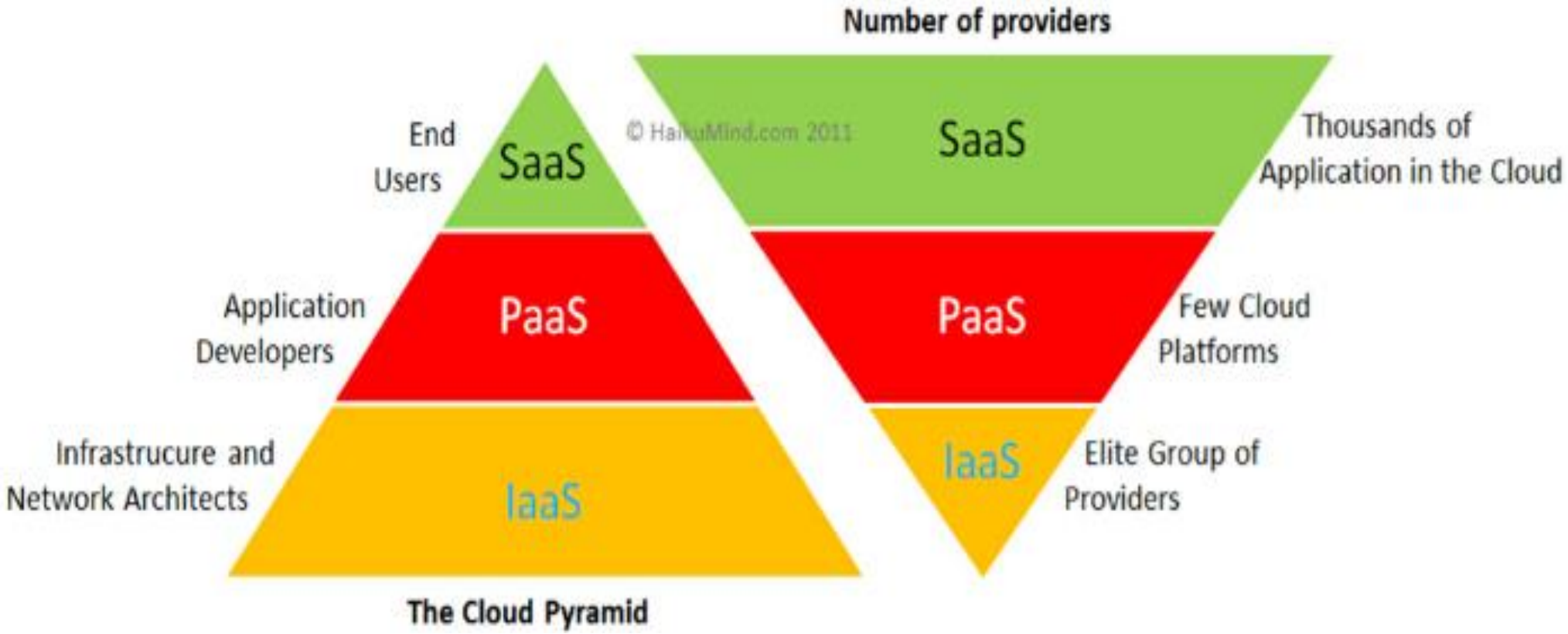

CLIENT Side Infrastructure
Frontend
Internet
Application
Management
Service
Security
Storage
Backend

*

* w3school.in

Cloud service models

- **Infrastructure as a service (IaaS)**
- **Platform as a service (PaaS)**
- **Software as a service (SaaS)**

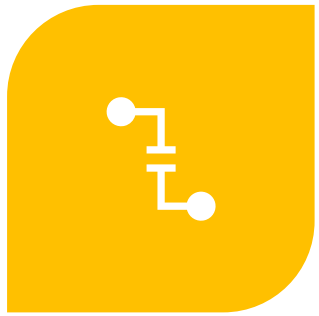


*haikumind.com

Software as a service (SaaS)

DON’T NEED TO INSTALL THE SOFTWARE ON YOUR PC

USERS CAN STORE AND ANALYZE DATA AND COLLABORATE ON PROJECTS



DATA IS SECURE IN THE CLOUD; EQUIPMENT FAILURE DOES NOT RESULT IN LOSS OF DATA

SOME KNOWN EXAMPLE OF SAAS INCLUDES GOOGLE G SUITE, MICROSOFT OFFICE 365, DROPBOX ETC.

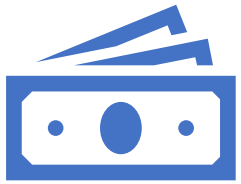
Platform as a service (PaaS)

PROVIDES USERS WITH A CLOUD ENVIRONMENT IN WHICH THEY CAN DEVELOP, MANAGE AND DELIVER APPLICATIONS

PROVIDERS MANAGE SECURITY, OPERATING SYSTEMS, SERVER SOFTWARE AND BACKUPS

GOOGLE APP ENGINE AND AWS ELASTIC BEANSTALK ARE TWO TYPICAL EXAMPLES OF PAAS

Infrastructure as a service (IaaS)



Saves enterprises the costs of buying and maintaining their own hardware

Enables the virtualization of administrative tasks, freeing up time for other work.

Service providers: Amazon web services, Microsoft Azure, and Google Compute Engine

Cloud deployment models

Public cloud

Private cloud

Hybrid cloud

Community cloud

Public cloud

Available to the general public

For businesses that operate with low privacy concerns

Examples: Microsoft Azure Google App Engine, IBM cloud, Salesforce Heroku and others

Pros and Cons of Public Cloud

Reduced costs

24/7 uptime

Weak Data security

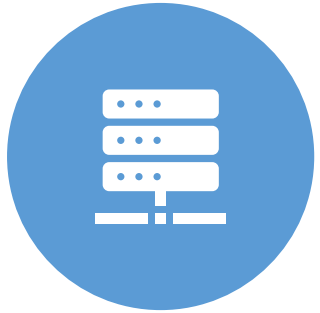
Lack of bespoke services

Private cloud

OWNED BY ONLY ONE SPECIFIC COMPANY

ALSO CALLED “INTERNAL” OR “CORPORATE”

CAN’T BE ACCESSED BY GENERAL PUBLIC



SERVICE PROVIDERS: AMAZON, IBM, CISCO, DELL, RED HAT

Pros and Cons of Private Cloud

High security, privacy and reliability

Flexible development

Expensive

Not suited for small companies

Community cloud

OWNED BY SEVERAL ORGANIZATIONS WITH SIMILAR BACKGROUNDS

SIMILAR TO PRIVATE CLOUD

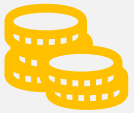
SUITED FOR ORGANIZATIONS THAT WORK ON JOINT PROJECTS

COSTS ARE SHARED ACROSS ALL USERS

Pros and Cons of Community Cloud

Improved security, privacy and reliability

Ease of data sharing and collaboration



High costs

Not widespread so far

Hybrid cloud

Combines the best features of other models

Cost- and resource-effective

Only makes sense if companies can split their data into mission-critical and non-sensitive

The Benefits of a Hybrid Cloud

IMPROVED SECURITY AND PRIVACY

ENHANCED SCALABILITY AND FLEXIBILITY

REASONABLE PRICE

	Public	Private	Community	Hybrid
Ease of setup and use	Easy	Requires IT proficiency	Requires IT proficiency	Requires IT proficiency
Data security and privacy	Low	High	Comparatively high	High
Data control	Little to none	High	Comparatively high	Comparatively high
Reliability	Vulnerable	High	Comparatively high	High
Scalability and flexibility	High	High	Fixed capacity	High
Cost-effectiveness	The cheapest one	Cost-intensive, the most expensive one	Cost is shared among community members	Cheaper than a private model but more costly than a public one
Demand for in-house hardware	No	Depends	Depends	Depends

*sam-solutions.com

Cloud computing statistics

- Countries that spent the most on cloud computing technologies in 2019:

  The US – $124.6 billion

  China – $10.5 billion

  The UK – $10 billion

  Germany – $9.5 billion

  Japan – $7.4 billion

Table 1. Worldwide Public Cloud Service Revenue Forecast (Billions of U.S. Dollars)

	2018	2019	2020	2021	2022
Cloud Business Process Services (BPaaS)	41.7	43.7	46.9	50.2	53.8
Cloud Application Infrastructure Services (PaaS)	26.4	32.2	39.7	48.3	58.0
Cloud Application Services (SaaS)	85.7	99.5	116.0	133.0	151.1
Cloud Management and Security Services	10.5	12.0	13.8	15.7	17.6
Cloud System Infrastructure Services (IaaS)	32.4	40.3	50.0	61.3	74.1
Total Market	**196.7**	**227.8**	**266.4**	**308.5**	**354.6**

* gartner.com

Facts about Cloud Computing

90% of companies are on the cloud

60%-2019

45%-2018

Amazon Web Services is the leading cloud vendor with a 32% share

13% OF AMAZONS TOTAL SALES

200+ SERVICES

The average business runs 38% of workloads in public and 41% in private cloud

Enterprises-46% on private cloud, 33% on public

Small to medium businesses-43% on public cloud, 35% on private

89% of companies use SaaS

4 out of 5 Companies use IaaS

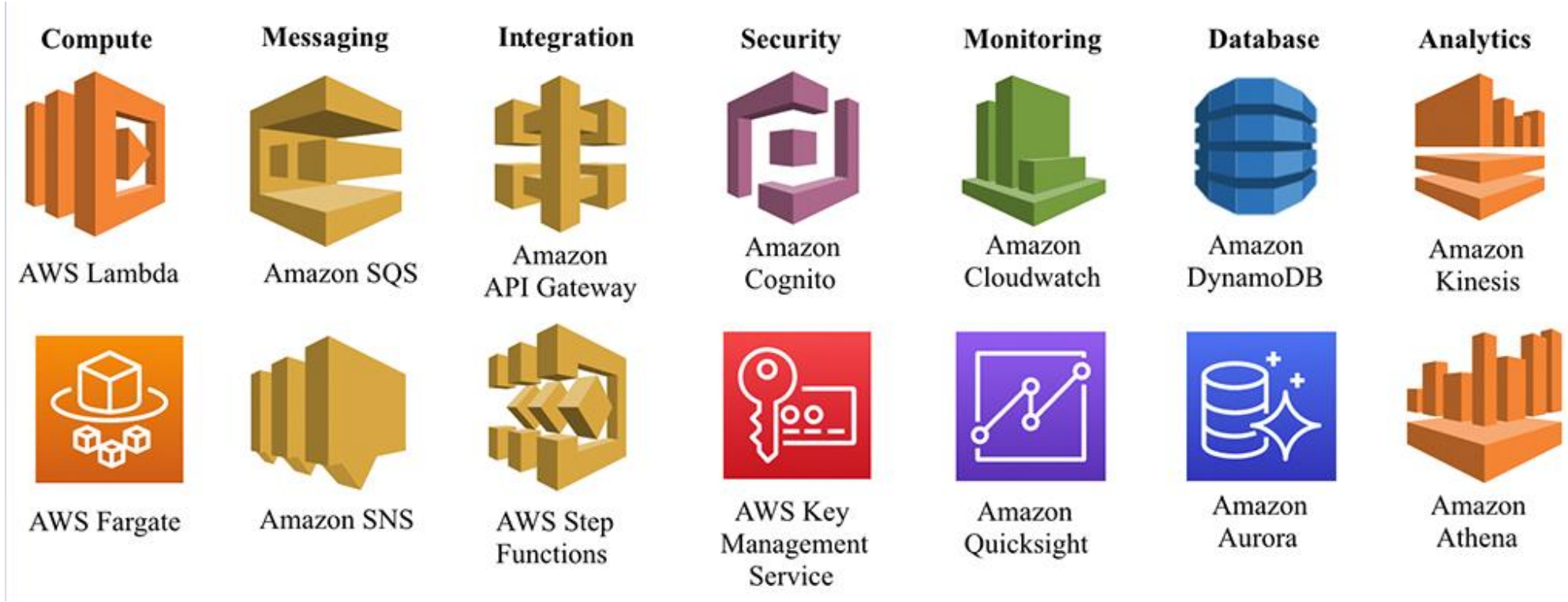
61% use PaaS

- CEO - Andy Jassy
- Industry – Web service, Cloud computing
- Revenue - $35.03 billion (2019)
- Launched – 2006
- "Pay-as-you-go" model

Getting Started with AWS | Amazon Web Services BASICS

*https://en.wikipedia.org

AWS Services



*https://blogs.itemis.com

Summary

- Cloud computing is on-demand delivery of IT resources
- Common examples of Cloud computing: Email, Virtual desktops, Backup services
- Cloud architecture consists of different components
- Cloud service models: SaaS, PaaS, IaaS
- Cloud deployment models: Public, Private, Community and Hybrid Clouds
- Statistics
- Amazon Web Services

References

- https://azure.microsoft.com/en-us/overview/what-is-cloud-computing/
- https://www.youtube.com/watch?v=dH0yz-Osy54
- https://www.ecpi.edu/blog/a-brief-history-of-cloud-computing
- https://www.ecpi.edu/blog/a-brief-history-of-cloud-computing
- https://www.dataversity.net/brief-history-cloud-computing/
- https://blog.trginternational.com/7-common-uses-of-cloud-computing
- https://www.newgenapps.com/blog/top-10-cloud-computing-examples-and-uses/
- https://www.hcltech.com/technology-qa/what-is-cloud-architecture
- https://en.wikipedia.org/wiki/Cloud_computing_architecture
- https://www.w3schools.in/cloud-computing/cloud-computing-architecture/
- https://www.sam-solutions.com/blog/four-best-cloud-deployment-models-you-need-to-know/
- https://www.ibm.com/cloud/learn/iaas-paas-saas
- https://www.fingent.com/blog/cloud-service-models-saas-iaas-paas-choose-the-right-one-for-your-business/
- https://www.gartner.com/en/newsroom/press-releases/2019-11-13-gartner-forecasts-worldwide-public-cloud-revenue-to-grow-17-percent-in-2020
- https://hostingtribunal.com/blog/cloud-computing-statistics/
- https://hostingtribunal.com/blog/cloud-computing-statistics/?fbclid=IwAR3ZExVe_PyJqIIUWeaBfL-RSsDe2nLamakT_wvcO5dAec8vum3a19iaUbo#gref
- http://www.haikumind.com/cloud-computing-acronyms-iaas-paas-and-saas/