

The Cloud

DSC 96, Fall 2019, Colin Jemmott



What is "the cloud"?

Delivery of computing services over the internet.

- Servers
- Storage
- Databases
- Networking
- Software
- Analytics
- Intelligence











Benefits of cloud computing*



Cost

- Don't have to buy and manage hardware & datacenters
- Pay for only what you use (elastic)

Speed

- Self service and on demand
- Don't have to wait for IT to set up, patch, etc.

Global Scale

- Multiple geographic regions
- All the compute you can afford

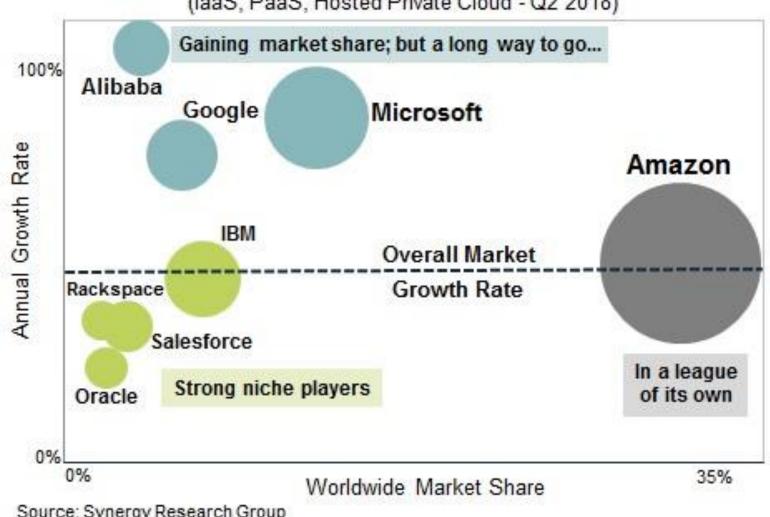




^{*} According to Microsoft's Azure cloud marketing materials, actual benefits will vary.

Cloud Provider Competitive Positioning

(laaS, PaaS, Hosted Private Cloud - Q2 2018)



Source: Synergy Research Group

Categories of Cloud Services



Infrastructure as a Service (laaS)

Renting virtual machines (VMs), storage, network, etc.



Platform as a Service (PaaS)

Development tools, database management, business analytics



Serverless Computing

Fully managed, so infrastructure is invisible to you. (there are still servers)



Software as a Service (SaaS)

Software on demand, usually as a subscription

Examples of Compute Services



Functions

Runs simple, single-purpose, triggered code

Totally managed environment



Containers

Containers wrap up code and all its dependencies

Lightweight, standalone, executable package

Standardized so you can deploy anywhere quickly and reliably



Virtual Machines

Similar to having your own hardware (SSH, install programs, etc)

Available in preconfigured images (OS, software, settings)

Examples of Storage Services



Databases

SQL and NoSQL

Fully managed versions available



Storage

Cold versus hot



Disks

Typically attached to VMs

Data Services



Data analysis platforms

Often combines: managed database + interface + tools to load, query, export + data permissions



Batch processing

Extract, Transform, Load (ETL)



Streaming data processing

Realtime and near-realtime Best for parallel tasks

Machine Learning Services



Pre-built APIs

Examples: image recognition, OCR, speech to text, text to speech, etc.



ML Tools

Train models at scale without setup, host trained models in cloud to make predictions

