The Cloud

DSC 96, Fall 2019, Colin Jemmott


There is no cloud
it's just someone else's computer

What is “the cloud”?

Delivery of computing services over the internet.

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


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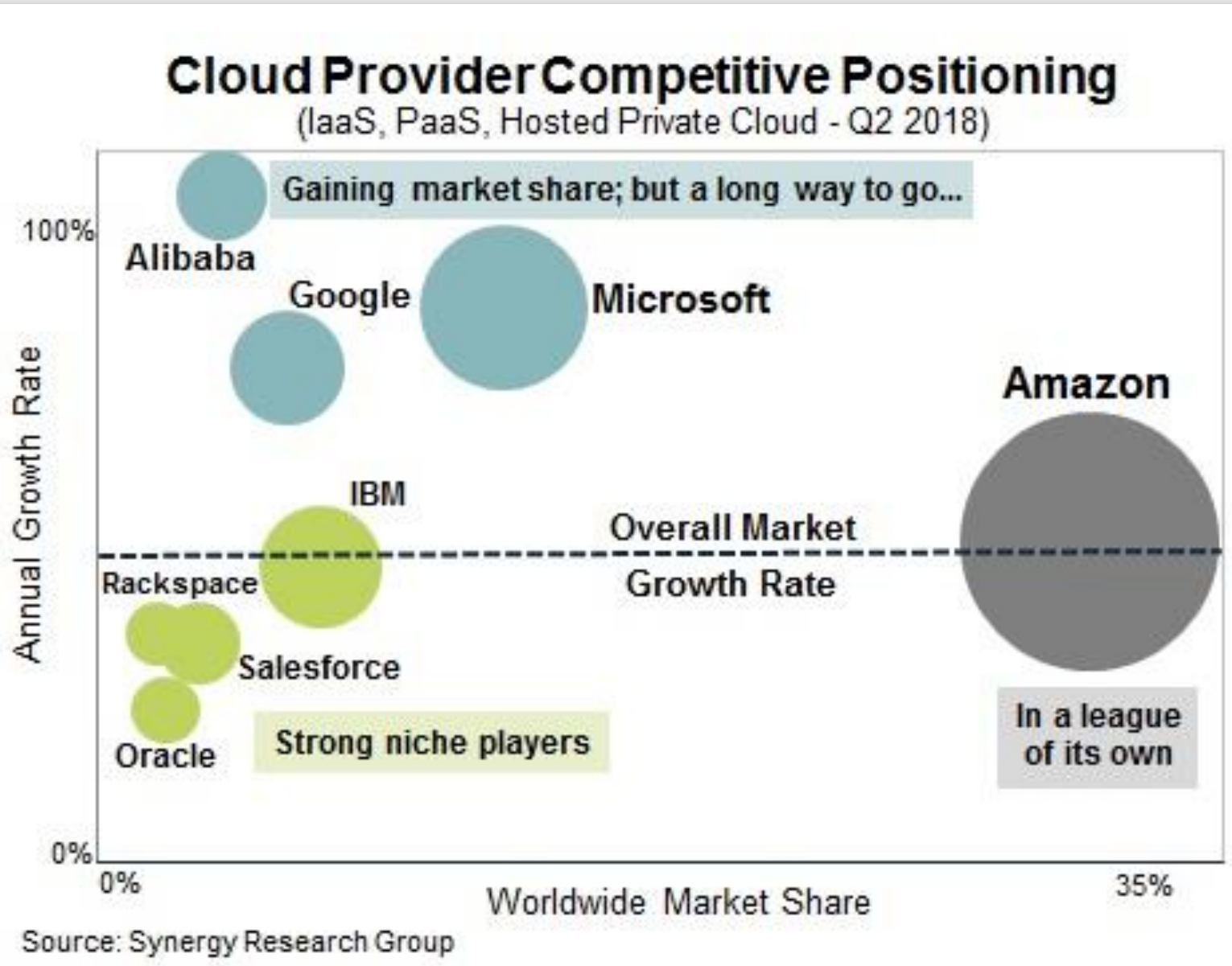
Benefits of cloud computing*

- 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
(IaaS, PaaS, Hosted Private Cloud - Q2 2018)
Gaining market share; but a long way to go...
Alibaba
Google
Microsoft
Amazon
IBM
Overall Market
Growth Rate
Rackspace
Salesforce
Oracle
Strong niche players
In a league of its own
100%
0%
Annual Growth Rate
0%
35%
Worldwide Market Share
Source: Synergy Research Group

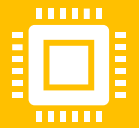
Categories of Cloud Services

Infrastructure as a Service (IaaS)

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

Platform as a Service (PaaS)

Development tools, database management, business analytics



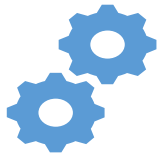
Serverless Computing

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

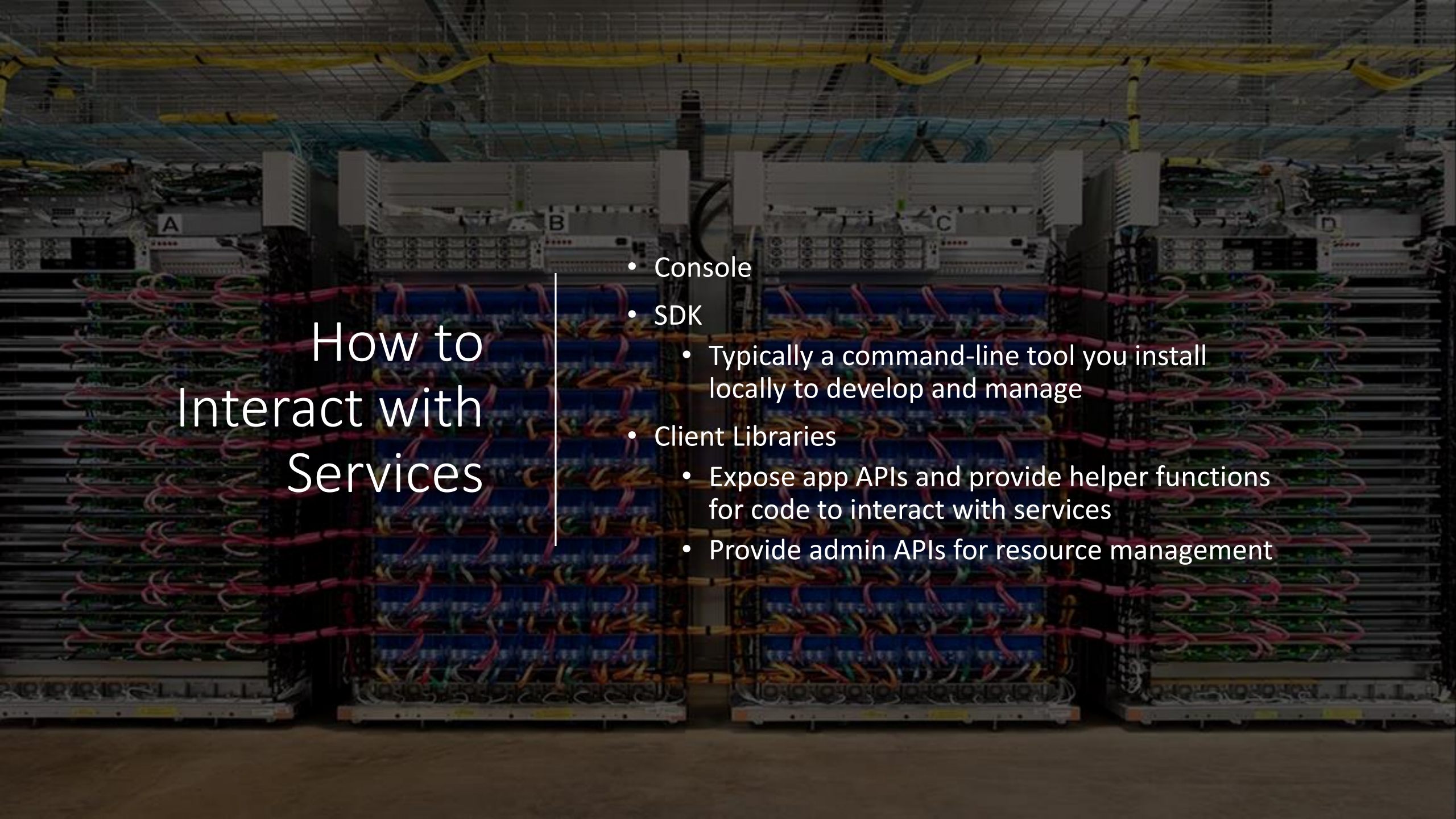
Machine Learning Services

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



How to Interact with Services

- Console
- SDK
  - Typically a command-line tool you install locally to develop and manage
- Client Libraries
  - Expose app APIs and provide helper functions for code to interact with services
  - Provide admin APIs for resource management