Definition

- remote on-demand servers to host, store, manage and process data
  – stored as [[Distributed Data Storage]] in [[Data Center]] instead of own locally hosted servers

Service Models

IaaS: Infrastructure as a service (e.g., storage/compute nodes)
PaaS: Platform as a service (e.g., distributed systems/frameworks)
**SaaS: Software as a Service** (e.g., email, databases, office, github)

Cloud Industry

Transforming IT Industry/Landscape
- Since ~2010 increasing move from on-prem to cloud resources
- System software licenses become increasingly irrelevant
- Few cloud providers dominate IaaS/PaaS/SaaS markets (w/ 2018 revenue):
  Microsoft Azure Cloud ($ 32.2B), Amazon AWS ($ 25.7B), Google Cloud (N/A),
  IBM Cloud ($ 19.2B), Oracle Cloud ($ 5.3B), Alibaba Cloud ($ 2.1B)

Benefits

- pay as you go
  – no upfront cost
  – pay per use or aquired resources
  – variable utilization
    * prevents having too many/not enough ressources
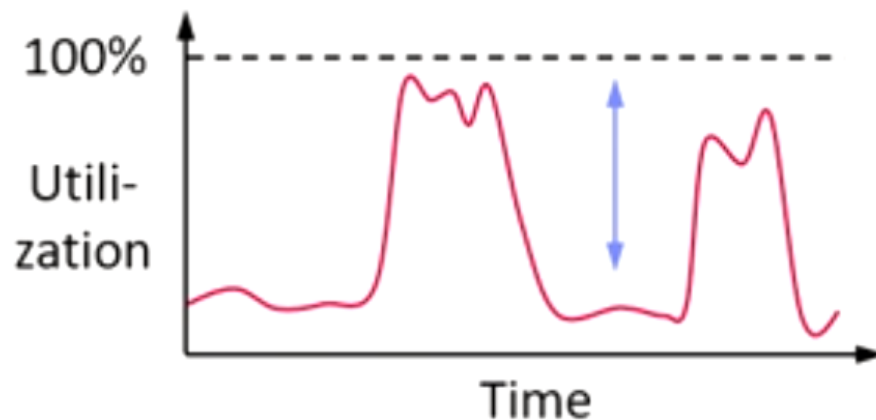
    *
- economies of scale
  – purchasing IT infrastructure at scale ==> lower cost
    * hardware as well as IT infrastructure know-how
  – focus on scale-out HW over scale-up ==> lower cost

- elasticity
  - flexiblity on resource demand
  - work for 10 days on 1 nodes ==> 1 day on 10 nodes

100 days @ 1 node

≈

1 day @ 100 nodes

  - *
  - assuming perfect scalability

(but beware Amdahl's law: max speedup sp = 1/s)

  - *
    - * 5% not parallelizable ==> max speed up 20x
    - * 25% not parallelizable ==> max speed up 4x

Characeristics and Deployment Models

Characteristics

- ■ **On-demand self service:** unilateral resource provision
- ■ **Broad network access:** network accessibility
- ■ **Resource pooling:** resource virtualization / multi-tenancy
- ■ **Rapid elasticity:** scale out/in on demand
- ■ **Measured service:** utilization monitoring/reporting

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Deployment Models

- ■ **Public cloud:** general public, on premise of cloud provider
- ■ **Hybrid cloud:** combination of two or more of the above
- ■ **Community cloud:** single community (one or more orgs)
- ■ **Private cloud:** single org, on/off premises

MS Azure
Private Cloud

IBM Cloud Private

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[[Data Management]]

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