What is Cloud Computing?

Cloud computing is a model for enabling ubiquitous, convenient, **on-demand** network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction [1].

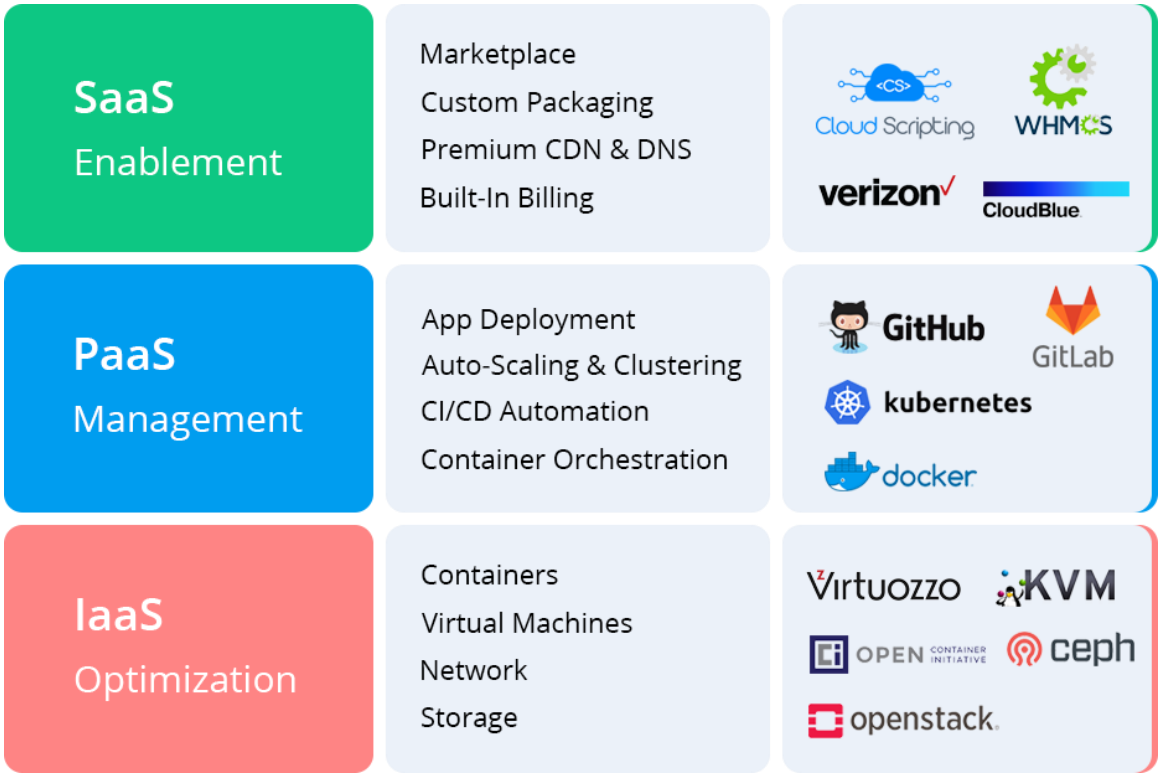
Informal: Cloud Computing = computing with large datacenters.

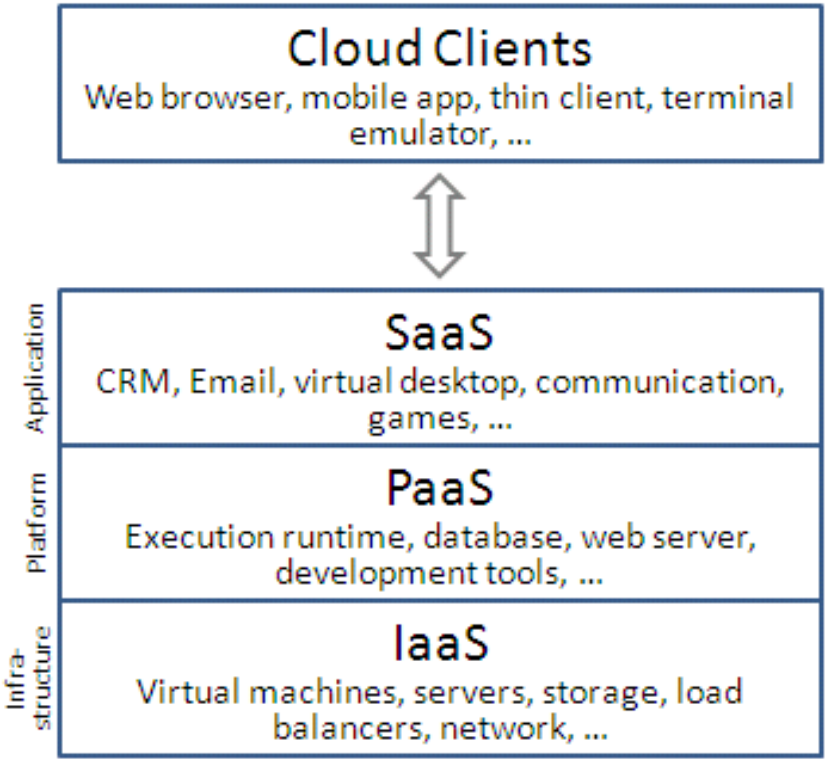
Our focus: Cloud Computing = computing as a utility outsourced to a third party or internal org

[1] Peter Mell (NIST), Tim Grance (NIST),
The National Institute of Standards and Technology (NIST) Definition of Cloud Computing
https://csrc.nist.gov/publications/detail/sp/800-145/final

Service Models

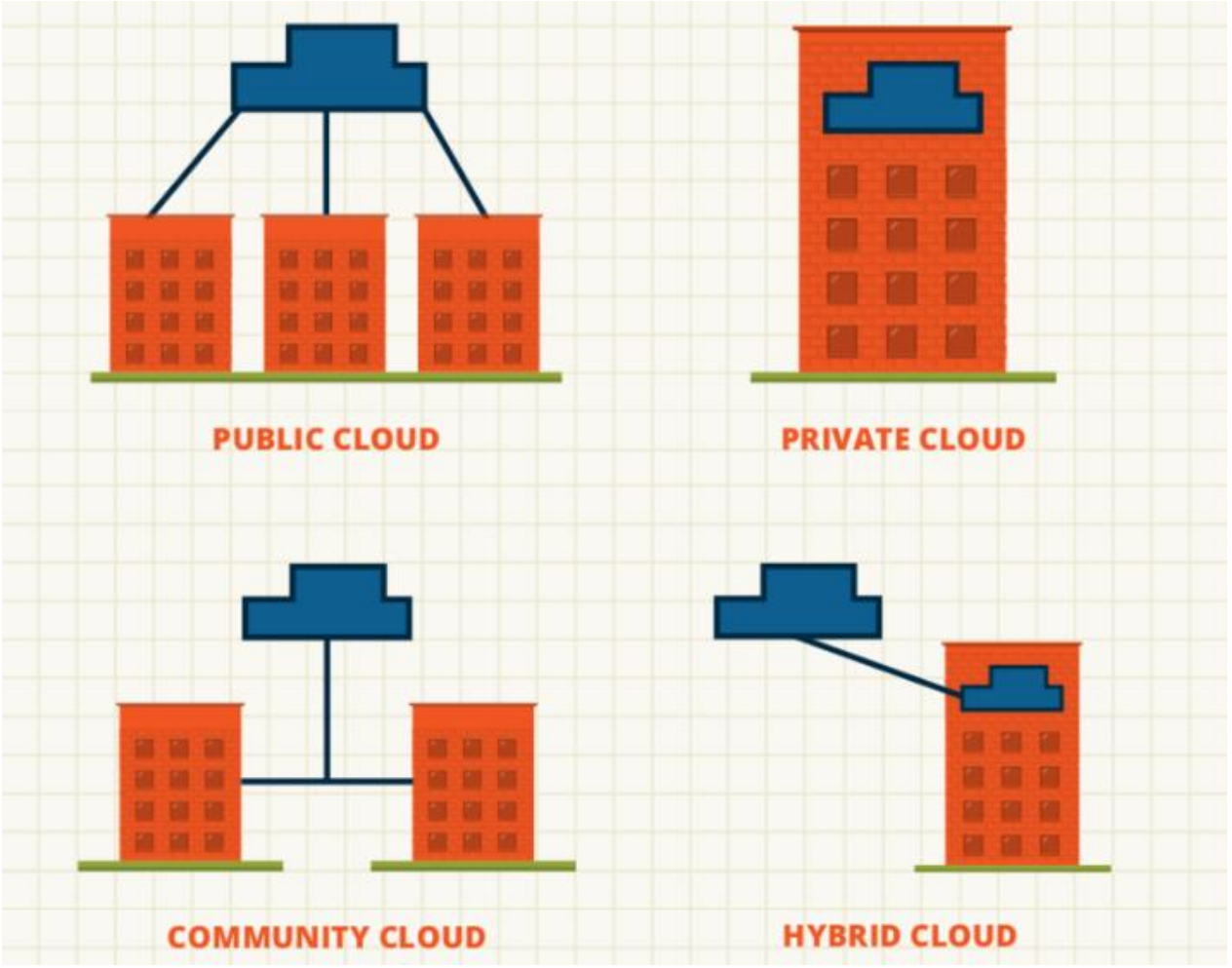
Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS)





Deployment Models

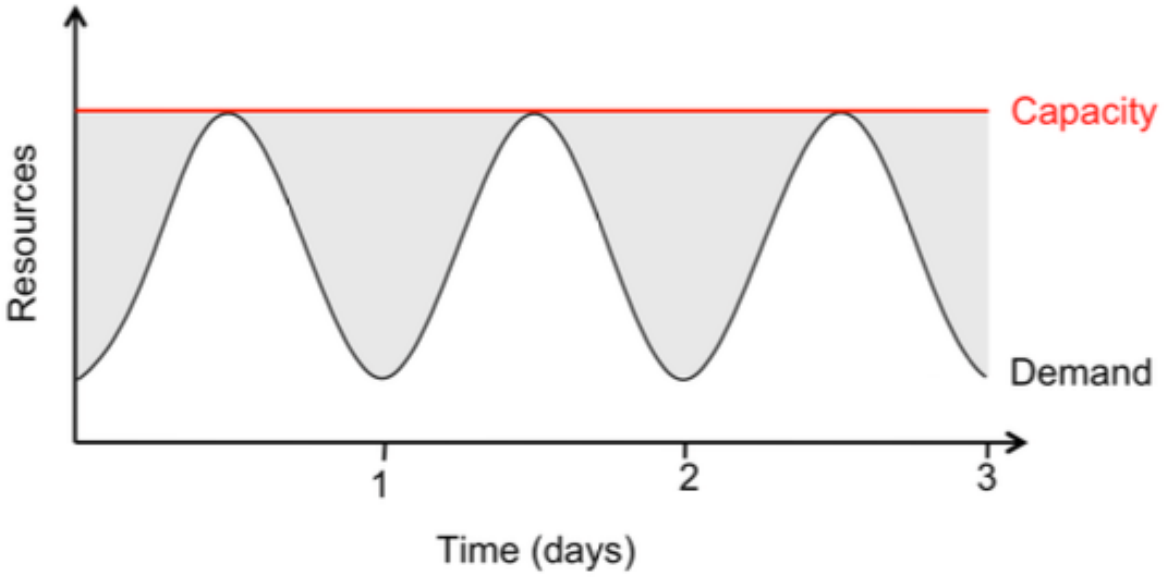
Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS)



Cloud Economics: For Users

Pay-as-you-go (usage-based) pricing:

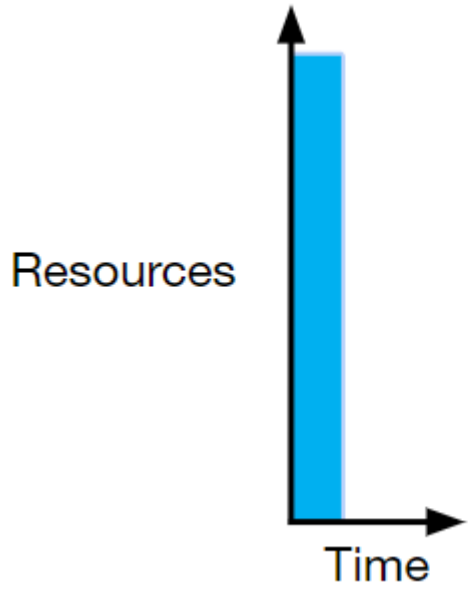
- Most services charge per minute, per byte, etc
- No minimum or up-front fee
- Helpful when apps have variable utilization

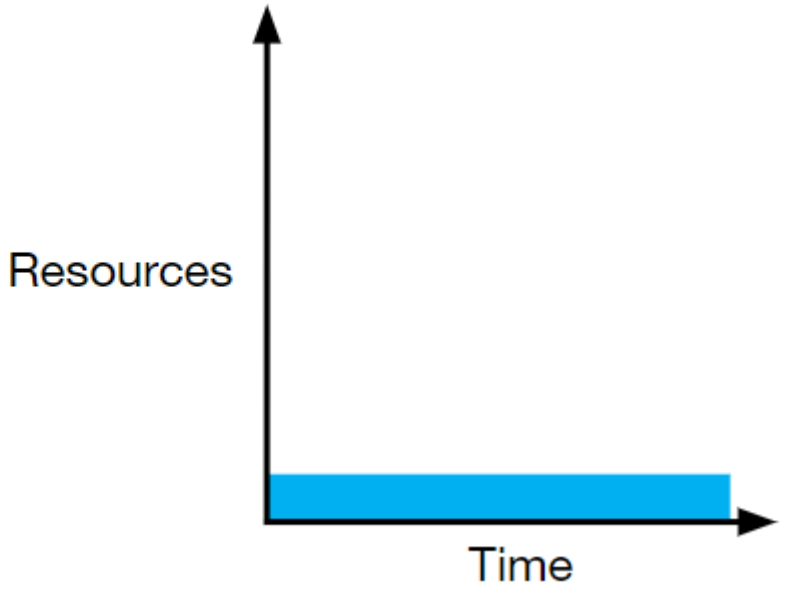


Cloud Economics: For Users

Elasticity:

- Using 1000 servers for 1 hour costs the same as 1 server for 1000 hours
- Same price to get a result faster!





Cloud Economics: For Providers

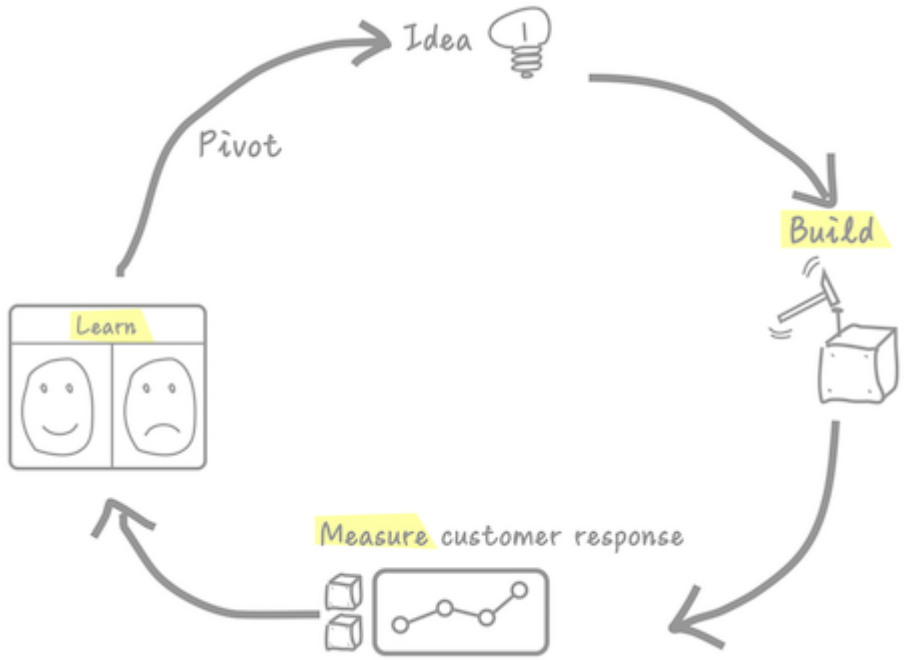
Economies of scale:

- Purchasing, powering & managing machines at scale gives lower per-unit costs than customers'
- To find Tradeoff: fast growth vs efficiency
- To find Tradeoff: flexibility vs cost

Cloud Economics: For Providers

Speed of iteration:

- Software as a service means fast time-to-market, updates, and detailed monitoring/feedback
- Compare to speed of iteration with ordinary software distribution



Other Interesting Features

- Spot market for preemptible machines, the ability to purchase a productive old server
- Wide geographic access for disaster recovery and speed of access
- Ability to quickly try exotic hardware
- Ability to A/B test anything