Day 1: Cloud Computing Overview

Outline of topics covered

- Introduction to Cloud Computing
  - Types of Service Models
  - Types of Deployment Models
- Advantages of Cloud Computing
- Cloud Compute Service (IaaS)
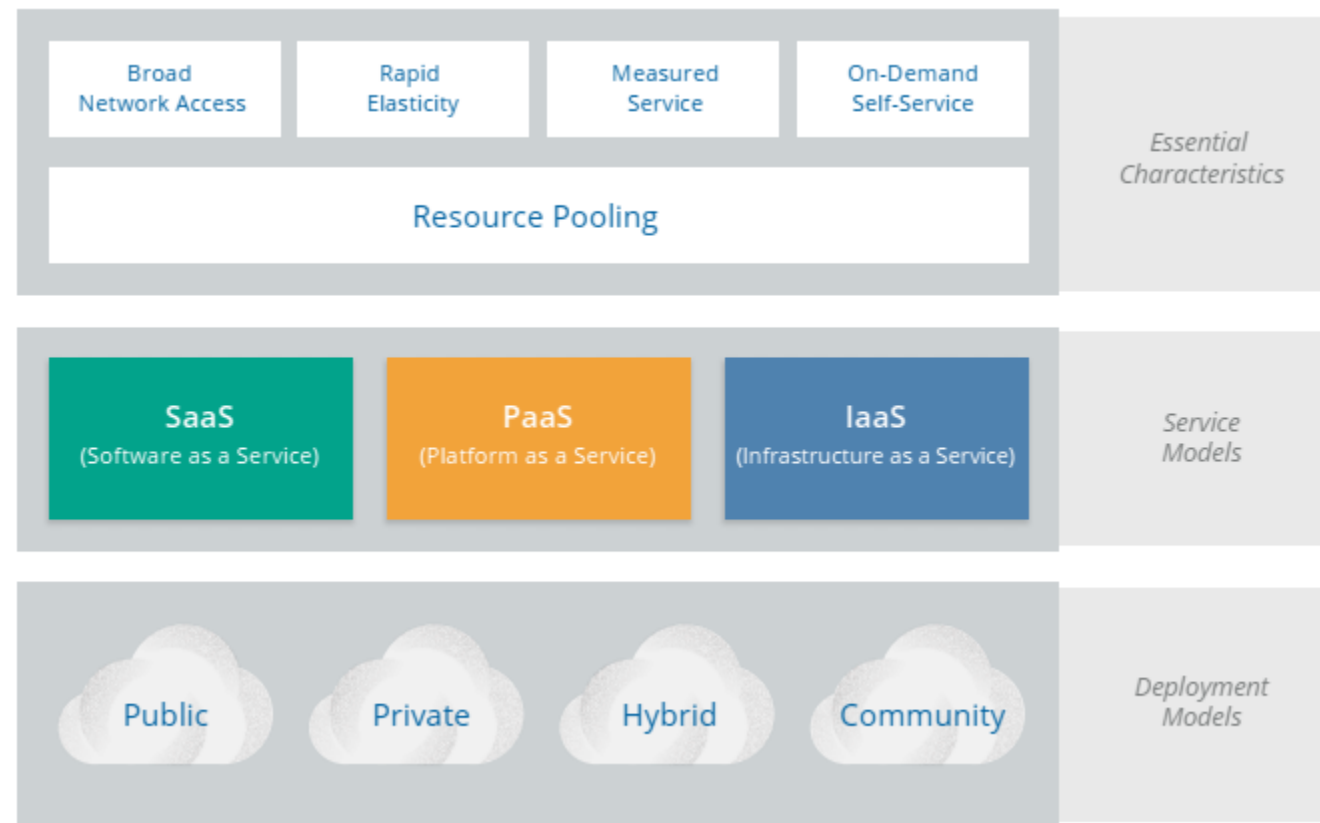
What is cloud computing?

Cloud computing defined

Cloud computing is the **on-demand** delivery of compute power, database, storage, applications, and other IT resources **via the internet** with **pay-as-you-go** pricing.
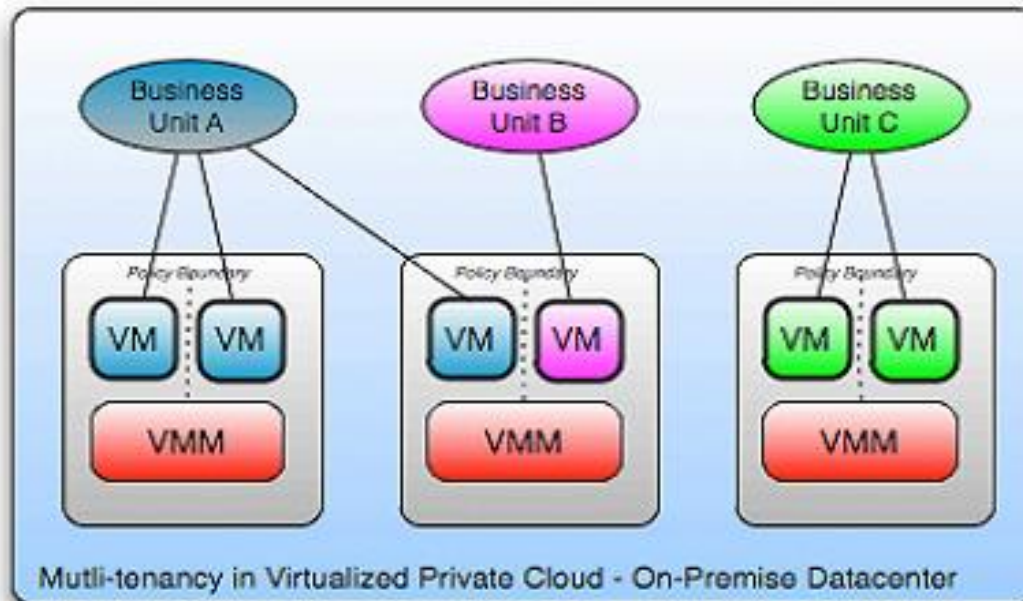
Cloud computing defined (NIST)

*"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"* – NIST

				Essential Characteristics
Broad Network Access	Rapid Elasticity	Measured Service	On-Demand Self-Service	
Resource Pooling				

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

				Deployment Models
Public	Private	Hybrid	Community	

+ Multi-Tenancy (as per ISO/IEC 17788)

Mutli-tenancy in Virtualized Private Cloud - On-Premise Datacenter

Mutli-tenancy in Virtualized Public Cloud - Off-Premise Datacenter

Private Cloud of Company XYZ with 3 business units, each with different security, SLA, governance and chargeback policies on shared infrastructure
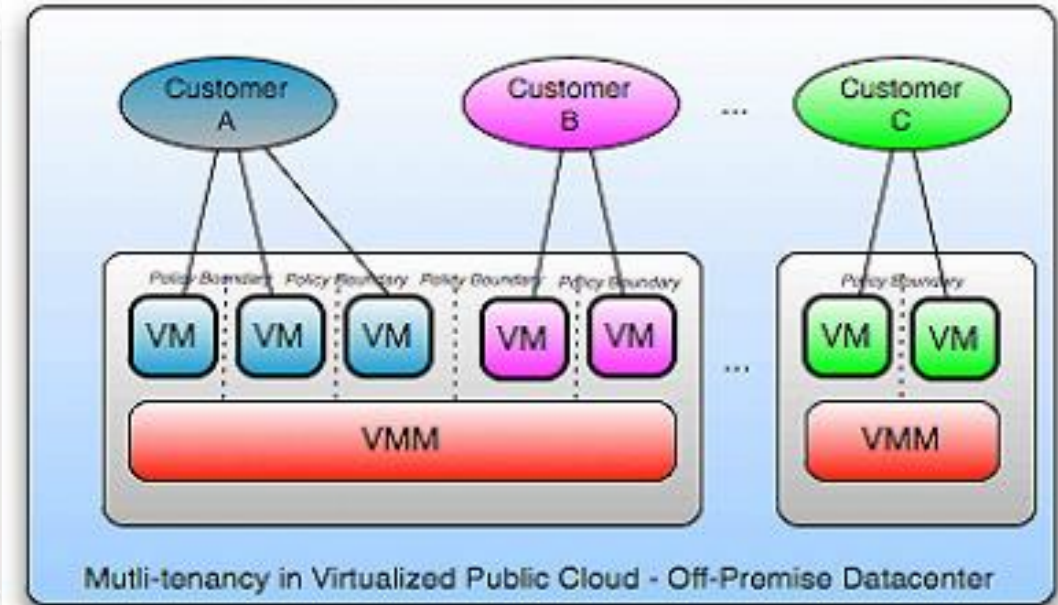
Public Cloud Provider with 3 business customers, each with different security, SLA, governance and billing policies on shared infrastructure

Infrastructure as software

Cloud computing enables you to **stop thinking of your infrastructure as hardware**, and instead **think of (and use) it as software.**
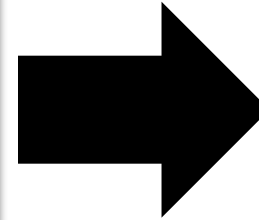
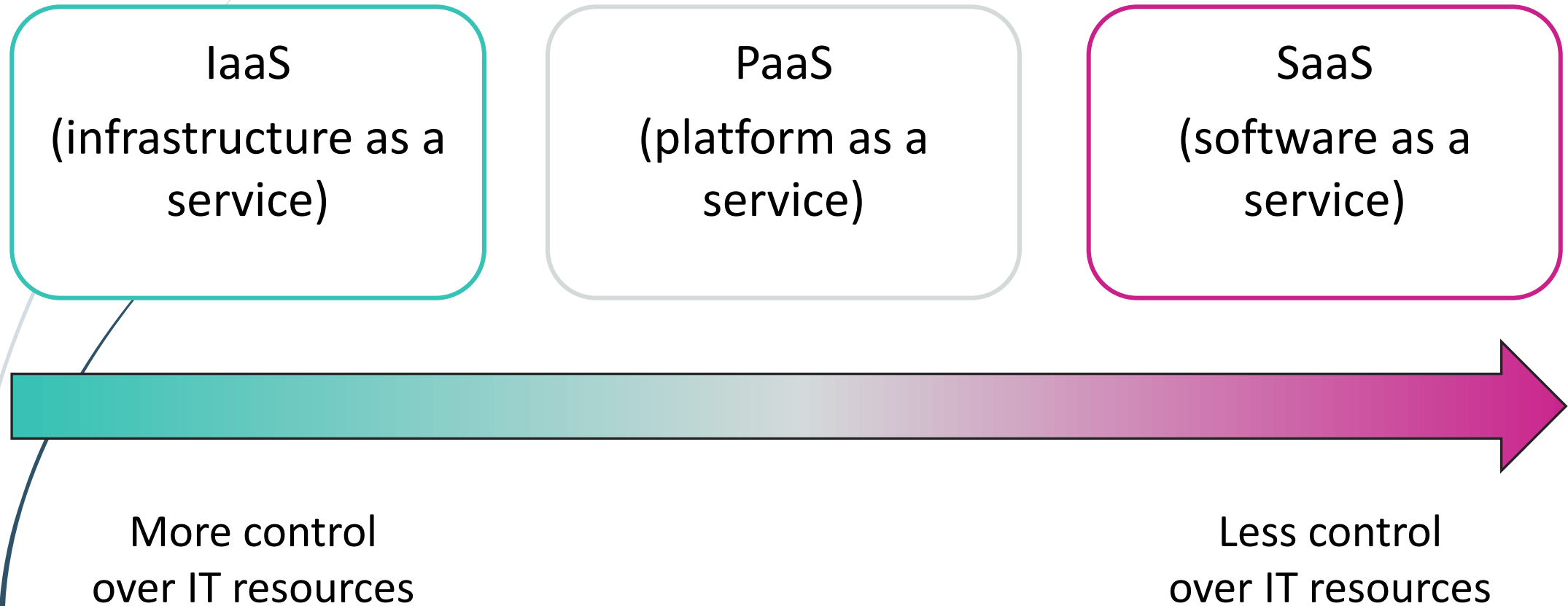# Traditional computing model (Servers)

➡ Infrastructure as hardware

➡ Hardware solutions:

  o Require space, staff, physical security, planning, capital expenditure

  o Have a long hardware procurement cycle

  o Require you to provision capacity by guessing theoretical maximum peaks
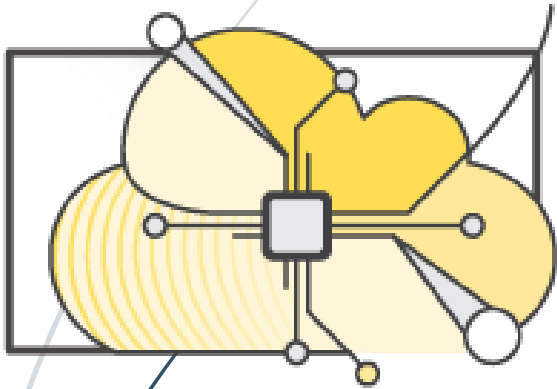
Cloud computing model (IaaS)

➡ Infrastructure as software

➡ Software solutions:

o Are flexible

o Can change more quickly, easily, and cost-effectively than hardware solutions

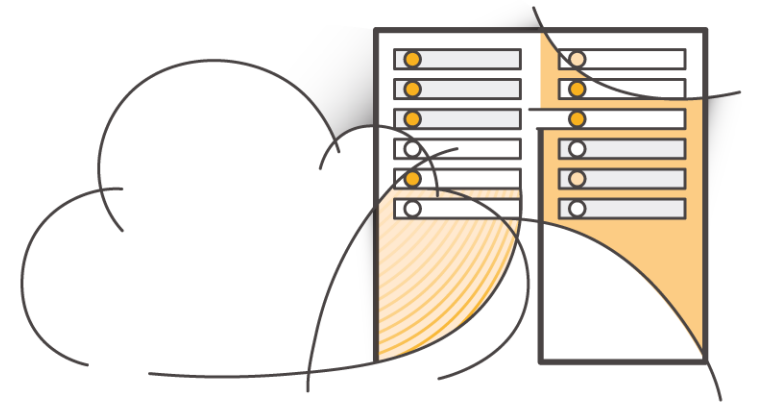o Eliminate the undifferentiated heavy-lifting tasks

Cloud service models

IaaS
(infrastructure as a service)

PaaS
(platform as a service)

SaaS
(software as a service)

More control
over IT resources

Less control
over IT resources

Cloud computing deployment models

Cloud   Hybrid   On-premises
(private cloud)

Cloud Deployment Model

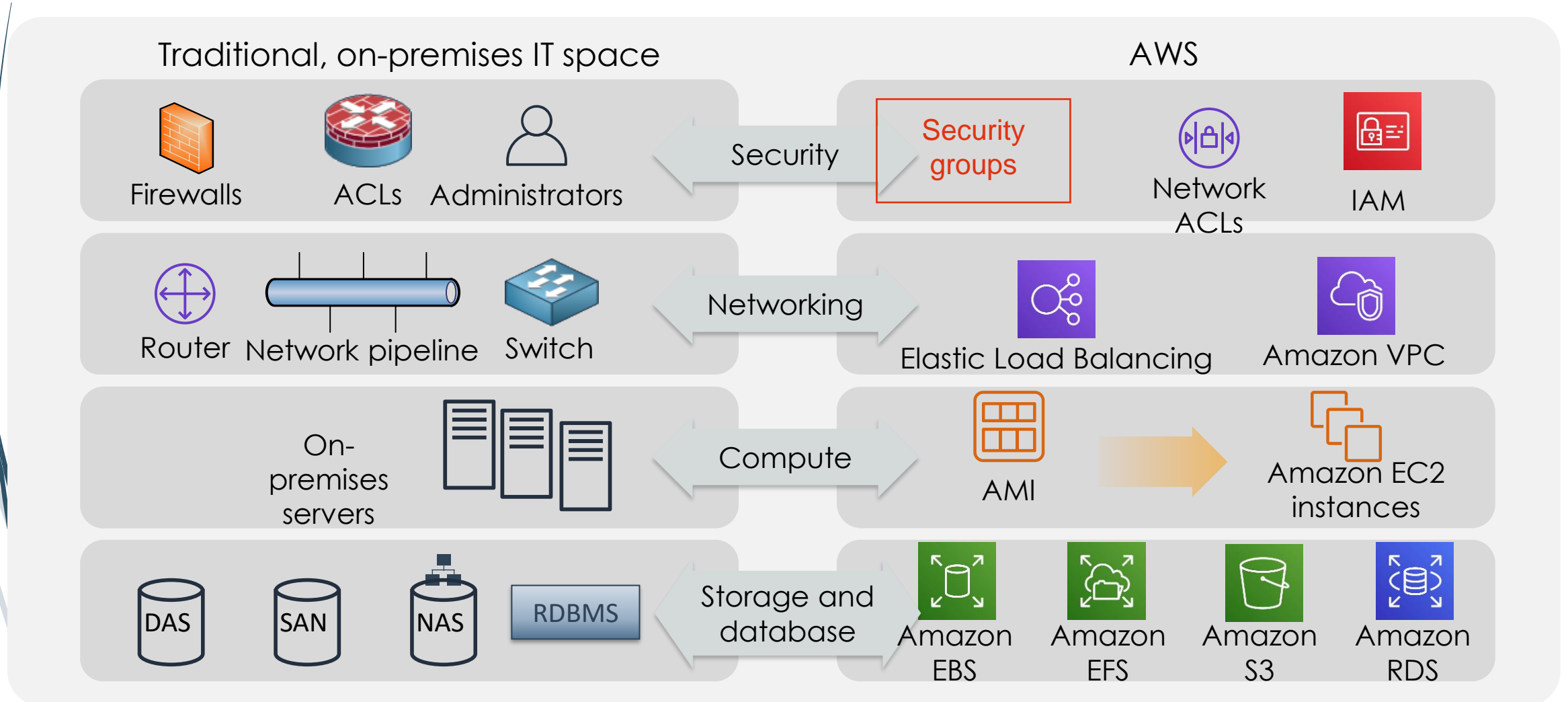|	Infrastructure Managed By[1]	Infrastructure Owned By[2]	Infrastructure Located[3]	Accessible and Consumed By[4]
Public	Third-Party Provider	Third-Party Provider	Off-Premises	Untrusted
Private/ Community	Organization → / Third-Party Provider →	Organization → / Third-Party Provider →	On-Premises / Off-Premises	Trusted
Hybrid	Both Organization & Third-Party Provider	Both Organization & Third-Party Provider	Both On-Premises & Off-Premises	Trusted & Untrusted

[1] Management includes: governance, operations, security, compliance, etc...

[2] Infrastructure implies physical infrastructure such as facilities, compute network and storage equipment

[3] Infrastructure location is both physical relative to an organization's management umbrella and speaks to ownership versus control

[4] Trusted consumers of service are those who are considered part of an organization's legal/contractual/policy umbrella including employees, contractors, and business partners. Untrusted consumers are those that may be authorized to consume some/all services but are not logical extensions of the organization.

cloud security alliance℠

Similarities between AWS and traditional IT

Traditional, on-premises IT space — AWS

Security: Firewalls, ACLs, Administrators → Security groups, Network ACLs, IAM

Networking: Router, Network pipeline, Switch → Elastic Load Balancing, Amazon VPC

Compute: On-premises servers → AMI → Amazon EC2 instances

Storage and database: DAS, SAN, NAS, RDBMS → Amazon EBS, Amazon EFS, Amazon S3, Amazon RDS

Section 1 key takeaways

- ➡ Cloud computing is the on-demand delivery of IT resources via the internet with pay-as-you-go pricing.

- ➡ Cloud computing enables you to think of (and use) your infrastructure as software.

- ➡ There are three cloud service models: IaaS, PaaS, and SaaS.

- ➡ There are three cloud deployment models: cloud, hybrid, and on-premises or private cloud.

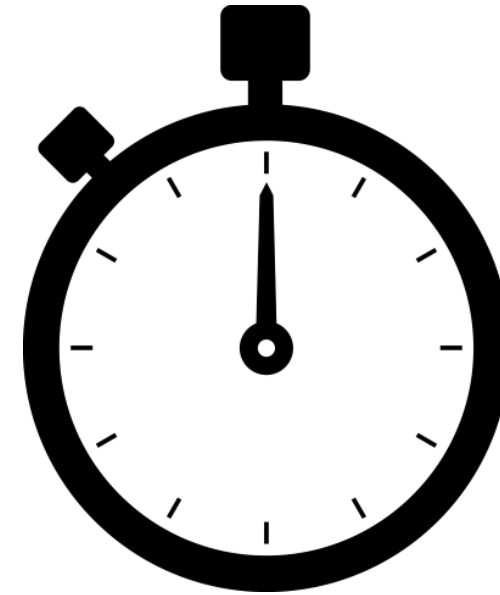- ➡ Almost anything you can implement with traditional IT can also be implemented as an AWS cloud computing service.

Advantages of cloud computing

1 - Trade capital expense for variable expense

Capital

Data center investment based on forecast

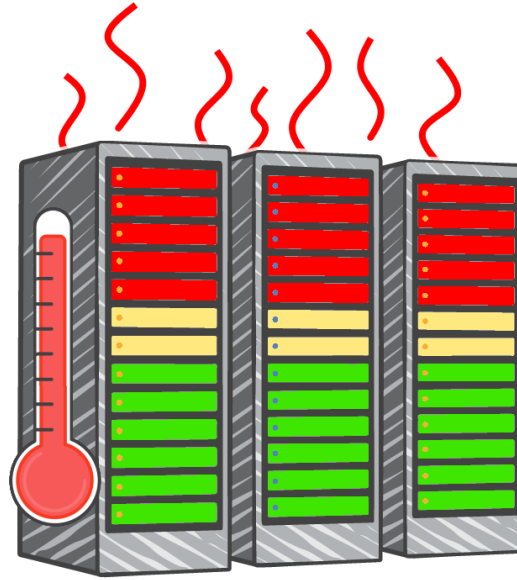Pay only for the amount you consume

2- Massive economies of scale

Because of aggregate usage from all customers, AWS can achieve higher economies of scale and pass savings on to customers.
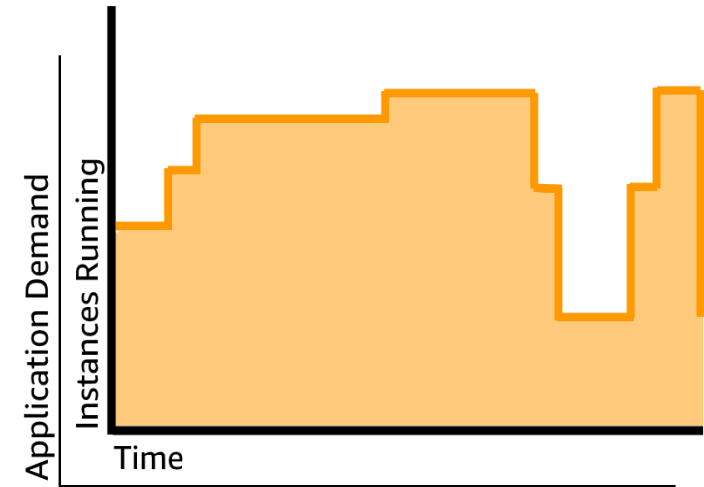
AWS Cloud

Economies of scale

Savings

Bill

Services used..........
Total.....................

3 - Stop guessing capacity

Overestimated
server capacity

Underestimated
server capacity

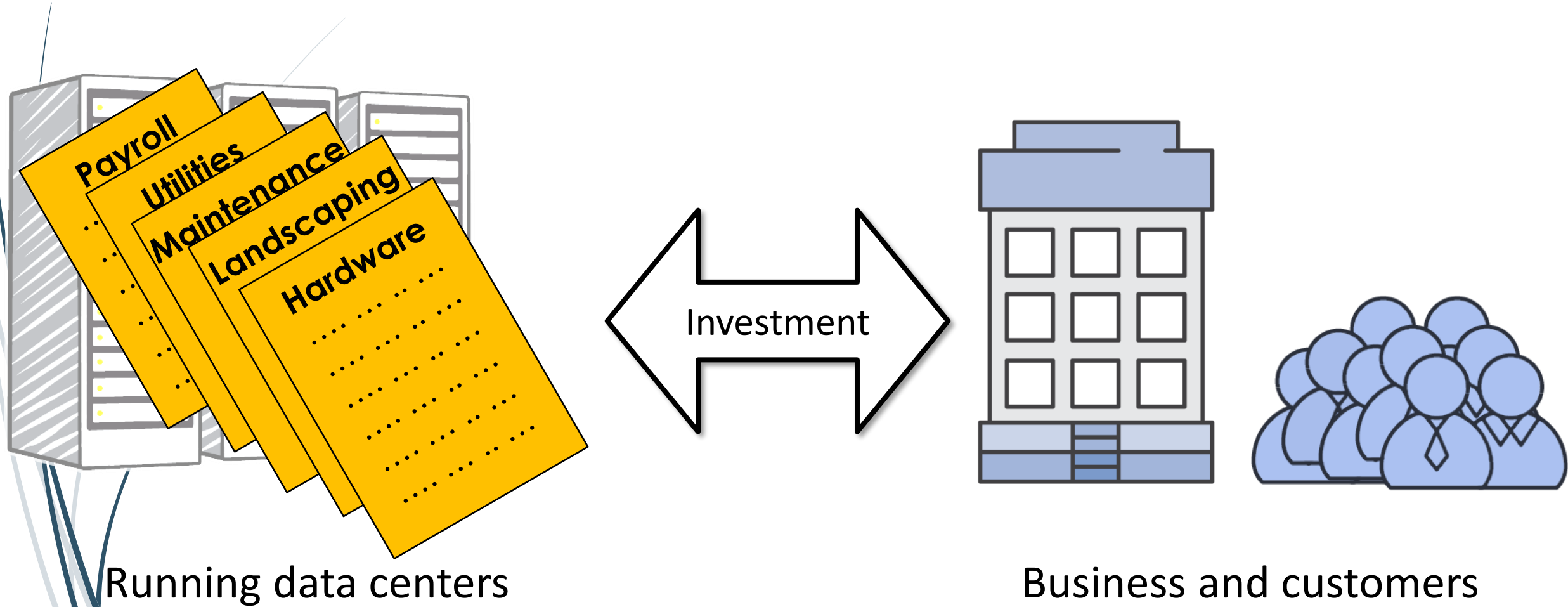Scaling on demand

4 - Increase speed and agility

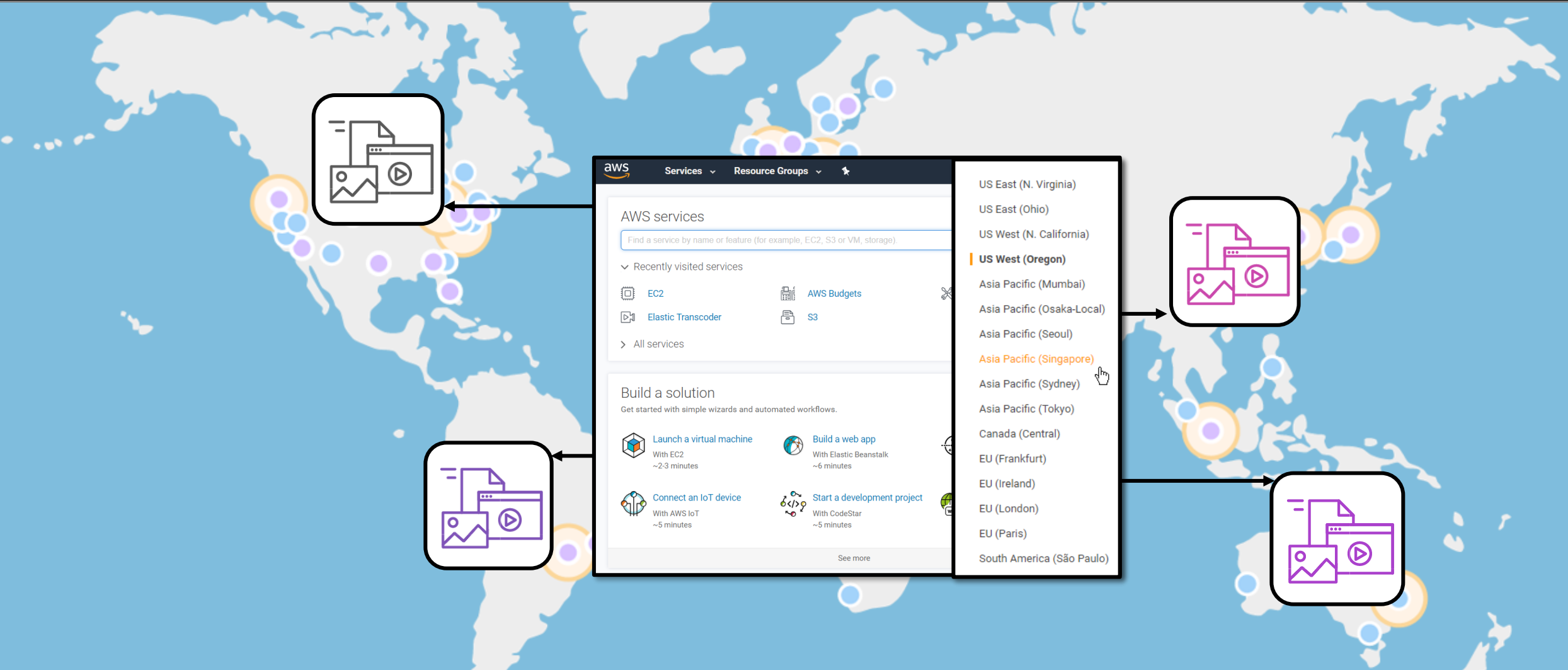

Weeks between wanting resources and having resources

Minutes between wanting resources and having resources

5 - Get rid of running and maintaining data centers

Payroll
Utilities
Maintenance
Landscaping
Hardware

Investment

Running data centers

Business and customers

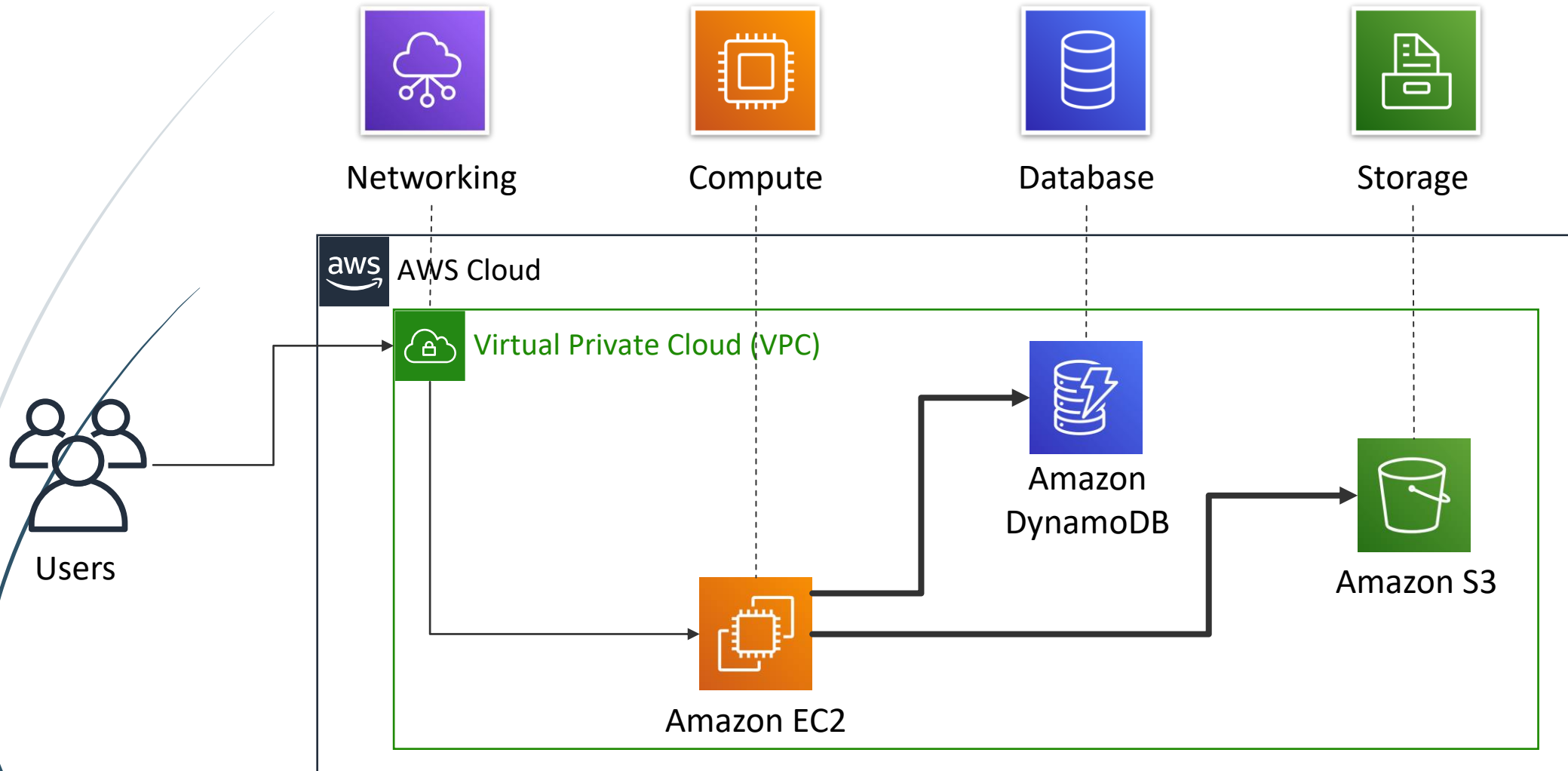# 6 - Go global in minutes

key takeaways

- Trade capital expense for variable expense
- Benefit from massive economies of scale
- Stop guessing capacity
- Increase speed and agility
- Stop spending money on running and maintaining data centers
- Go global in minutes

aws

How applications work in the cloud

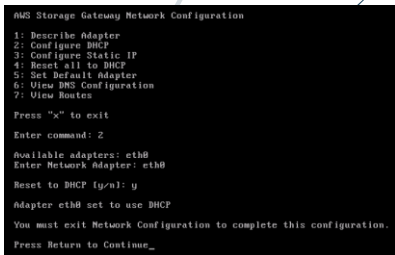# Simple solution example
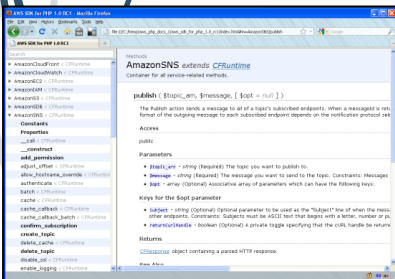
Three ways to interact with AWS

AWS Management Console

Easy-to-use graphical interface

Command Line Interface (AWS CLI)

Access to services by discrete commands or scripts

Software Development Kits (SDKs)

Access services directly from your code (such as Java, Python, and others)

Cloud Platforms

- Amazon Web Services: AWS Cloud

- Google Cloud Platform: GCP

- Microsoft Azure

- Open-Source Cloud Deployment Platform: OpenStack

- Cloud Applications:

  - Google Docs, sheets, slides, etc..

  - Microsoft Office 365

  - Storage: Dropbox, Google Drive, Microsoft OneDrive, **NextCloud***