Cloud Foundation & AWS

AWS Academy Cloud Foundations

Module overview

Sections

- Introduction to cloud computing
- Advantages of cloud computing
- Introduction to Amazon Web Services (AWS)
  - Compute
  - Data Base
  - Web Hosting
- AWS Academy

Introduction to cloud computing

Cloud Concepts Overview

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.

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

- Infrastructure as hardware
- Hardware solutions:
  - Require space, staff, physical security, planning, capital expenditure
  - Have a long hardware procurement cycle
  - Require you to provision capacity by guessing theoretical maximum peaks

Cloud computing model

- Infrastructure as software
- Software solutions:
  - Are flexible
  - Can change more quickly, easily, and cost-effectively than hardware solutions
  - Eliminate the undifferentiated heavy-lifting tasks

Cloud service models

IaaS
(infrastructure as a service)

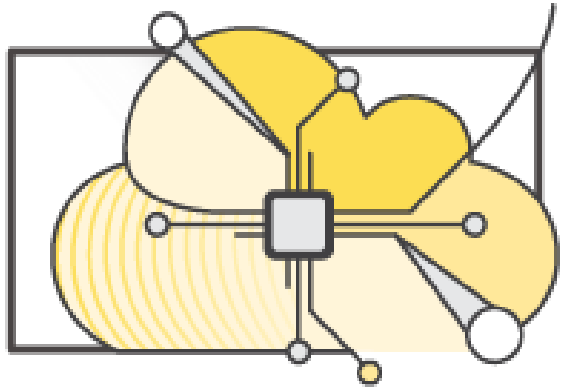
PaaS
(platform as a service)

SaaS
(software as a service)

More control
over IT resources

Less control
over IT resources

Cloud computing deployment models

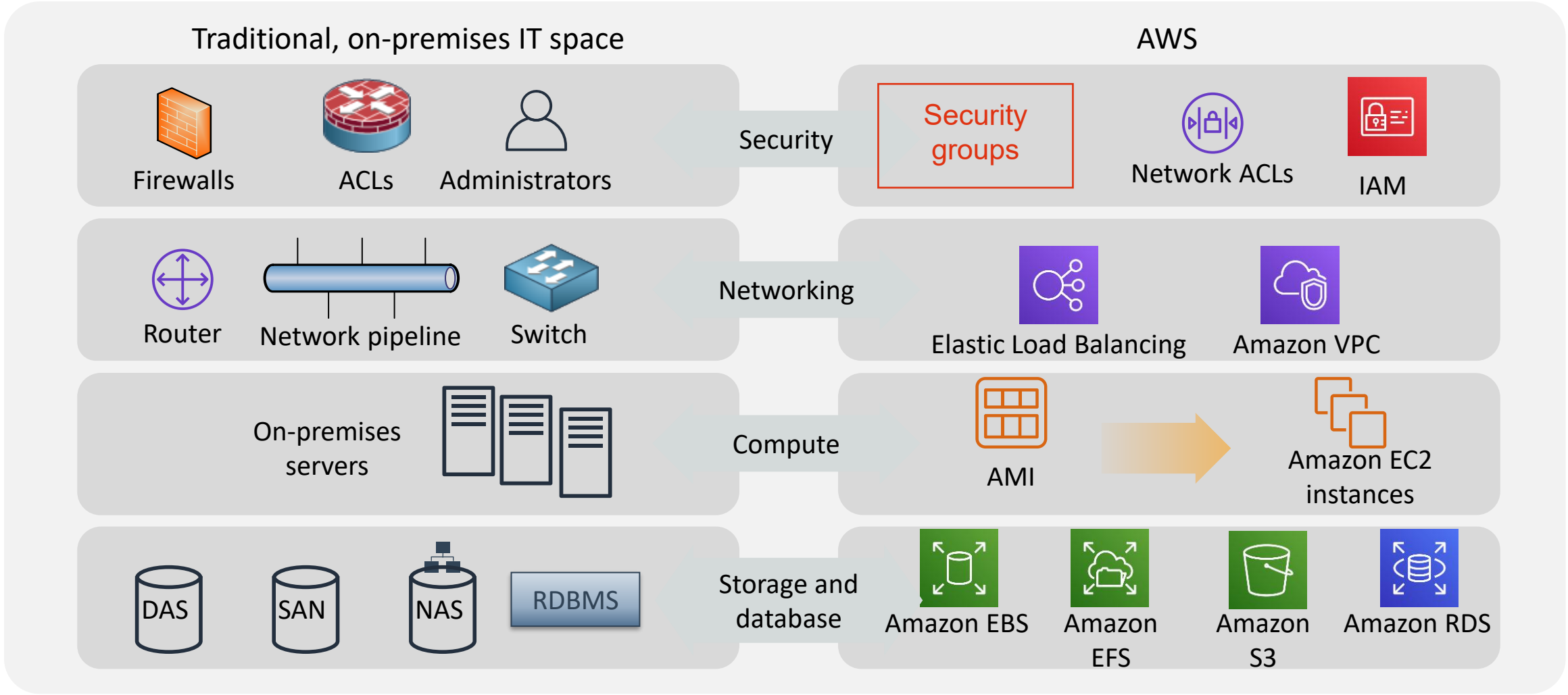


Cloud

Hybrid

On-premises
(private cloud)

Similarities between AWS and traditional IT



Key takeaways

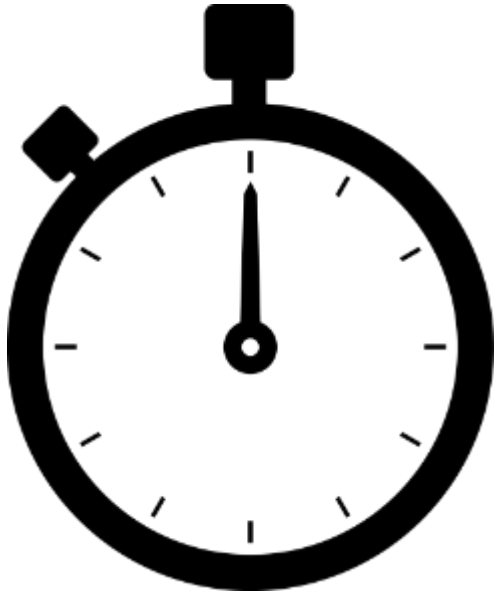
- Cloud computing is the on-demand delivery of IT resources via the internet with pay-as-you-go pricing.
- Cloud computing enables you to think of (and use) your infrastructure as software.
- There are three cloud service models: IaaS, PaaS, and SaaS.
- There are three cloud deployment models: cloud, 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

Cloud Concepts Overview

Trade capital expense for variable expense

Data center investment based on forecast



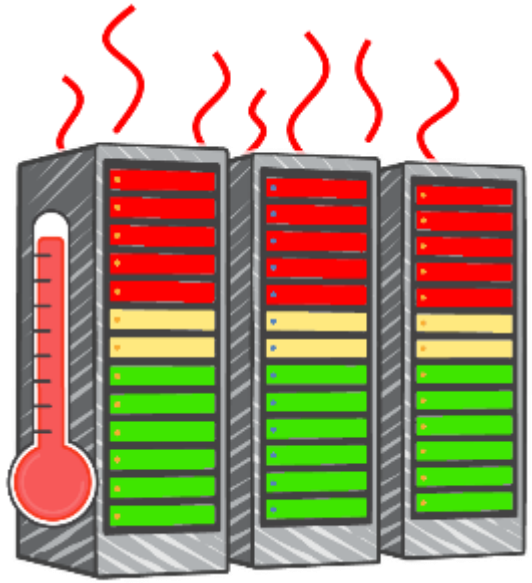
Pay only for the amount you consume

Massive economies of scale

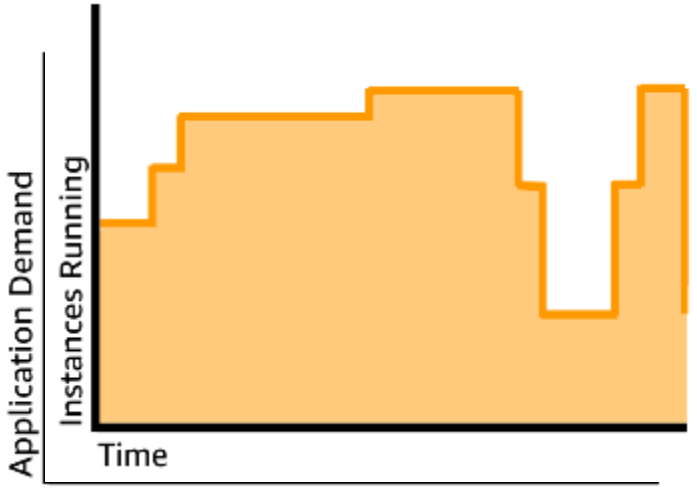
Because of aggregate usage from all customers, AWS can achieve higher economies of scale and pass savings on to customers.

Stop guessing capacity

Overestimated server capacity



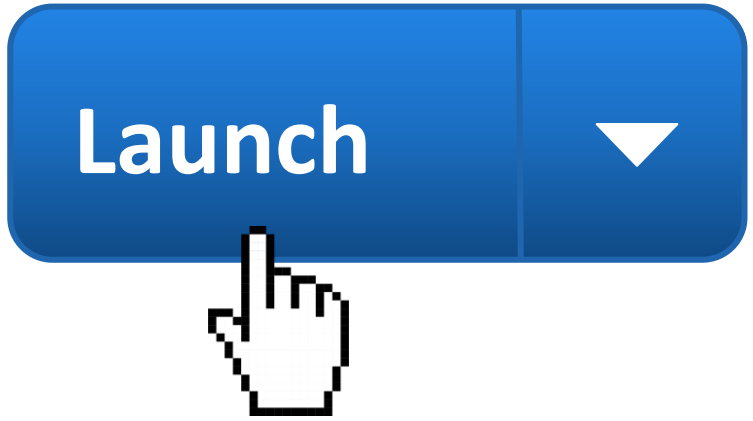
Underestimated server capacity



Scaling on demand

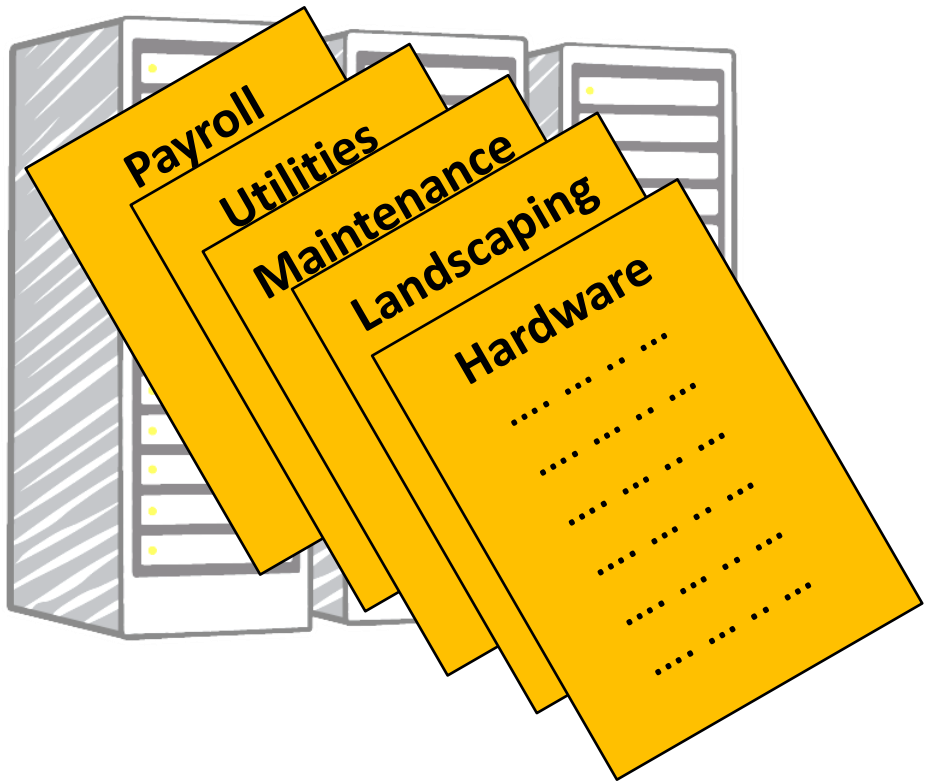
Increase speed and agility

Weeks between wanting resources and having resources

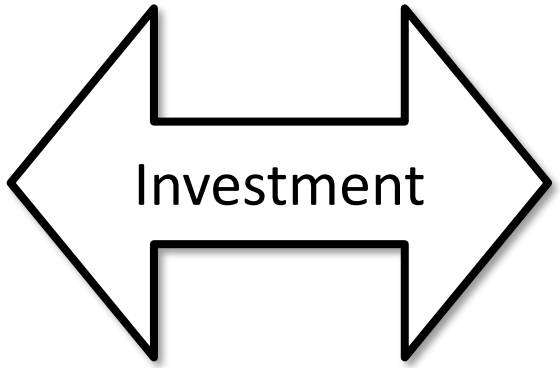


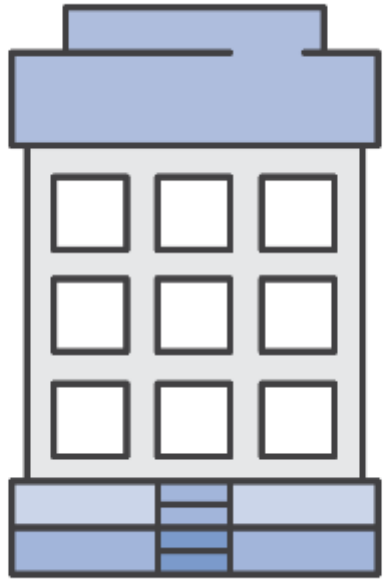
Minutes between wanting resources and having resources

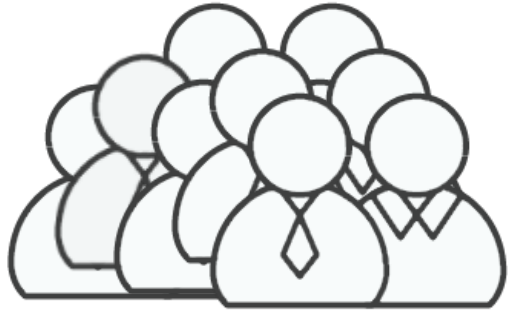
Stop spending money on running and maintaining data centers



Running data centers

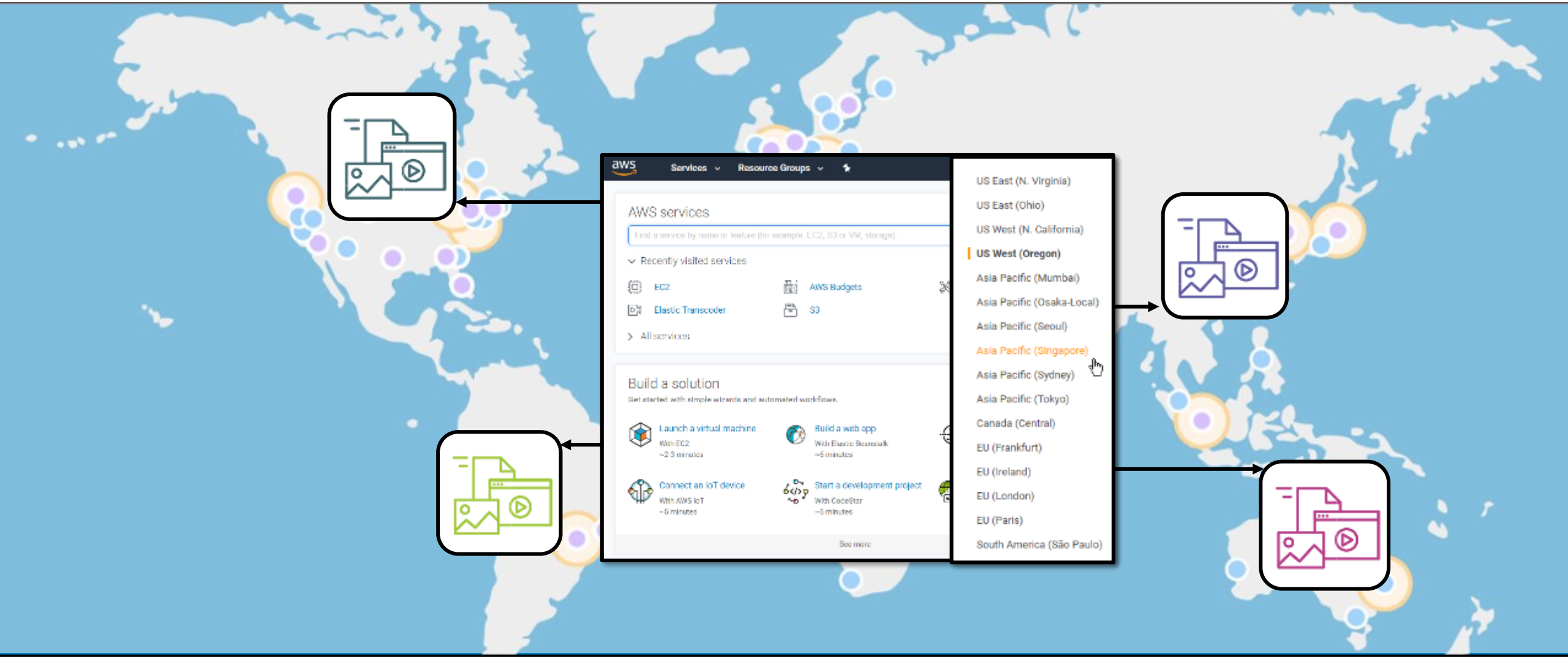






Business and customers

Go global in minutes

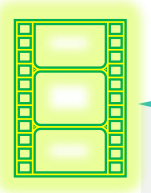


Key takeaways

- 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

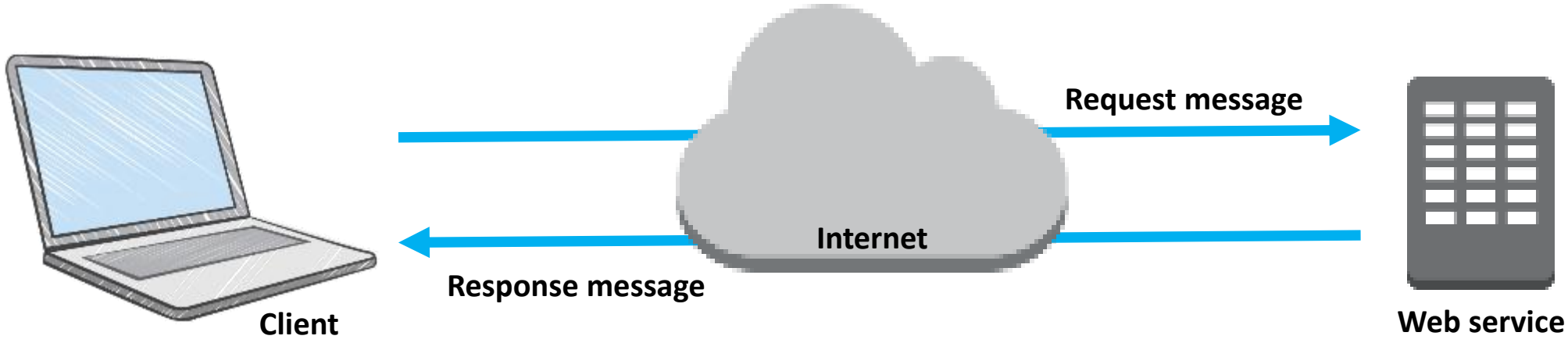
Introduction to Amazon Web Services (AWS)

Cloud Concepts Overview



What are web services?

A **web service** is any piece of software that makes itself available over the internet and uses a **standardized format**—such as Extensible Markup Language (XML) or JavaScript Object Notation (JSON)—for the request and the response of an **application programming interface (API) interaction**.



What is AWS?

- AWS is a **secure cloud platform** that offers a **broad set of global cloud-based products**.
- AWS provides you with **on-demand access** to compute, storage, network, database, and other IT resources and management tools.
- AWS offers **flexibility**.
- You **pay only for the individual services you need**, for **as long as you use them**.
- AWS services **work together** like building blocks.

Categories of AWS services


Analytics


Application Integration


AR and VR


Blockchain


Business Applications


Compute


Cost Management


Customer Engagement


Database


Developer Tools


End User Computing


Game Tech


Internet of Things


Machine Learning


Management and Governance


Media Services


Migration and Transfer


Mobile


Networking and Content Delivery

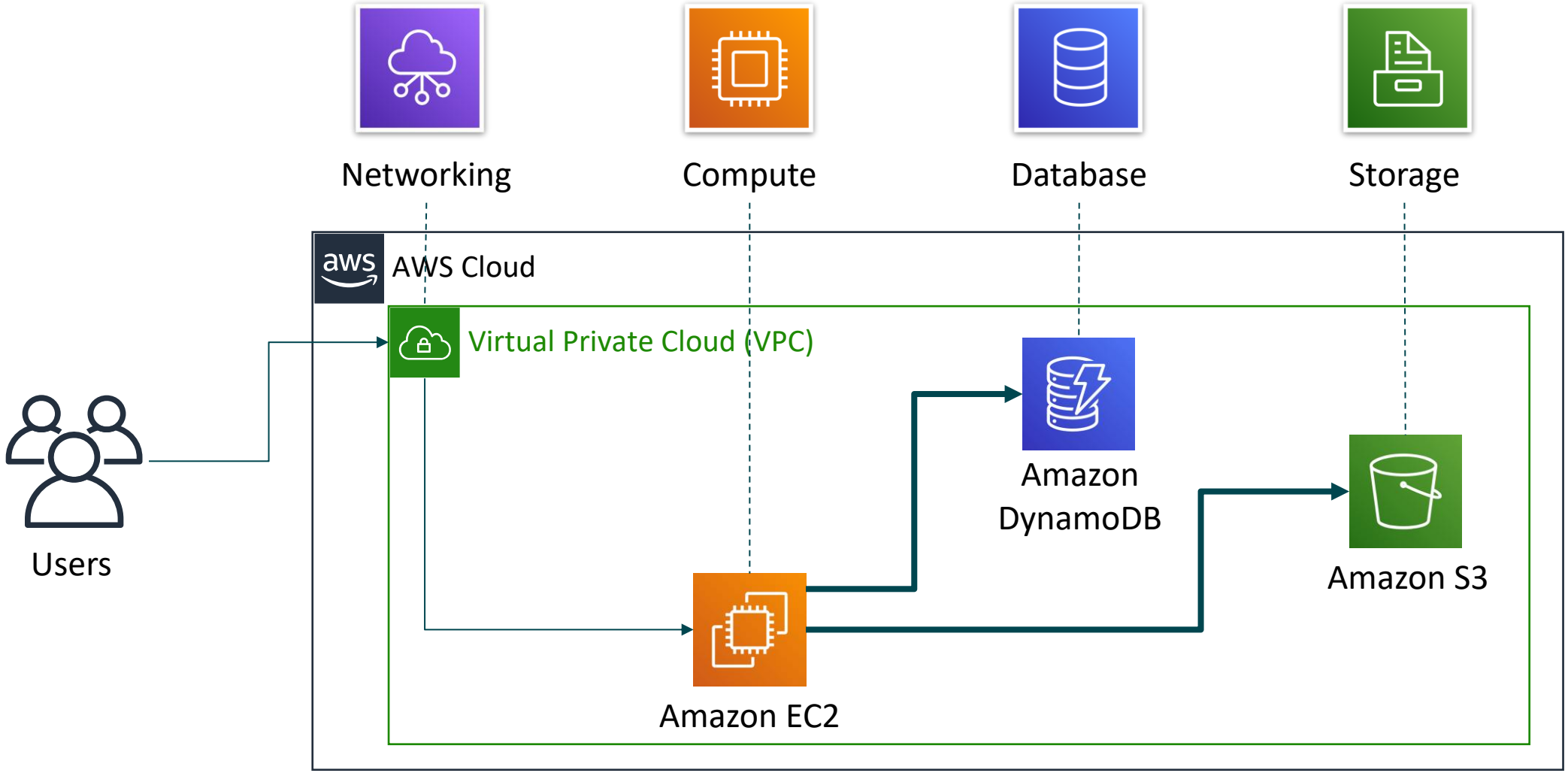

Robotics


Satellite


Security, Identity, and Compliance

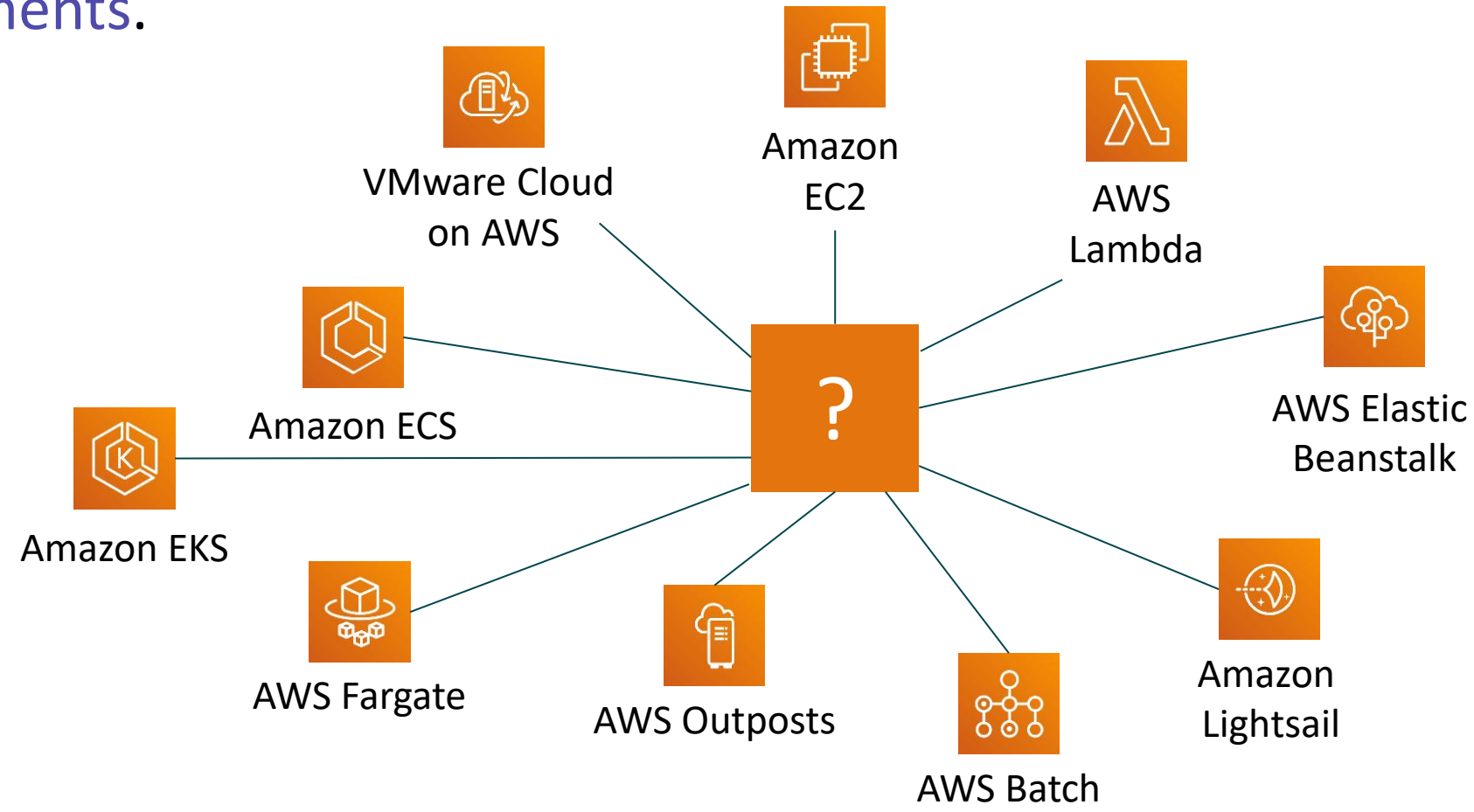

Storage

Simple solution example



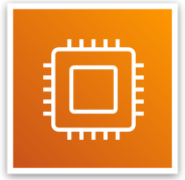
Choosing a compute service

The service you select depends on your business goals and technology requirements.



Services covered in this course

Compute services –



- Amazon EC2
- AWS Lambda
- Amazon EC2 Auto Scaling
- Amazon ECS
- Amazon EKS
- Amazon ECR
- AWS Fargate

Security, Identity, and Compliance services –

- AWS IAM
- Amazon Cognito
- AWS Shield
- AWS Artifact
- AWS KMS

Storage services –

- Amazon S3
- Amazon S3 Glacier
- Amazon EFS
- Amazon EBS

Database services –

- Amazon RDS
- Amazon DynamoDB
- Amazon Redshift
- Amazon Aurora

Networking and Content Delivery services –

- Amazon VPC
- Amazon Route 53
- Amazon CloudFront
- Elastic Load Balancing

Management and Governance services –

- AWS Trusted Advisor
- AWS CloudWatch
- AWS CloudTrail
- AWS Well-Architected Tool
- AWS Auto Scaling
- AWS Command Line Interface
- AWS Config
- AWS Management Console
- AWS Organizations

AWS Cost Management services –

- AWS Cost & Usage Report
- AWS Budgets
- AWS Cost Explorer

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)

AWS Documentation

- Find user guides, developer guides, API references, tutorials, and more at https://docs.aws.amazon.com/

- ***Whitepapers*** are also available at https://aws.amazon.com/whitepapers/, including these which are recommended reading for the AWS Cloud Practitioner exam:
  - Overview of Amazon Web Services: https://d0.awsstatic.com/whitepapers/aws-overview.pdf
  - Architecting for the Cloud: AWS Best Practices: https://d1.awsstatic.com/whitepapers/AWS_Cloud_Best_Practices.pdf
  - How AWS Pricing Works: https://d0.awsstatic.com/whitepapers/aws_pricing_overview.pdf

Key takeaways

- AWS is a secure cloud platform that offers a broad set of global cloud-based products called services that are designed to work together.
- There are many categories of AWS services, and each category has many services to choose from.
- Choose a service based on your business goals and technology requirements.
- There are three ways to interact with AWS services.

Compute services overview

Categorizing compute services

Services	Key Concepts	Characteristics	Ease of Use
• Amazon EC2	• Infrastructure as a service (IaaS) • Instance-based • **Virtual machines**	• Provision virtual machines that you can manage as you choose	A familiar concept to many IT professionals.
• AWS Lambda	• **Serverless** computing • Function-based • Low-cost	• Write and deploy code that runs on a schedule or that can be triggered by events • Use when possible (architect for the cloud)	A relatively new concept for many IT staff members, but easy to use after you learn how.
• Amazon ECS • Amazon EKS • AWS Fargate • Amazon ECR	• **Container-based** computing • Instance-based	• Spin up and run jobs more quickly	AWS Fargate reduces administrative overhead, but you can use options that give you more control.
• AWS Elastic Beanstalk	• Platform as a service (PaaS) • For **web applications**	• Focus on your code (building your application) • Can easily tie into other services—databases, Domain Name System (DNS), etc.	Fast and easy to get started.

Section 5: Introduction to AWS Lambda

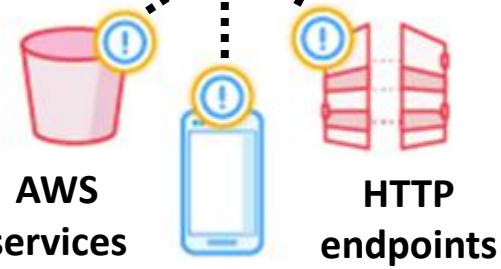
Module 6: Compute

AWS Lambda: Run code without servers

AWS Lambda is a **serverless** compute service.

Upload your code

The code you run
is a **Lambda function**

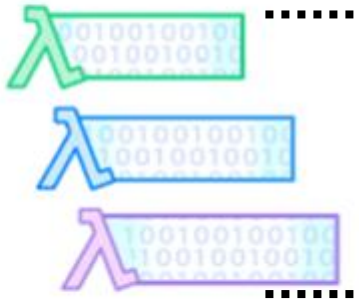


AWS services

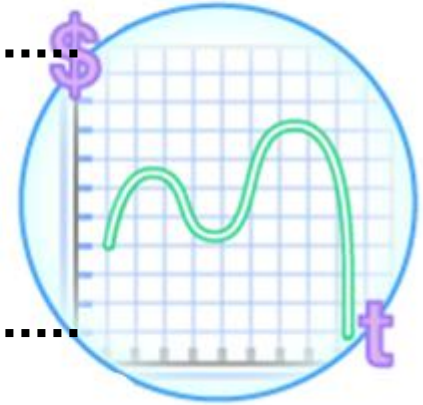
HTTP endpoints

Mobile apps

Run your code on a ***schedule***
or in response to ***events***



Your code
runs only when it is
triggered



Pay only for the
compute time that
you use

Benefits of Lambda

AWS Lambda

It supports multiple programming languages

Completely automated administration

Built-in fault tolerance

It supports the orchestration of multiple functions

Pay-per-use pricing

AWS Lambda quotas

Soft limits per Region:

- Concurrent executions = 1,000
- Function and layer storage = 75 GB

Hard limits for individual functions:

- Maximum function memory allocation = 10,240 MB
- Function timeout = 15 minutes
- Deployment package size = 250 MB unzipped, including layers
- Container image code package size = 10 GB

Additional limits also exist. Details are in the AWS Lambda quotas documentation at https://docs.aws.amazon.com/lambda/latest/dg/gettingstarted-limits.html.

Key takeaways

- **Serverless computing** enables you to build and run applications and services without provisioning or managing servers.
- **AWS Lambda is a serverless compute service** that provides built-in fault tolerance and automatic scaling.
- The maximum memory allocation for a single Lambda function is 10,240 MB.
- The maximum run time for a Lambda function is 15 minutes.

Database services overview

Relational versus non-relational databases

<table>
<tr><th></th><th colspan="4">Relational (SQL)</th><th>Non-Relational</th></tr>
<tr><td>Data Storage</td><td colspan="4">Rows and columns</td><td>Key-value, document, graph</td></tr>
<tr><td>Schemas</td><td colspan="4">Fixed</td><td>Dynamic</td></tr>
<tr><td>Querying</td><td colspan="4">Uses SQL</td><td>Focuses on collection of documents</td></tr>
<tr><td>Scalability</td><td colspan="4">Vertical</td><td>Horizontal</td></tr>
<tr><td>Example</td><td colspan="4"><table><tr><th>ISBN</th><th>Title</th><th>Author</th><th>Format</th></tr><tr><td>3111111223439</td><td>Withering Depths</td><td>Jackson, Mateo</td><td>Paperback</td></tr><tr><td>3122222223439</td><td>Wily Willy</td><td>Wang, Xiulan</td><td>Ebook</td></tr></table></td><td>{
ISBN: 3111111223439,
Title: “Withering Depths”,
Author: ”Jackson, Mateo”,
Format: “Paperback”
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</table>

Categorizing AWS Database Services

Services	Key Concepts	Characteristics	Ease of Use
• Amazon RDS	• Relational Database (SQL) Managed Service (IaaS)	• Supports MySQL, PostgreSQL, Oracle, SQL Server, MariaDB • Automated backups, scaling, and patching	Familiar SQL database with managed operations
• Amazon Aurora	• High-Performance Relational Database • MySQL/PostgreSQL Compatible	• **Serverless** scaling with Aurora Serverless • High availability and durability	Easy to migrate from MySQL/PostgreSQL; automated scaling
• Amazon DynamoDB	• **NoSQL** (Key-Value, Document) Serverless	• **Serverless,** fully managed, automatic scaling • Microsecond latency	Simple API-driven access, no server management needed
• Amazon ElastiCache	• In-memory Data Store **Caching** (Redis, Memcached)	• Sub-millisecond latency for caching Improves app performance	Easy to integrate as a caching layer

What is Amazon DynamoDB?

Fast and flexible NoSQL database service for any scale

Amazon DynamoDB

- NoSQL database tables
- Virtually unlimited storage
- Items can have differing attributes
- Low-latency queries
- Scalable read/write throughput

key takeaways

Amazon DynamoDB:

- Runs exclusively on SSDs.
- Supports document and key-value store models.
- Replicates your tables automatically across your choice of AWS Regions.
- Works well for mobile, web, gaming, adtech, and Internet of Things (IoT) applications.
- Is accessible via the console, the AWS CLI, and API calls.
- Provides consistent, single-digit millisecond latency at any scale.
- Has no limits on table size or throughput.

AWS certification exam information

Course Introduction

AWS Certification exams

Role-based certifications

Professional level

Associate level

Foundational level

Specialty certifications

*This course helps prepare you for the AWS **Cloud Practitioner** certification exam*

AWS Certified Cloud Practitioner exam

- Details about the exam—including how to register for it—are at https://aws.amazon.com/certification/certified-cloud-practitioner/
  - Download and carefully read the AWS Certified Cloud Practitioner Exam Guide at https://d1.awsstatic.com/training-and-certification/Docs - Cloud Practitioner/AWS_Certified_Cloud_Practitioner-Exam_Guide_EN_v1.6.pdf
  - Download the sample exam questions at https://d1.awsstatic.com/training-and-certification/Docs - Cloud Practitioner/AWS Certified Cloud Practioner_Sample Questions_v1.1_FINAL.PDF

- See the recommended path to attain the certification at https://aws.amazon.com/training/path-cloudpractitioner/
  - AWS Academy Cloud Foundations covers much of the same material found in the Cloud Practitioner Essentials course, but in greater depth.
  - There is additional free digital training available at https://www.aws.training/.

Thank you

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