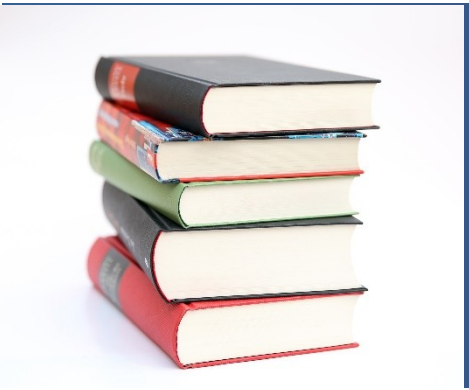
UNIVERSITY OF ŽILINA
Faculty of Management Science and Informatics

Presentation 1

- AWS M1 - Cloud Concepts Overview
- AWS M3 - AWS Global Infrastructure Overview

Vytvorené v rámci projektu **KEGA 026TUKE-4/2021**

aws academy



Outline

- **Course Introduction**
  - Course objectives and overview
  - Certification
    - AWS certification exam information
    - Cisco Devnet certification
  - Documentation
    - AWS Documentation
    - Cisco Devnet Documentation
- **Part 1: M1 Cloud Concepts Overview**
  - Introduction of CC
  - Advantages of CC
  - Introduction to AWS
  - AWS Cloud Adoption Framework (AWS CAF)
- **Part 2: M3 AWS Global Infrastructure Overview**
  - AWS Global Infrastructure
  - AWS service and service category overview

Course Introduction

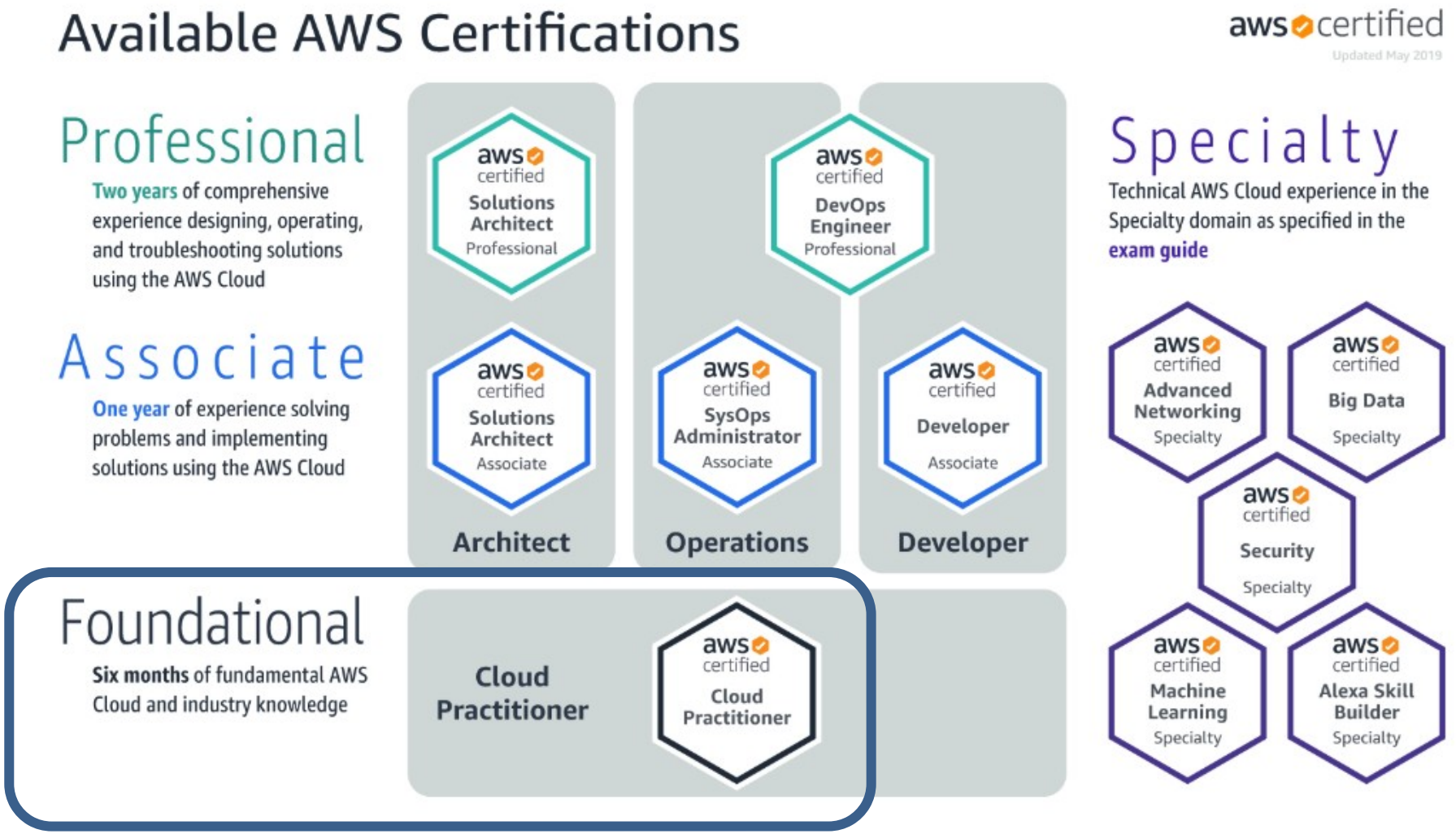
Course outline

AWS Foundation + Cisco Netacad Devnet

Week	Lectures	
1	AWS M1 - Cloud Concepts Overview	Introduction of CC
		Advantages of CC
		Introduction to AWS
	AWS M3 - AWS Global Infrastructure Overview	AWS Global Infrastructure
		AWS service category overview
2	AWS M2 - Cloud Economics and Billing	Fundamentals of pricing
		Total Cost of Ownership
		AWS Organizations
		AWS Billing and Cost Managment
		Technical support
	AWS M4 - AWS Cloud Security	AWS shared responsibility model
		AWS Identity and Access Management (IAM)
		Securing AWS account
		Securing data on AWS
3	AWS M5 - Networking and Content Delivery	Networking basics
		Amazon VPC
		VPC networking and security
		Amazon Route 53
		Amazon CloudFront
4	AWS M6 - Compute	Compute services overview
		Amazon EC2 and EC2 cost optimization
		Container services
		Introduction to AWS Lambda
		Introduction to AWS Elastic Beanstalk
5	AWS M7 - Storage	Amazon EBS
		Amazon S3
		Amazon EFS
		Amazon S3 Glacier
6	AWS M8 - Databases	Amazon RDS
		Amazon DynamoDB
		Amazon Redshift
		Amazon Aurora
7	AWS M9 - Cloud Architecture	AWS Well-Architected Framework
		Reliability and availability
		AWS Trusted Advisor
	AWS M10 - Automatic Scaling and Monitoring	Elastic Load Balancing
		Amazon CloudWatch
		Amazon EC2 Auto Scaling
8	DevNet M4 - Understanding and Using APIs	Introducing APIs
		API Design Styles
		API Architecture Styles
		Introduction to REST APIs
		Authenticating to a REST API
		API Rate Limits
		Working with Webhooks
		Troubleshooting API Calls
9	DevNet M6 - Application Deployment and Security	Understanding Deployment Choices with Different Models
		Creating and Deploying a Sample Application
		Continuous Integration/Continuous Deployment (CI/CD)
		Networks for Application Development and Security
		Securing Applications
10	DevNet M7 - Infrastructure and Automation	Automating Infrastructure with Cisco
		DevOps and SRE
		Basic Automation Scripting
		Automation Tools
		Infrastructure as Code
		Automating Testing
		Network Simulation

Certification - AWS

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



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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
  - Download the sample exam questions
- 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 aws.training

Documentation - AWS

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

- ***Whitepapers***
  - available at https://aws.amazon.com/whitepapers/,
  - including these which are recommended reading for the AWS Cloud Practitioner exam:
    - Overview of Amazon Web Services
    - Architecting for the Cloud: AWS Best Practices
    - How AWS Pricing Works
    - The Total Cost of (Non) Ownership of Web Applications in the Cloud

Certification - Cisco Devnet

Documentation – Cisco Devnet

Module 1: Cloud Concepts Overview

by AWS Academy Cloud Foundations course

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
  - 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)

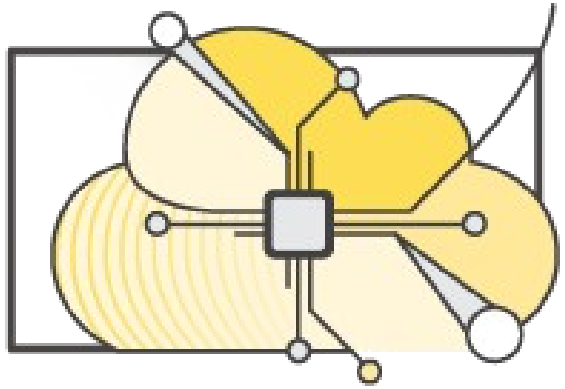
PaaS
(platform as a service)

SaaS
(software as a service)

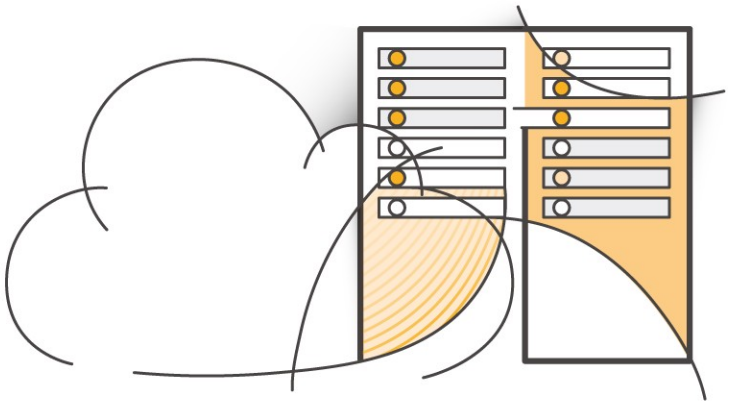
More control over IT resources

Less control over IT resources

Cloud computing deployment models



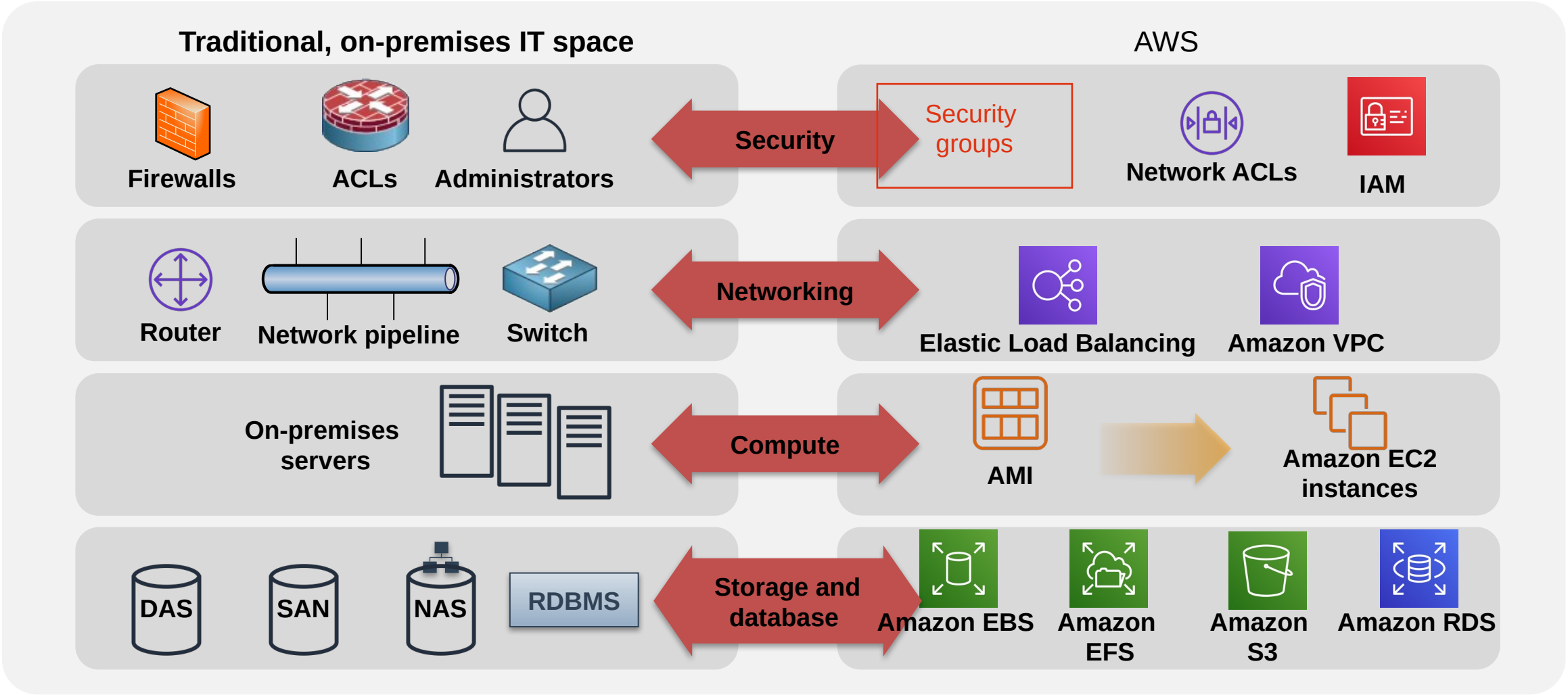
Cloud



Hybrid

On-premises
(private cloud)

Similarities between AWS and traditional IT



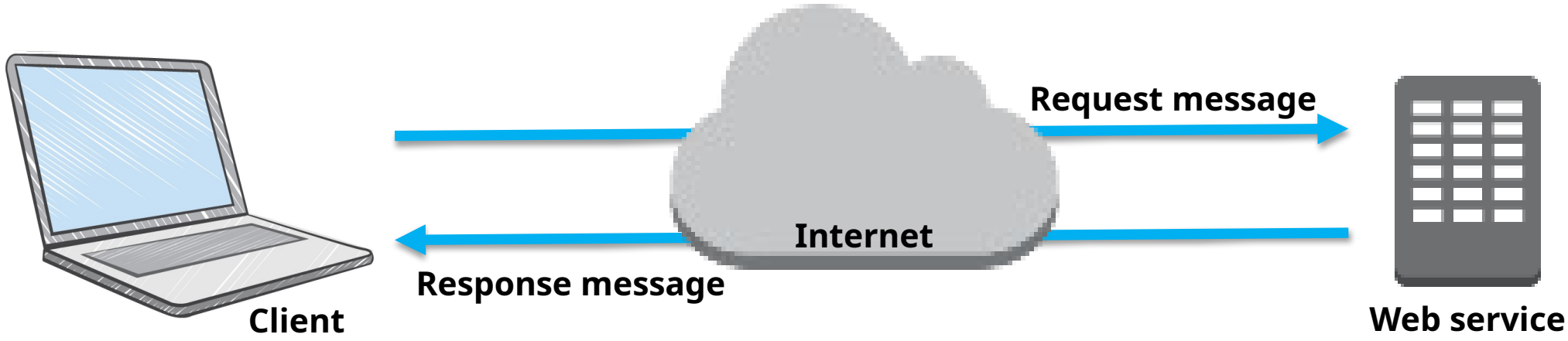
Advantages of cloud computing

- Business: Capex vs variable expenses
  - ***Capex*** *(Capital Expense)*
    - *funds that a company uses to acquire, upgrade, and maintain physical assets such as property, industrial buildings, or equipment*.
  - ***Variable Expenses***
    - *Expense that the person who bears the cost can easily alter or avoid*
- **Benefits:**
  1. Trade capital expense for variable expense
     - Data center investment based on forecast
     - Pay only for the amount you consume
  2. Massive economies of scale
     - Benefit form customer aggregation
     - Aggregation of customers in cloud provides lower variable cost
  3. Better capacity estimation instead of guessing capacity
     - Cloud eliminate guessing about infrastructure capacity needs
     - Access as much or as little as you need, and scale up and down as required with only a few minutes' notice
  4. Increase speed and agility
     - Cloud reduces the time it takes to make those resources available
       - Resources available very soon, from weeks to just minutes
     - increases agility
  5. Stop spending money on running and maintaining data centers
     - focus on customers/staff
     - instead of racking, stacking, and powering servers
  6. Go global in minutes
     - AWS = Multiple AWS regions around the world
     - = Go global in minutes in a few cl

Introduction to Amazon Web Services (AWS)

What are web services?

- Web service
  - Any piece of software that makes itself available over the internet
  - For the communication (the request and the response) uses a **standardized format** available over an **application programming interface (API)**
    - Extensible Markup Language (XML) or JavaScript Object Notation (JSON)



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 (building blocks)

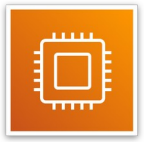

Analytics


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

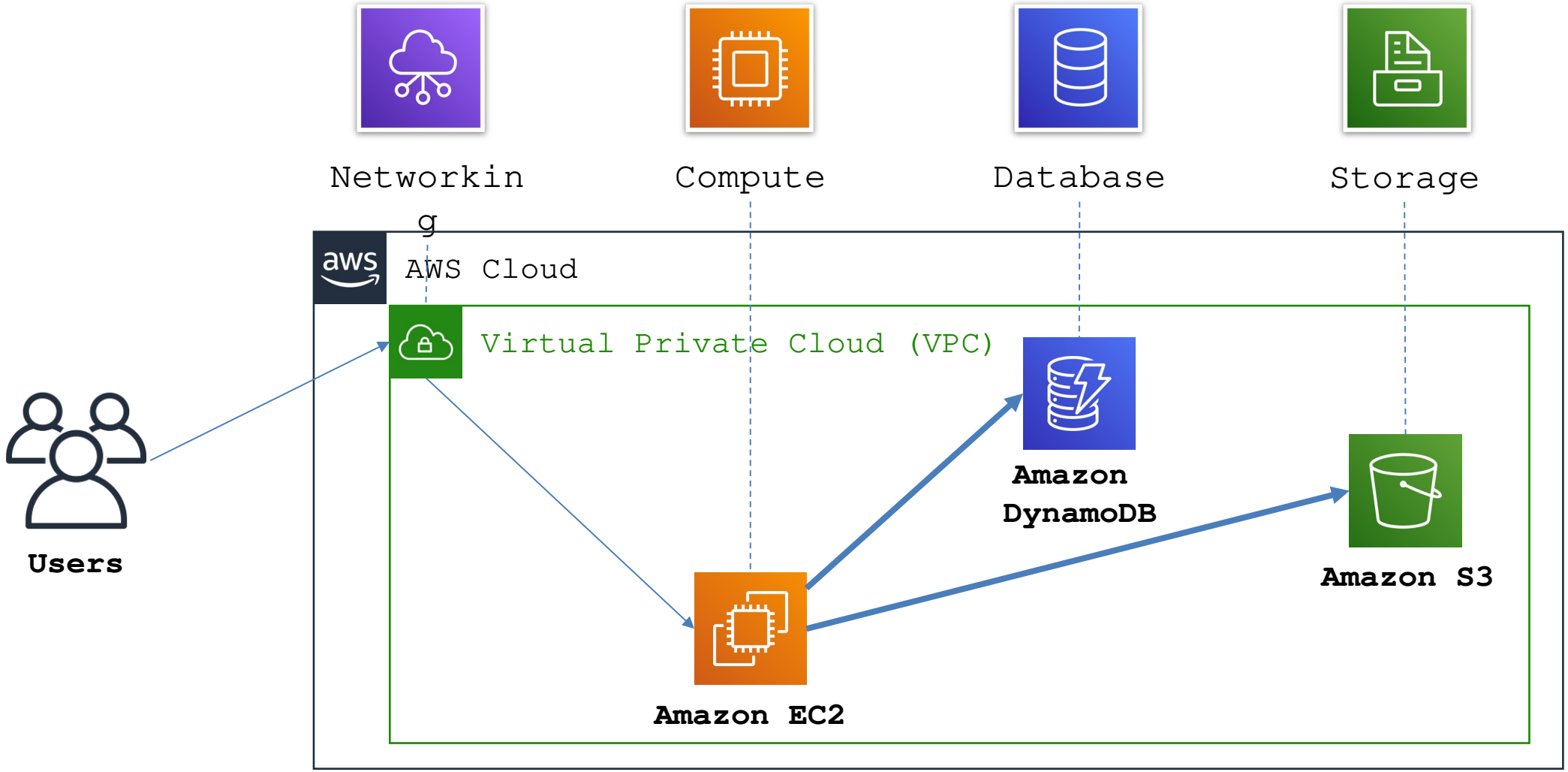

Robotics


Satellite


Security, Identity, and Compliance

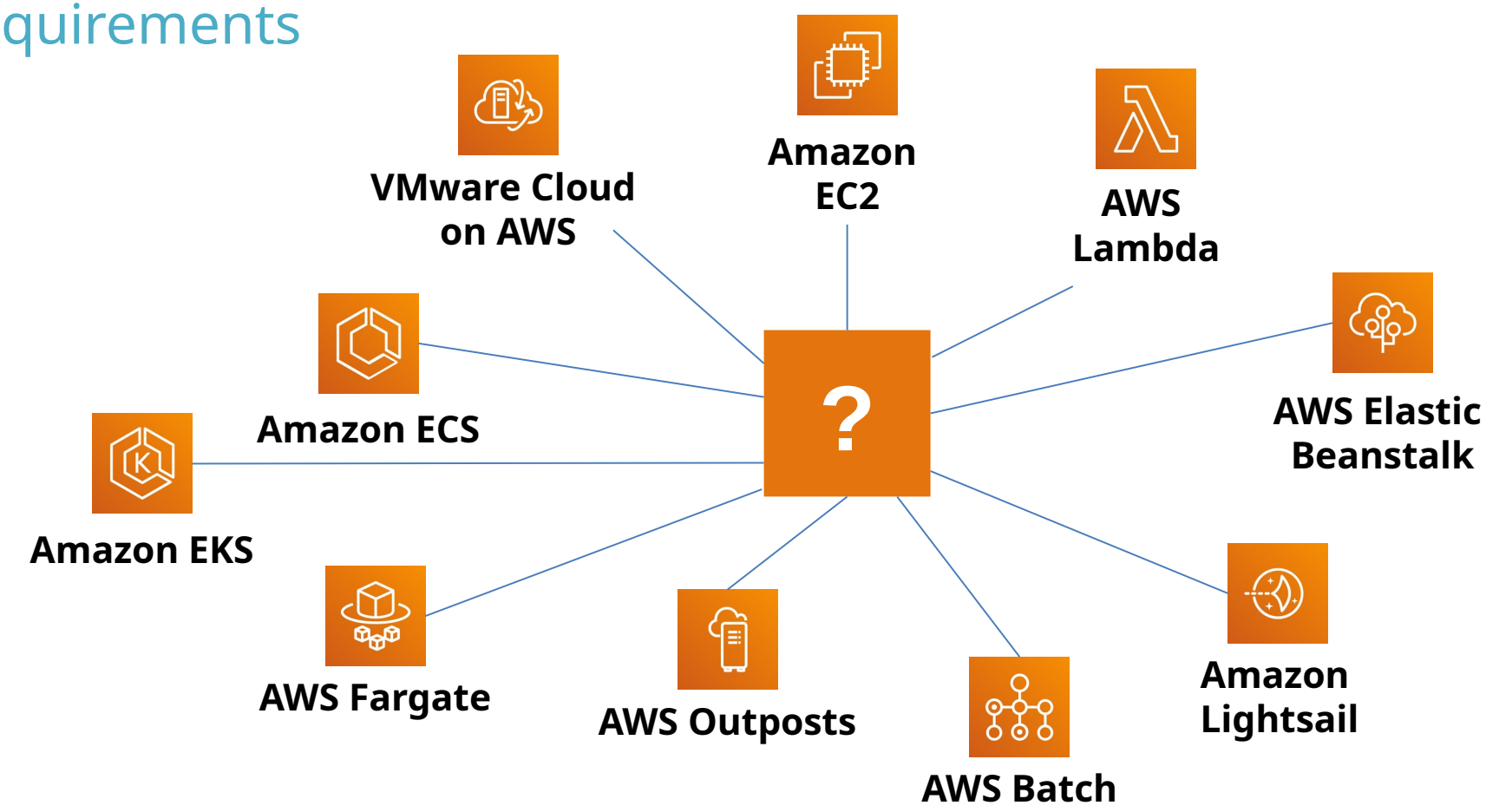

Storage

Simple solution example



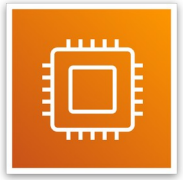
Choosing a service

- The service selection depends on your business goals and technology requirements



Services covered in this course

Compute services –



- Amazon EC2
- AWS Lambda
- AWS Elastic Beanstalk
- 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

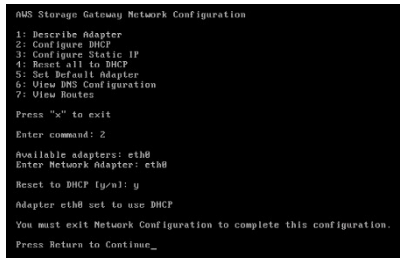
AWS Cost Management services –

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

Three ways to interact with AWS

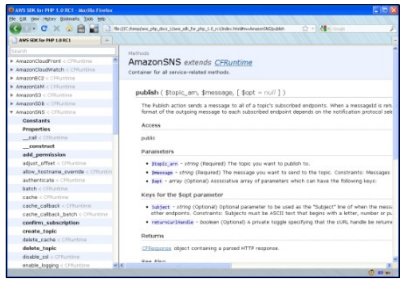
AWS Management Console

Easy-to-use graphical interface



Command Line Interface (AWS CLI)

Access to services by discrete commands or scripts



Software Development Kits (SDKs)

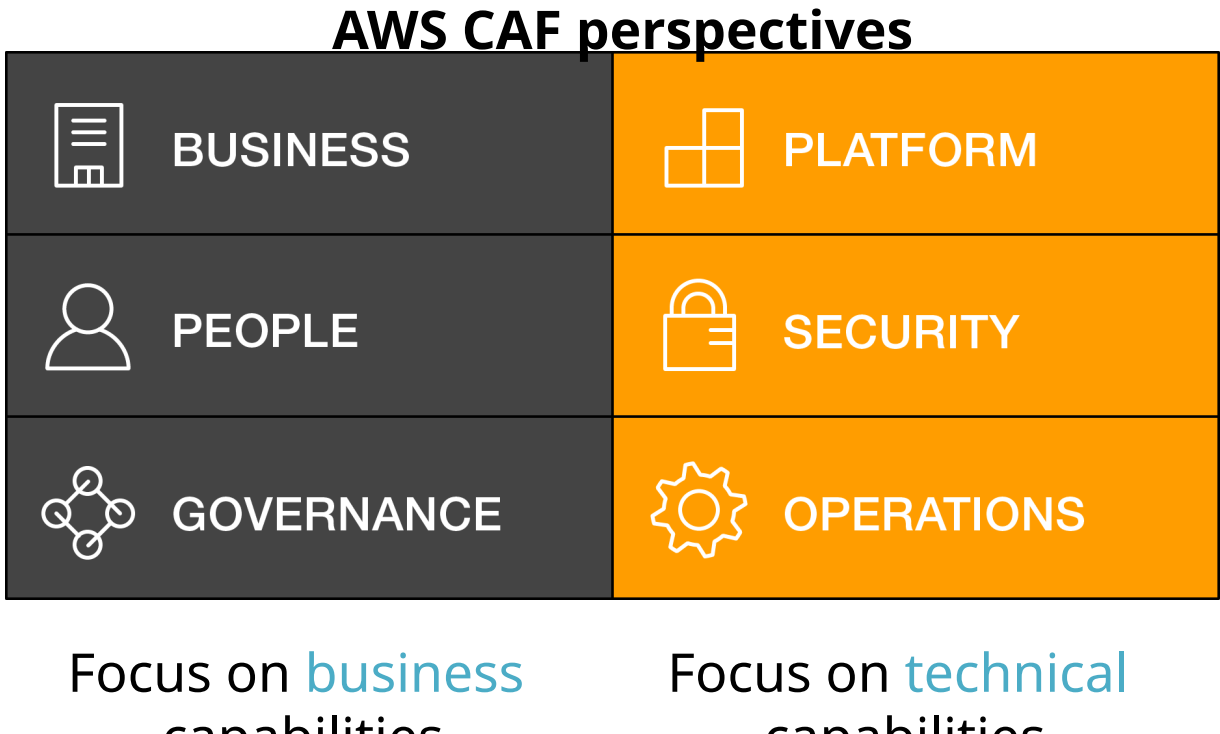
Access services directly from your code (such as Java, Python, and others)

Moving to the AWS Cloud – The AWS Cloud Adoption Framework (AWS CAF)

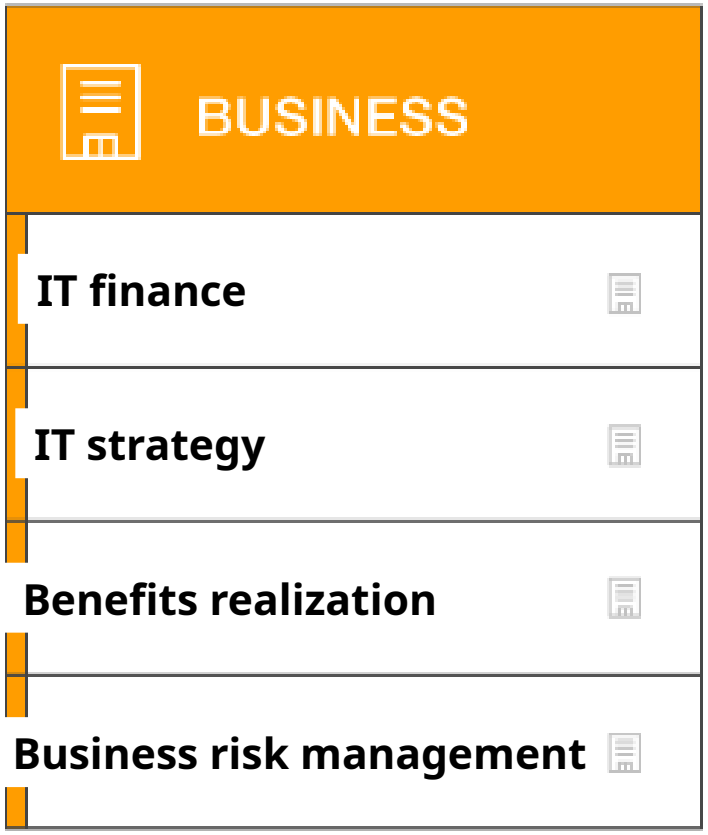
AWS Cloud Adoption Framework (AWS CAF)

- AWS CAF
  - provides guidance and best practices
  - helps organizations build a comprehensive approach to cloud computing
  - across the organization and throughout the IT lifecycle to accelerate successful cloud adoption.

- AWS CAF is organized into six perspectives.
  - Perspectives consist of sets of capabilities.



Business perspective

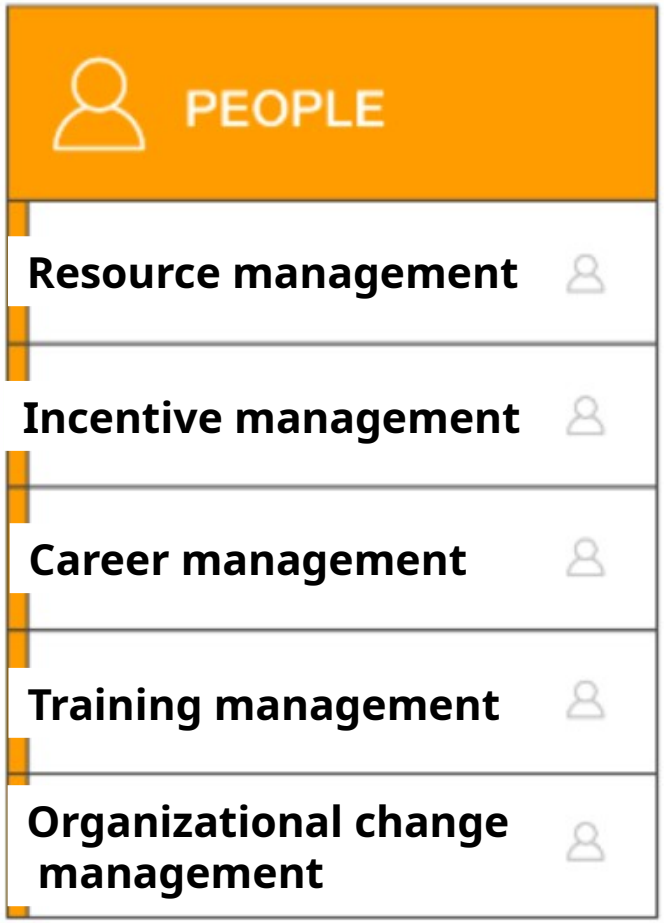


Business perspective capabilities

We must ensure that IT is aligned with business needs, and that IT investments can be traced to demonstrable business results.

Business managers, finance managers, budget owners, and strategy stakeholders

People perspective



People perspective capabilities

We must prioritize training, staffing, and organizational changes to build an agile organization.

Human resources, staffing, and people managers

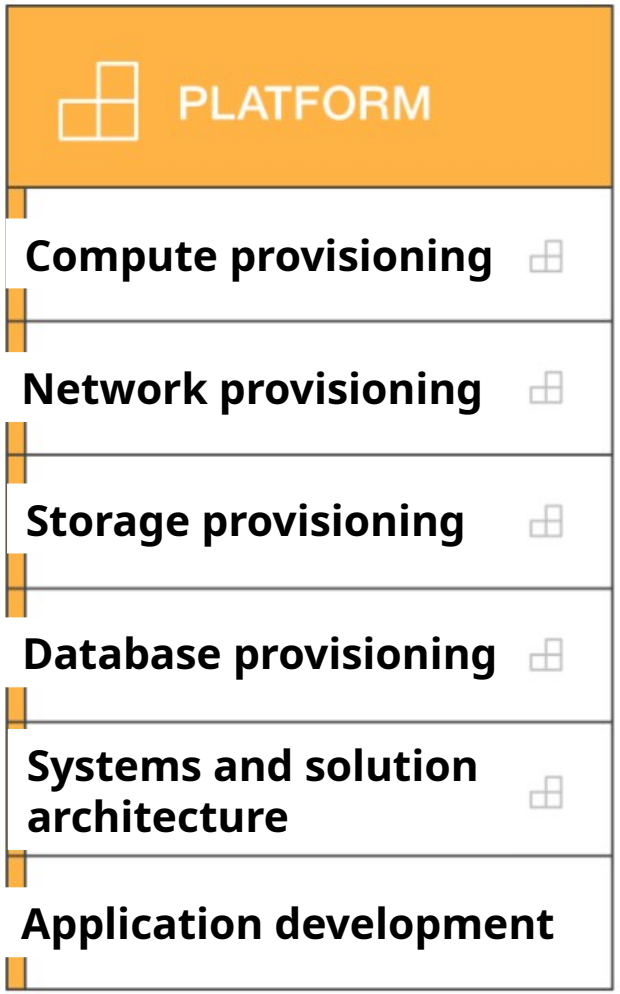
Governance perspective

Governance perspective capabilities

We must ensure that skills and processes align IT strategy and goals with business strategy and goals so the organization can maximize the business value of its IT investment and minimize business risks.

CIO, program managers, enterprise architects, business analysts, and portfolio managers

Platform perspective



Platform perspective capabilities

We must understand and communicate the nature of IT systems and their relationships.
We must be able to describe the architecture of the target state environment in detail.

CTO, IT managers, and solutions architects

Security perspective

Security perspective capabilities

We must ensure that the organization meets its security objectives.

CISO, IT security managers, and IT security analysts

Operations perspective

OPERATIONS

- Service monitoring
- Application performance monitoring
- Resource inventory management
- Release management/ change management
- Reporting and analytics
- Business continuity/ Disaster recovery
- IT service catalog

We align with and support the operations of the business, and define how day-to-day, quarter-to-quarter, and year-to-year business will be conducted.

IT operations managers and IT support managers

Operations perspective capabilities

Additional resources (Module 1)

- What is AWS? YouTube video
- Cloud computing with AWS website
- Overview of Amazon Web Services whitepaper
- An Overview of the AWS Cloud Adoption Framework whitepaper
- 6 Strategies for Migrating Applications to the Cloud AWS Cloud Enterprise Strategy blog post

Module 3: AWS Global Infrastructure Overview

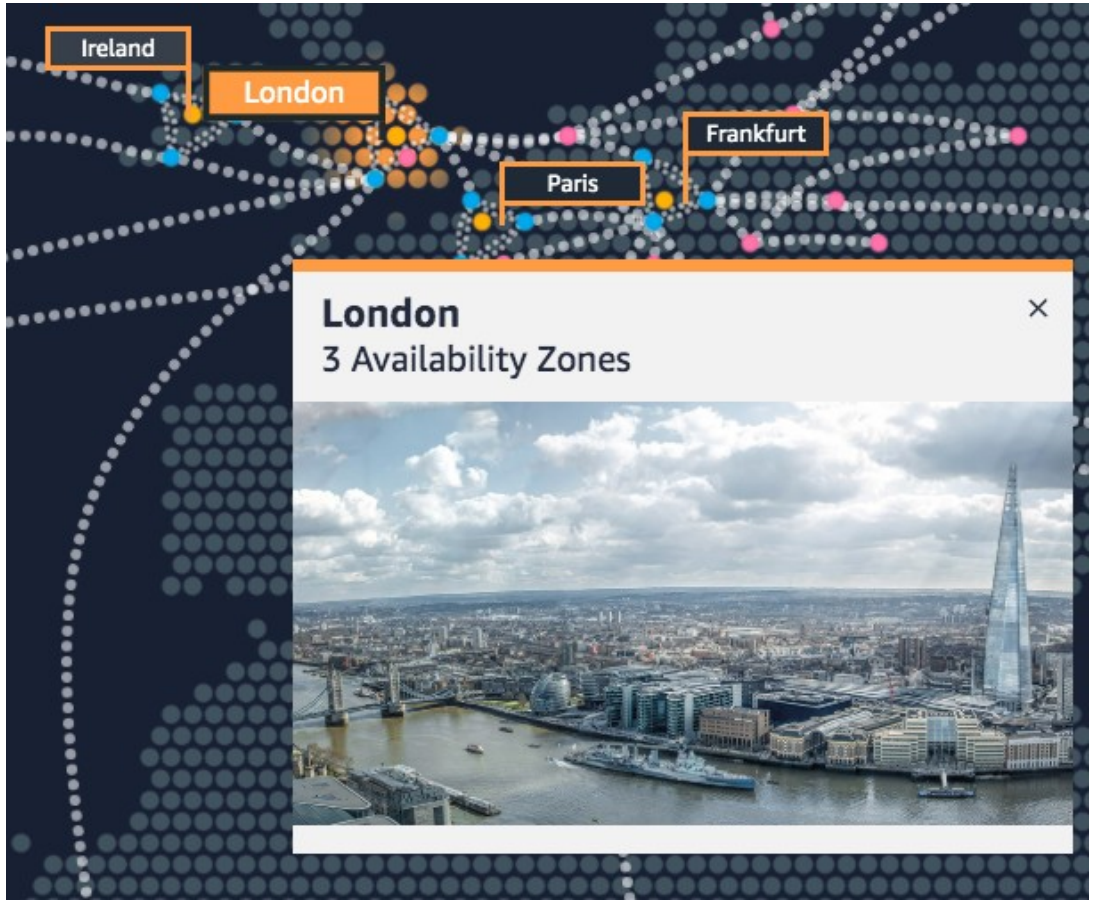
by AWS Academy Cloud F foundations course

AWS Global Infrastructure

- Designed and built to deliver a flexible, reliable, scalable, and secure cloud computing environment with high-quality global network performance.
  - Consists of Regions and Availability Zones
  - Current AWS Regions: https://infrastructure.aws

AWS Regions

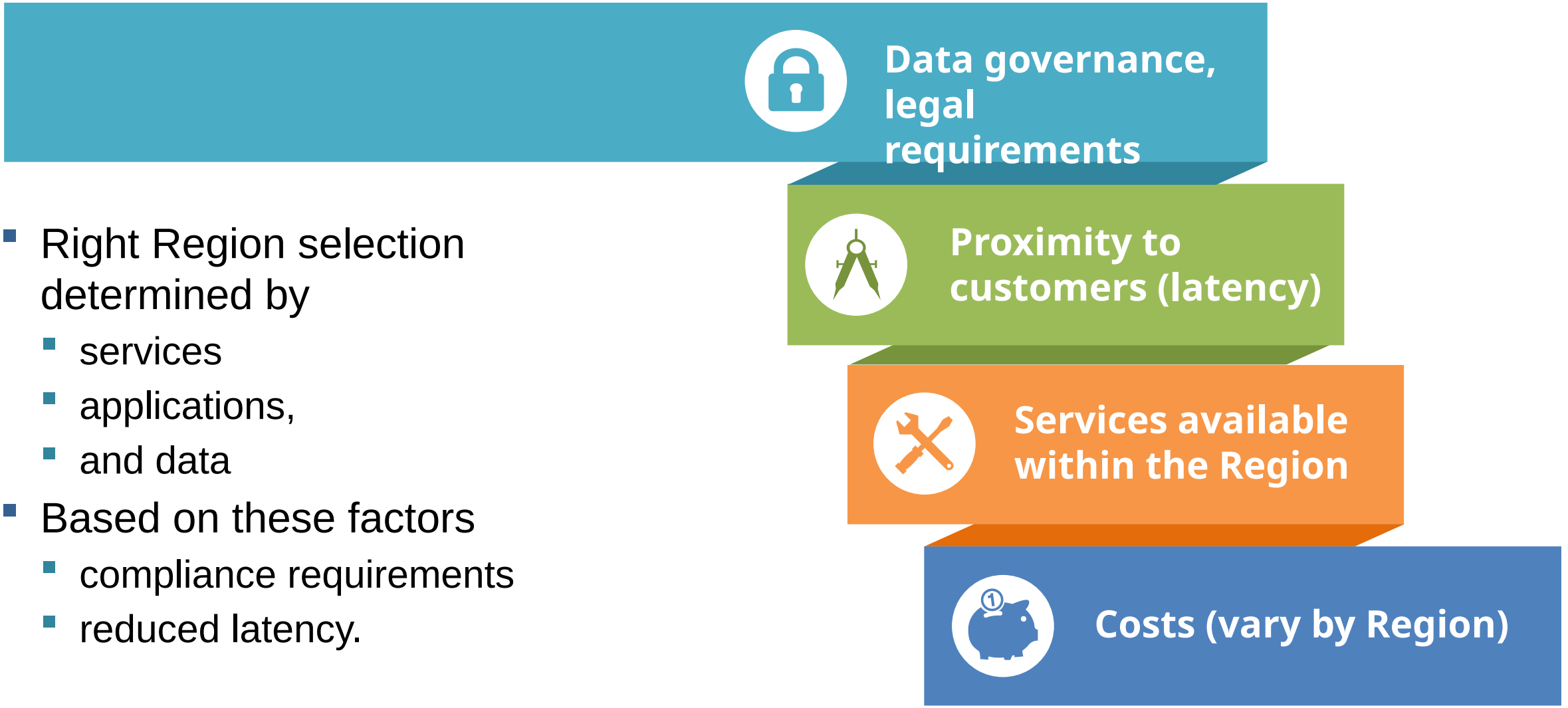
- An AWS Region is a geographical area.
  - Data replication across Regions => controlled by an AWS user
  - Communication between Regions => uses AWS backbone network infrastructure
- Each Region
  - provides full redundancy and connectivity to the network
  - consists of two or more Availability Zones.



Example: London Region

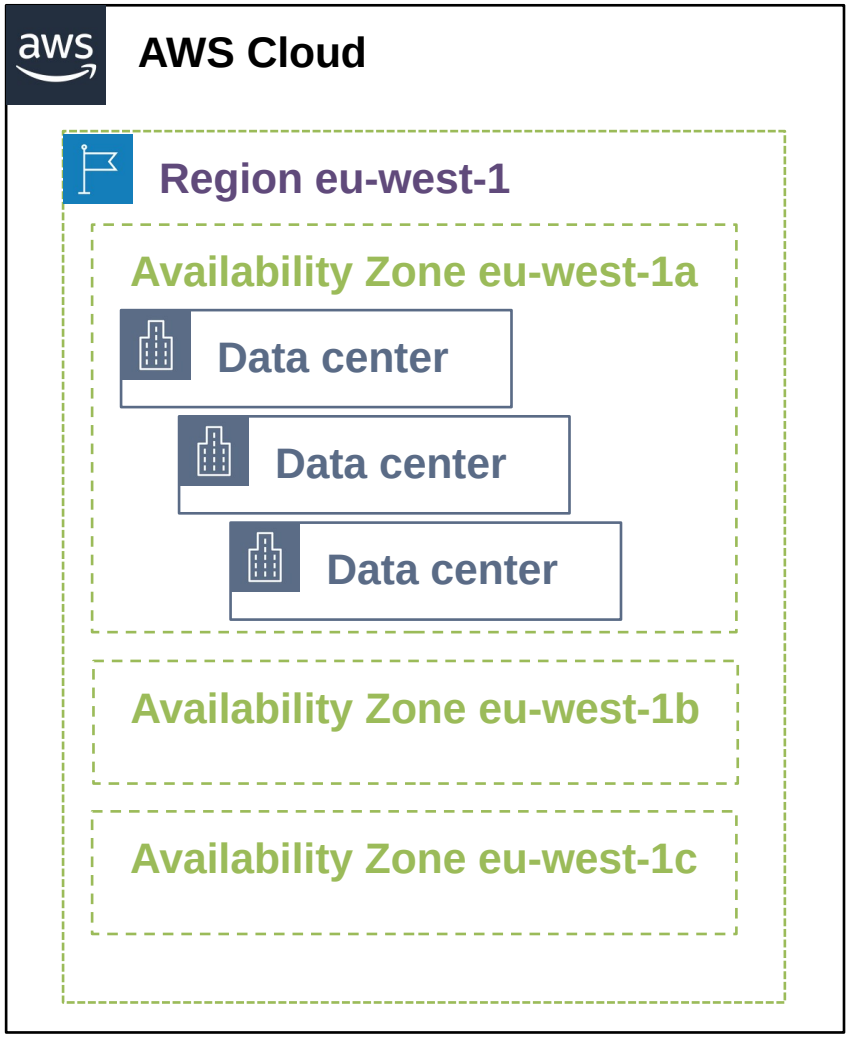
Selecting a Region

- Right Region selection determined by
  - services
  - applications,
  - and data
- Based on these factors
  - compliance requirements
  - reduced latency.



Availability Zones

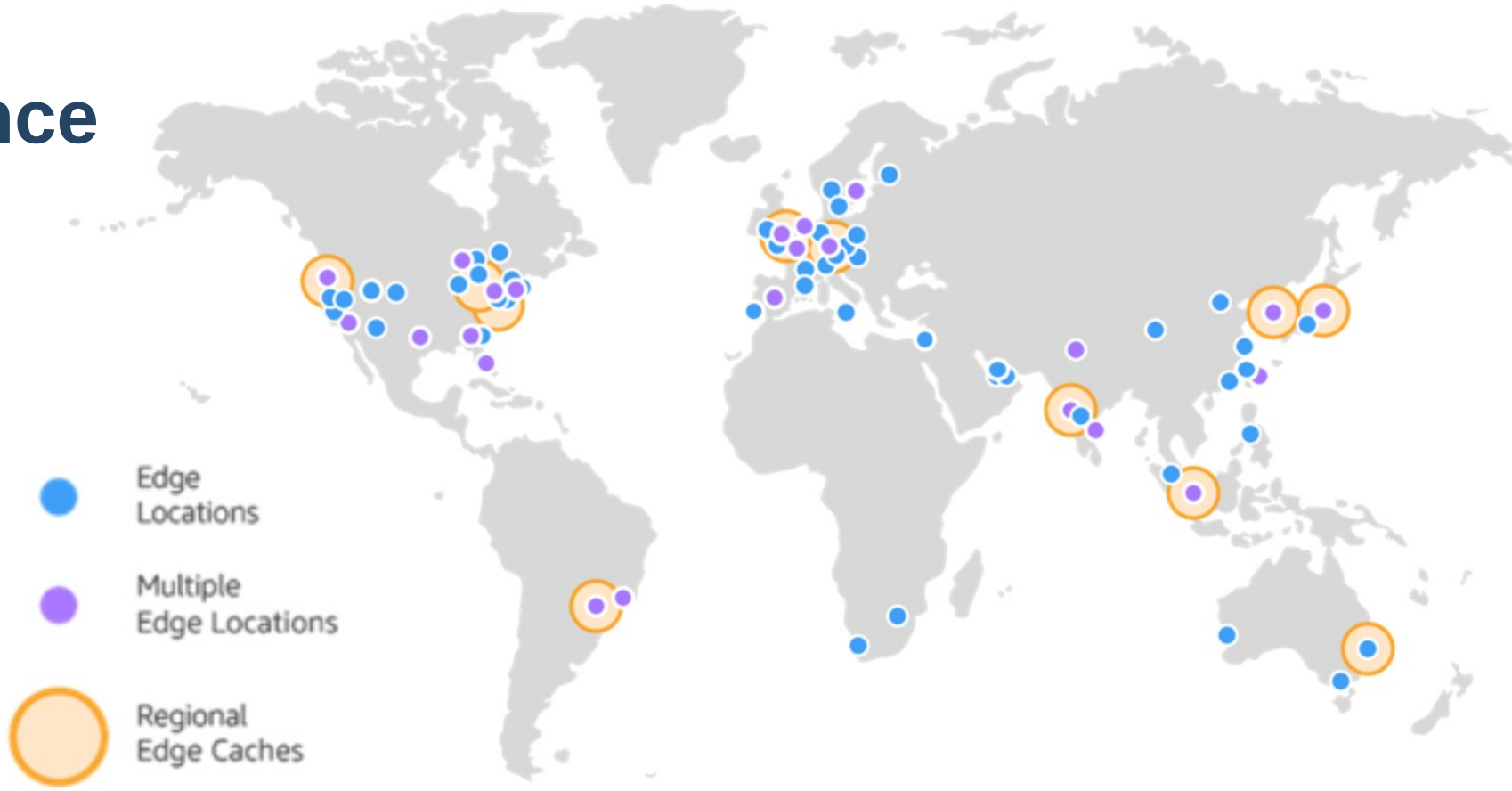
- Each Region => separated to multiple Availability Zones
- Each Availability Zone => fully isolated partition of the AWS infrastructure.
  - There are currently 69 Availability Zones worldwide
  - Availability Zones consist of discrete data centers
  - They are designed for fault isolation
  - They are interconnected with other Availability Zones by using high-speed private networking
  - You choose your Availability Zones.
  - AWS recommends replicating data and resources across Availability Zones for resiliency.



AWS data centers

- Data center
  - Typically from 50,000 to 80,000 physical servers
  - Redundant power, networking, and connectivity,
  - Housed in a separate facility
- Data centers are where the data resides and data processing occurs.
- **=> Designed for security!**

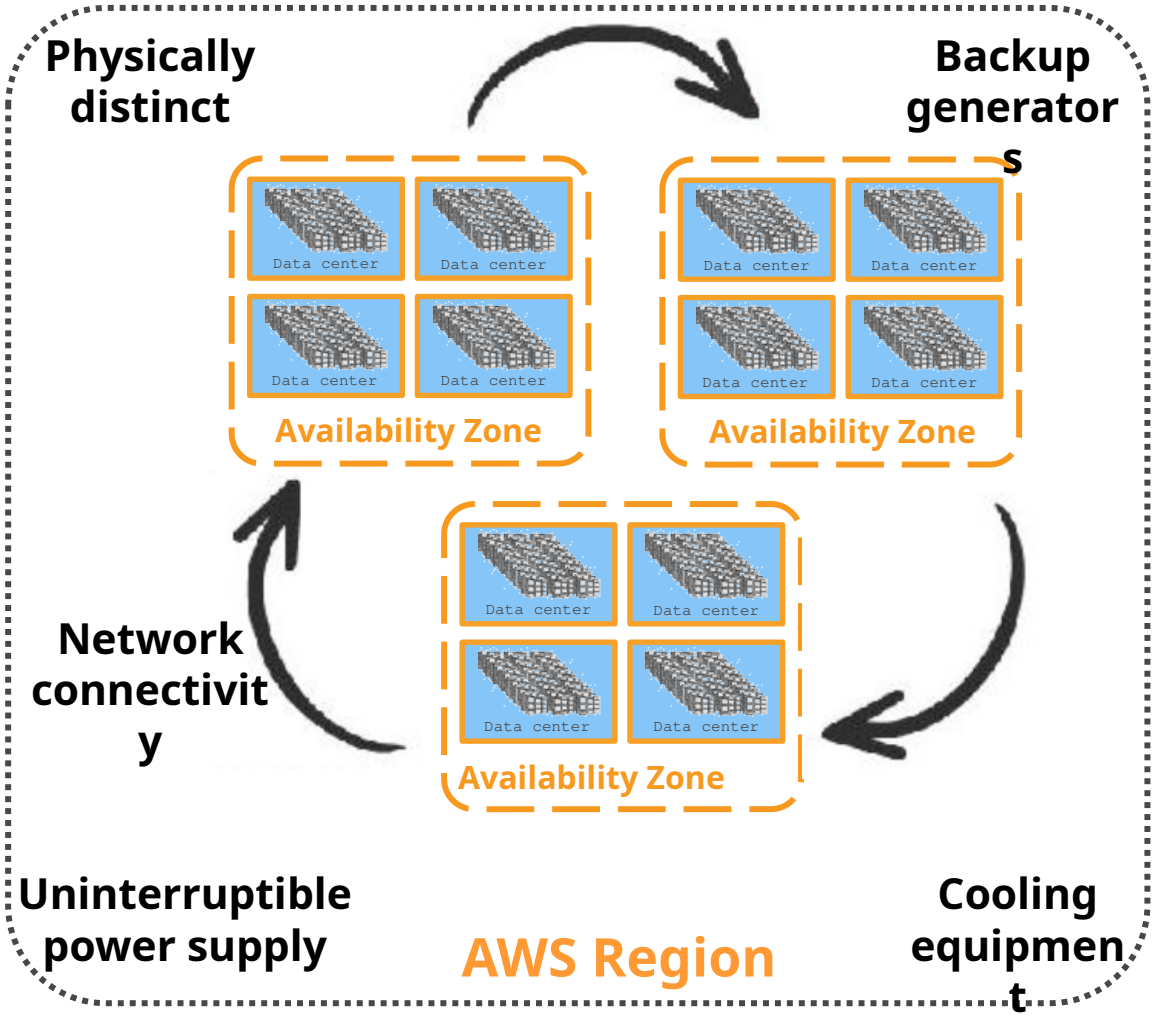
Points of Presence



- AWS => provides a global network of 187 Points of Presence locations
- Consists of 176 edge locations and 11 Regional edge caches
  - Design improves performance by caching content closer to users
- Used with Amazon CloudFront
  - A global Content Delivery Network (CDN), that delivers content to end users with reduced latency
- Regional edge caches used for content with infrequent access.

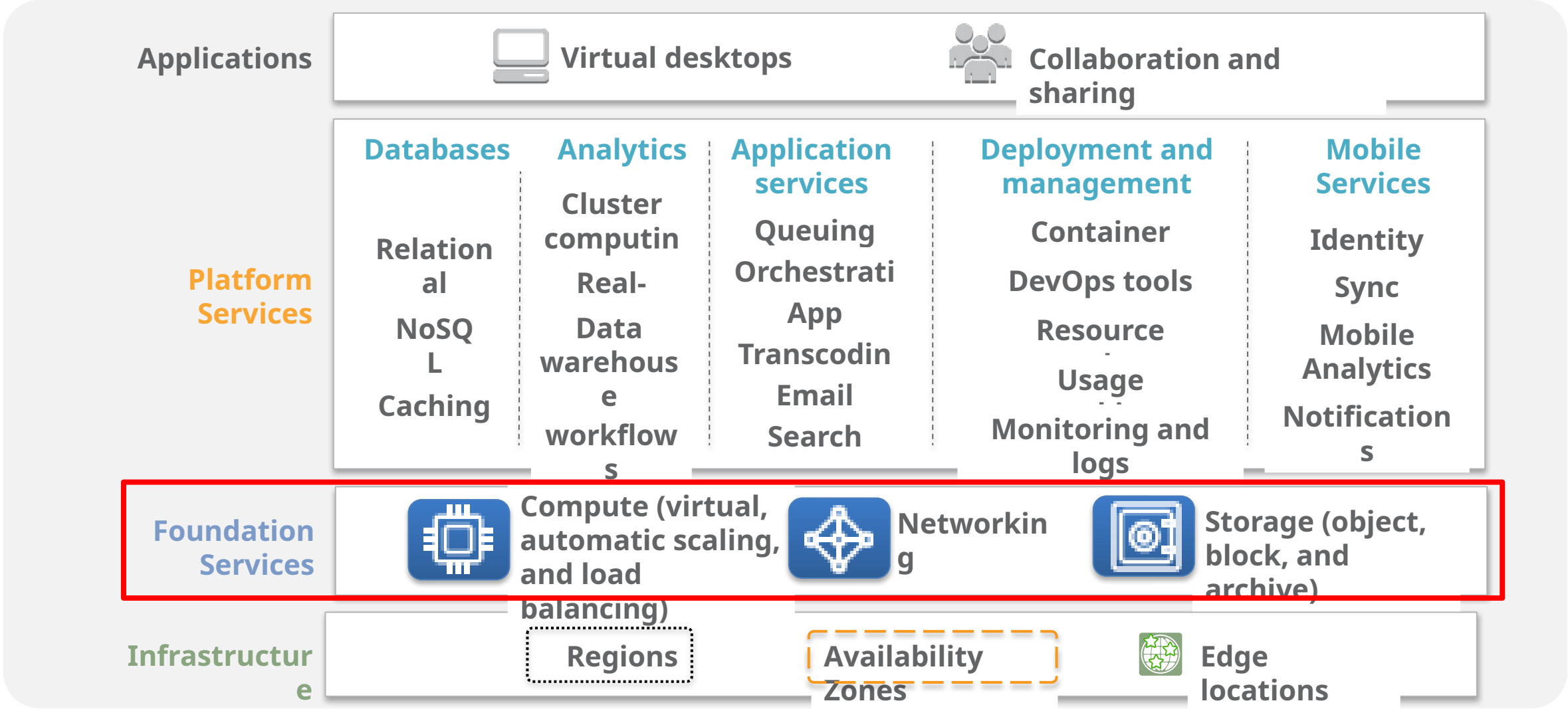
AWS infrastructure features

- Elasticity and scalability
  - Elastic infrastructure; dynamic adaption of capacity
  - Scalable infrastructure; adapts to accommodate growth
- Fault-tolerance
  - Continues operating properly in the presence of a failure
  - Built-in redundancy of components
- High availability
  - High level of operational performance
  - Minimized downtime
  - No human intervention



AWS services and service category overview

AWS foundational services



AWS categories of services

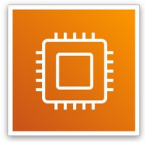

Analytics


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

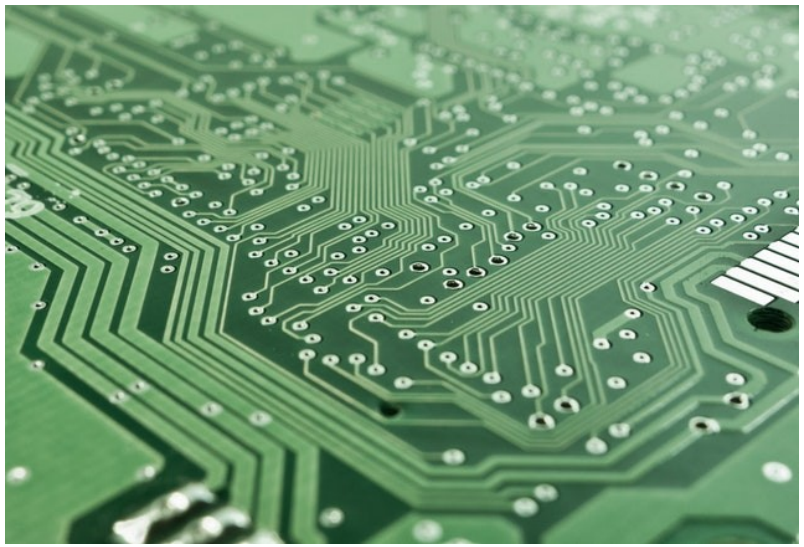

Storage

Storage service category

AWS storage services:

- Amazon Simple Storage Service (Amazon S3)
- Amazon Elastic Block Store (Amazon EBS)
- Amazon Elastic File System (Amazon EFS)
- Amazon Simple Storage Service Glacier

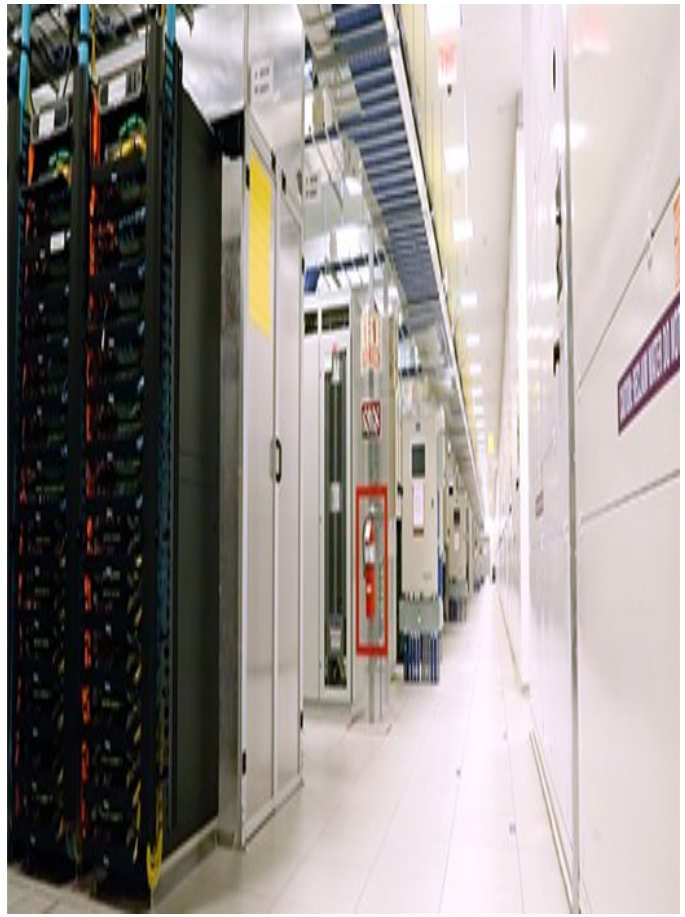
Compute service category



AWS Compute services:

- Amazon EC2
- Amazon EC2 Auto Scaling
- Amazon Elastic Container Service (Amazon ECS)
- Amazon EC2 Container Registry
- AWS Elastic Beanstalk
- AWS Lambda
- Amazon Elastic Kubernetes Service (Amazon EKS)
- AWS Fargate

Database service category



AWS Database services:

- Amazon Relational Database Service
- Amazon Aurora
- Amazon Redshift
- Amazon DynamoDB

Networking and content delivery service category

AWS networking and content delivery services

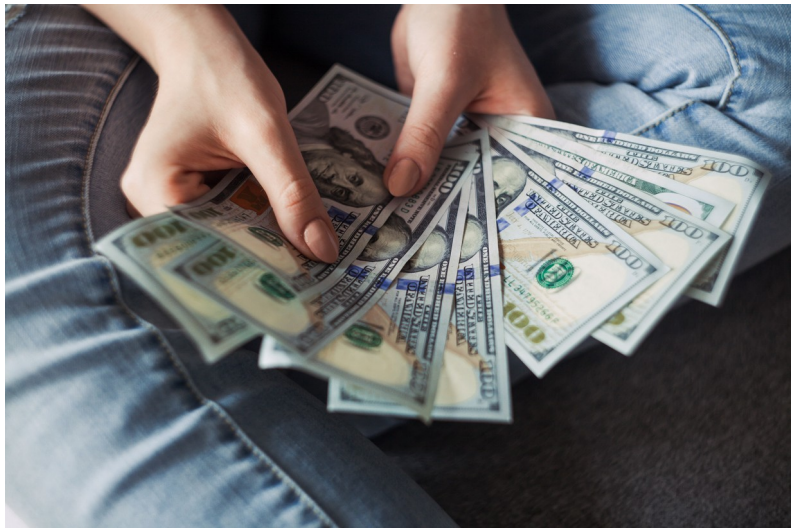
- Amazon VPC
- Elastic Load Balancing
- Amazon CloudFront
- AWS Transit Gateway
- Amazon Route 53
- AWS Direct Connect
- AWS VPN

Security, identity, and compliance service category

WS security, identity, nd compliance services:

- AWS Identity and Access Management (IAM)
- AWS Organizations
- Amazon Cognito
- AWS Artifact
- AWS Key Management Service
- AWS Shield

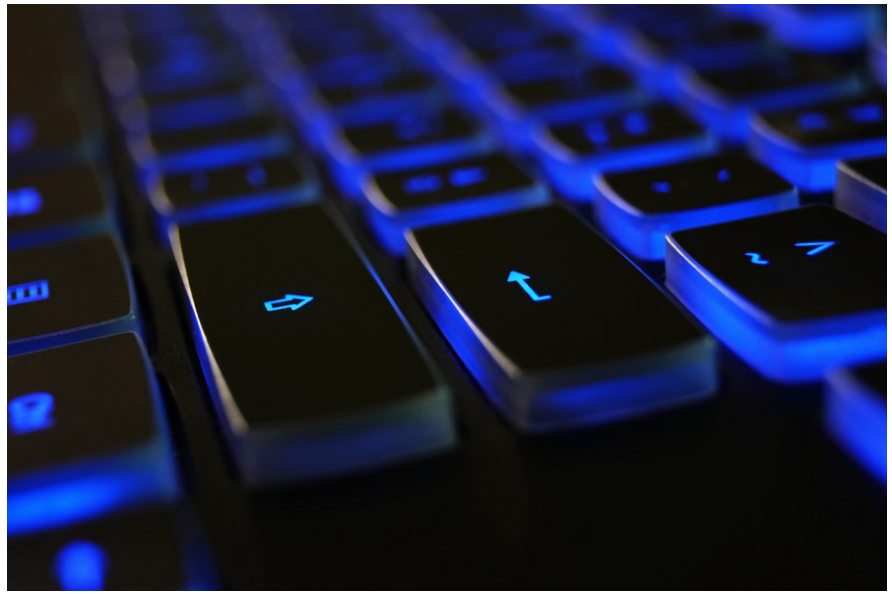
AWS cost management service category



AWS cost management services

- **AWS Cost and Usage Report**
- **AWS Budgets**
- **AWS Cost Explorer**

Management and governance service category



AWS management and governance services

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

Additional resources (Module 3)

- AWS Global Infrastructure
- AWS Global Infrastructure Region Table
- AWS Cloud Products

UNIVERSITY OF ŽILINA
Faculty of Management Science and Informatics

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Thank you for your attention.

The content was chapter from AWS Foundations Modules

- AWS M1 - Cloud Concepts Overview
- AWS M3 - AWS Global Infrastructure Overview

Vytvorené v rámci projektu **KEGA 026TUKE-4/2021**