AWS Academy Cloud Foundations

Module 3: AWS Global Infrastructure Overview

Module overview

Topics

- AWS Global Infrastructure
- AWS service and service category overview

Demo

- AWS Global Infrastructure

Activities

- AWS Management Console clickthrough

Knowledge check

Module objectives

After completing this module, you should be able to:

- Identify the difference between AWS Regions, Availability Zones, and edge locations
- Identify AWS service and service categories

Module 3: AWS Global Infrastructure Overview

Section 1: AWS Global Infrastructure

AWS Global Infrastructure

- The **AWS Global Infrastructure** is designed and built to deliver a **flexible**, **reliable**, **scalable**, and **secure** cloud computing environment with high-quality **global network performance**.
- AWS continually updates its global infrastructure footprint. Visit one of the following web pages for current infrastructure information:
  - AWS Global Infrastructure Map
    Choose a circle on the map to view summary information about the Region represented by the circle.
  - Regions and Availability Zones
    Choose a tab to view a map of the selected geography and a list of Regions, Edge locations, Local zones, and Regional Caches.

Educator-Led Demo: AWS Global Infrastructure Details

AWS Regions

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

Example: London Region

Selecting a Region

Determine the right Region for your services, applications, and data based on these factors

Data governance, legal requirements

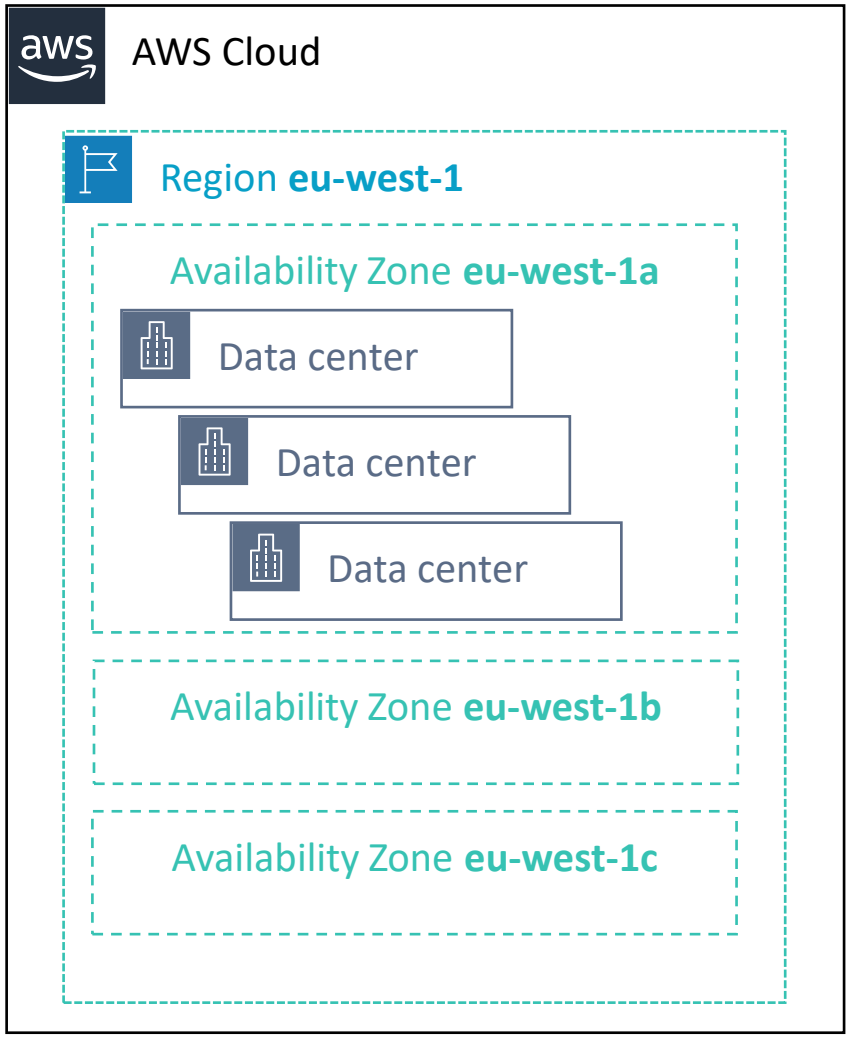
Proximity to customers (latency)

Services available within the Region

Costs (vary by Region)

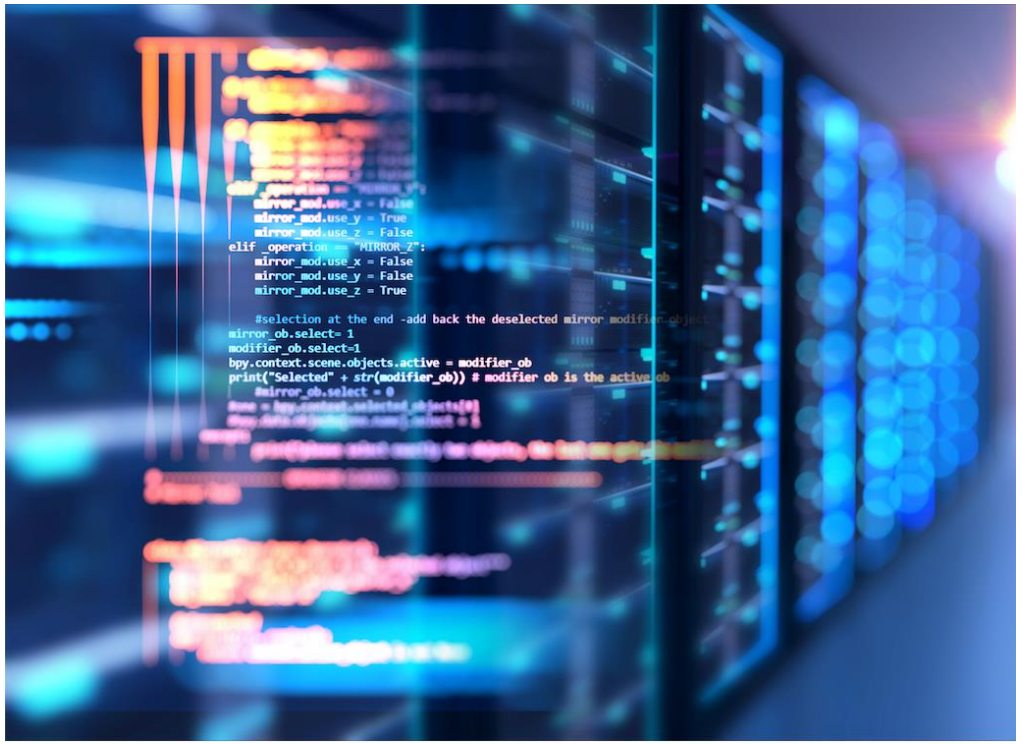
Availability Zones

- Each **Region** has multiple Availability Zones.
- Each **Availability Zone** is a fully isolated partition of the AWS infrastructure.
  - 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.



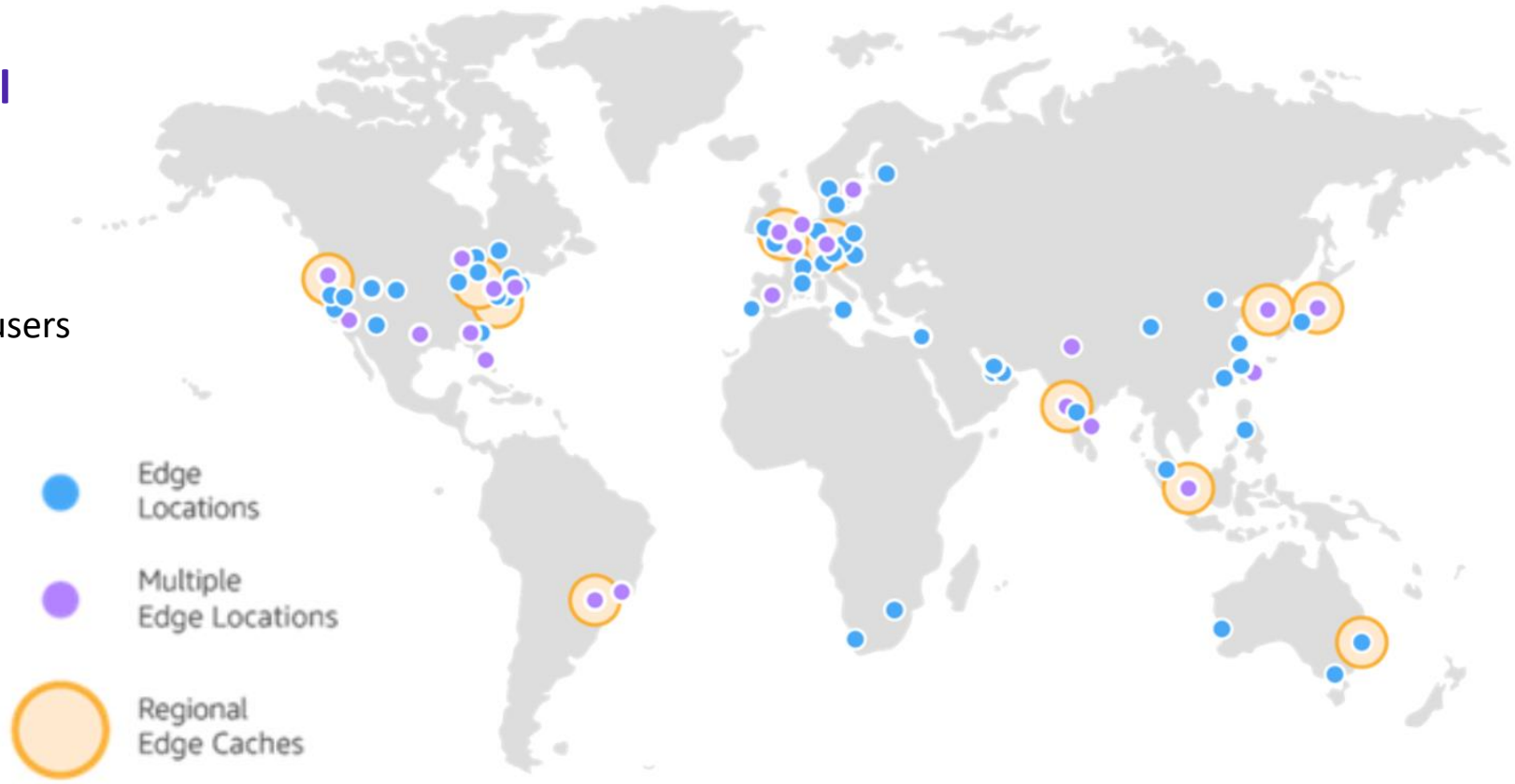
AWS data centers

- AWS data centers are designed for security.
- Data centers are where the data resides and data processing occurs.
- Each data center has redundant power, networking, and connectivity, and is housed in a separate facility.
- A data center typically has 50,000 to 80,000 physical servers.



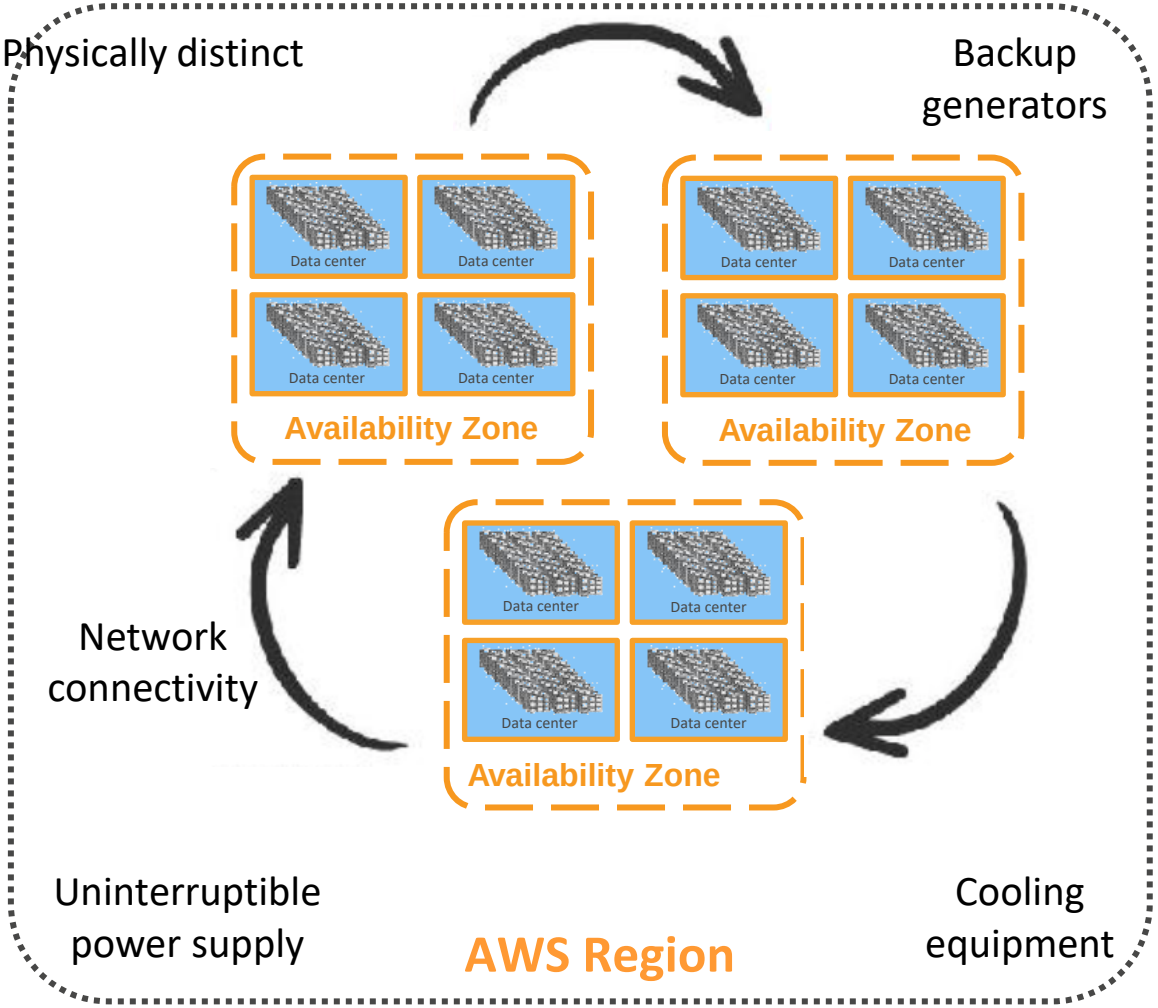
Points of Presence

- AWS provides a global network of Points of Presence locations
- Consists of **edge locations** and a much smaller number of **Regional edge caches**
- 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



Key takeaways

- The **AWS Global Infrastructure** consists of Regions and Availability Zones.
- Your choice of a **Region** is typically based on compliance requirements or to reduce latency.
- Each **Availability Zone** is physically separate from other Availability Zones and has redundant power, networking, and connectivity.
- **Edge locations**, and **Regional edge caches** improve performance by caching content closer to users.

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Section 2: AWS services and service category overview

AWS foundational services

Applications

 Virtual desktops

 Collaboration and sharing

Platform Services

Databases	Analytics	Application services	Deployment and management	Mobile Services
Relational	Cluster computing	Queuing	Containers	Identity
NoSQL	Real-time	Orchestration	DevOps tools	Sync
Caching	Data warehouse	App Streaming	Resource templates	Mobile Analytics
	Data workflows	Transcoding	Usage tracking	Notifications
		Email	Monitoring and logs	
		Search		

Foundation Services

 Compute (virtual, automatic scaling, and load balancing)

 Networking

 Storage (object, block, and archive)

Infrastructure

Regions

Availability Zones

 Edge locations

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

Photo from https://www.pexels.com/photo/black-and-grey-device-159282/

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

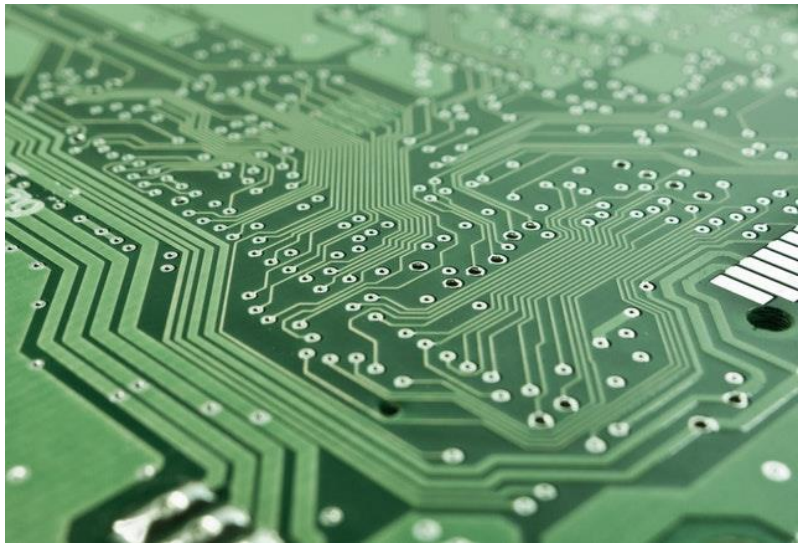

Photo from https://www.pexels.com/photo/technology-computer-lines-board-50711/

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

Photo from https://aws.amazon.com/compliance/data-center/data-centers/

AWS Database services

Amazon Relational Database Service

Amazon Aurora

Amazon Redshift

Amazon DynamoDB

Networking and content delivery service category

Photo by Umberto on Unsplash

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

Photo by Paweł Czerwiński on Unsplash

AWS security, identity, and 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

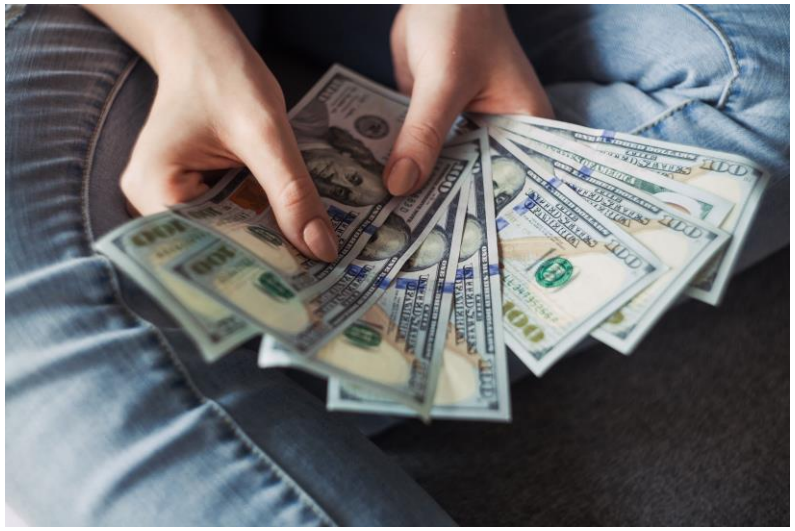

Photo by Alexander Mils on Unsplash

AWS cost management services

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

Management and governance service category

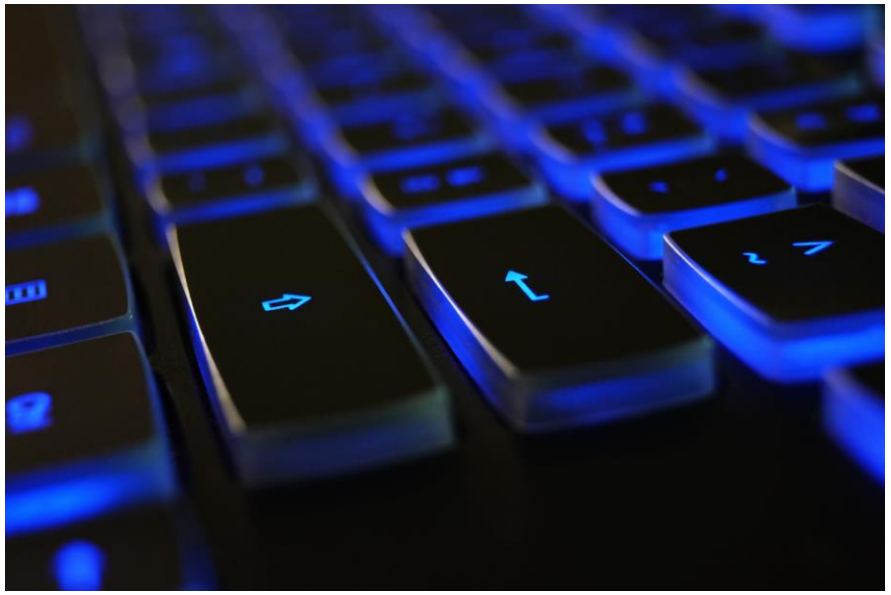

Photo by Marta Branco from Pexels

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

Activity: AWS Management Console clickthrough

Photo by Pixabay from Pexels.

Hands-on activity: AWS Management Console clickthrough

1. Launch the Sandbox hands-on environment and connect to the AWS Management Console**.**
2. Explore the AWS Management Console.
   A. Click the **Services** menu.
   B. Notice how services are grouped into service categories. For example, the **EC2** service appears in the **Compute** service category.

      Question #1: Under which service category does the **IAM** service appear?

      Question #2: Under which service category does the **Amazon VPC** service appear?
   C. Click the **Amazon VPC** service. Notice that the dropdown menu in the top-right corner displays an AWS Region (for example, it might display *N. Virginia*).
   D. Click the Region menu and switch to a different Region. For example, choose **EU (London)**.
   E. Click **Subnets** (on the left side of the screen). The Region has three subnets in it. Click the box next to one of the subnets. Notice that the bottom half of the screen now displays details about this subnet.

      Question #3: Does the subnet you selected exist at the level of the Region or at the level of the Availability Zone?
   F. Click **Your VPCs**. An existing VPC is already selected.

      Question #4: Does the VPC exist at the level of the Region or the level of the Availability Zone?

      Question #5: Which services are global instead of Regional? Check Amazon EC2, IAM, Lambda, and Route 53.

Activity answer key

- Question #1: Under which service category does the **IAM** service appear?
  - **Answer**: **Security, Identity, & Compliance**.
- Question #2: Under which service category does the **Amazon VPC** service appear?
  - **Answer**: **Networking & Content Delivery**
- Question #3: Does the subnet that you selected exist at the level of the Region or the level of the Availability Zone?
  - **Answer**: Subnets exist at the **level of the Availability Zone.**
- Question #4: Does the VPC exist at the level of the Region or the level of the Availability Zone?
  - **Answer**: VPCs exist at the **Region level.**
- Question #5: Which of the following services are global instead of Regional? Check Amazon EC2, IAM, Lambda, and Route 53.
  - **Answer: IAM and Route 53 are global**. Amazon EC2 and Lambda are Regional.

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Module wrap-up

Module summary

In summary, in this module you learned how to:

- Identify the difference between AWS Regions, Availability Zones, and edge locations
- Identify AWS service and service categories

Complete the knowledge check

Sample exam question

Which component of AWS global infrastructure does Amazon CloudFront use to ensure low-latency delivery?

A. AWS Regions
B. AWS edge locations
C. AWS Availability Zones
D. Amazon Virtual Private Cloud (Amazon VPC)

Additional resources

- AWS Global Infrastructure
- AWS Regional Services List
- AWS Cloud Products

Thank you

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