AWS Certified Solutions Architect - Associate

Week 1 Content Review

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Week 1 Training Summary

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Week 1 Digital Training Curriculum

Core Trainings

Course
AWS Partner: Accreditation
Introduction to AWS Organizations
AWS Technical Essentials
Getting started with AWS Storage

Optional Hands-On

AWS Builder Labs

Lab
Launching Amazon EC2 Instances

Program Landing page – Bookmark this!

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About the Exam

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AWS Certified Solutions Architect - Associate

About the Exam

- 130 minutes
- 65 Questions
  - Scored 100 to 1000 (720+ pass)
- $150/voucher
- Multiple Response & Individual response questions
- In-Person & Remote proctoring available

AWS Certified Solutions Architect - Associate

Key Exam Topics

Domains Covered:	% of Exam
Domain 1: Design Secure Architectures	30%
Domain 2: Design Resilient Architectures	26%
Domain 3: Design High-Performing Architectures	24%
Domain 4: Design Cost-Optimized Architectures	20%
Total:	**100%**

AWS Certified Solutions Architect - Associate

Helpful Resources

Training

- AWS Partner Accreditation: Technical
- AWS Solutions Architect – Accelerator Learning plan

White Papers

- Overview of Amazon Web Services
- AWS Well-Architected Framework
- Management and Governance Lens
- AWS Global Infrastructure
- Shared Responsibility Model
- How AWS Pricing Works
- AWS Architecture Center
- Secure Content Delivery with Amazon CloudFront
- IPv6 on AWS
- Overview of Deployment options on AWS
- Organizing your AWS Environment using multiple accounts

Exam Preparation

- Twitch Power Hours
- Sample Questions
- Schedule an Exam

Looking for more ***Practice Exams***?

*Check out our **Skill Builder Subscription** (information on the next slide)*

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OPTIONAL AWS Skill Builder Subscription

The Skill Builder subscription provides access to official AWS Certification practice exams, self-paced digital training content including open-ended challenges, self-paced labs, and game-based learning.
Please note, the Skill Builder subscription is not required for this Accelerator program.

Free digital training

LINK HERE

Special features include:

- 500+ digital courses
- Learning plans
- 10 Practice Question Sets
- *AWS Cloud Quest*

Individual subscription

LINK HERE

Everything in free digital training, plus:

- AWS Cloud Quest (3 additional roles)
- AWS Certification Official Practice Exams
- Exam prep courses
- 100+ AWS Builder Labs
- AWS Jam Journey (lab-based challenges)

Individual subscriptions are priced at $29 USD per month (*Flexibility to cancel anytime*) or $299 USD per year.

Access ***65*** Solutions Architect - Associate Practice Exam Questions with feedback on your answer choices

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Get AWS Certified: Associate Challenge

WHO is the challenge for?

Individuals who want to earn one of the three AWS Associate Certifications:

WHEN is the challenge?

June 6 – September 29, 2023

The last day to join and receive the 50% discount voucher is September 29, 2023.

Complete the exam by October 31, 2023 to leverage the voucher.

WHERE do I get started?

Sign up for the Get AWS Certified: Associate Challenge today!

*Terms and conditions apply. A 50% discount exam voucher is available for participants who want to earn an AWS Certified Associate - level Certification

[1] Enterprise Strategy Group, AWS Training and Certification Help Learners Thrive in an Increasingly Cloud-first World, 2022

Week 1 Homework Assignment

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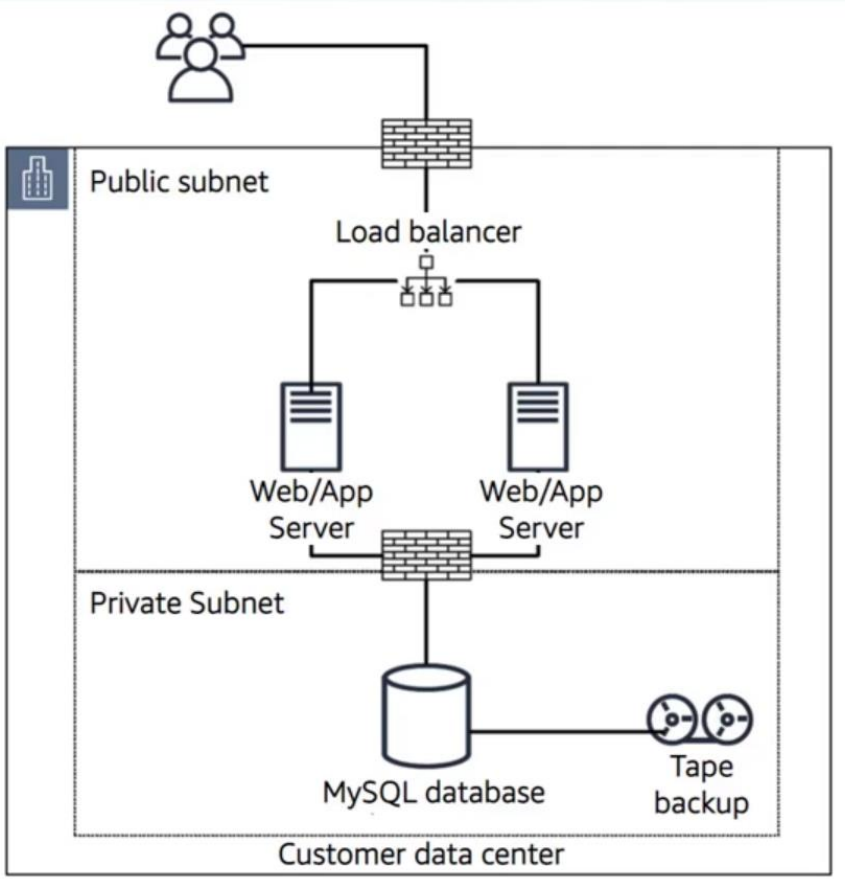
Week 1 Homework – AnyCompany's New Requirements

Solution Requirements:

1. **Keep Application on-prem**
2. **Cloud Based solution for Tape Backup**

<u>Your Task:</u>

Propose a cloud-based solution for tape backup, including long-term archival. Optimize for minimal rework of existing application infrastructure.

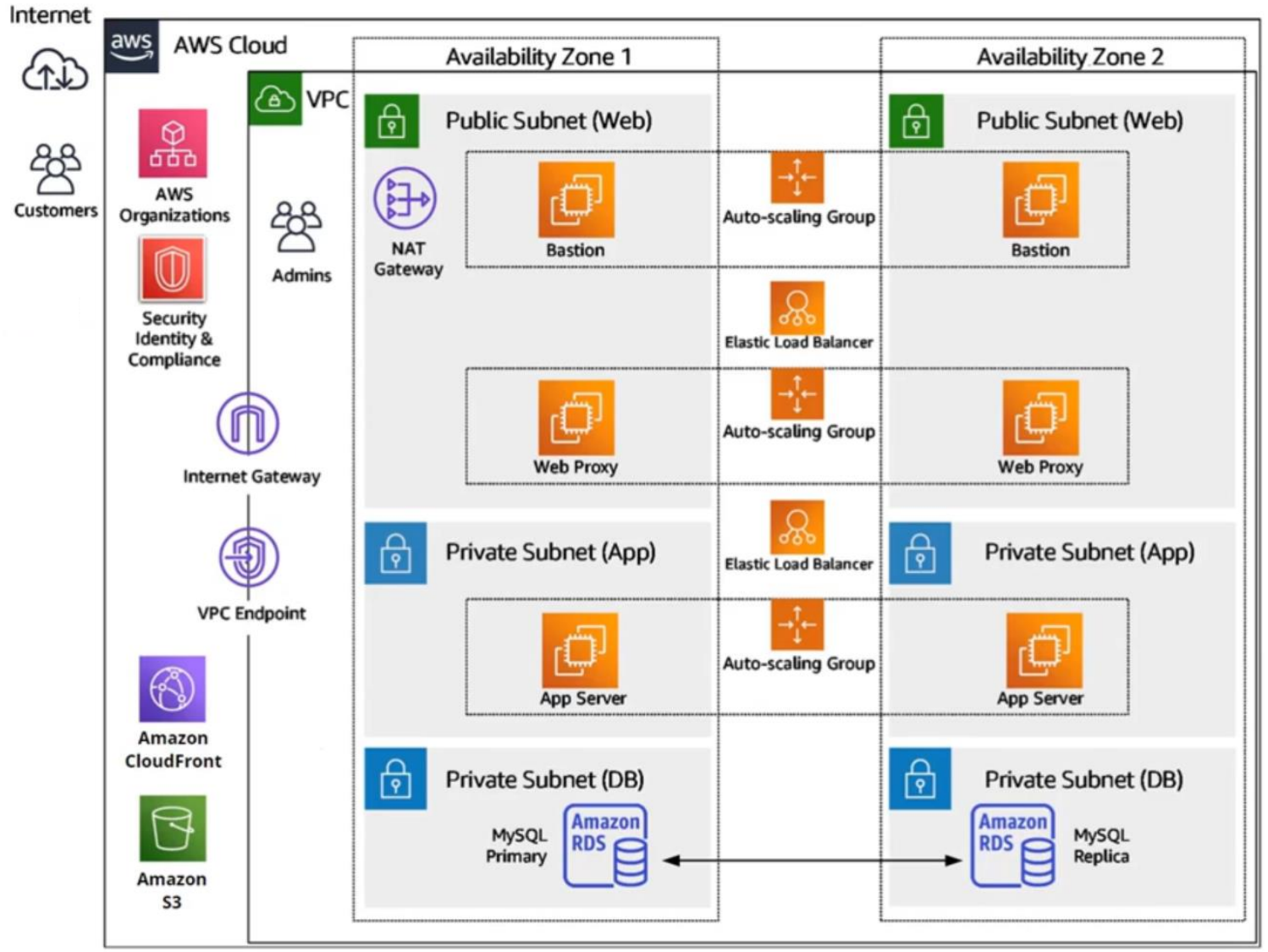


Week 1 Homework – Bonus Points!

Your Task:

How would you propose to monitor the Web / App / DB tier of the solution proposed in the training?

How will you provide access logs for auditing and security purposes to the AWS services used?



Week 1 Homework – Show and Tell!

Share us your architecture, answers, and explanation on LinkedIn!

#AWSpartners

#AWSaccelerator

Tag us so we don't miss it!

Kevin, Sam, Brady

Please do not share confidential or proprietary information on social media.

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AWS Global Infrastructure

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AWS Regions

A Region location around the world where AWS clusters data centers

What's in a Region?

Each AWS Region consists of multiple, isolated, and physically separate Availability Zones (AZ's)

Why are they important?

AWS Regions are totally isolated from each other, creating the greatest possible fault tolerance and stability.

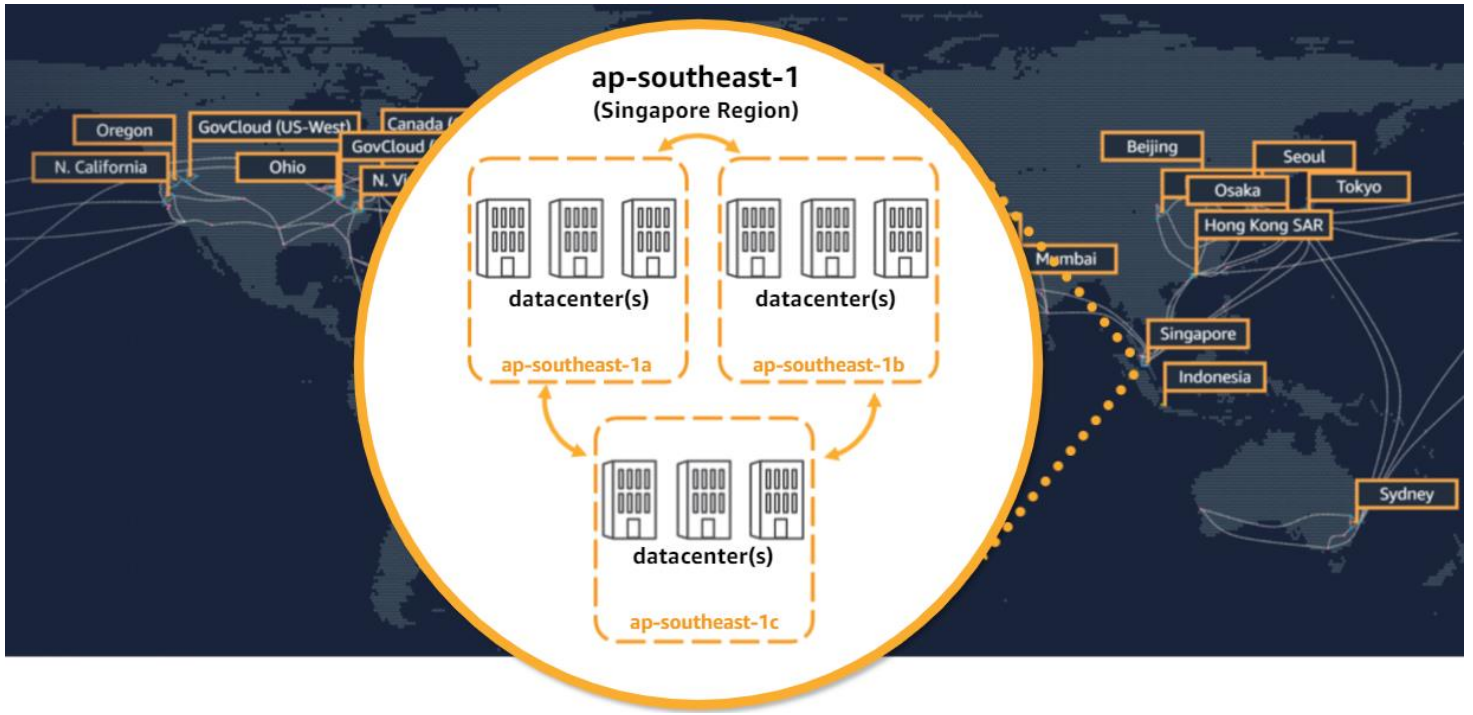
AWS Availability Zones (AZs)

One or more discrete data centers with redundant power, networking, and connectivity located within an AWS Region

Why are they important?

AZs give customers the ability to operate production applications and databases that are more highly available, fault tolerant, and scalable than would be possible from a single data center.

AZs are connected to each other with fast, private, and secure fiber-optic networking, enabling you to easily architect applications that automatically fail-over between AZs without interruption.



Points of Presence (PoP)

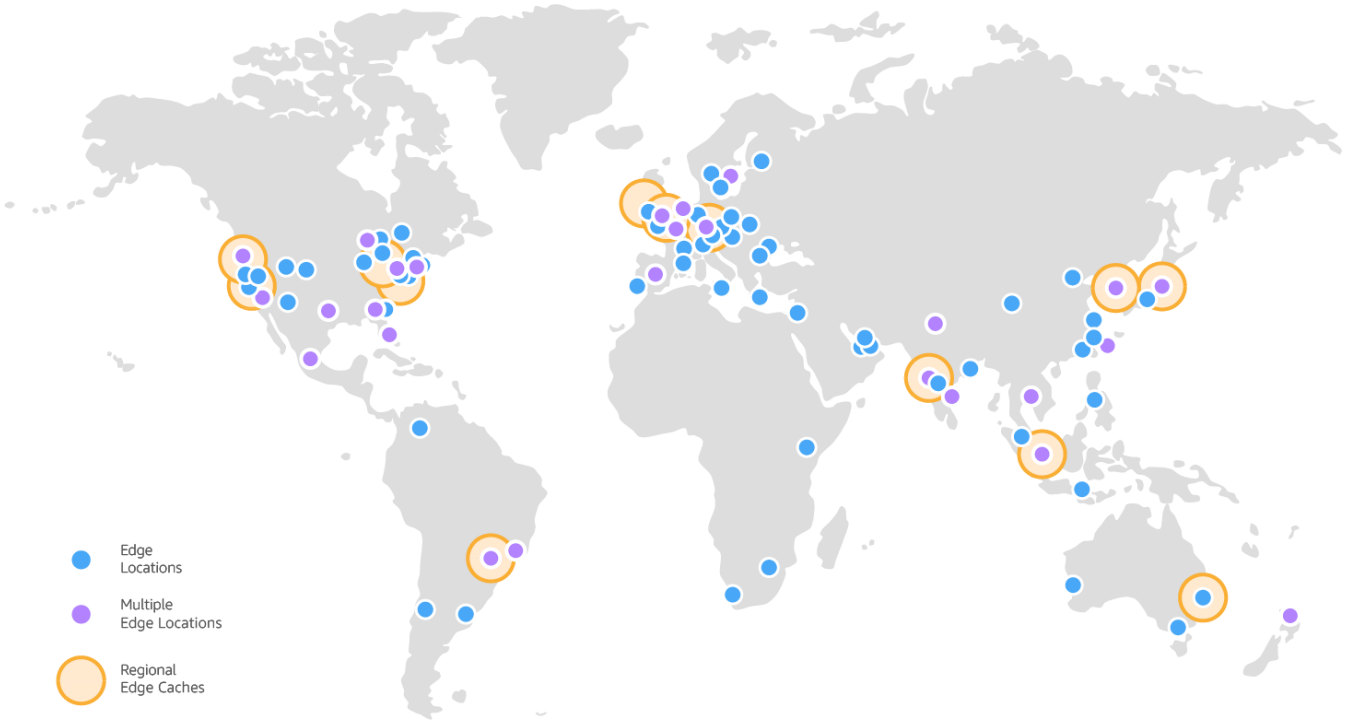
400+ edge locations and 13 regional edge caches

What are they?

Smaller endpoints used for hosting cached, frequently accessed, data.

Why are they important?

Points of Presence enable Amazon CloudFront to securely deliver data, videos, applications, and APIs to customers globally with low latency and high transfer speeds, all within the security of the AWS network and a developer-friendly environment.



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Amazon CloudFront

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Amazon CloudFront

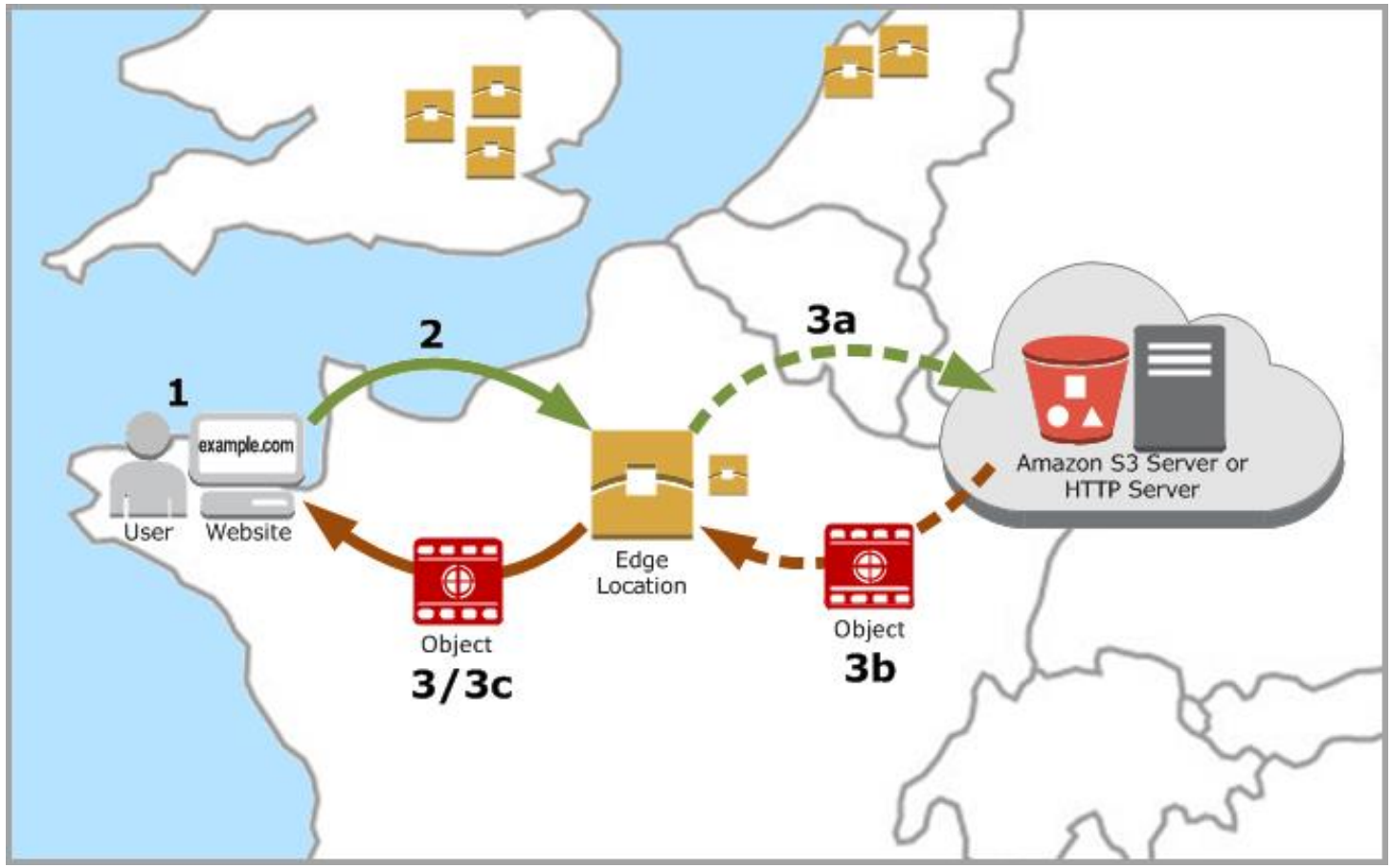
Low latency, high transfer speed global CDN service

Summary

Web service speeding up distribution of static and dynamic web content to end users. Routes content requests to edge location with lowest latency to optimize performance.

Use Cases

- Deliver fast, secure websites
- Accelerate dynamic content delivery and APIs
- Stream live and on-demand video
- Distribute patches and updates



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Amazon CloudFront & Regional Edge Caches

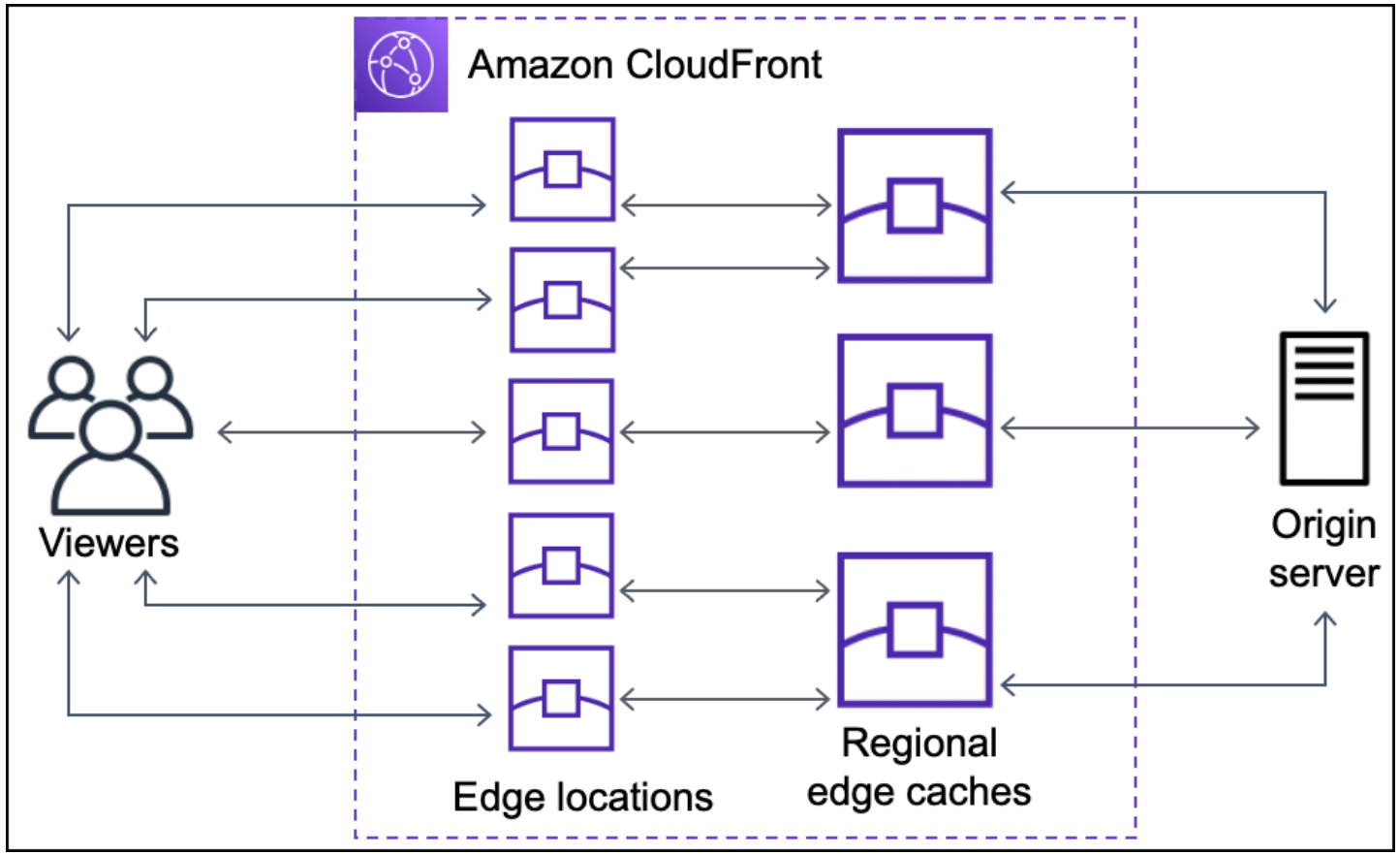
Regional caches for less popular content

Summary

Content not popular enough to store in a POPs will be stored in a regional edge cache to get more content closer to users. Useful for content with an over-time decay in popularity.

How it Works

CloudFront locations between origin server and POPs, with a larger cache than individual POPs. Serves as intermediary hop for content. Requests go from viewer, to edge location, to regional edge caches, checking for content availability at each site before requesting directly from origin server.



Loosely Coupled Architecture

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Monolithic Applications

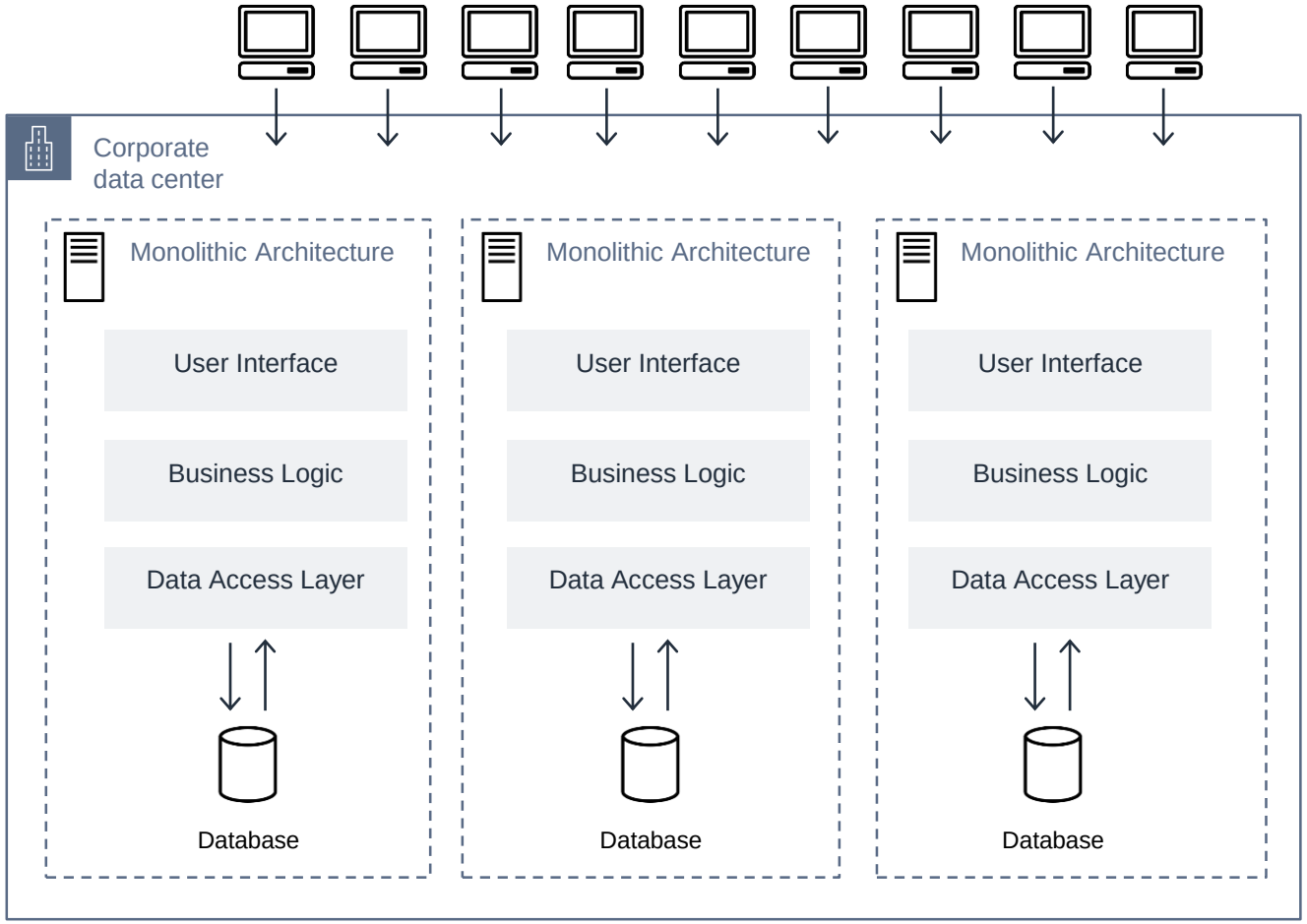
Single, unified application with all components tightly coupled, working from a shared database

Challenges

Resource management – Massive application requiring resources across memory, storage, and network bandwidth.

Inefficient Scaling - monoliths up or out requires scaling of the entire application, even if single module needs the resources

Complexity – Tightly coupled modules grow increasingly complex over time. Maintenance and updates are exceedingly resource intensive, with large impacts to business agility.



Microservice Applications

Break apart a monolith to build more scalable, fault tolerant applications

Use individual components and services, loosely coupled, which operate independently

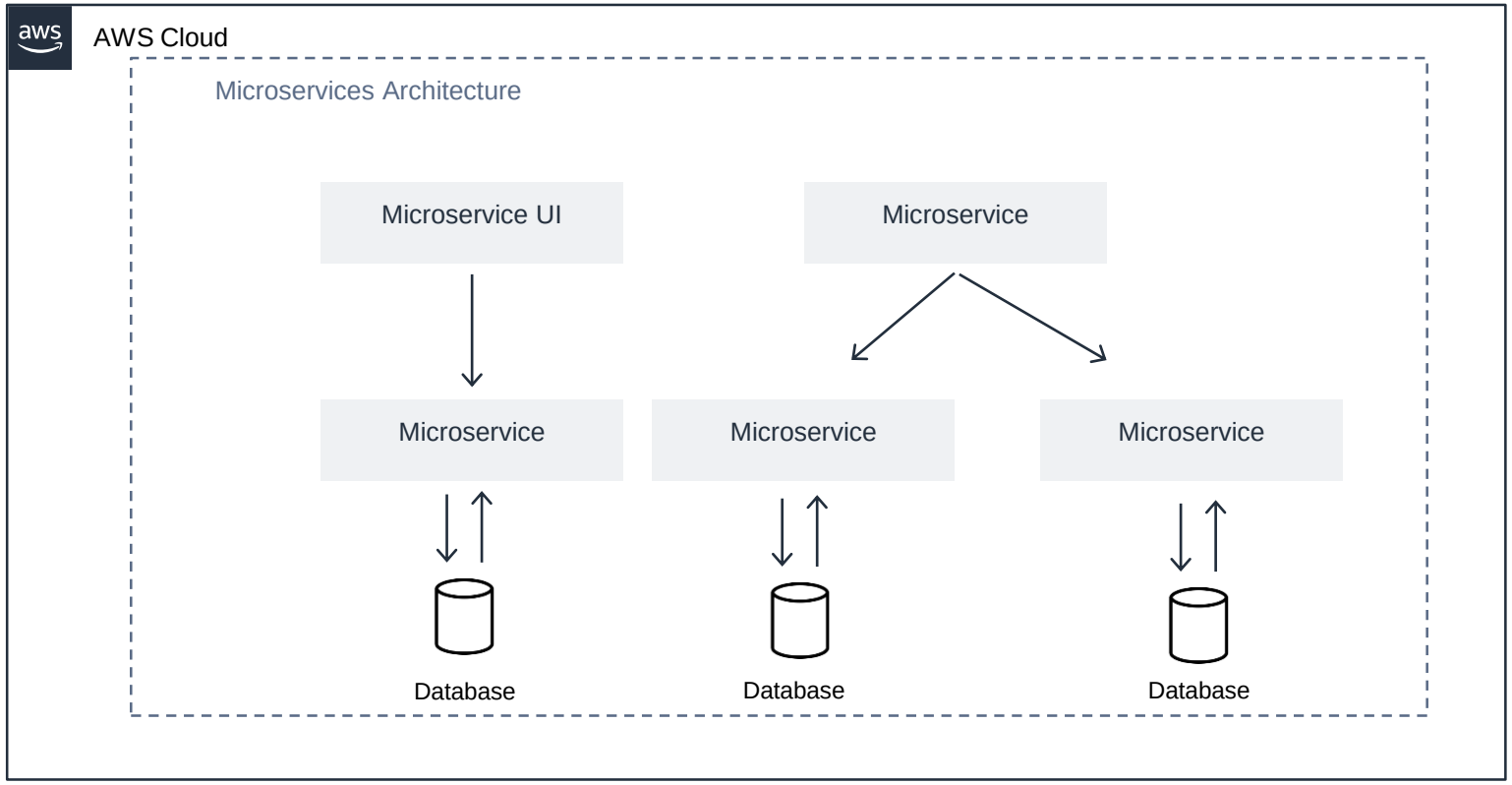
Summary

Decompose monoliths or architect loose coupling from the beginning.

Outcomes

Rapid adjustments to fluctuating business demand but without interrupting core activities, such as high scalability, improved resiliency, continuous delivery, and failure isolation.

Faster innovation because each microservice can be individually tested and deployed.



Event-Driven Architecture

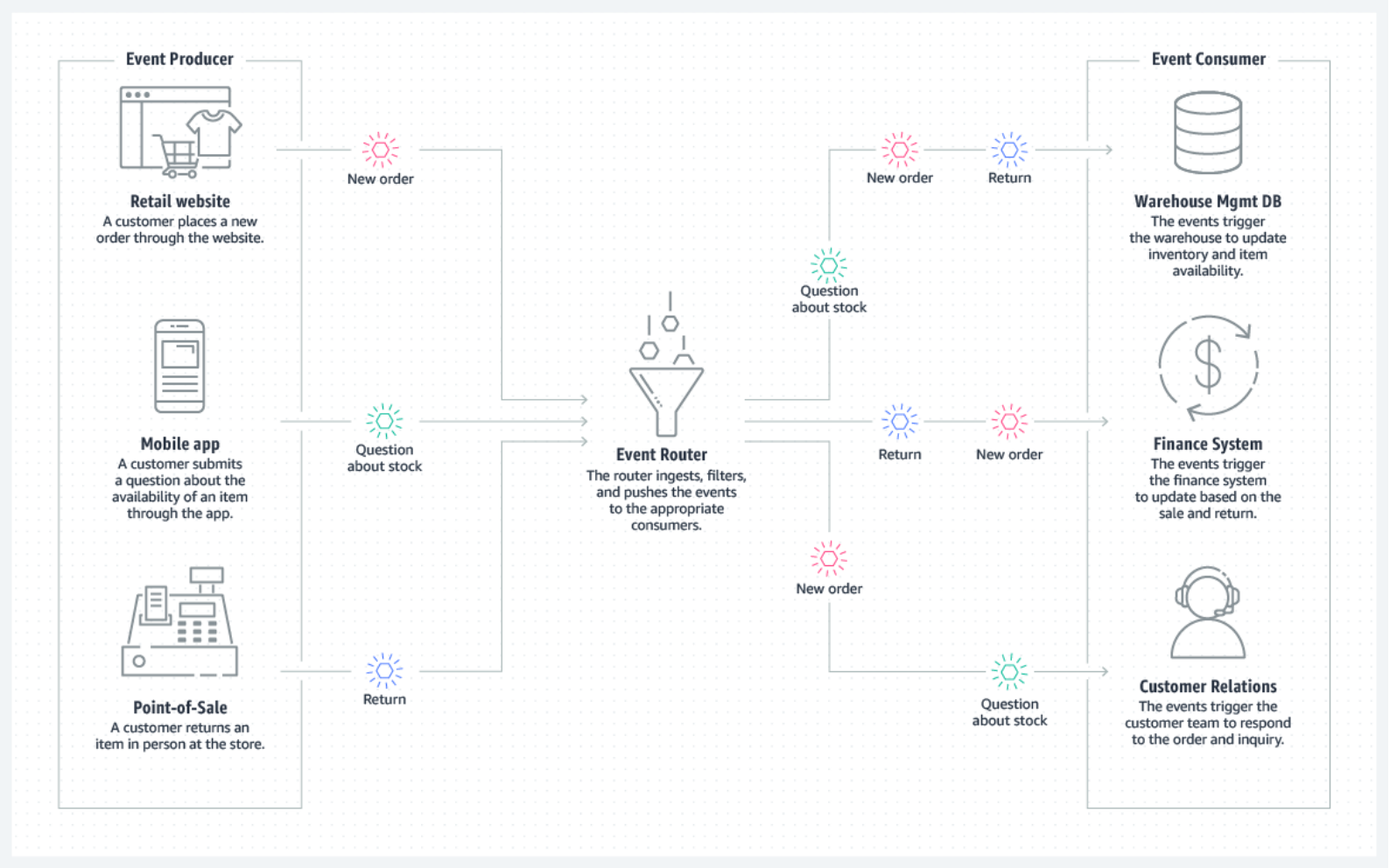
Decoupled systems that run in response to events

How it Works

Uses events to trigger and communicate between decoupled services and is common in modern applications built with microservices. Event-driven architectures have three key components: event producers, event routers, and event consumers.

Benefits

- Scale and fail independently
- Audit with ease
- Develop with agility
- Cut costs



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Identity and Access Management

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What is IAM?

Policies and Technologies used to ensure the appropriate access to technology resources

Overview

AWS IAM provides fine-grained access control across all of AWS. With IAM, you can specify who can access which services and resources, under which conditions.

IAM Policies

IAM Policies allow you to manage permissions for your workforce and systems to ensure least-privileged access.

What is Least – Privileged?

A core component in AWS Security Best Practices AND in understanding Access

Overview

The principle of Least-Privileged is that a user/resource should be granted the least amount of permissions or privileges needed to complete their job role.

If a user does not need an access right, they should not have that access right.

Exam Questions

The exam will sometimes ask you to evaluate permissions / policy documents in response to providing access to a user. These questions assume that you understand least-privileged.

IAM Users and Groups

The building blocks of AWS Identity and Access Management

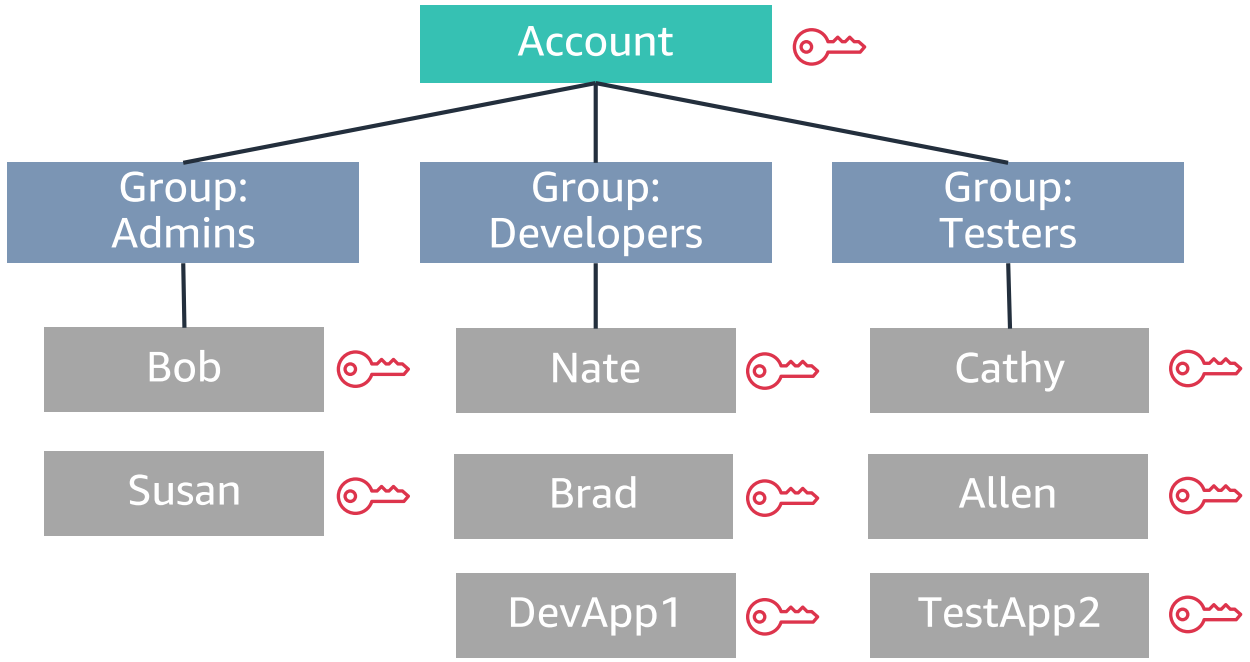
IAM Users

An IAM User is an entity that is created in AWS to represent the person, or application, that uses it to interact with AWS.

IAM Groups

An IAM Group is a collection of IAM users. User groups let you specify permissions for multiple users, which can make it easier to manage the permissions for those users.

Ex: You could have a user group called Admins and give that user group typical administrator permissions.



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AWS Organizations (1 of 2)

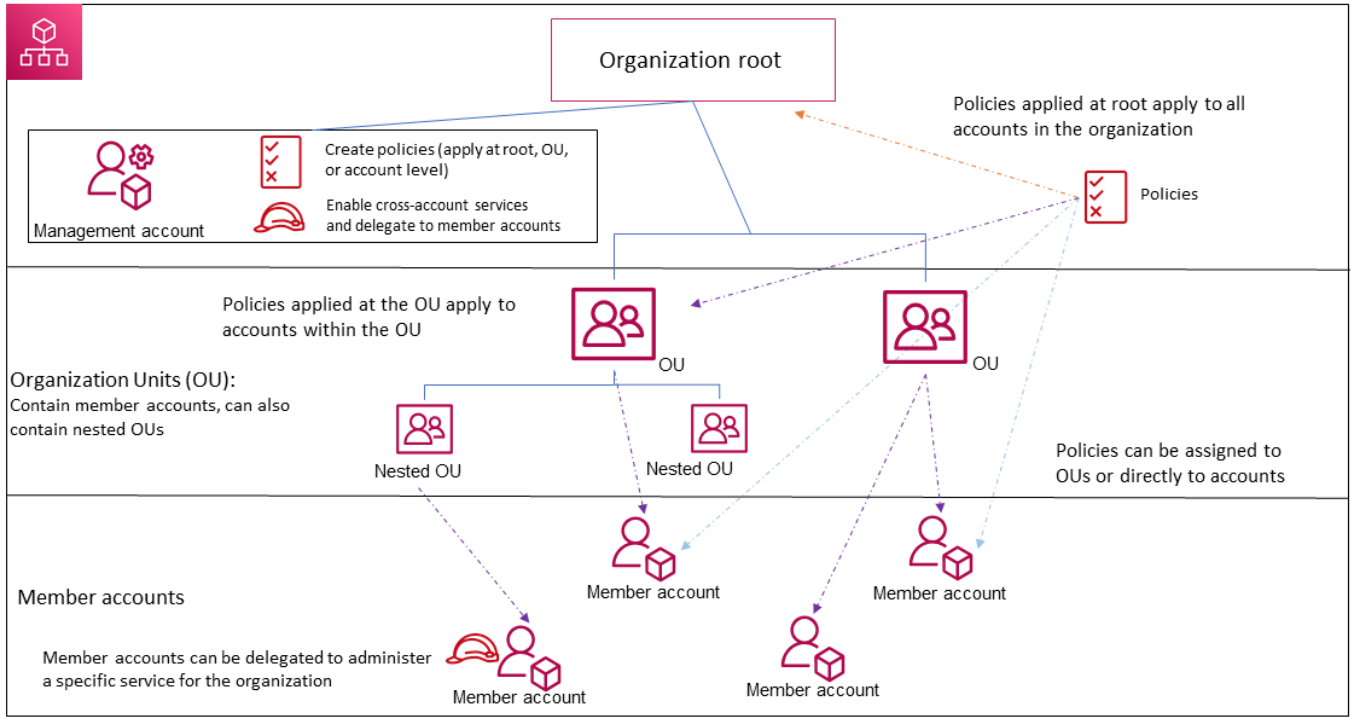
An account management service that enables account consolidation and organization

Purpose

A way to consolidate accounts, assign permissions to OUs, and automate the onboarding of new team members based on job function.

Components

- **Organizations –** an entity created to consolidate your AWS accounts.
- **Root –** Parent container for all the accounts for your organization
- **Organizational Unit (OU) –** A container for accounts within a root. An OU can also contain other OUs



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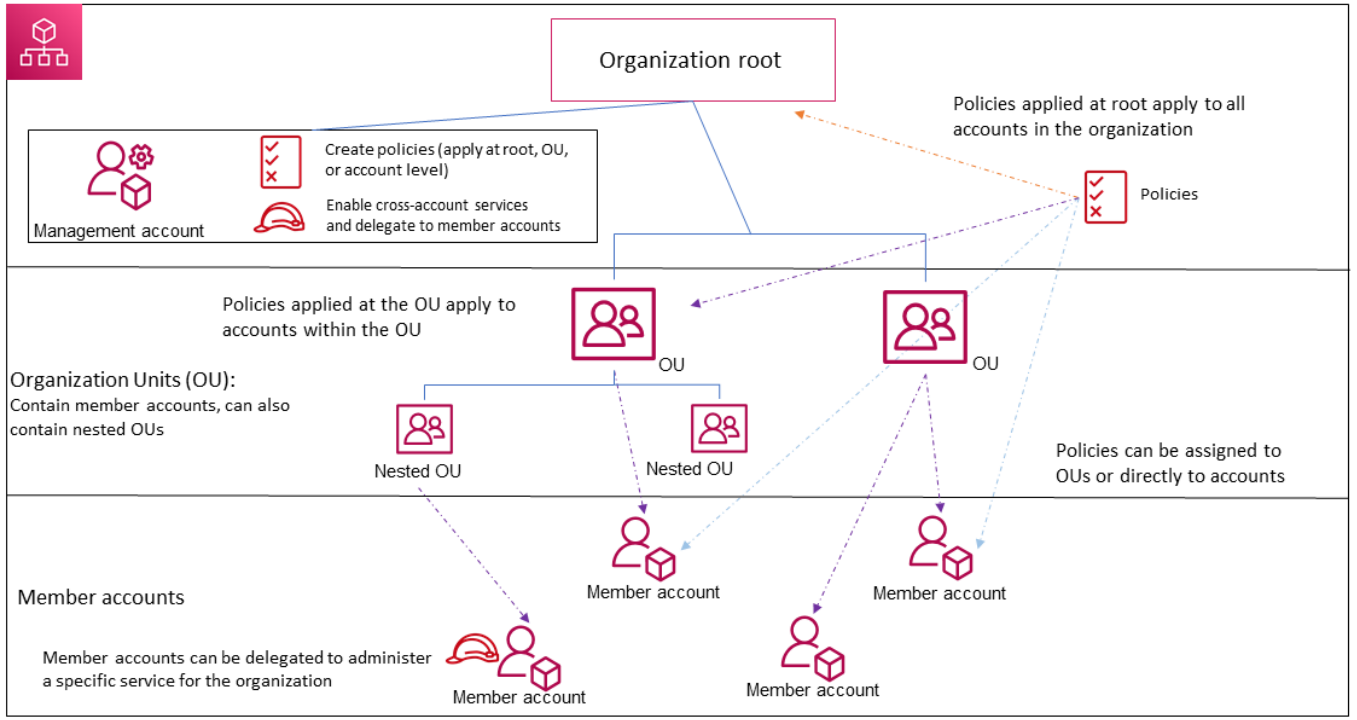
AWS Organizations (cont. 2/2)

An account management service that enables account consolidation and organization

Components

- **Account –** An account in an organization is a standard AWS account that contains AWS resources and identities.
- **Service Control Policy (SCP) –** A policy that specifies the services and actions that users and roles can use in the accounts that the SCP affects.
- **Tagging –** A best practices for your OUs to keep track of your AWS accounts and resources. This assists with more granular monitoring and logging of your AWS environment.



IAM Policies

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Policy Interpretation Deep Dive!

IAM Policies are the bedrock of strong IAM security. Understanding how the policies work and being able to interpret them is critical for success as an Architect and on the exam

Identity Policies

Identity Policies are IAM policies that are applied to identities. This can include both users as well as roles that users can assume. These are **different** than resource policies.

Implicit vs. Explicit Allow/Deny

The default response to all requests is an **Implicit Deny**. This 'stance' can be overridden by allowing the user access with a permissions policy – this grants the user access because it has been **Explicitly Allowed.** The same process can be done with an **Explicit Deny** policy. This will deny access regardless of the permissions the user might have.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "ExplicitDenyIfNotTheOwner",
            "Effect": "Deny",
            "Action": [
                "datapipeline:ActivatePipeline",
                "datapipeline:AddTags",
                "datapipeline:DeactivatePipeline",
                "datapipeline:DeletePipeline",
                "datapipeline:DescribeObjects",
                "datapipeline:EvaluateExpression",
                "datapipeline:GetPipelineDefinition",
                "datapipeline:PollForTask",
                "datapipeline:PutPipelineDefinition",
                "datapipeline:QueryObjects",
                "datapipeline:RemoveTags",
                "datapipeline:ReportTaskProgress",
                "datapipeline:ReportTaskRunnerHeartbeat",
                "datapipeline:SetStatus",
                "datapipeline:SetTaskStatus",
                "datapipeline:ValidatePipelineDefinition"
            ],
            "Resource": ["*"],
            "Condition": {
                "StringNotEquals": {"datapipeline:PipelineCreator": "${aws:userid}"}
            }
        }
    ]
}
```

Policy Interpretation Deep Dive!

IAM Policies are the bedrock of strong IAM security. Understanding how the policies work and being able to interpret them is critical for success as an Architect and on the exam

Resource Policies

Unlike an identity-based policy, a resource-based policy specifies WHO (which principal) can access that resource. The principals identified within a resource-based policy include accounts, IAM users, federated users, IAM roles, assumed-role sessions, or AWS services.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Principal": {
                "AWS": "arn:aws:iam::123456789012:user/carlossalazar"
            },
            "Action": "s3:*",
            "Resource": [
                "arn:aws:s3:::carlossalazar/*",
                "arn:aws:s3:::carlossalazar"
            ]
        }
    ]
}
```

Policy Interpretation Deep Dive!

More practice! What does this permissions policy allow or not allow? What would this policy be applied to?

Policy Interpretation

What is allowed, or not allowed, in the policy shown at right? Are there any specific instances where this might not apply?

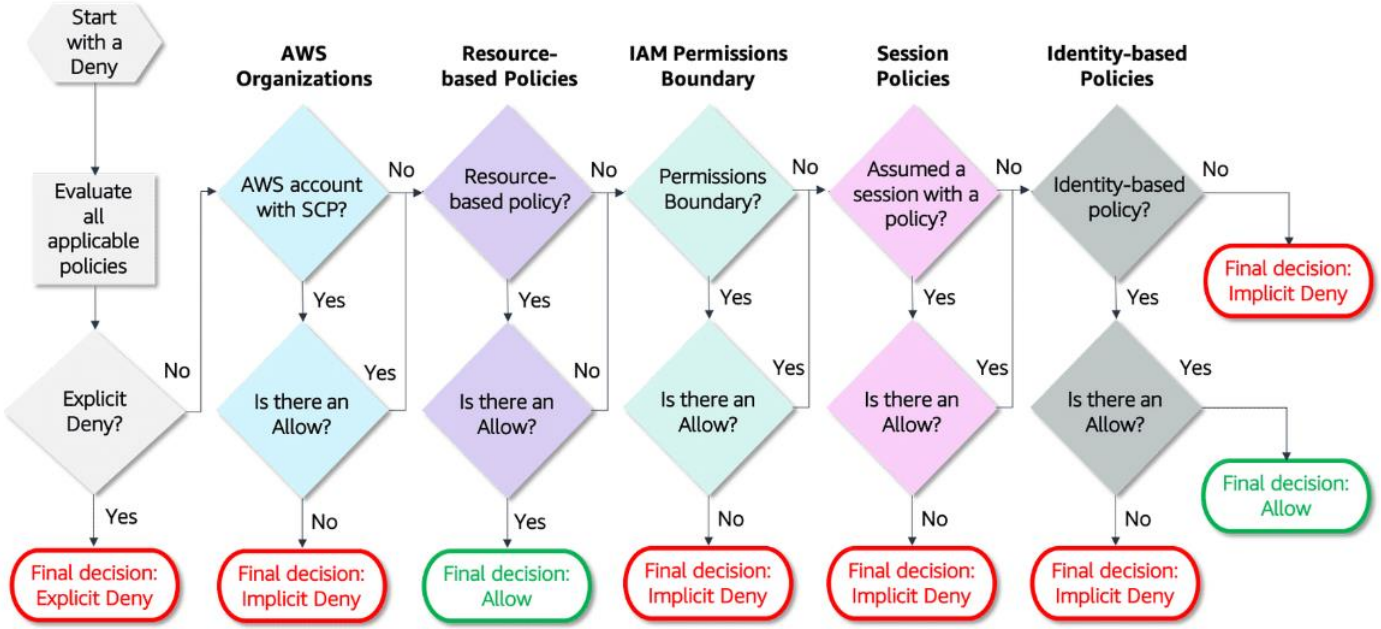
```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "EnableDisableHongKong",
            "Effect": "Allow",
            "Action": [
                "account:EnableRegion",
                "account:DisableRegion"
            ],
            "Resource": "*",
            "Condition": {
                "StringEquals": {"account:TargetRegion": "ap-east-1"}
            }
        },
        {
            "Sid": "ViewConsole",
            "Effect": "Allow",
            "Action": [
                "aws-portal:ViewAccount",
                "account:ListRegions"
            ],
            "Resource": "*"
        }
    ]
}
```

Policy Interpretation Deep Dive!

Review the flow chart and commit it to memory!

Policy Interpretation

This flow chart provides details about how the decision is made as AWS authenticates the principal that makes the request. AWS evaluates the policy types in this order.



Amazon Resource Names (ARN)

A way to uniquely identify AWS resources

What are they?

We require an ARN when you need to specify a resource unambiguously across all of AWS, such as in IAM policies, Amazon Relational Database Service (Amazon RDS) tags, and API calls.

ARN Format (right)

The specific formats depend on the resource. To use an ARN, replace the italicized text with the resource-specific information.

Be aware that the ARNs for some resources omit the Region, the account ID, or both the Region and the account ID.

```
arn:partition:service:region:account-id:resource-id
arn:partition:service:region:account-id:resource-type/resource-id
arn:partition:service:region:account-id:resource-type:resource-id
```

The Importance of IAM Roles

Roles are a way for users to temporarily gain permissions

What are they?

AWS Roles have the same makeup as an IAM user with the following differences:

- An IAM role does not have long term credentials associated with it. A principal (user, machine, or authenticated identity) assumes the role and inherits permissions assigned to the user.
- Temporary access is granted using tokens (STS). Token expiration reduces the risks associated with credentials leaking or being reused.
- An IAM role has a trust policy that defines which conditions must be met to allow other principals to assume it.

When should they be used?

In general, there are four scenarios where IAM roles might be used:

1. One AWS service accesses another AWS Service
2. One AWS account accesses another AWS account
3. A third-party web identity needs access (i.e., Google, Facebook, Cognito)
4. Authentication using SAML2.0 federation (enables SSO)

Security Token Service (STS)

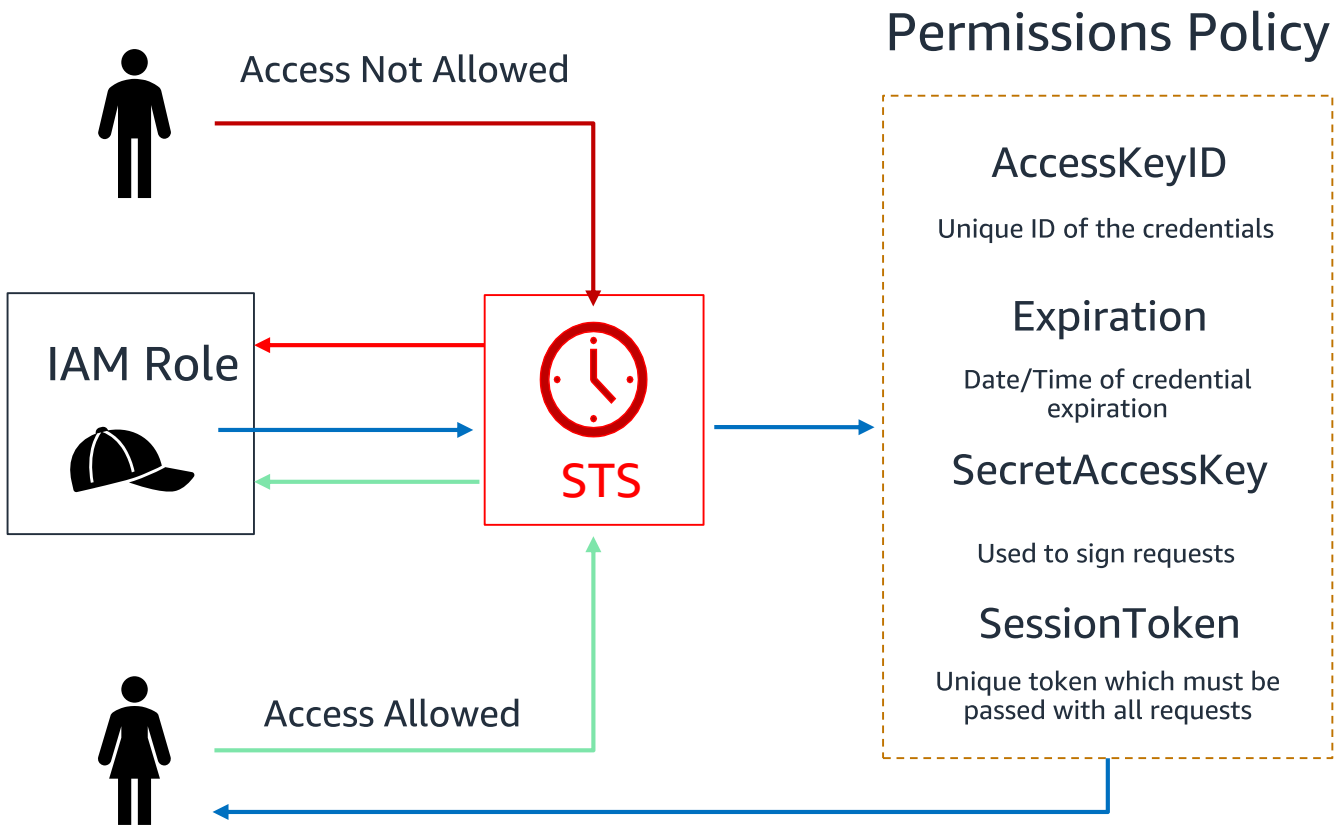
Request temporary, limited-privilege credentials for AWS IAM

Your Users OR Federated Users

STS allows you to provide temporary, limited-privilege credentials for your IAM users, or users that you federate as a part of access authentication. STS is a service that is available globally.

Generating Credentials

Temporary credentials can be assumed by authorized identities through the generate temporary credentials (sts:AssumeRole*) command. The process of authorization follows the flow at the right.



Revoking Temporary Credentials

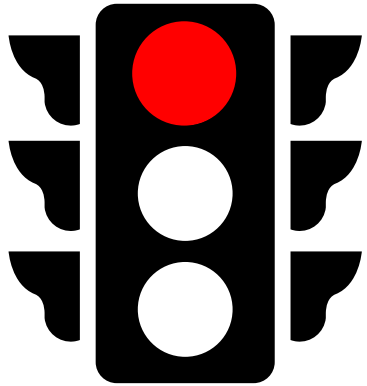
Remember that Roles can be assumed by MANY identities who will all get the same permissions. What happens if those credentials are compromised?

Trust Policies

Changing Trust policies only effect identities that have not already assumed the role. These policy changes have **NO impact** on existing credentials.

Permission Policies

Changing the **PERMISSIONS** policy will impact **ALL** credentials. Updating the policy with a **AWSRevokeOlderSessions** inline deny for any sessions older than now. This signs out all identities that have currently assumed the role and applies the new policies.



Amazon S3 – Overview

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Amazon Simple Storage Service (S3)

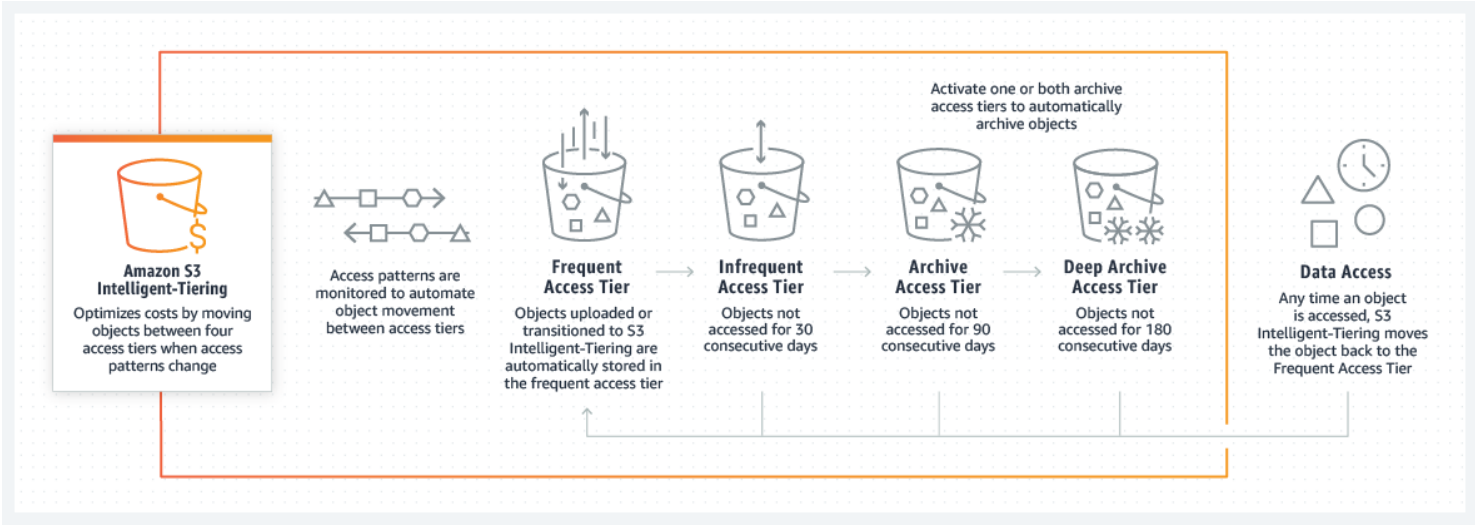
Provides infinitely scalable, highly durable object storage in the AWS Cloud

What does it do?

Stores objects in resources called Buckets, which can be up to 5TB in size, but there are no total limits to the # of objects stored.

Designed to provide 99.999999999% durability and up to 99.99% availability.

Offered at multiple tiers of pricing based on the frequency the objects are needed, and the speed at which they are required to be retrieved.



Amazon Simple Storage Service (S3)

Provides infinitely scalable, highly durable object storage in the AWS Cloud

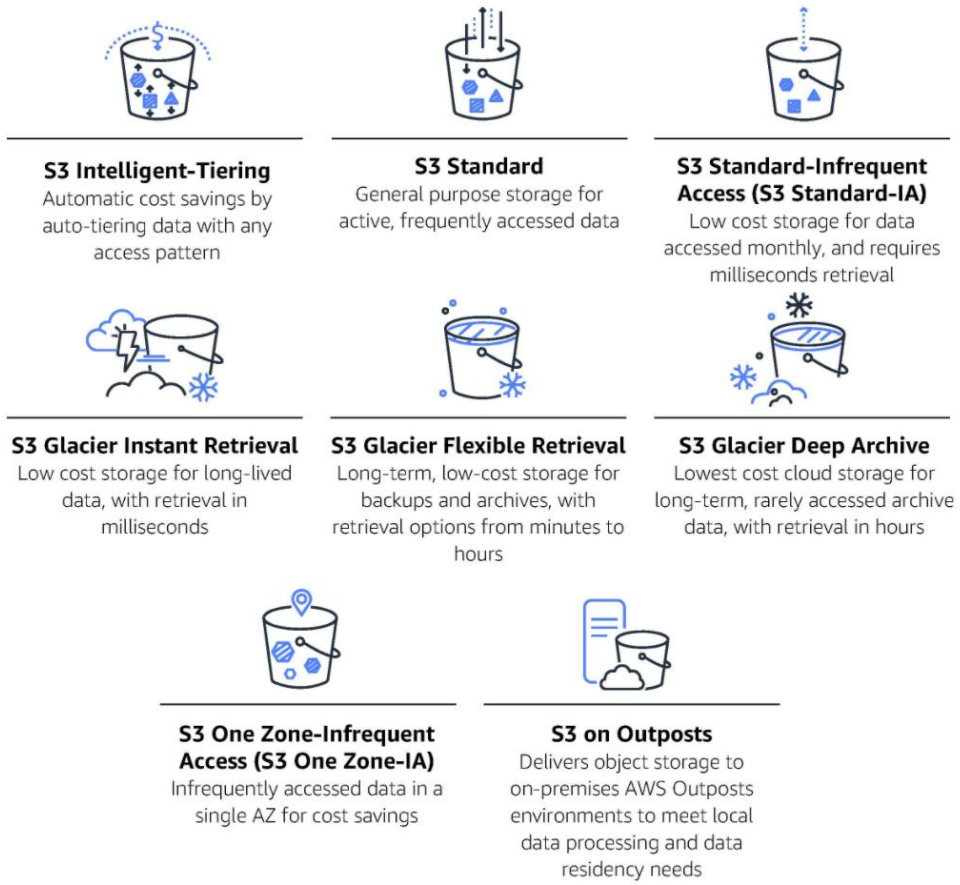
Storage Classes

Amazon S3 currently provides a range of storage class offerings to fit our customers needs.

Each storage class is purpose-built for varying access patterns at corresponding costs.

Exam Tip

Amazon S3 features heavily in questions and use cases that are presented in the exam. Read these carefully for 'giveaways' that might be included in the question stem that highlight a storage class as an option.



Your Choice of Amazon S3 Storage classes

Become familiar with which class you should choose – and when

S3 Intelligent-Tiering

S3 Standard

S3 Standard-IA

S3 Glacier

S3 Glacier Deep Archive

S3 One Zone-IA

S3 Outposts

AWS Region ≥ 3 Availability Zones

- Data with changing access patterns
- Opt in for automatic archiving

- Active, frequently accessed data
- Milliseconds access

- Infrequently accessed data
- Milliseconds access
- Retrieval fee per GB
- Minimum storage duration
- Minimum object size

- Archive data
- In minutes and hours
- Retrieval fee per GB
- Minimum storage duration
- Minimum object size

- Long-term archive data
- Select hours
- Retrieval fee per GB
- Minimum storage duration
- Minimum object size

AWS Single AZ

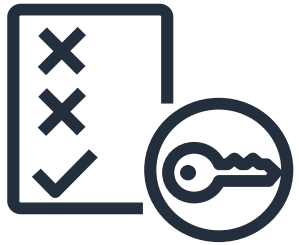
- Re-creatable, less accessed data
- Milliseconds access
- Retrieval fee per GB
- Minimum storage duration
- Minimum object size

AWS Outposts

- On-premises data
- Milliseconds access
- Encrypted with SSE-S3

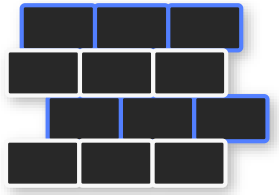
S3 Security – The Core of what we do

Data stored in S3 is secure by default

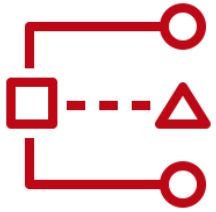


Access control with IAM and bucket policies

Amazon S3 Access Points



Amazon S3 Block Public Access



IAM Access Analyzer

Encrypt data by default in Amazon S3

S3 Bucket Policies

A bucket policy that allows a principal (AWS Account ID 111111111111) to read and write to the bucket “sample-bucket-reinvent”

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:PutObject",
                "s3:GetObject"
            ],
            "Resource": "arn:aws:s3:::/sample-bucket-reinvent/*“,
            ”Principal”: {"AWS":"111111111111"}
        }
    ]
}
```

Principal: specifies whom the statement covers

S3 Bucket Policy Principals

Who/What can be a principal in an S3 bucket policy?

Valid principals for your bucket policies include:

- AWS account and root user
- IAM users
- Federated users (using web identity or SAML federation)
- IAM roles
- Assumed-role sessions
- AWS services
- Anonymous users (public) – not recommended

Amazon S3 Transfer Acceleration

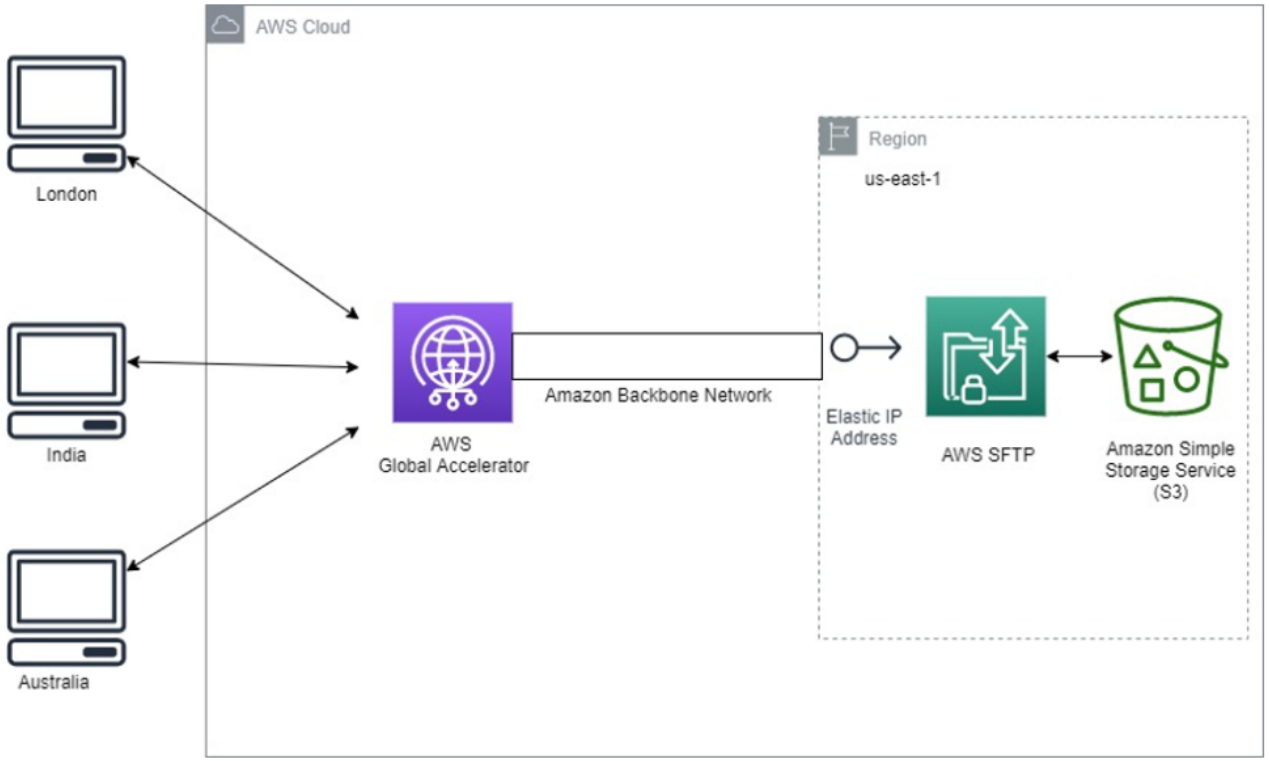
Provides faster, long-distance S3 uploads & downloads

What does it do?

S3 Transfer Acceleration (S3TA) reduces the variability in Internet routing, congestion and speeds that can affect transfers, and logically shortens the distance to S3 for remote applications. S3TA improves transfer performance by routing traffic through Amazon CloudFront's globally distributed Edge Locations and over AWS backbone networks, and by using network protocol optimizations.

Exam Tip

S3TA helps reduce network variability by physically shortening the distance between your apps and AWS. Any question that speaks to long-distance uploads, or finding ways to increase data transfer with S3 - consider S3TA



Thank you!

aws training and certification