

# Introducing **AWS S3**

Simple  
Storage Service





# S3 Introduction



Amazon S3, a cornerstone of AWS, offers **limitless storage** for all your data needs. Websites, applications, and even other AWS services leverage S3's scalability and reliability.

- **Backup & Archive:** Securely store and retrieve your essential data.
- **Disaster Ready:** Ensure business continuity with S3's disaster recovery features.
- **Cost-Effective Archive:** Store data long-term at lower costs with Glacier.
- **Cloud Flexibility:** Integrate S3 seamlessly with your cloud and on-premises storage.
- **Host & Deliver:** Host applications and distribute software effortlessly.



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# S3 Buckets

Think of Amazon S3 as a giant storage facility. You can **organize** your **files** within this facility using **“buckets”** which act like folders. Here’s what you need to know about S3 buckets:

**Globally Unique Names:** Each bucket name must be one-of-a-kind across all AWS regions and accounts.

**Regional Placement:** While S3 appears as a global service, buckets actually reside within a specific AWS region you choose.

## Naming Rules:

- Lowercase alphanumeric characters only (no uppercase or underscores).
- Between 3 and 63 characters long.
- Must start with a lowercase letter or number.



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# S3 Objects

S3 buckets store your data as objects (files) with unique **keys**. These keys act like **file paths**, including the bucket name and internal path (separated by /). Don't be fooled by the directory-like view in the console - S3 uses **keys with slashes**, not true folders

- **Object Keys:** Combination of prefix (internal folder path) and object name.
- **Object Size:** Up to 5TB per object! Larger uploads require “multi-part upload”.
- **Object Details:**
  - **Content:** The actual data you store.
  - **Metadata:** Labels for details like creation date.
  - **Tags (up to 10):** User-defined labels for access, security, and lifecycle control.
- **Versioning (Optional):** Creates new versions with unique IDs for each upload.



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# S3 Security

S3 offers multiple layers of security to keep your data safe:

## Who Gets In?

- **IAM & Bucket Policies:** Control user access through IAM or bucket-level permissions.
- **Object ACLs (optional):** Set granular object access (disabling recommended).

## Double the Lock:

- Both IAM permissions and resource policies must allow access.
- “DENY“ overrides permissive policies.

**Encryption Option:** Encrypt objects for extra protection.



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# Bucket Policies



S3 bucket policies, written in **JSON**, provide granular control over **who** can access your data and **what** they can do with it. Here's the breakdown:

**What it Governs:** Bucket policies apply to both buckets and the objects within them.

**The Rules:** Policies consist of “Allow” or “Deny” statements, specifying which actions (like reading or writing) a specific user (the “Principal”) can perform.

**Cross-Account Sharing:** Bucket policies enable secure access for users in other AWS accounts.

## Key Features:

- Public access (use with caution).
- Enforced encryption.
- Cross-account sharing.



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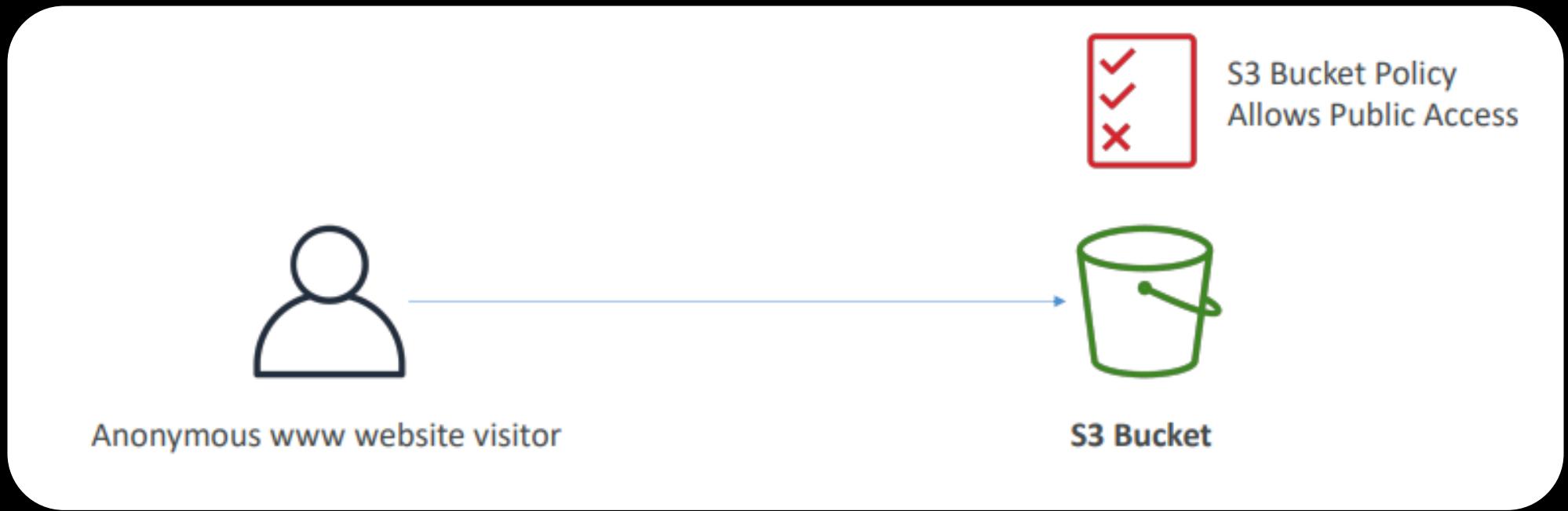
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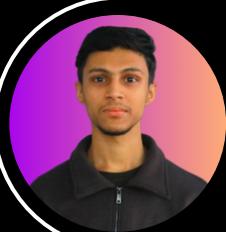
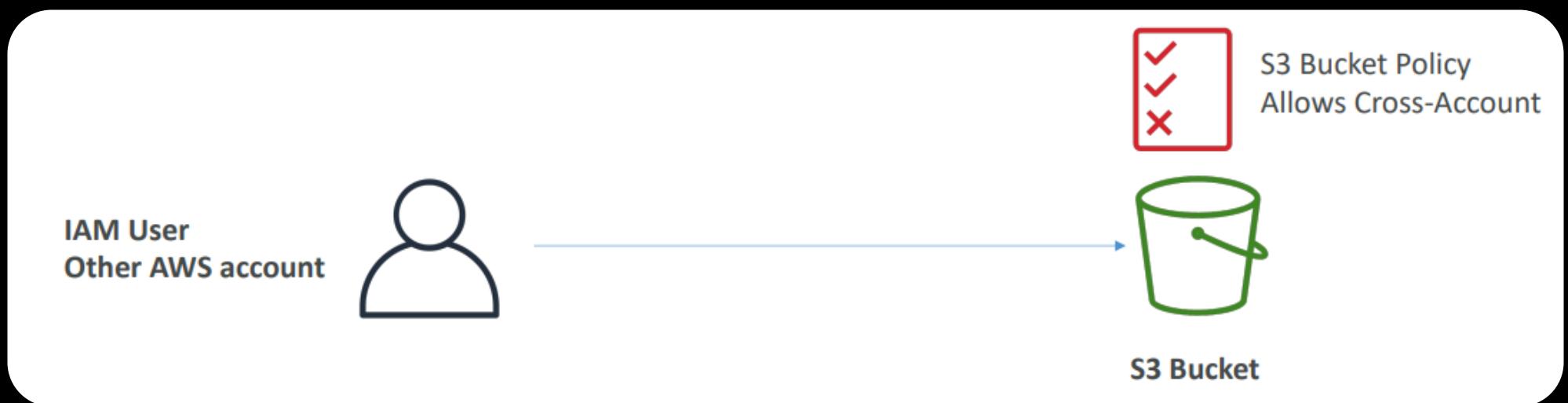
# Bucket Policies Diagram



## Public Access:-



## Cross Account Access:-



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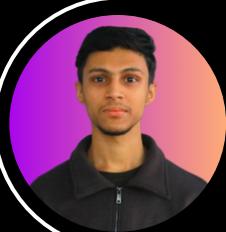
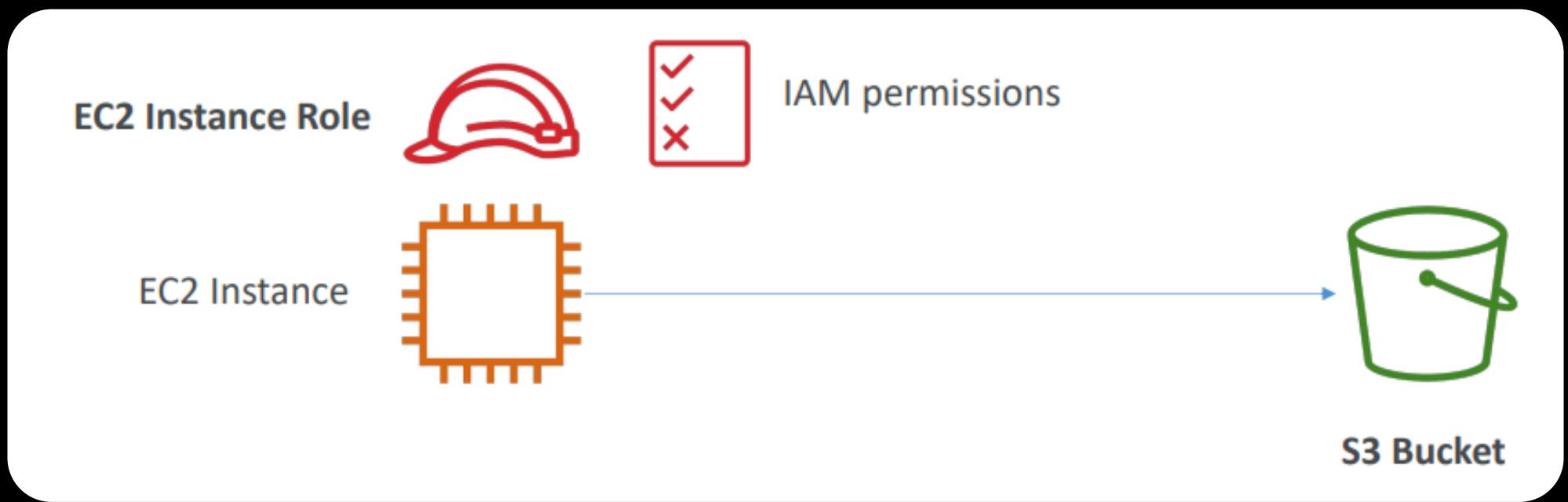
# Bucket Policies Diagram



## User Access - IAM Permissions:-



## EC2 Instance Access - IAM Roles:-



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# S3 Versioning

Amazon S3 offers a powerful feature called versioning, enabled at the bucket level. This lets you **keep track of all previous versions** of your files, even after they've been overwritten. Here's why versioning is a best practice:

- **Undo Mistakes:** Accidentally deleted a file? Restore a previous version with ease!
- **Rollback Changes:** Easily revert to an earlier version if needed.
- **Version History:** Track all changes to your data over time.

## Note:-

- Files uploaded before enabling versioning won't have version history.
- Suspending versioning keeps existing versions but doesn't create new ones.



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# S3 Replication

S3 replication offers a way to automatically **copy** your **data between buckets**, ensuring it's always up-to-date and readily available. Here's a breakdown of the two main options:

- **Cross-Region Replication (CRR)**: Replicates data across regions for disaster recovery, compliance, or lower latency access. Works between accounts too!
- **Same-Region Replication (SRR)**: Great for log aggregation or mirroring data between environments within a region.

## Note:-

- Versioning must be enabled in both source and destination buckets for replication.
- IAM permissions need to be configured correctly for S3 to perform replication.



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# S3 Static Web Hosting

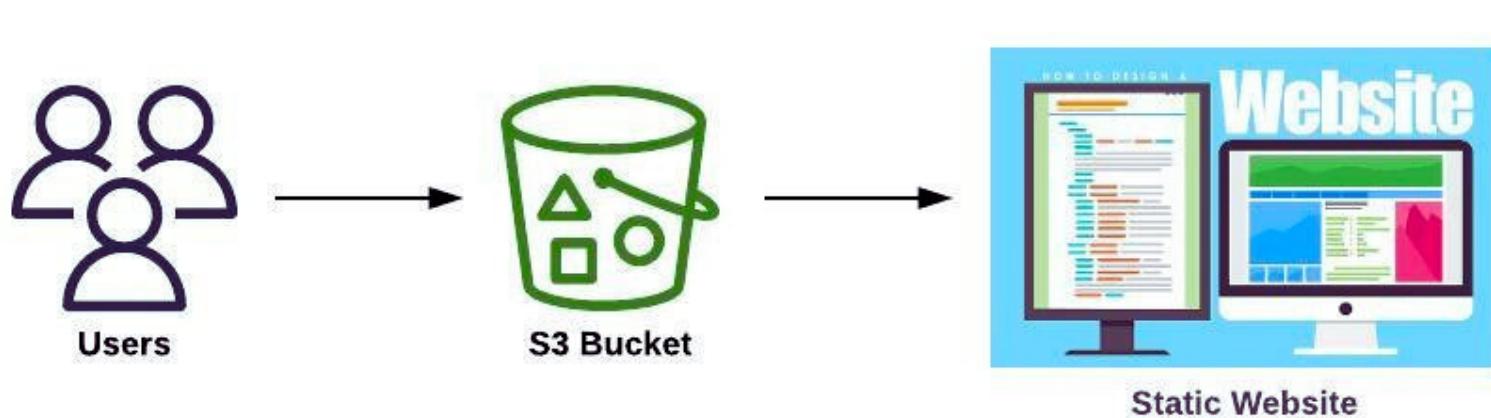


Did you know S3 can host static websites?

Simply configure your bucket and your website will be accessible through a web address like this:

`http://bucket-name.s3-website.region.amazonaws.com` (Most regions)

`http://bucket-name.s3-website-us-east-1.amazonaws.com` (US East 1 region)



[Static Website Hosting with S3](#)



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# Storage Classes



Amazon S3 offers a variety of **storage classes**, each **optimized** for different **access patterns** and **cost considerations**. Here's a breakdown, starting with the most popular options:

- **S3 Standard:** Best for frequently accessed data (high performance, availability).
- **S3 Intelligent-Tiering:** Automatic cost optimization for data with unknown access patterns.
- **S3 Standard-IA:** Less frequent access, faster retrieval than Glacier (cost-effective).
- **S3 Glacier Instant Retrieval:** Infrequent archives, immediate retrieval (within hours).
- **S3 Glacier Flexible Retrieval:** Long-term archive, hours retrieval (cost-effective).
- **S3 Glacier Deep Archive:** Ultra-low-cost archive, days retrieval.



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# Storage Classes Standard



**Always Available:** 99.99% uptime keeps your data accessible.

**Fast & Furious:** Experience low latency and high throughput for speedy data retrieval.

**Built to Last:** Handles even major disruptions with its resilient architecture.

**Perfect for:** Big data analytics Mobile & gaming applications Content distribution and much more.



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# Storage Classes Infrequent Access

Need storage for data you don't access all the time, but still require quick retrieval? S3 Infrequent Access offers a cost-effective solution:

## Choose Your Option:

- **S3 Standard-IA (99.9% Availability):** Ideal for disaster recovery backups or archives you might need quickly.
- **S3 One Zone-IA (99.5% Availability):** Lowest cost option for highly durable, rarely accessed data (like secondary backups) that can be recreated if needed. **Caution:** Data stored in a single Availability Zone (AZ) might be lost if that AZ is unavailable.



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# Storage Classes Glacier



Need a cost-effective way to store data for the long haul? Look no further than S3 Glacier! Here's a breakdown of its options:

## Glacier Retrieval Options:

- **S3 Glacier Instant Retrieval:** Millisecond access for data you need occasionally (at least once per quarter). Minimum storage duration: 90 days.
- **S3 Glacier Flexible Retrieval:** Choose your retrieval speed (Expedited, Standard, Bulk) - free retrievals available. Minimum storage duration: 90 days.
- **S3 Glacier Deep Archive:** Most cost-effective for long-term, rarely accessed data. Standard retrieval takes 12 hours, with Bulk retrievals taking 48 hours. Minimum storage duration: 180 days.



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# Storage Classes Intelligent Tiering



S3 Intelligent-Tiering automates storage cost optimization for your data. Here's what it does:

## Tier Breakdown:

- **Frequent Access (default):** For actively used data.
- **Infrequent Access (30 days inactive):** Automatically stores less-used data for cost savings.
- **Archive Instant Access (90 days inactive):** Provides quick retrieval for infrequently accessed archives.
- **Optional Archive & Deep Archive Tiers:** Configure custom access times for long-term, rarely accessed data (90 days or more).



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# Storage Classes Comparision



Storage Class	Durability	Availability	Use Case	Min. Storage Duration	Retrieval Fee
S3 Standard	99.99%	99.99%	Frequent access	None	None
S3 Standard-IA	99.9%	99.9%	Less frequent access	None	None
S3 One Zone-IA	99.99999999% (single AZ)	99.5%	Infrequent access, data recreatable	None	None
S3 Glacier Instant Retrieval	99.99999999%	Eventual consistency	Infrequent access, milliseconds retrieval	90 days	Applies
S3 Glacier Flexible Retrieval	99.99999999%	Eventual consistency	Infrequent access, 1-12 hours retrieval	90 days	Applies
S3 Glacier Deep Archive	99.99999999%	Eventual consistency	Long-term archive, 12-48 hours retrieval	180 days	Applies
S3 Intelligent-Tiering	Varies (underlying tier)	Varies (underlying tier)	Automatic tiering	None	No fees within tiers



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