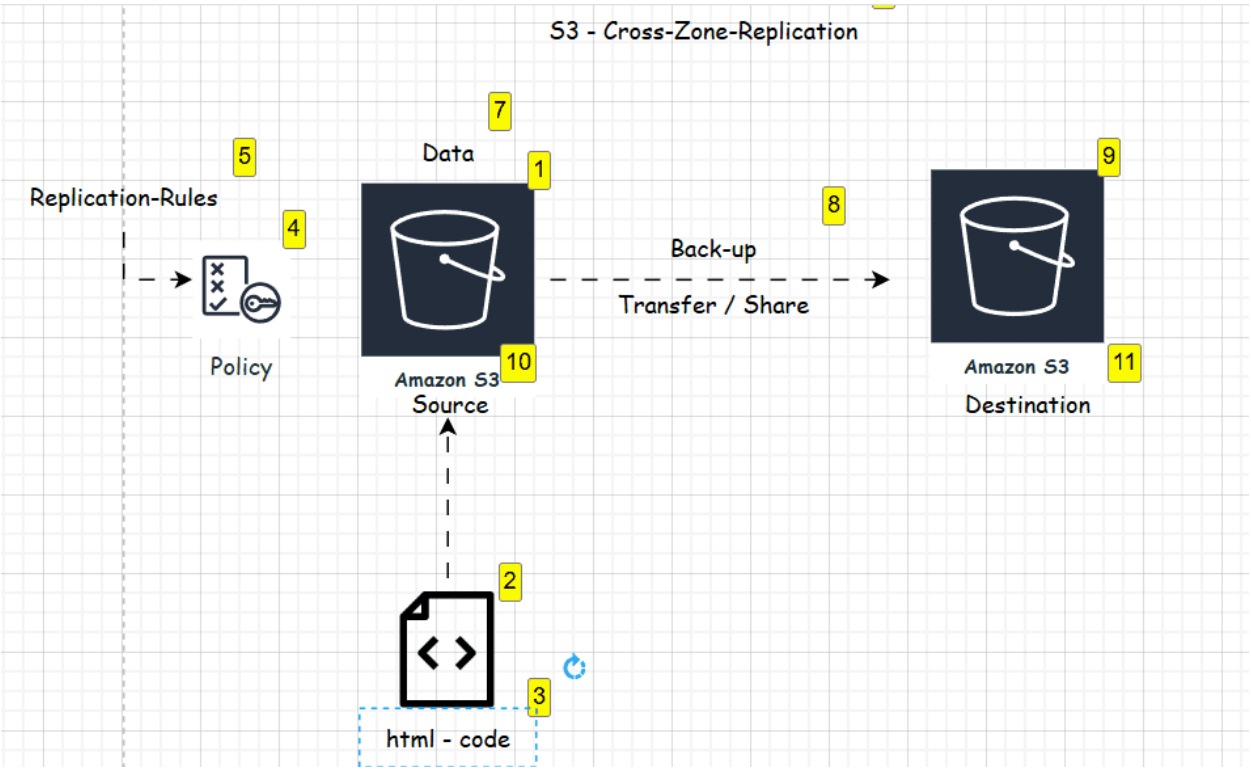
🌍 What Is S3 Cross-Region Replication (CRR)?

S3 Cross-Region Replication (CRR) is an Amazon S3 feature that **automatically replicates objects from one S3 bucket (source) to another bucket in a different AWS region (destination)**.



This is particularly useful for:

- **Disaster recovery**
- **Compliance** and **data residency**
- **Low-latency access** in multiple geographic regions
- **Backup** and **redundancy**

🔧 How Does It Work?

When you enable CRR on a bucket:

- Any new object uploaded to the **source bucket** is automatically copied to the **destination bucket** in another AWS region.
- The replication happens **asynchronously**, typically within seconds.

✅ Requirements for CRR

1. **Versioning must be enabled** on both source and destination buckets.
2. You must have **proper IAM permissions**.
3. The destination bucket must be in a **different AWS region** than the source.
4. You define **replication rules** to specify what to replicate (all objects or specific prefixes/tags).

📌 Key Features

Feature	Description
One-way replication	Data flows from source → destination only.
Replicate delete markers	Optional – you can choose to replicate or ignore delete markers.
Object metadata	All metadata, ACLs, and tags are also replicated.
Replication Time Control (RTC)	Optional feature to guarantee replication within 15 minutes (extra cost).

🛠️ How to Enable S3 Cross-Region Replication

Step 1: Enable Versioning

- On both **source** and **destination** buckets: go to **Properties** > Enable **Versioning**.

Step 2: Create IAM Role or Use Existing Role

- AWS needs permission to replicate objects on your behalf.
- During setup, S3 can automatically create the required role.

Step 3: Set Up Replication Rule

1. Go to the **source bucket** > **Management** > **Replication rules** > **Create rule**
2. Choose:
    - Entire bucket or filtered objects (by prefix/tags)
3. Set the **destination bucket and region**
4. Choose whether to:
    - Replicate delete markers
    - Enable **Replication Time Control**
5. Choose or create the **IAM role**
6. Save the rule

🧠 **Example Use Cases**

- **Disaster Recovery:** Replicate critical data to another region in case of a region failure.
- **Global Access:** Serve users from multiple regions with lower latency.
- **Compliance:** Ensure data is stored in specific geographic regions.

⚠️ **Notes and Considerations**

- **CRR only replicates new objects** (after the rule is enabled). Existing objects must be copied manually.
- **CRR is not bi-directional** — you need another rule in the opposite direction to make it two-way.
- **Replication is billed** — you pay for storage and data transfer in the destination region.
