

# 1. AWS IAM Preparation

## Key Learnings:

- Watched **Stephane Maarek's AWS IAM Masterclass** (YouTube) and reviewed **AWS IAM documentation**.



- Understood core IAM concepts:
  - **Users, Groups, Roles, Policies** (Identity vs. Resource-based policies).
  - **Principle of Least Privilege (PoLP)** – Granting minimal required permissions.
  - **Multi-Factor Authentication (MFA)** for enhanced security.
  - **IAM Access Analyzer** to detect unintended resource exposure.

## Hands-on Exploration:

- Created an IAM user with **programmatic & console access**.
- Attached **AmazonS3ReadOnlyAccess** policy to a group.

- Tested **IAM policy simulator** to verify permissions.
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## 2. AWS SLAs Research

### Service Level Agreements (SLAs) for Key AWS Services:

AWS Service	SLA Uptime %	Allowed Downtime per Year
Amazon EC2	99.99%	~52.56 minutes
Amazon S3	99.9%	~8.76 hours
AWS Lambda	99.95%	~4.38 hours
RDS (Multi-AZ)	99.95%	~4.38 hours

### Observations:

- **Higher SLA (e.g., 99.99%) means stricter uptime guarantees.**
  - **EC2 vs. S3:**
    - EC2 (99.99%) allows ~52 mins downtime/year.
    - S3 (99.9%) allows ~8.76 hours/year.
  - **Impact of Downtime:**
    - **Financial penalties** (service credits) apply if SLA is breached.
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## 3. AWS Basics & Free Tier Exploration

### Key Takeaways:

- **AWS Global Infrastructure:**
  - **Regions** → **Availability Zones (AZs)** → **Edge Locations.**
  - **Free Tier** offers 12-month free usage (e.g., 750 EC2 hours/month).
- **Core Services:**
  - **EC2** (Virtual Servers), **S3** (Object Storage), **VPC** (Networking).

### Hands-on Activity:

- Created an **S3 bucket** and uploaded a test file.
  - Checked **AWS Free Tier limits** in the Billing Dashboard.
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## 4. CDN & Edge Locations Study

### Comparison: CloudFront vs. Akamai vs. Fastly

Feature	AWS CloudFront	Akamai	Fastly
Global Edge Network	600+ Locations	4,100+ Locations	100+ Locations
Integration	Native AWS services	Third-party	API-driven
Pricing	Pay-as-you-go	Enterprise contracts	Usage-based
DDoS Protection	AWS Shield	Prolexic	Built-in

### Experiment: Testing CloudFront with S3

1. Deployed a static website on S3.
2. Enabled CloudFront distribution.
3. Compared latency:
  - **Without CDN:** ~300ms (Direct S3 access from India).
  - **With CloudFront:** ~50ms (via Mumbai Edge Location).

### India's Edge Locations:

- **33 CloudFront Edge Locations** (Mumbai, Delhi, Chennai, etc.).
  - **Reduced latency** for Indian users.
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## 5. Command Line Network Testing

### Traceroute to AWS Domains:

bash

```
tracert aws.amazon.com
```

### Findings:

- Multiple hops observed (ISP → AWS Edge → Origin).
  - **Ping Test:** Lower latency when accessing via CDN.
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## 6. AWS Global Infrastructure Diagram

