

AWS Cloudfront CDN

1. Cloudfront - Amazon Cloudfront is a Content Delivery Network (CDN) that securely delivers data, videos, applications and APIs to users globally with low latency & high transfer speeds.

OR

2. AWS Cloudfront is a content delivery network (CDN) that speeds up the delivery of web content to users by caching it at servers (edge locations) close to them, improving load times and performance globally.

Core Concept

1. Edge Location - A data center where content is cached. Cloudfront has 600+ worldwide.

2. Origin - The source of the content (eg, on S3 bucket, EC2 instance, or custom server).

3. Distribution - A setup that tells Cloudfront how to serve content. There are two types: Web and RTMP.

4. Cache Behaviour - Rules that defines how Cloudfront responds to requests (eg, which methods are allowed, TTL setting).

5. TTL (Time to Live) - The amount of time Cloudfront caches content at edge locations.

Working

1. User requests content (eg, a file or image).

2. Cloudfront checks the nearest edge location.

3. → If cached, it serves the file immediately.

→ If not cached, it fetch from the origin, cache it, then serves.

4. Future requests are faster because they're served from the edge cache.

Configuration Steps

1. Create an S3 bucket (or other origin).

2. Upload website or content.

3. Go to Cloudfront Console > Create Distribution.

- Choose web distribution

- Set your origin (e.g., S3 bucket).

- Configure cache behaviour, SSL, logging, etc.

4. Get the Cloudfront domain URL (e.g., d123abc.cloudfront.net) and use it in your app.

Problems: Global Latency & High Cost with Route 53 alone

- Route 53 only does DNS resolution - it does not optimize content delivery.

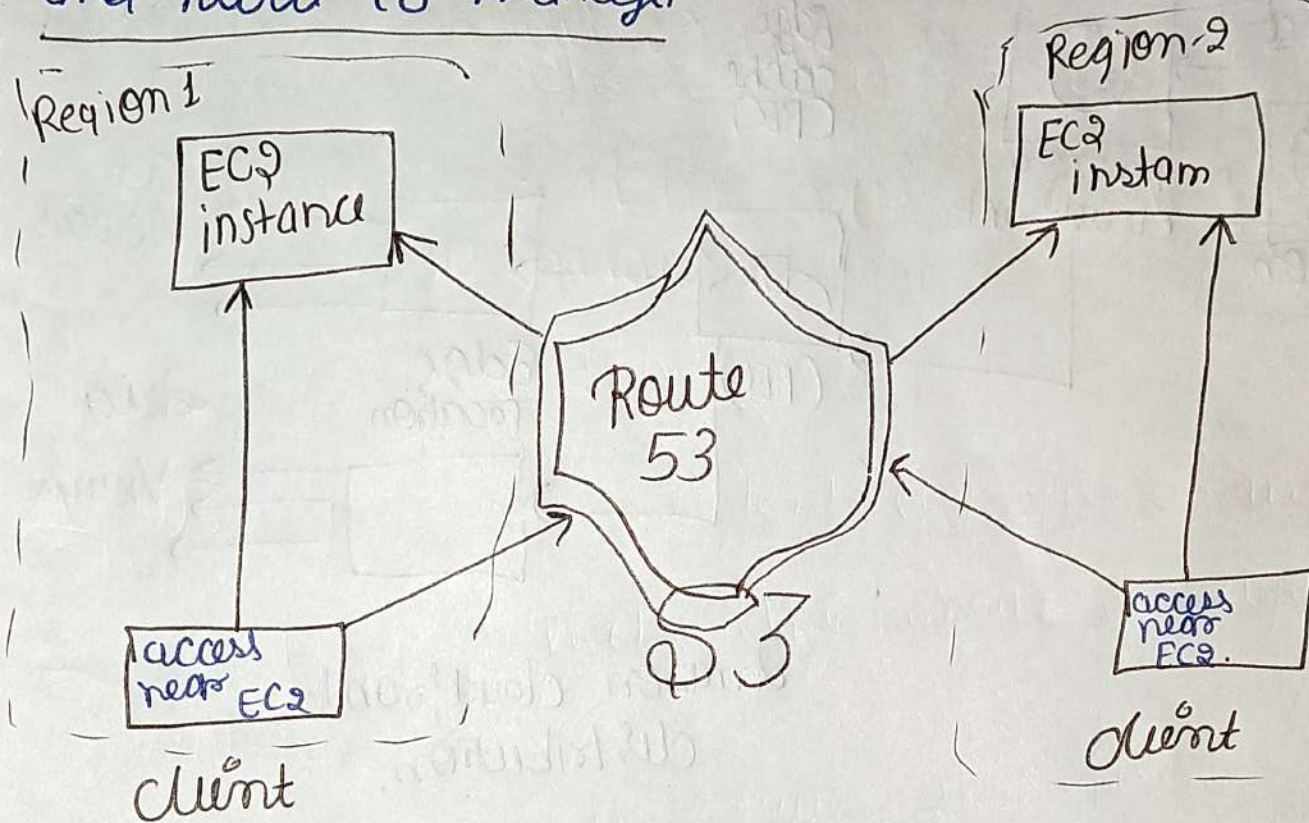
- Your origin server (e.g., S3, EC2) in one region - users far from the region experience high latency and delay.

- Every request hit the origin server



° directly, increasing data transfer cost and server load.

° If you deploy multiple regional instance to reduce latency, the cost becomes very high and hard to manage.

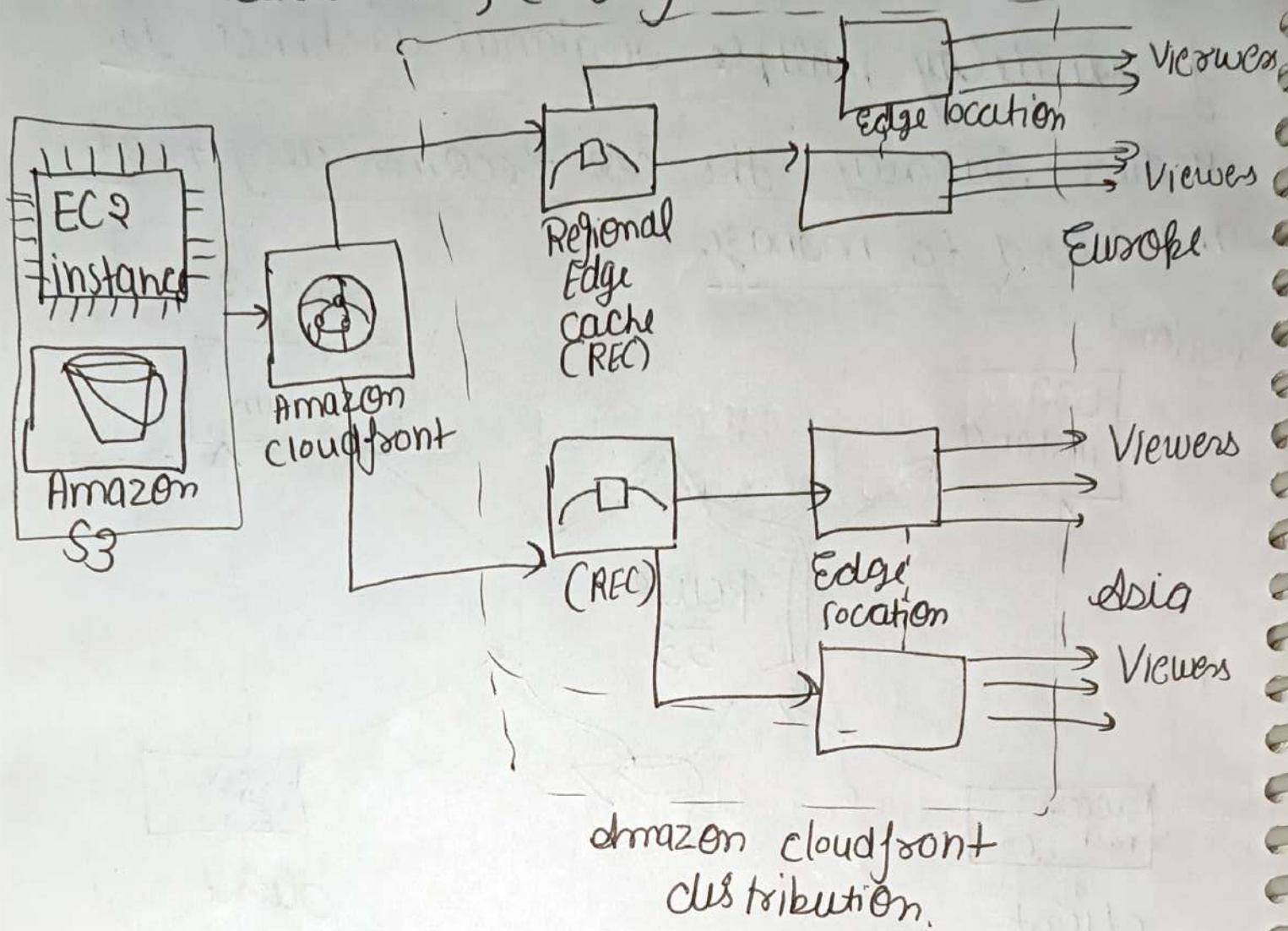


Solution:

AWS cloud front primarily caches static content like images, CSS, JS and videos. It can also cache dynamic content (e.g., HTML or API responses) if configured with caching policy & Headers.

By default, sensitive or user-specific data & backend logic are not cached.

Cache behaviour is controlled via TTLs, cache behaviour, & origin headers.



Amazon Cloudfront has three types of infrastructure to securely deliver content with high performance to end users:-

1. Cloudfront Regional Edge Caches (RECs)
2. Cloudfront points of presence with ISP network.
3. Cloudfront embedded points of presence are situated within internet service providers (ISP) network.

Browser act like a mini-CDN by caching website files (like images, CSS, and JavaScript) locally on a user's device, which speed up loading for repeat visits.

Only helps individual users.

Included in Always free tier

• 1 TB of data transfer out to the internet per month.

• 10,000,000 HTTPS or HTTP request per month.

• 2,000,000 CloudFront function invocations per month.

• 2,000,000 CloudFront Key Value store read per month.

• free SSL certificates.

• No limitations, all features available.

Key features

• Global Edge Network: low latency, high availability.

- Security : Integrate with AWS Shield, WAF, ACM (SSL/TLS).
- Access Control : Signed URLs, cookies for private content.
- Real-Time Metrics : Via CloudWatch & logs.
- Content Versioning : Use cache invalidation or versioned URLs.