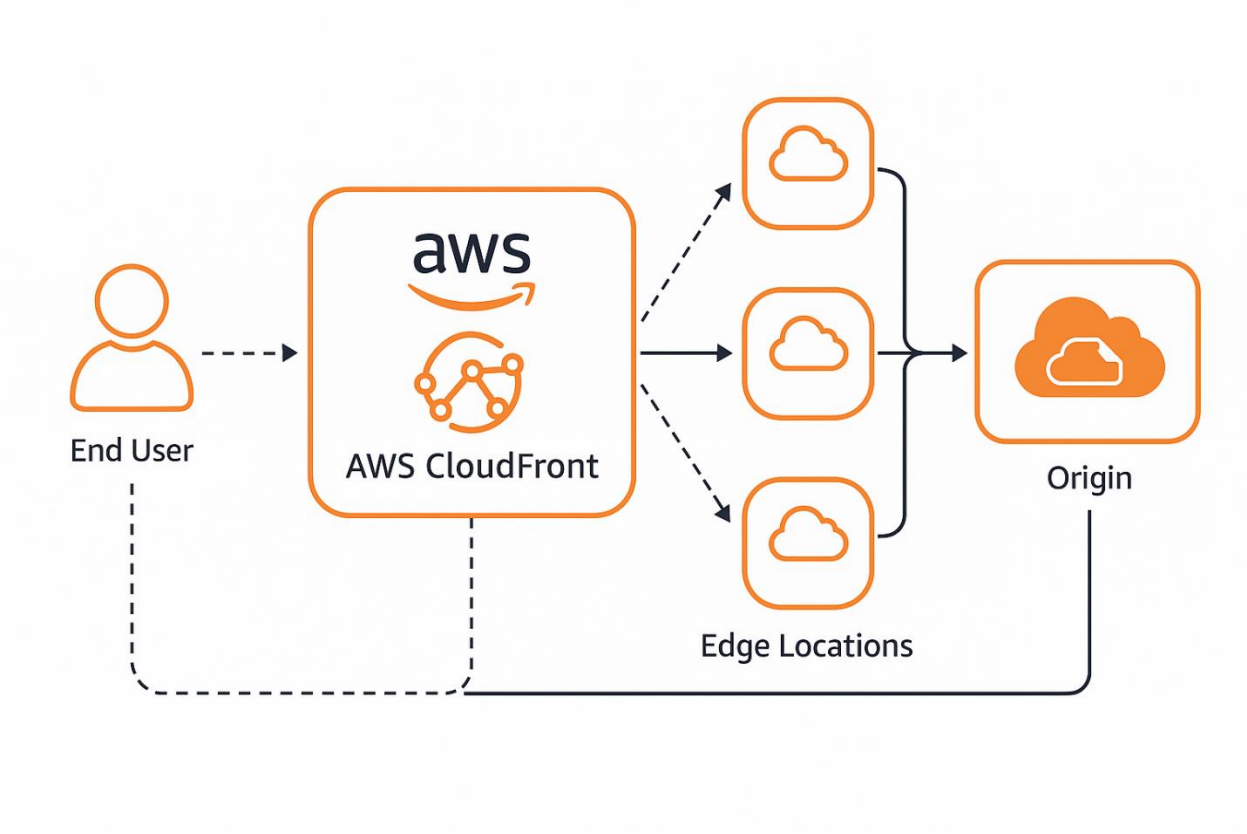
AWS CLOUD FRONT

What is AWS CloudFront?

Amazon CloudFront is a Content Delivery Network (CDN) service. It speeds up the delivery of your content (like HTML, CSS, JS, images, videos, APIs, etc.) to users by caching it at edge locations around the world.

How it Works (Architecture)



Basic Flow

1. User Request → from browser or app to a CloudFront distribution.

2. CloudFront checks its Edge Cache:

If content is cached, it's served immediately (fast).

If not cached, CloudFront pulls it from the origin (e.g., S3, EC2, or even an external HTTP server), stores it in cache, and then serves it.

3. Subsequent requests from other users near that edge location are faster.

Component	Role
Edge Locations	Data centers located globally (200+), used to cache content.
Origin	The source of your content (S3 bucket, EC2, ALB, or external).
Distribution	The CloudFront setup that connects your content to users.
Cache Behavior	Defines how CloudFront caches specific paths or content types.
Invalidation	Manually remove cached content from edge locations.
Signed URLs/Headers	Restrict access to private content.

Supported Origins

Amazon S3 (static websites or private objects)

EC2 or ALB (dynamic web apps or APIs)

Any HTTP/HTTPS server

Key Use Cases

Use Case	Description
✅ Static Website Hosting	Use S3 + CloudFront to serve static websites globally.
✅ API Acceleration	Reduce latency for API responses by caching at edges.
✅ Media Streaming	Distribute video/audio files with low latency.
✅ Software Downloads	Accelerate large file downloads (e.g., installers).
✅ DDoS Protection	Integrated with AWS Shield and WAF for protection.

Example: Simple Static Website with CloudFront

Let’s say you have a portfolio site

Steps:

1. Create an S3 Bucket → Upload your static site (HTML, CSS, JS).
2. Make S3 Bucket public or use Origin Access Control (OAC).
3. Create a CloudFront Distribution

    Origin: Your S3 bucket

    Default Root Object: `index.html`
4. Deploy and access using the CloudFront URL:

    https://d123abcd.cloudfront.net

Benefits

Feature	Benefit
Global Edge Network	Faster load times worldwide
Cost-Effective	Caching reduces origin server cost and load
Secure	HTTPS, WAF, Shield, signed URLs
Customizable	Cache policies, behaviors, Lambda@Edge support
Automatic Scaling	No need to provision infra

Security Options

HTTPS support by default.

AWS WAF (Web Application Firewall).

Signed URLs / Cookies (to protect private content).

Origin Access Control (OAC) to restrict S3 access to CloudFront only.

Monitoring Tools

CloudWatch: Metrics and logs (e.g., 4xx/5xx errors)

AWS CloudFront Access Logs: Detailed request logs to S3

AWS X-Ray (for tracing via Lambda\@Edge)

Conclusion:

CloudFront improves performance, scalability, and security of your content delivery. Whether you're serving a global user base, running a static website, or distributing software, CloudFront ensures low-latency, secure, and reliable content delivery.