

Service Name

Amazon CloudFront

Service Overview

Amazon CloudFront is a web service that speeds up distribution of static and dynamic web content to users through a worldwide network of data centers called edge locations. When a user requests content, CloudFront routes the request to the edge location that provides the lowest latency, delivering content with the best possible performance. If content is already cached at the edge location, CloudFront delivers it immediately; if not, CloudFront retrieves it from the origin server. CloudFront accelerates website performance by reducing the load on application servers and delivering content from locations closest to end users, utilizing the AWS backbone network for optimal performance.

Key Use Cases

- **Accelerating static website content delivery:** CloudFront speeds up delivery of static content like images, style sheets, and JavaScript by using Amazon S3 as the origin
- **Video on demand (VOD) and live streaming:** CloudFront supports streaming in common formats and caches media fragments at the edge to reduce load on origin servers
- **API and application acceleration:** CloudFront can accelerate dynamic content delivery and API responses through intelligent routing and protocol optimizations
- **Global content distribution:** Delivering websites, applications, and APIs to customers globally with low latency and high transfer speeds
- **Secure content delivery:** Serving private content using signed URLs, signed cookies, field-level encryption, and integration with security services

Features

- **Global Edge Network:** Worldwide network of edge locations including Points of Presence (POPs), Regional Edge Caches (RECs), and embedded Points of Presence for content delivery
- **Origin Shield:** Additional caching layer that reduces traffic to origin servers and improves cache hit ratios while providing centralized caching
- **CloudFront Functions:** Lightweight JavaScript functions that run at edge locations for high-scale, latency-sensitive CDN customizations with sub-millisecond execution
- **Lambda@Edge:** Serverless compute feature for complex, computationally intensive operations that run closer to viewers in Node.js or Python

- **Security Integration:** Built-in protection through AWS Shield, AWS WAF, field-level encryption, SSL/TLS support, and origin access control
- **Real-time Monitoring:** Integration with CloudWatch for metrics, standard and real-time logging capabilities, and comprehensive request tracking
- **Multiple Origin Support:** Support for various origins including S3, MediaPackage, Application Load Balancers, EC2 instances, and custom HTTP servers with failover capabilities

Value Proposition

CloudFront delivers superior global performance through its extensive edge network with hundreds of terabits of deployed capacity and connections to thousands of telecom carriers. The service provides automatic DDoS protection via AWS Shield, integrated security through WAF, and comprehensive compliance certifications including PCI-DSS Level 1, HIPAA, and SOC:

- CloudFront offers significant cost advantages with free data transfer between AWS services, regional edge caches that reduce origin costs, and flexible pricing options including flat-rate plans with no overages
- The platform enables advanced customization through edge functions while maintaining enterprise-grade reliability and fast change propagation within minutes

Service Integration

CloudFront integrates seamlessly with Amazon S3 for static content storage and origin access control, AWS Shield and AWS WAF for comprehensive security protection, and Amazon Route 53 for DNS management and traffic routing. The service works with AWS Certificate Manager for SSL/TLS certificates, Amazon CloudWatch for monitoring and logging, and AWS Lambda for edge computing capabilities:

- CloudFront also integrates with Amazon API Gateway for API acceleration, Application Load Balancers and Network Load Balancers for dynamic content, AWS Elemental MediaPackage and MediaStore for video streaming, and Amazon ElastiCache for enhanced caching strategies
- Additional integrations include AWS Config for compliance, AWS CloudTrail for audit logging, and AWS Resource Access Manager for resource sharing

Onboarding and Offboarding

Getting started with CloudFront involves setting up an AWS account, then creating a distribution by specifying origin servers where the original content resides. Customers can use the AWS Management Console to create a standard distribution with S3 as origin, which automatically configures origin access control (OAC) for secure authenticated requests:

- The process includes uploading content to the origin, creating the CloudFront distribution, and configuring cache behaviors and security settings
- AWS provides multiple tutorials including console-based setup, AWS CLI implementation, and secure static website deployment
- The service offers standard distributions for typical use cases and multi-tenant distributions for SaaS providers managing multiple tenants

Getting Started Guide:

<https://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/GettingStarted.html>

Data Removal

To offboard from CloudFront, customers must first disable their distributions, then delete them after confirming deployment status. The process involves updating distribution configuration to disabled status, waiting for the change to propagate across edge locations, then submitting a delete request with the distribution's ETag. Customers should also clean up associated resources including S3 buckets, SSL certificates, CloudFront Functions, Lambda@Edge functions, and any created IAM roles or policies to ensure complete data removal and avoid ongoing charges.

Backup/Restore and Disaster Recovery

CloudFront inherently provides disaster recovery capabilities through its globally distributed architecture with multiple edge locations and Regional Edge Caches. The service offers origin failover functionality that automatically routes traffic to backup origins when primary origins become unavailable. CloudFront's multi-origin support enables backend architecture redundancy, while Origin Shield provides additional protection and centralized caching. The service maintains content availability through cached objects across hundreds of edge locations worldwide, ensuring content remains accessible even during regional outages.

Backup Capabilities

CloudFront does not provide traditional backup capabilities as it is a content delivery network focused on caching and distribution rather than data storage. Content backup is managed at the origin level (such as S3 versioning, database backups, or application server backups). CloudFront automatically caches content across its global network of edge locations, providing natural redundancy and availability, but this caching mechanism is designed for performance optimization rather than data protection or backup purposes.

Disaster Recovery

CloudFront supports disaster recovery through its distributed architecture and origin failover capabilities. The service does not directly integrate with AWS Elastic Disaster Recovery, but provides origin failover that automatically switches to backup origins during

primary origin failures. CloudFront's global network of edge locations ensures content remains available even during regional disasters, and customers can configure multiple origins across different AWS regions for comprehensive disaster recovery strategies.

Recovery Objectives

CloudFront helps meet aggressive RPO and RTO objectives through its global edge network that maintains cached content across hundreds of locations worldwide. Origin failover provides near-instantaneous switching to backup origins, supporting RTO objectives of seconds to minutes. The service's distributed caching architecture ensures content remains available from edge locations even during origin failures, effectively providing RPO of near-zero for cached content. Multi-region origin configurations and intelligent traffic routing further enhance recovery capabilities for mission-critical applications.

Service Constraints

Service Quotas:

<https://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/cloudfront-limits.html>

FAQ: <https://aws.amazon.com/cloudfront/faqs/>

Technical Requirements

Service Documentation:

<https://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/>

User Guide: <https://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide/>

API Reference: <https://docs.aws.amazon.com/cloudfront/latest/APIReference/>

Pricing Overview

Please see the AWS UK G Cloud 15 Pricing Document accompanying this service in the Digital Marketplace.

Public Pricing: <https://aws.amazon.com/cloudfront/pricing/>

Cost Optimization

CloudFront offers unique cost optimization through flat-rate pricing plans (Free, Pro, Business, Premium) that eliminate overage charges and provide predictable monthly costs with included AWS WAF and DDoS protection. Price class selection allows customers to limit content delivery to specific geographic regions, reducing costs by excluding more expensive edge locations:

- Origin Shield reduces origin operating costs by collapsing requests and improving cache hit ratios

- Free data transfer between AWS services and CloudFront for origin fetches provides significant savings
- Regional Edge Caches decrease operational burden on origins while custom pricing options are available for high-volume customers with 10TB+ monthly commitments

Savings Considerations

Primary cost savings come from reduced origin server load through efficient caching and Origin Shield implementation, which can significantly decrease compute and bandwidth costs at origin servers. CloudFront's free tier includes 1TB of data transfer and 10 million requests monthly, providing substantial value for smaller workloads:

- Intelligent caching strategies and proper cache policy configuration maximize cache hit ratios, reducing expensive origin requests
- Geographic optimization through price class selection and strategic content placement near user populations minimizes data transfer costs
- Integration with other AWS services provides additional cost efficiencies through consolidated billing and service-specific optimizations like S3 Transfer Acceleration alternatives