

Service Name

Amazon Elastic File System (EFS)

Service Overview

Amazon Elastic File System (EFS) is a serverless, fully elastic file storage service that provides scalable, shared file storage for AWS compute services. It automatically scales from gigabytes to petabytes without disrupting applications and supports the NFSv4.1 and NFSv4.0 protocols. EFS eliminates the need to provision or manage storage capacity and performance, offering a simple web services interface for creating and configuring file systems. The service manages all file storage infrastructure, including deployment, patching, and maintenance of complex configurations, making it accessible across EC2, ECS, EKS, Lambda, and Fargate.

Key Use Cases

- **Big Data and Analytics:** Processing large datasets with high throughput and concurrent access from multiple compute instances
- **Content Management and Web Serving:** Sharing website content, media files, and documents across web servers with low latency access
- **Media Processing Workflows:** Supporting video encoding, image processing, and other media operations requiring shared file access
- **Application Development and Testing:** Providing shared storage for development environments, CI/CD pipelines, and testing frameworks
- **Database Backups and Disaster Recovery:** Storing database backups and supporting cross-region replication for business continuity
- **Home Directories and User Data:** Serving as centralized storage for user files and application data across multiple instances

Features

- **Elastic Scaling:** Automatically scales from gigabytes to petabytes without disrupting applications
- **Multiple Storage Classes:** Standard, Infrequent Access (IA), and Archive classes with lifecycle management
- **Regional and One Zone Types:** Regional for high durability across AZs, One Zone for cost-optimized single AZ storage
- **Performance Modes:** General Purpose and Max I/O modes for different latency and throughput requirements
- **Throughput Modes:** Elastic, Provisioned, and Bursting throughput modes for workload optimization
- **Encryption:** Data encryption at rest and in transit using AWS KMS

- **EFS Replication:** Cross-region replication for disaster recovery with RPO of 15 minutes
- **Access Points:** Secure, fine-grained access control to specific directories and files
- **AWS Backup Integration:** Automated backup and restore capabilities with configurable retention policies

Value Proposition

Amazon EFS offers significant advantages over alternatives through its serverless, fully managed approach that eliminates infrastructure management overhead. Unlike self-managed solutions, EFS provides 99.999999999% durability with automatic multi-AZ replication, delivering up to 219% ROI according to Forrester research:

- The service offers elastic scaling without capacity planning, pay-as-you-go pricing with no upfront costs, and seamless integration with AWS compute services
- EFS provides cost optimization through intelligent tiering, reducing storage costs by up to 94% with Infrequent Access classes, while maintaining high performance with sub-millisecond latency and support for thousands of concurrent connections

Service Integration

EFS integrates deeply with core AWS compute services including Amazon EC2 for persistent shared storage, AWS Lambda for serverless file access, Amazon ECS and EKS for containerized workloads, and AWS Fargate for serverless containers. It works with AWS Backup for automated data protection, AWS DataSync for data transfer, and AWS Transfer Family for managed file transfers:

- EFS connects with CloudWatch for monitoring, CloudFormation for infrastructure as code, CloudTrail for API logging, and IAM for access control
- The service supports on-premises connectivity through AWS Direct Connect and VPN, enabling hybrid cloud architectures and data migration scenarios

Onboarding and Offboarding

Customers can get started with EFS through multiple approaches: using the EC2 launch wizard for one-click file system creation during instance launch, the EFS console for custom configurations, or AWS CLI/API for programmatic deployment. The Quick Create feature automatically configures recommended settings including Regional file system type, General Purpose performance mode, and Elastic throughput:

- Prerequisites include an AWS account, VPC setup, and appropriate security groups
- The process involves creating the file system, configuring mount targets in desired subnets, and mounting via NFS protocol
- AWS provides comprehensive documentation, tutorials, and getting started guides to facilitate onboarding

Getting Started Guide: <https://docs.aws.amazon.com/efs/latest/ug/getting-started.html>

Data Removal

Offboarding from EFS involves deleting file systems and associated resources through the EFS console, AWS CLI, or API. Customers must first unmount file systems from all instances, then delete mount targets in each Availability Zone. File system deletion is irreversible and permanently removes all data, so AWS recommends creating backups before deletion. Access points, replication configurations, and lifecycle policies should be removed separately. AWS Backup retains backups according to configured retention policies even after file system deletion.

Backup/Restore and Disaster Recovery

EFS provides comprehensive backup and disaster recovery through AWS Backup integration with automatic daily backups enabled by default for console-created file systems. EFS Replication offers cross-region disaster recovery with continuous synchronization and 15-minute RPO for most file systems. Backup rates reach 2,000 files per second or 400 MBps, while restore rates achieve 1,500 files per second or 200 MBps. Point-in-time recovery and incremental backups minimize storage costs and recovery times.

Backup Capabilities

EFS fully integrates with AWS Backup for managed backup services, performing incremental backups that retain necessary reference data for full restoration. Customers can configure automatic backup policies or create on-demand backups without backup plans:

- Regional file systems automatically replicate data across multiple Availability Zones, while One Zone file systems include automatic daily backups by default
- Backup duration can extend up to 30 days without consuming burst credits or affecting file operations

Disaster Recovery

EFS supports disaster recovery through EFS Replication for cross-region protection and works with AWS Elastic Disaster Recovery for comprehensive DR strategies. EFS Replication provides continuous data synchronization to destination regions with configurable RPO and RTO objectives. The service enables failover scenarios by making replica file systems writable during disasters, with options for failback to original regions while preserving or discarding changes made during recovery periods.

Recovery Objectives

EFS helps customers achieve aggressive RPO and RTO objectives through multiple mechanisms: EFS Replication maintains 15-minute RPO for cross-region disaster recovery,

while Regional file systems provide continuous availability even during single AZ outages. Automated backups support point-in-time recovery scenarios, and the service's high availability architecture minimizes downtime. Fast restore capabilities and elastic scaling ensure rapid recovery from backup or replica systems during disaster scenarios.

Service Constraints

Service Quotas: <https://docs.aws.amazon.com/efs/latest/ug/limits.html>

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

Technical Requirements

Service Documentation: <https://docs.aws.amazon.com/efs/latest/ug/whatisefs.html>

User Guide: <https://docs.aws.amazon.com/efs/latest/ug/index.html>

API Reference: <https://docs.aws.amazon.com/efs/latest/ug/api-reference.html>

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/efs/pricing/>

Cost Optimization

EFS offers several unique cost optimization features including three storage classes (Standard, Infrequent Access, Archive) with automatic lifecycle management that can reduce costs by up to 94%. EFS Intelligent-Tiering automatically moves files between storage classes based on access patterns without performance impact:

- One Zone file systems provide cost savings for workloads not requiring multi-AZ resilience
- Elastic throughput mode eliminates over-provisioning by automatically scaling performance, while storage optimization through deduplication and compression reduces storage footprint
- Customers can share file systems across multiple applications to maximize throughput utilization

Savings Considerations

Primary cost savings opportunities include leveraging Infrequent Access and Archive storage classes for rarely accessed data, implementing One Zone file systems for development/testing environments, and using lifecycle policies to automatically transition files to lower-cost tiers. Sharing EFS file systems across multiple applications maximizes resource utilization without additional costs:

- Elastic throughput eliminates provisioned throughput charges during low-usage periods, while proper mount target placement minimizes cross-AZ data transfer charges
- Regular monitoring and rightsizing of performance modes ensures customers pay only for required performance levels rather than over-provisioning resources