**EFS**

Q. What is Amazon Elastic File System?

Amazon EFS is a fully-managed service that makes it easy to set up, scale, and cost-optimize file storage in the AWS Cloud. With a few clicks in the AWS Management Console, you can create file systems that are accessible to Amazon EC2 instances via a file system interface (using standard operating system file I/O APIs) and support full file system access semantics (such as strong consistency and file locking).

Amazon EFS file systems can automatically scale from gigabytes to petabytes of data without needing to provision storage. Tens, hundreds, or even thousands of Amazon EC2 instances can access an Amazon EFS file system at the same time, and Amazon EFS provides consistent performance to each Amazon EC2 instance. Amazon EFS is designed to be highly durable and highly available. With Amazon EFS, there is no minimum fee or setup costs, and you pay only for what you use.

Q. What use cases does Amazon EFS support?

Amazon EFS is designed to provide performance for a broad spectrum of workloads and applications, including Big Data and analytics, media processing workflows, content management, web serving, and home directories.

Amazon EFS file systems can also be mounted on an on-premises server, so any data that is accessible to an on-premises server can be read and written to Amazon EFS using standard Linux tools.

**Q. How do I access my file system from outside my VPC?**

Amazon EC2 instances within your VPC can access your file system directly, and Amazon EC2 Classic instances outside your VPC can mount a file system via [ClassicLink](http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/vpc-classiclink.html). On-premises servers can mount your file systems via an [AWS Direct Connect](https://aws.amazon.com/directconnect/) connection to your VPC.

**Q. How many Amazon EC2 instances can connect to a file system?**

Amazon EFS supports one to thousands of Amazon EC2 instances connecting to a file system concurrently.

**Q. When should I use Amazon EFS vs. Amazon S3 vs. Amazon Elastic Block Store (EBS)?**

Amazon Web Services (AWS) offers cloud storage services to support a wide range of storage workloads.

Amazon EFS is a [file storage service](https://aws.amazon.com/what-is-cloud-file-storage/) for use with Amazon EC2. Amazon EFS provides a file system interface, file system access semantics (such as strong consistency and file locking), and concurrently-accessible storage for up to thousands of Amazon EC2 instances.

[Amazon EBS](https://aws.amazon.com/ebs/) is a block level storage service for use with Amazon EC2. Amazon EBS can deliver performance for workloads that require the lowest-latency access to data from a single EC2 instance.

[Amazon S3](https://aws.amazon.com/s3/) is an object storage service. Amazon S3 makes data available through an Internet API that can be accessed anywhere.

**Q. What Amazon EC2 instance types and AMIs work with Amazon EFS?**

Amazon EFS is compatible with all Linux-based AMIs for Amazon EC2. You can mix and match the instance types connected to a single file system.

**Q. How do I load data into a file system?**

[AWS DataSync](https://aws.amazon.com/datasync/) provides a fast and simple way to securely sync existing file systems with Amazon EFS.  DataSync works over any network connection, including with [AWS Direct Connect](https://aws.amazon.com/directconnect/) or [AWS VPN](https://docs.aws.amazon.com/vpc/latest/userguide/VPC_VPN.html). AWS Direct Connect provides a high bandwidth and lower latency dedicated network connection, over which you can mount your EFS file systems. You can use AWS DataSync to copy files between two EFS file systems, including those in different AWS regions and those belonging to different AWS accounts.  You can also use standard Linux copy tools to move data files to Amazon EFS.

**Q. What Amazon EFS features are supported when using EFS IA storage class?**

All Amazon EFS features are supported when using the EFS IA storage class. Files smaller than 128 KiB are not eligible for Lifecycle Management and will always be stored on EFS Standard.

**Q. How do I back up a file system?**

Amazon EFS is designed to be highly durable. You can use [AWS Backup](https://aws.amazon.com/backup/) to schedule automatic, incremental backups of your Amazon EFS file systems

**Q. How do I access my file system from outside my VPC?**

Amazon EC2 instances within your VPC can access your file system directly, and Amazon EC2 Classic instances outside your VPC can mount a file system via [ClassicLink](http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/vpc-classiclink.html). Amazon EC2 instances in other VPCs can access your file system if connected using a VPC peering connection or VPC Transit Gateway. On-premises servers can mount your file systems via an [AWS Direct Connect](https://aws.amazon.com/directconnect/) or [AWS VPN](https://docs.aws.amazon.com/vpc/latest/userguide/VPC_VPN.html) connection to your VPC.

**Q. How much data can I store?**

Amazon EFS file systems can store petabytes of data. Amazon EFS file systems are elastic, and automatically grow and shrink as you add and remove files. You do not provision file system size up front, and you pay only for what you use.

**Q. How many file systems can I create?**

You can create up to 1,000 file systems per region. For information on Amazon EFS limits, please visit the [Amazon EFS Limits page](https://docs.aws.amazon.com/efs/latest/ug/limits.html#limits-efs-resources-per-account-per-region).

How does Amazon EFS performance compare to that of other storage solutions?

Amazon EFS file systems are distributed across an unconstrained number of storage servers, enabling file systems to grow elastically to petabyte-scale and allowing massively parallel access from Amazon EC2 instances to your data. Amazon EFS’s distributed design avoids the bottlenecks and constraints inherent to traditional file servers.

This distributed data storage design means that multi-threaded applications, and applications that concurrently access data from multiple Amazon EC2 instances can drive substantial levels of aggregate throughput and IOPS. Big Data and analytics workloads, media processing workflows, content management and web serving are examples of these applications.

The table below compares high-level performance and storage characteristics for AWS's file and block cloud storage offerings.

|  |  |  |
| --- | --- | --- |
|  | **Amazon EFS** | **Amazon EBS (io1)** |
| Per-operation latency | Low, consistent | Lowest, consistent |
| Throughput scale | Multiple GBs per second | Single GB per second |

Amazon EFS’s distributed nature enables high levels of availability, durability, and scalability. This distributed architecture results in a small latency overhead for each file operation. Due to this per-operation latency, overall throughput generally increases as the average I/O size increases, since the overhead is amortized over a larger amount of data. Amazon EFS's support for highly parallelized workloads (i.e. with consistent operations from multiple threads and multiple EC2 instances) enables high levels of aggregate throughput and IOPS.

**Q. How do I control which Amazon EC2 instances can access my file system?**

You control which EC2 instances can access your file system using [VPC security group rules](https://docs.aws.amazon.com/efs/latest/ug/security-considerations.html#network-access) and AWS Identity and Access Management (IAM) policies. Use VPC security groups to control the network traffic to and from your file system. Attach an IAM policy to your file system to control which clients can mount your file system and with what permissions, and use EFS Access Points to manage application access. Control access to files and directories with POSIX-compliant [user and group-level permissions](https://docs.aws.amazon.com/efs/latest/ug/accessing-fs-nfs-permissions.html).

Data can be encrypted in transit between your Amazon EFS file system and its clients by using the EFS mount helper.

Encryption of data at rest and of data in transit can be configured together or separately to help meet your unique security requirements.

Q. How can I use IAM policies to manage file system access?

Using the Amazon EFS console, you can apply common policies to your file system such as disabling root access, enforcing read-only access, or enforcing that all connections to your file system are encrypted

**Q: Does encryption impact Amazon EFS performance?**

Encrypting your data has a minimal effect on I/O latency and throughput.

**Q: How do I access an EFS file system from servers in my on-premises datacenter?**

To access EFS file systems from on-premises, you must have an [AWS Direct Connect](https://aws.amazon.com/directconnect/) or [AWS VPN](https://docs.aws.amazon.com/vpc/latest/userguide/VPC_VPN.html) connection between your on-premises datacenter and your Amazon VPC.

You mount an EFS file system on your on-premises Linux server using the standard Linux mount command for mounting a file system via the NFSv4.1 protocol.

Q. Can I access my Amazon EFS file system concurrently from my on-premises datacenter servers as well as Amazon EC2 instances?

Yes, you can access your Amazon EFS file system concurrently from servers in your on-premises datacenter as well as Amazon EC2 instances in your Amazon VPC. Amazon EFS provides the same file system access semantics, such as strong data consistency and file locking, across all EC2 instances and on-premises servers accessing a file system.

Q: How do I copy existing data from on-premises file storage to Amazon EFS?

There are a number of methods to copy existing on-premises data into Amazon EFS. AWS DataSync provides a fast and simple way to securely sync existing file systems into Amazon EFS, and works over any network, including AWS Direct Connect

[AWS Direct Connect](https://aws.amazon.com/directconnect/) provides a high bandwidth and lower latency dedicated network connection over which you can mount your Amazon EFS file systems. Once mounted, you can use DataSync to copy data into Amazon EFS up to 10x faster than standard Linux copy tools.

Q. Can Amazon EFS data be transferred between regions?

You can use AWS DataSync to transfer files between two Amazon EFS file systems, including ones in different AWS Regions. AWS Transfer Family endpoints must be in the same region as your Amazon EFS file system.

Q. Can I access my file system with another AWS account?

Yes, you can use AWS DataSync to copy files to an Amazon EFS file system in another AWS account.

You can also configure your Amazon EFS file system to be accessed by AWS Transfer Family using another account as long as the account has been granted permissions to do so. To learn more about granting AWS Transfer Family permissions to external AWS accounts via file system policies, see the [documentation](https://docs.aws.amazon.com/efs/latest/ug/using-aws-transfer-integration.html#efs-cross-acct-access-transfer).

Q. What type of locking does Amazon EFS support?

Locking in Amazon EFS follows the NFSv4.1 protocol for advisory locking, and enables your applications to use both whole file and byte range locks.

Q. Are file system names global (like Amazon S3 bucket names)?

Every file system has an automatically generated ID number that is globally unique. You can tag your file system with a name, and these names do not need to be unique.

AWS DataSync

Q. What is AWS DataSync?

AWS DataSync is an online data transfer service that makes it faster and simpler to move data between on-premises storage and Amazon EFS. DataSync uses a purpose-built protocol to accelerate and secure transfer over the Internet or AWS Direct Connect, at speeds up to 10 times faster than open-source tools. Using DataSync you can perform one-time data migrations, transfer on-premises data for timely in-cloud analysis, and automate replication to AWS for data protection and recovery

Q: How do I copy data into or out of my EFS file system with AWS DataSync?

To get started with AWS DataSync you first deploy a software agent that is available for download from the AWS Management Console. Once deployed, you can use the console or AWS Command Line Interface (CLI) to connect the agent to your on-premises or in-cloud file systems using the Network File System (NFS) protocol, select your Amazon EFS file system, and start copying data.

Q. Can EFS data be copied between regions with AWS DataSync?

Yes, you can use AWS DataSync to transfer files between two EFS file systems, including ones in different AWS Regions or ones belonging to different AWS accounts.

Q. What type of locking does Amazon EFS support?

Locking in Amazon EFS follows the NFSv4.1 protocol for advisory locking, and enables your applications to use both whole file and byte range locks.

Q. Are file system names global (like Amazon S3 bucket names)?

Every file system has an automatically generated ID number that is globally unique. You can tag your file system with a name, and these names do not need to be unique.

Q. Can I access Amazon EFS from Amazon Elastic Container Service (Amazon ECS) containers?

Yes, you can access Amazon EFS from containerized applications launched by [Amazon Elastic Container Service (Amazon ECS)](https://aws.amazon.com/ecs/) using both Amazon EC2 and AWS Fargate launch types by referencing an Amazon EFS file system in your task definition

Q. Can I access Amazon EFS from Amazon Elastic Kubernetes Service (Amazon EKS) pods?

Yes, you can access Amazon EFS from containerized applications launched by [Amazon EKS](https://aws.amazon.com/eks/), via either [Amazon EC2](https://aws.amazon.com/ec2/) or [AWS Fargate](https://aws.amazon.com/fargate/) launch types, using the Amazon EFS CSI driver. Getting started instructions can be found in the [Amazon EKS documentation](https://docs.aws.amazon.com/eks/latest/userguide/efs-csi.html).

Q. Can I access Amazon EFS from AWS Lambda functions?

Yes, you can access Amazon EFS from functions running in [AWS Lambda](https://aws.amazon.com/lambda/) by referencing an Amazon EFS file system in your function settings