AWS Solution Architect Associate Certification Training – Module 9

9. EFS (Elastic File System)

What is EFS

Amazon Elastic File System (Amazon EFS) provides a simple, scalable, elastic file system for Linux-based workloads for use with AWS Cloud services and on-premises resources. It is built to scale on demand to petabytes without disrupting applications, growing and shrinking automatically as you add and remove files, so your applications have the storage they need – when they need it. It is designed to provide massively parallel shared access to thousands of Amazon EC2 instances, enabling your applications to achieve high levels of aggregate throughput and IOPS with consistent low latencies. Amazon EFS is a fully managed service that requires no changes to your existing applications and tools, providing access through a standard file system interface for seamless integration. There is a Standard and an Infrequent Access storage class available with Amazon EFS. Using Lifecycle Management, files not accessed for 30 days will automatically be moved to a cost-optimized Infrequent Access storage class, giving you a simple way to store and access active and infrequently accessed file system data in the same file system while reducing storage costs by up to 85%. Amazon EFS is a regional service storing data within and across multiple Availability Zones (AZs) for high availability and durability. You can access your file systems across AZs, regions, and VPCs and share files between thousands of Amazon EC2 instances and on-premises servers via AWS Direct Connect or AWS VPN.

Amazon EFS is well suited to support a broad spectrum of use cases from highly parallelized, scale-out workloads that require the highest possible throughput to single-threaded, latency-sensitive workloads. Use cases such as lift-and-shift enterprise applications, big data analytics, web serving and content management, application development and testing, media and entertainment workflows, database backups, and container storage.

Important: Amazon EFS is not supported on Windows instances.

Benefits

Dynamic Elasticity

Amazon EFS automatically and instantly scales your file system storage capacity up or down as you add or remove files without disrupting your applications, giving you the storage you need – when you need it. You simply create your file system and start adding files with no need to provision storage in advance.

Scalable Performance

Amazon EFS is designed to provide the throughput, IOPS, and low latency needed for Linux workloads. Throughput and IOPS scale as a file system grows and can burst to higher throughput levels for short periods of time to support the unpredictable performance needs of file workloads. For the most demanding workloads, Amazon EFS can support performance over 10 GB/sec and up to 500,000 IOPS.

Shared file storage

Amazon EFS provides secure access for thousands of connections. Amazon EC2 instances and on-premises servers can simultaneously access a shared Amazon EFS file system using a traditional file permissions model, file locking capabilities, and hierarchical directory structure via the NFSv4 protocol.

Amazon EC2 instances can access your file system across AZs and regions while on-premises servers can access using AWS Direct Connect or AWS VPN.

Fully Managed

Amazon EFS is a fully managed service providing shared file system storage for Linux workloads. It provides a simple interface allowing you to create and configure file systems quickly and manages the file storage infrastructure for you, removing the complexity of deploying, patching, and maintaining the underpinnings of a file system.

Cost-effective

With Amazon EFS storage, you pay only for what you use. There is no need to provision storage in advance and there are no minimum commitments or up-front fees. With Lifecycle Management, you can automatically move files that have not been accessed for 30 days to a cost-optimized storage class, reducing storage costs by up to 85%.

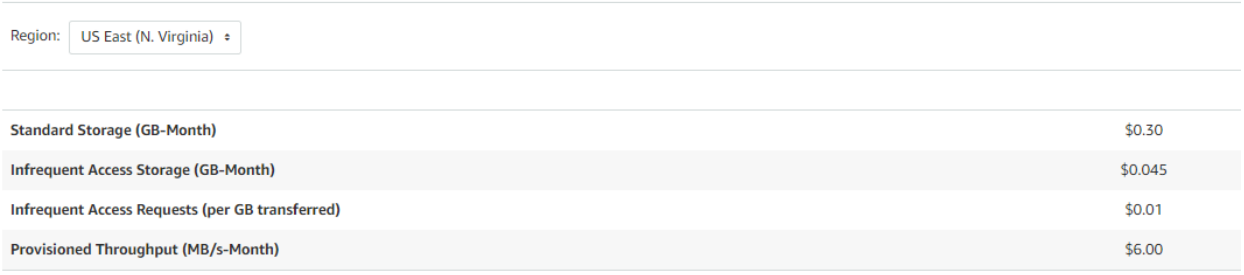
Security and compliance

Amazon EFS allows you to securely access your files using your existing security infrastructure. Control access to your Amazon EFS file systems with POSIX permissions, Amazon VPC, and AWS IAM. Secure your data by encrypting your data at rest and in transit. Amazon EFS also meets many eligibility and compliance requirements to help you meet your regulatory needs.

Pricing

Within your first 12 months on AWS, you can use up to 5 GB/month for free.

After first 12 months, below is the price for 1 region as an example



Region: US East (N. Virginia)

Standard Storage (GB-Month)	$0.30
Infrequent Access Storage (GB-Month)	$0.045
Infrequent Access Requests (per GB transferred)	$0.01
Provisioned Throughput (MB/s-Month)	$6.00

Points to know about EFS

- When you have an application that requires multiple virtual machines to access the same file system at the same time, AWS EFS is a tool that you can use.
- Think of EFS as a managed Network File System (NFS), that is easily integrated with other AWS services like EC2 or S3.
- By the way, S3 could neither be an alternative to a Network File System nor a replacement for EFS... S3 is not a file system.

- Sometimes when you think about using a service like EFS, you may also think about “Cloud Lock” and its negative sides on your business but to reduce the Time To Market, increase productivity and costs, EFS could be a good choice.
- What I liked the more about EFS is the extreme simplicity to use it.
- Creating an EFS file system can be done easily using the console or the CLI.
- The replication of files between multiple availability zones in a region is insured automatically by EFS.
- EFS support encryption.
- EFS is SSD based storage and its storage capacity and pricing will scale in or out as needed, so there is no need for the system administrator to do additional operations. It can grow to a petabyte scale.
- Throughput and IOPS (Input/output operations per second) will be scaled according to how much your storage will grow/shrink.
- It is possible to use your EFS from your in-premise data center and attach your storage directly to EFS using Direct Connect.
- EFS is expensive compared to EBS (probably 10x more EBS pricing).
- EFS is not the magical solution for all your distributed FS problems, it can be slow in many cases. Test, benchmark and measure to insure your if EFS is a good solution for your use case.
- EFS is only compatible with Linux, if you’re using another OS, find another solution..

Amazon EFS Use Cases

Amazon EFS is designed to meet the performance needs of the following use cases.

Big Data and Analytics

Amazon EFS provides the scale and performance required for big data applications that require high throughput to compute nodes coupled with read-after-write consistency and low-latency file operations.

Media Processing Workflows

Media workflows like video editing, studio production, broadcast processing, sound design, and rendering often depend on shared storage to manipulate large files. A strong data consistency model with high throughput and shared file access can cut the time it takes to perform these jobs and consolidate multiple local file repositories into a single location for all users.

Content Management and Web Serving

Amazon EFS provides a durable, high throughput file system for content management systems that store and serve information for a range of applications like websites, online publications, and archives.

Home Directories

Amazon EFS can provide storage for organizations that have many users that need to access and share common data sets. An administrator can use Amazon EFS to create a file system accessible to people across an organization and establish permissions for users and groups at the file or directory level.