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Amazon Elastic File System (EFS) and Amazon Simple Storage Service (S3) are both storage services offered by Amazon Web Services (AWS), but they serve different purposes and have different sets of limitations. Here are some of the limitations of EFS compared to S3:

1. File System-based: EFS is a file system service, meaning it provides a traditional file system interface, allowing multiple instances to access the same file system concurrently. On the other hand, S3 is an object storage service, where data is stored as objects in buckets.
2. Performance: EFS is designed for low-latency, frequently accessed file-based workloads. However, its performance may not match the high throughput and low latency of S3 for large-scale data storage and retrieval. S3 is optimized for storing and retrieving large amounts of data and is highly scalable.
3. Cost: EFS can be more expensive compared to S3, especially for storing large amounts of data. EFS pricing is based on the amount of storage provisioned, while S3 pricing is based on the amount of data stored. If you have infrequently accessed or archival data, S3's storage classes like Glacier or Glacier Deep Archive may be more cost-effective.
4. Availability Zones: EFS is designed to be accessible within a single AWS Region and can be mounted by instances in different Availability Zones. However, it doesn't support cross-region replication. In contrast, S3 can replicate data across multiple AWS Regions for better data durability and availability.
5. Access Control: EFS uses traditional POSIX permissions for controlling access to files and directories, similar to on-premises file systems. S3, on the other hand, uses AWS Identity and Access Management (IAM) policies and Access Control Lists (ACLs) to control access to objects stored in buckets. S3 provides more granular control and integrates well with other AWS services.
6. Object Size Limit: S3 allows storing individual objects up to 5 terabytes in size, while EFS has a file size limit that depends on the operating system and file system used by the instances accessing the file system.

It's important to note that EFS and S3 are designed for different use cases, and the choice between them depends on your specific requirements. EFS is suitable for shared file storage and frequently accessed data, while S3 is ideal for scalable object storage and data archival.

2.

When it comes to archival storage, Amazon S3 provides several storage classes that are specifically designed for long-term data retention and cost-effective archival:

1. S3 Glacier: S3 Glacier is a low-cost storage class designed for long-term data archival. It offers three retrieval options: expedited, standard, and bulk. Expedited retrieval provides data access within minutes, while standard retrieval takes several hours, and bulk retrieval can take up to 12 hours. Glacier is suitable for data that is rarely accessed but requires long-term retention.
2. S3 Glacier Deep Archive: Glacier Deep Archive is the most cost-effective storage class for long-term data archival. It is optimized for infrequently accessed data and offers the lowest storage

costs among the S3 storage classes. Retrieval times for Deep Archive can range from 12 to 48 hours, making it ideal for data that is rarely accessed and has stringent cost considerations.

Both S3 Glacier and S3 Glacier Deep Archive provide durable storage with high durability guarantees (99.999999999%) for your archived data.

EFS, on the other hand, is not specifically designed for archival storage. It is better suited for frequently accessed file-based workloads where low latency and high throughput are important. While EFS can store and retain data, its pricing model and performance characteristics make it less cost-effective and efficient for long-term archival purposes compared to the dedicated archival storage options provided by S3 Glacier and Glacier Deep Archive.

If your primary requirement is archival storage, it is recommended to use the S3 Glacier storage classes for their optimized features and cost-effectiveness.

3.

When retrieving data that was last accessed years back, there are some technical limitations to consider for Amazon EFS compared to Amazon S3:

Amazon EFS:

1. Performance Impact: If you have a large number of files or directories with infrequent access, EFS performance might be affected when accessing these rarely used files. EFS is optimized for low-latency, frequently accessed workloads, so accessing files that have been dormant for a long time may result in higher latency compared to regularly accessed files.

2. File Metadata Overhead: EFS stores file metadata, such as permissions and timestamps, alongside the actual file data. If you have a high number of files with infrequent access, the storage of metadata can have an impact on storage costs and overall performance.

3. Scalability: While EFS is highly scalable in terms of storage capacity and throughput, retrieving large amounts of data from EFS, especially if the data hasn't been accessed for a long time, may require more time and resources compared to S3. EFS is more optimized for small to medium-sized file workloads rather than large-scale data retrieval.

4. Cost: EFS can be more expensive for long-term archival storage due to its pricing model based on provisioned storage. If you have infrequently accessed data that is rarely touched, the cost of keeping it in EFS may be higher compared to using S3 Glacier or Glacier Deep Archive, which are specifically designed for long-term archival storage with lower costs.

In contrast, Amazon S3 Glacier and Glacier Deep Archive are designed for archival storage with optimized retrieval options and cost-effectiveness:

1. Retrieval Options: S3 Glacier and Glacier Deep Archive offer different retrieval options with varying retrieval times, allowing you to balance cost and retrieval speed based on your needs. However, retrieving data from the archival storage classes typically takes longer compared to EFS or other storage classes in S3.

2. Lower Storage Costs: S3 Glacier and Glacier Deep Archive provide significantly lower storage costs compared to EFS for long-term archival storage. These storage classes are designed for infrequently accessed data and offer cost-effective solutions for data retention over extended periods.

Considering these limitations, if you have data that was last accessed years back and requires retrieval, S3 Glacier or Glacier Deep Archive are more suitable options due to their cost-effectiveness, retrieval options, and optimized archival storage features.

Feature	Amazon EFS	Amazon S3 (Archival Storage)
Storage Type	File system-based	Object-based
Archival Storage Option	Not specifically designed for archival storage	S3 Glacier and S3 Glacier Deep Archive
Technical Limitations	Limited support for cross-region replication	N/A
	No specific retrieval options or retrieval time guarantees	Different retrieval options with varying retrieval times
Optimization	Designed for low-latency, frequently accessed workloads	Optimized for long-term data retention and cost-efficiency

	Suitable for shared file storage and frequently accessed data	Ideal for scalable object storage and data archival
Cost	Can be more expensive, especially for large-scale data storage	Cost-effective, with different storage classes for archival storage
	Pricing based on storage provisioned	Pricing based on storage consumed
		Lower storage costs for archival storage classes
Access Control	Uses traditional POSIX permissions	IAM policies and ACLs for access control
Durability	Highly durable (designed for 11 nines durability)	High durability guarantees (99.999999999%)

Note that the table provides a high-level overview of the