EFS

Sunday, August 11, 2024   8:27 PM

AWS EFS

Table of Contents

► Introduction to EFS (Elastic File System)
► Features of EFS
► Comparison of Storage Systems

Marketteki NFS in AWSteki karsiligi EFS.

What is File System?

- In computing, a file system or filesystem (often abbreviated to fs) is a method and data structure that the operating system uses to control how data are stored and retrieved.
- Every time you open a file on your computer or smart device, your operating system uses its file system internally to load it from the storage device.
- Or when you copy, edit, or delete a file, the file system handles it under the hood.

Why do we need a file system in the first place, you may ask?

- Well, without a file system, the storage device would contain a big chunk of data stored back to back, and the operating system wouldn't be able to tell them apart.
- The term file system takes its name from the old paper-based data management systems, where we kept documents as files and put them into directories.
- Imagine a room with piles of papers scattered all over the place. A storage device without a file system would be in the same situation - and it would be a useless electronic device.

What is Network File System(NFS)?

The Network File System (NFS) is a mechanism for storing files on a network. It is a distributed file system that allows users to access files and directories located on remote computers and treat those files and directories as if they were local.

File system isletim sitemindeki verilerin nasil depolanip nasil alinacagiyla alakali bilgileri kullandigi bir method ya da bir data structure.
Bir telefondaki actigimizda bu telefondaki depolama sistemine ulasir ve harddisk ya da ssd den sisteme ulasip arka tarafta dosyayi kullanir. Bunu yukleyip getirip bize okutan sisteme file system diyoruz.
Ya da biz bir dosyayi sildigimizde, degistirdigimizde vs arka tarafta file system bunu kendi icinde halletmis oluyor.
File system olmazsa bilgisayarimza yuklenen yigin yigin veriler bir islemci olmadigi icin anlamli bir hale gelmeyecek. Bu durumda biz bu sistemle bu yiginlari anlamli hale getirip birbirlerinden ayrilacak hale gelmesi icin bir dosya sistemi kullanmis oluyoruz.
NFS network uzerinde bir dosya sistemi. Dosyalari bir ag uzerinde depolamak icin kullanilan bir dosya sistemi.
Kullanicilari uzakta bulunan dosya ve dizinlere erismek icin bu dosyalara ve dizinlere yerelmis gibi davranabiliyorlar. Boylece paylasimli dosya olmus oluyor ve agdaki tum bilgisayarlar bu network icindeki dosyalara erisip degisiklik ekleme cikarma vs yapabiliyorlar.

What is File System?

It is a system used by an operating system to manage files. The system controls how data is saved or retrieved

Shirts
Accessories
Skirts
Jackets
Shoes
Pants

BIR FILE SYSTEM OLMAYAN PC

What is File System?

It is a system used by an operating system to manage files. The system controls how data is saved or retrieved

Closet

Shirts
Accessories
Skirts
Jackets
Shoes
Pants

BIR FILE SYSTEMI OLAN PC

What is File System?

Operating system stores files and directories in an organized and structured way

System configuration file = Folder A
User files = Folder B
Log files = Folder C
Commands or scripts = Folder D and so on

There are many different types of filesystems. In general, improvements have been made to filesystems with new releases of operating systems and each new filesystem has been given a different name
e.g. ext3, ext4, ext5, xfs, NTFS, FAT etc.

Operating sistem aslinda dosyalaarimizi ve directorylerimizi organize edilmis ve structured edilmis bir sekilde depolarlar.
Linux olarak dusunursek sistem kullanicilari bir dosyada duruyor, kullanici bilgileri bir dosyada, log dosyalari bir dosyada, komutlar scriptler bir dosyada tutulur gibi.
Farkli farkli turde dosyalar var.
Genel haliyle her gelismis bir dizin yeni haliyle adlandiriliyor.

Introduction to EFS

An EFS is a Network File System (NFS) that organizes data in a logical file hierarchy. Data is stored in a path-based system, where data files are organized in folders and sub-folders.

Mapped file server drives and detachable USB drives both use hierarchical file systems, so the concept should be familiar to anyone who has ever dealt with personal computers and servers.

EFSs are ideal candidates for storing:
- Organizational data
- File server
- Individual data
- Application data

Amazon states that a single EFS can be simultaneously connected to thousands of Elastic Compute Cloud (EC2) instances or on-premise resources, allowing you to share EFS data with as many resources as needed. Access to shared EFS folders and data is provided through native operating system interfaces.

NFS sisteminin karsiliginda bir EFS sistemi cikiyor.
EFS logical data ve mantiksal dosya hiyerarsisinde verileri duzenleyen bir
Burada da datalar klasorler veya alt klasorler halinde duzenlendigi path tabanli bir sistemde saklanabiliyorlar.
Aws EFS icin ayni onda on binlerce instance ya da on premise resourcea baglanabilecegini soyluyor.
Bircok kaynak paylasma olanagi sagliyor.
Arayuz olarakta yerel isletmedeki arayuzu kullanabiliyoruz.
Organizal data, file server, birreysel data, application data icin bunu kullaniyoruz.
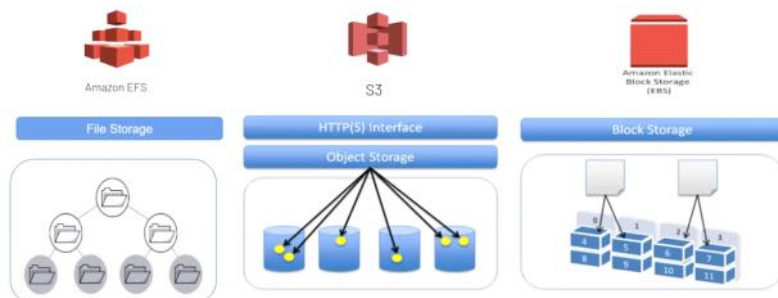
Introduction to EFS
What is EFS?

Basit, scale edilebilir ve full managed bir Elastic NFS dosya sistemidir.
Dosyalari tutarken ya da organize ederken klasorler ve alt klasorler olarak tutuyor.

- Simple, scalable, fully managed Elastic NFS file system.
- Amazon elastic file system (amazon efs) is service that provides a simple, scalable, fully managed elastic nfs file system.
- It offers a traditional file storage concept, with data organized into directories and subdirectories.

Introduction to EFS
Recap of the Storage Options

Amazon EFS — File Storage

S3 — HTTP(S) Interface / Object Storage

Amazon Elastic Block Storage (EBS) — Block Storage

EBSte datayi bloklara bolup bloklarda depoluyorduk ve cagirildiginda data bir burun olarak geliyordu.
S3 de bir butun olarak objeleri koyuyorduk. Bu objelere public ise heerkes, private ise izne sahip olanlar eisebiliyordu.
EFS de ise dosyalar halinde saklaniyor objeler. Bu dosyalara da tek bir EC2 ya da birden fazla izni ayarlanmis EC2 lar ulasabiliyor.

Features of EFS
Scalability-Cost

- Since EFS is scalable, it increases and decreases the storage capacity automatically as you add and delete files

- There is no minimum fee or setup cost

EFS scale edilebilir.
EBS teki gibi baslangicta bir size belirlemiyoruz. Icerisine attikca otomatik olarak storage kapasitesi artiyor. Sildikce de azaliyor.
Bir kurulum ucreti ya da minimum bir ucret yok.

Features of EFS
Attaching

- Unlike *EBS, **multiple Amazon EC2** instances (**Linux only**) even **in different AZ's** can be attached to Amazon **EFS** file system **at the same time.**

*Except Nitro-based instances in the same Availability Zone.

EBS ler sanallama uzrinden EC2 ya baglaniyor. Digeride enstance storelar. Bunlar da fiziksel olarak ec2 lara attach edilmis store tipleri. Sadece reboot halde ayakta kalabiliyorlar. Stopa aldiginiz icerideki veriler kayboluyor.
EBS te multi attach de var ama her instance icin gecerli degil.
Ama ortada bir dosya var ve burdan bir cok kullaniciya dagitilacaksa o zaman EFS kullanilir.
Sadece linux destekli ec2lar icin gecerli bu bilgiler. Cunku EFS linux tabanli bir sistem.
Farkli AZ lerde olsa bile bircok sunucu tek bir EFS dosyasina attach edilebilir.

EFS Structure : Mount Target (for Regional Storage Class)
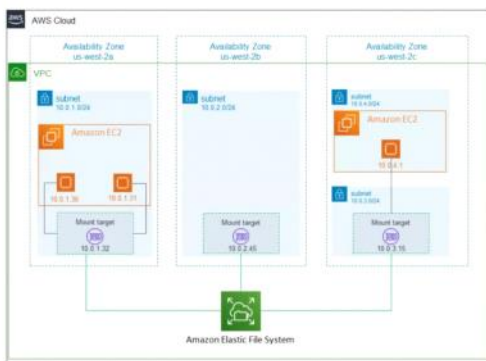
- Mount Target is a AZ based component.

- You can create only one Mount Target in a AZ

- It will be located only in one subnet of the relevant AZ.

- EFS mount targets are not "servers", but elastic network interfaces which expose EFS to our VPC. Our client access EFS by connecting to the mount targets (i.e. ENIs).

- If our VPC spans 3 AZs, to ensure high availability of access to our file system, a good practice is to create a mount target for each AZ.

CLARUSWAY

Ayni VPC icersinde 3 ayri AZ de subnetlerimiz var. Her bir AZ de mount targetlar var.
Mount targetlar regional storage classlar icin AZ based bir bilesen.
Bir AZ de yalnizca bir tane mount target noktasi olusturabiliriz regional storage classta.
Subnet sayisi artsada her bir Azde mount target bir tane.
EFSlerimize ulasmak icin bir mount target noktasina sahip olmamiz gerek. Buna sahipsek bu sekilde ec2 dosyalarimiza ulsabiliriz.
AZ dedigimiz zaman fokuslanacagimiz sey high availability. SINAVDA CIKABILIR!!!
Burada 3 mount target var her bir Azde. Bu da bize EFS imiz icin high availity sunmus oluyor.

EFS Structure : Mount Target (for One-Zone Storage Class)
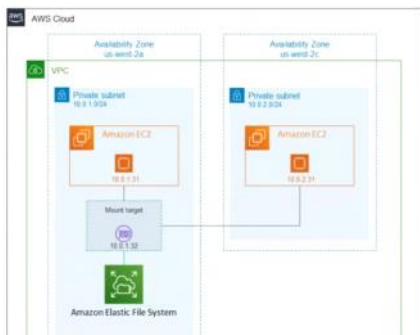
- Mount Target is created only in one subnet in relevant AZ.

- Other AZs also uses this Mount Target to communicate with EFS

- Amazon EFS file systems that use One Zone storage classes support only a single mount target which is located in the same Availability Zone as the file system.

Bir VPC icerisine bir tane mount target olusturuyoruz.
Diger Azlerdeki subnetler bu tek bir subnete kurulmus mount targeta baglanarak EFS dosyalarina erisebiliyorlar.

Features of EFS
Storage Classes

Amazon efs offers two main storage classes, **Standard** and **OneZone** storage classes.

EFS **standard** and **standard-ia** storage classes are regional storage classes that are designed to provide continuous availability to data, even when one or more availability zones in an aws region are unavailable. They offer the highest levels of availability and durability by storing data across multiple separated availability zones within a region. The efs standard storage class is used for frequently accessed files. The standard–ia storage class reduces storage costs for files that are not accessed every day.

EFS **one zone** and **one zone–ia** storage classes are designed to provide continuous availability to data within a single availability zone.

S3 deki gibi burada da claslama olayi var.
Standart olan regional olarak gecer ve bunun da alt 2 basligi vardir Standart ve Standart Infrequent Access.
S3 de dosyaya ne kadar hizli erismek istiyorsak ya da ulastigimizda ne kadar hizli cekecegimize bagli olarak siniflandirma da ona goreydi. Bir de ne kadar siklikla ulasacagiz ona gore bir class seciyorduk.
Burada da maliyeti dusurmek icin ne siklikla ulasmak istiyorsunuz kismi var ve ve tek bir zoneda mi yoksa region bazli mi kullanacagiz durumu var.
One zone maliyeti dusurmus oluyor haliyle.
Regionalda daha az ulasacaksak standart infrequent access oneriyor maliyet usuklugu sebebiyle

Features of EFS
Disadvantages of Using EFS

Amazon EFSs do have a couple limitations:

- No Windows instances. Amazon EFSs are not supported on AWS Windows EC2 instances. EFS volumes can only be used with non-Windows instances, such as Linux, that support NFS volumes.

- No system boot volumes. Amazon EFS volumes also cannot be used for system boot volumes. AWS EC2 instances must use Elastic Block Store (EBS) volumes for booting their systems. EBS volumes are like EFS volumes with one exception. An EBS volume can only be connected to one EC2 instance or server, while EFS volumes can be connected to several EC2 instances and on-premises resources.

Dezavantaj olarak windows instancelara bunu baglayamiyoruz.
Windowsta NFS kullanmak istiyorsak fsx kullanabiliriz.
EFS volumelarini gorunce aklimiza direkt linux instancelari gelecek. SINAVDA CIKABILIR!!!
Ec2 acilirken bir root volume var. Bu root volume icerisinde de bir boot system volumeu var. Oradan ciliyor. Yani EC2 ya EFS ekledim bir EBS eklemeyeyim diyemiyorsunuz. Cunku sistem boot volume olarak kullanilamayacagi icin o ec2 acilamaz.
EBSler tek bir instancea baglanir, EFS ler ise multi

Comparison of Storage Systems

Amazon EFS   S3   EBS

EBS hizini kendisimiz belirleyebiliyoruz input output olarak.
S3 leri bir ec2 ya mount edemiyoruz. EBS te sadece tek instance attach EFS te ise multi instance.
Kapasite olarak S3 ve EFS sinirsiz, buyudukce buyuyor. . EBS te ise 16-64 TB ta kadar degisiyor.

- Cost Optimized :   S3 > EBS > EFS   Hatali siralama. En ucuz S3 < EBS < EFS

- Speed   :   EBS , EFS >S3

- EC2 mount   :   S3 : No
                       EBS : Single*
                       EFS : Multiple

- Storage Capacity : S3, EFS = ∞ vs. EBS =16 - 64 TB

Comparison of Storage Systems

Amazon EFS   S3   EBS

Yuksek IOPS gerektiren datalar icin EBS. Ya da bir webserver kurduk mesela. Onun icerisinde barindiracagimiz dosyalar buralard tutulur.
Internet sitesine resim video ya da her taraftan erisilmesini istedigimiz dosyalar icin S3.
EFS te fokuslanacagimiz kisim global content management. Yani bircok yerden icerik yonetmek veya bircok yere icerik paylasma icin.

- Large quantities of data
- Large analytic workloads
- Global content management

-Website images and videos
-Data analytics of mobile/web applications
- Data which is needed to be accessed from anywhere

- High IOPS required data
- Database management

		File Amazon EFS	Object Amazon S3	Block Amazon EBS
Performance	Per-operation latency	Low, consistent	Low, for mixed request types, and integration with CloudFront	Lowest, consistent
	Throughput scale	Multiple GBs per second	Multiple GBs per second	Single GB per second
Characteristics	Data Availability/Durability	Stored redundantly across multiple AZs	Stored redundantly across multiple AZs	Stored redundantly in a single AZ
	Access	One to thousands of EC2 instances or on-premises servers, from multiple AZs, concurrently	One to millions of connections over the web	Single EC2 instance in a single AZ
	Use Cases	Web serving and content management, enterprise applications, media and entertainment, home directories, database backups, developer tools, container storage, big data analytics	Web serving and content management, media and entertainment, backups, big data analytics, data lake	Boot volumes, transactional and NoSQL databases, data warehousing & ETL
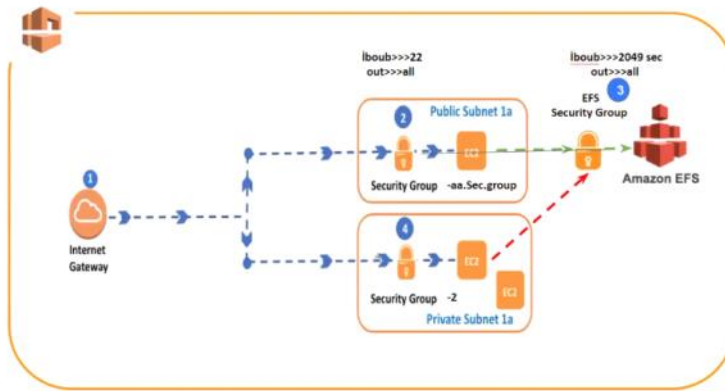
EFS e direkt ulasmalarini istemedigimiz icin onune bir sec group kurup onun uzerinden gelmelerini istiyoruz