**FSx**

* Overview
  + Is for Windows File Server and provides fully managed file storage that is accessible over industry-standard Server Message Block(SMB) protocol
  + Provides fully managed third-party file systems
  + FSx provides you with native compatibility of third-party file systems with feature sets for workloads such as
    - Windows-based storage
    - High-performance computing
    - ML
    - Electronic design automation(EDA)
  + You don't have to worry about managing file servers and storage as FSx automates the time-consuming administration tasks such as hardware provisioning, software configuration, patching and backups
  + Integrates the file systems with cloud-native AWS services, making them even more useful for a broader set of workloads
  + FSx provides you with two file systems to choose from
    - **FSx for Windows File Server**
      * **For windows based applications**
    - **FSx for Lustre**
      * **For compute intensive Linux workloads**
  + FSx for File Server
    - Fully managed native Microsoft Windows file system so you can easily move your windows-based applications that require shared file storage to AWS
    - **Built on Windows Server, FSx provides the compatibility and features that your Microsoft applications rely on, including full support for SMB protocol, Windows NTFS and Microsoft Active Directory integration**
    - uses SSD storage to provide fast performance with low latency
    - This compatibility, performance and scalability enables business-critical workloads such as home directories, media workflows, and business applications
    - FSx helps you to optimize TCO with Data Deduplication, reducing costs by 50-60% for general-purpose file shares
    - User quotas give you the option to better monitor and control costs. You pay for only the resources used, with no upfront costs or licensing fees
  + Details and Benefits
    - **High Availability:** FSx automatically replicates your data within an AZ it resides in(which you specify during creation) to protect it from component failure, continuously monitors for hardware failures, and automatically replaces infrastructre components in the event of a failure
    - **Multi-AZ:** FSx offers a multiple availability deployment option, designed to provide continuous availability to data, even in the event that an AZ is unavailable. Multi-AZ file systems include an active and standby file server in separate AZs and any changes written to disk in your file system are synchronously replicated across AZs to the standby
    - Supports Windows-native file system features:
      * Access Control Lists(ACLs), shadow copies and user quotas
      * NTFS file systems that can be accessed from up to thousands of compute instances using the SMB protocol
    - **Works with Microsoft AD(Active Directory) to easily integrate file systems with Windows environments**
    - Build on SSd-storage, FSx provides fast performance with up to 2 GB/second throughput per file system, hundreds of thousands of IPS, and consistent sub-millisecond latencies
    - Can choose a throughput level that is independent of your file system size
    - Using DFS Namespaces, you can scale performance up to tens of gigabytes per second of throughput, with millions of IOPS across hundreds of petabytes of data
    - FSx automatically encrypts your data at-rest and in-transit
    - Assesed to comply with ISO, PCI-DSS and SOC certifications and is HIPAA eligible
    - Integration with CloudTrail monitors and logs your API calls letting you see actions taken by users on FSx resources
    - Pay only for the resources you use with no minimum commitments or up-front fees
    - Can optimize costs by removing redundant dat awith Data Deduplication
    - User quotas provide tracking, monitoring and enforcing of storage consumption to help reduce costs
  + FSx for Lustre
    - FSx for Lustre provides a high-performance file system optimized for fast processing of workloads such as machine learning, high performance computing(HPC), video processing, financial modeling, and electronic design automation(EDA)
    - These workloads commonly require data to be presented via fast and scalable file system interface and typically have data sets stored on long-term data stores like S3
    - FSx for Lustre provides a fully managed high-performance Luster file system that allows file-based applications to access data with hundreds of gigabytes per second of data, millions of IOPS and sub millisecond latencies
    - FSx works natively with S3 letting you transparently access your S3 objects as files on FSx to run analyses for hours to months
    - You can then write results back to S3 and simply delete your file system. FSx for Lustre also enables you to burst your data processing workloads from on-premises to AWS by allowing you to access your FSx file system of Amazon Direct COnnect or VPN
    - You can also use FSx for Lustre as standalone high-performance file system to burst your workloads fom on-premises to the cloud
    - By copying on-premises data to an FSx Lustre file system you can make that data available for fast processing by compute instacnes running on AWS
    - With FSx you pay for the resources you use. There are no minimum commitments, upfront hardwrae or software costs, or additional fees
  + Details and Benefits
    - Lustre is a popular open-source parallel file system that is designed for high-performance workloads. These workloads include HPC, machine learning, analytics and media processing
    - A parallel file system provides high throughput for processing large amounts of data and performs operations with consistently low latencies
    - It does so by storing data across multiple networked servers that thousands of compute instances can interact with concurrently
    - **Lustre file system provides a POSIX-compliant file system interface**
    - FSx can cale up to hundreds of gigabytes per second of throughput, and millions of IOPS
    - Provides high throughput for processing large amounts of data and performs operations with consistent sub-millisecond latencies
    - **Supports file access to thousands of EC2 instance, enabling you to provide file storage for your high-performance workloads like genomics, seismic exploration and video rendering**
    - S3
      * FSx works natively with S3 making it easy to access your S3 data to run data processing workloads
      * Your S3 objects are presented as files in your file system, and you can write your results back to S3
      * This lets you run data processing workloads on FSx for Lustre and store your long-term data on S3 or on-premises data stores
    - On-premises:
      * You can use FSx for Lustre for on-premises workloads that need to burst to the cloud due to peak demands or capacity limits
      * To move your existing on-premises data into FSx=, you can mount your FSx for Lustre file system from an on-premises client over AWS Direct COnnect or VPN, and then use parallel copy tools to import your data to your FSx for Luster file system
      * At any time you can write your results back to be durably stored in your data lake
    - Security
      * All FSx file system data is encrypted at rest
      * You can access your file system from your compute instances using the open-source Lustre client
      * Once mounted, you can work with the files and directories in your file system just like you would with a local file system
      * FSx for Lustre is compatible with most popular Linux=-based AMIs including Amazon Linux, Red Hat Enterprise Linux, EcentOS, Ubuntu, and SUSE Linus
      * You can access your Amazon FSx file system from endpoints in your VPC which enables you to isolate your file system in your own virtual network
      * You can configure security group rules and control entwork access to your FSx file systems
      * FSx is integrated with IAM
        + This integration means you can control the actions your IAM users and groups take to manage your file systems(such as creating and delting file systems)
        + You can also tag your FSx resources and control the actions that your IAM users and groups take based on those tags