



# Simplifying File Storage with AWS Managed File Solutions

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# Agenda

- Challenges with on-premises file storage
- AWS File storage services and use cases
- TCO examples
- Getting file data into AWS
- Wrap up and Q&A

# Challenges with On-Premises File Storage

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# Challenges with on-premises storage solutions



## Time



- Procurement



- Delivery



- Installation



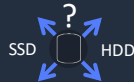
- Configuration



## Cost



- Capital Expense



- Provisioning



- SW & maintenance



- Warranty renewals



- Physical



## Complexity



- Expertise



- Availability



- Backup & DR



- Scalability



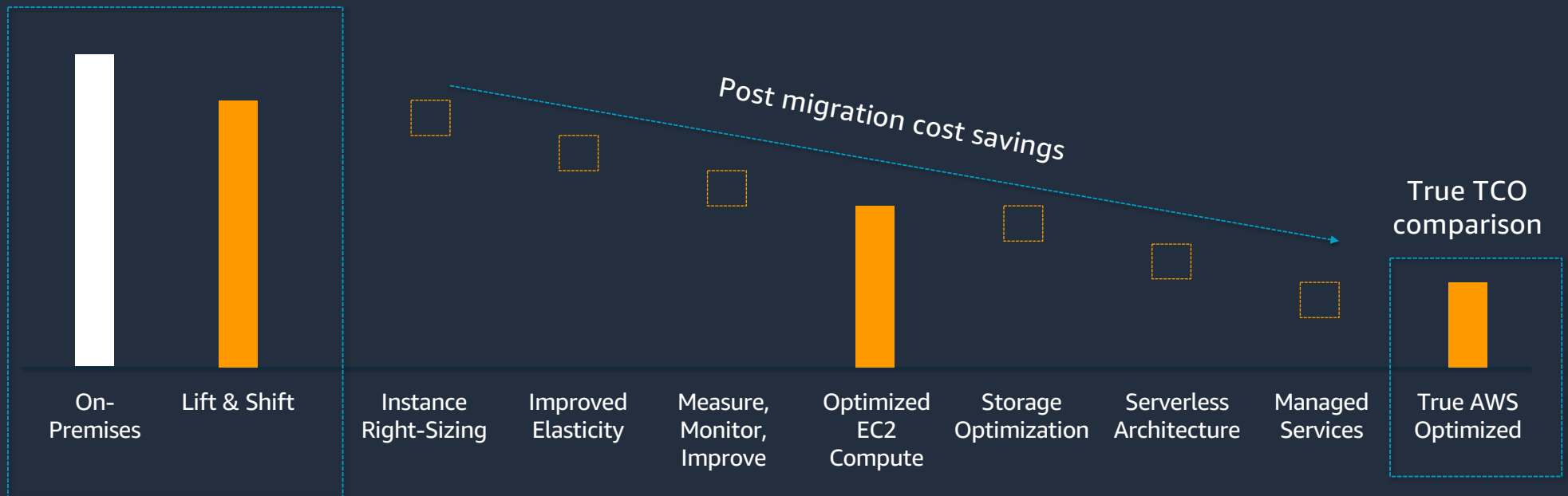
- Security & Compliance



**What if there's a Hardware failure?!** More Time! More Cost! More Complexity!

# Cost savings improve through optimizations

Typical TCO comparison



# AWS has been helping enterprises for 13 years



Increase  
agility



Accelerate  
innovation



Strengthen  
security



Reduce  
cost

# Fully managed cloud file systems

AWS provides file system options that help you easily address the diverse needs of your file-based applications and workloads

## FILE SYSTEMS FOR BUSINESS WORKLOADS

### Amazon EFS



Fully managed cloud-native file system for Linux-based applications

**LINUX-BASED WORKLOADS**

### Amazon FSx for Windows File Server



Fully managed Windows file servers for business applications

**WINDOWS-BASED WORKLOADS**

## FILE SYSTEM FOR COMPUTE-INTENSIVE WORKLOADS

### Amazon FSx for Lustre



Fully managed Lustre file system for high performance workloads

**COMPUTE-INTENSIVE WORKLOADS**

# Amazon managed file services benefits

Fully managed Linux and Windows file system deeply integrated with AWS for as low as 1.3 cents/GB-Month



## Simple

- No infrastructure to maintain
- Automatic updates
- Easy backups



## Scalable

- Supports wide spectrum of performance needs
- Seamlessly scale to PB+ storage
- Multiple options for performance



## Cost effective

- Multiple storage tiers with price points starting at 1.3 cents per GB-mo



## Robust

- Designed for high availability and durability
- Native encryption and backup
- Enterprise compliant

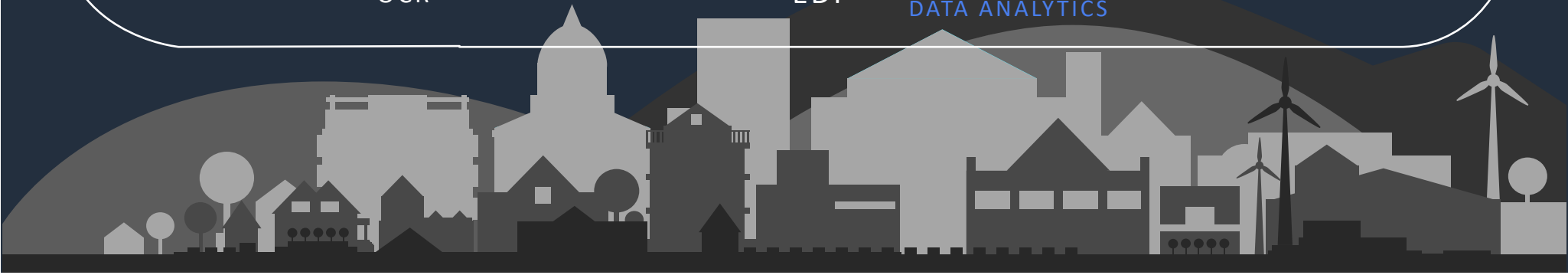
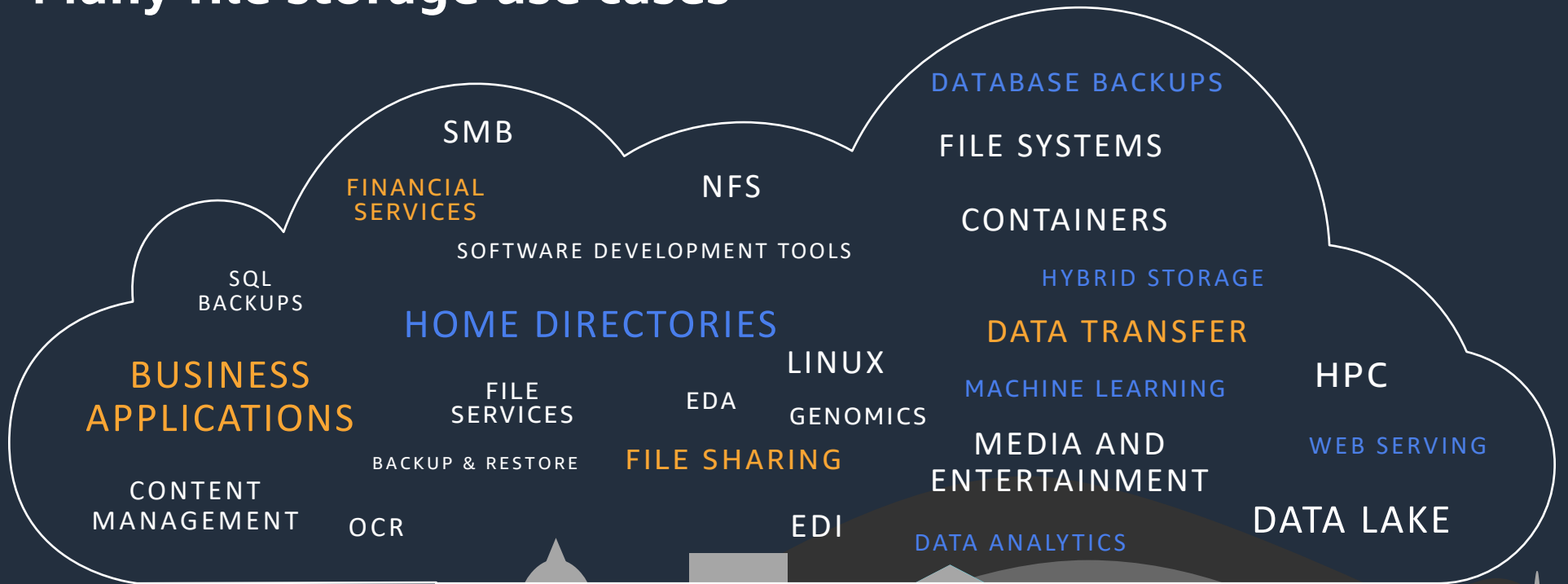


## Compatible

- Easily lift and shift existing NFS applications
- Use existing AD (Microsoft)
- Access your files from other cloud-native services



# Many file storage use cases



# AWS File Services | cost effectiveness

## LOWEST

### cost file storage in the cloud

#### Amazon EFS



Simple, scalable, elastic file storage  
for \$0.08/GB-month\*

Transparent storage tiering with EFS  
Infrequent Access (\$0.025/GB-  
month)

#### Amazon FSx for Windows File Server



HDD storage for \$0.013/GB-month Single-AZ  
and \$0.025/GB-month for Multi-AZ

Save ~50% with data deduplication

New

New

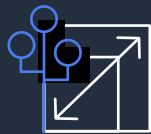
# Amazon EFS

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# Amazon EFS

Scalable, elastic, cloud-native Linux file system



Elastic and scalable

10 GB/sec &  
500K IOPS



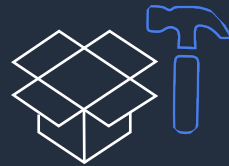
Performance



Storage classes



Shared access



Highly durable  
and available

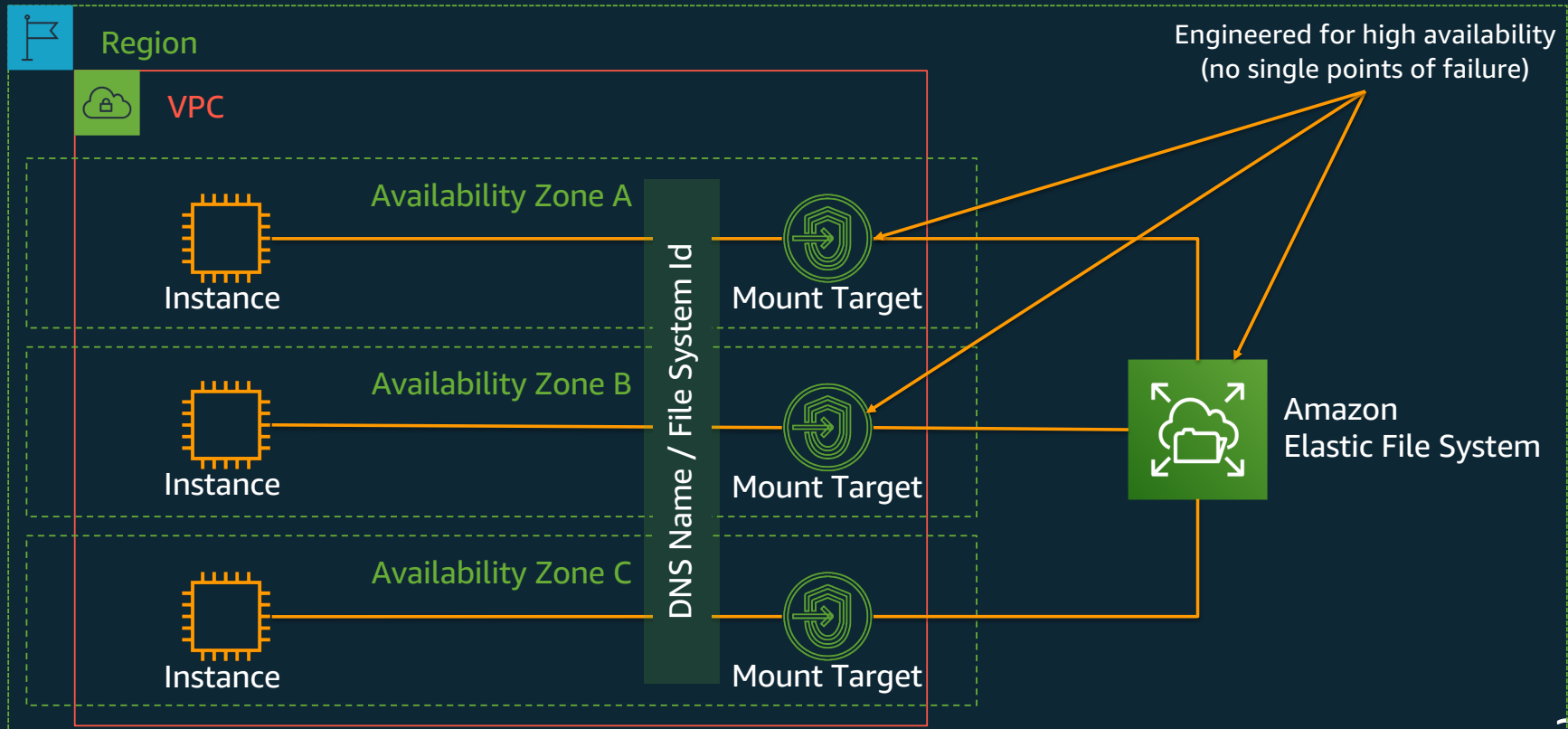


Secure and  
compliant

# Amazon EFS | Highly available and durable



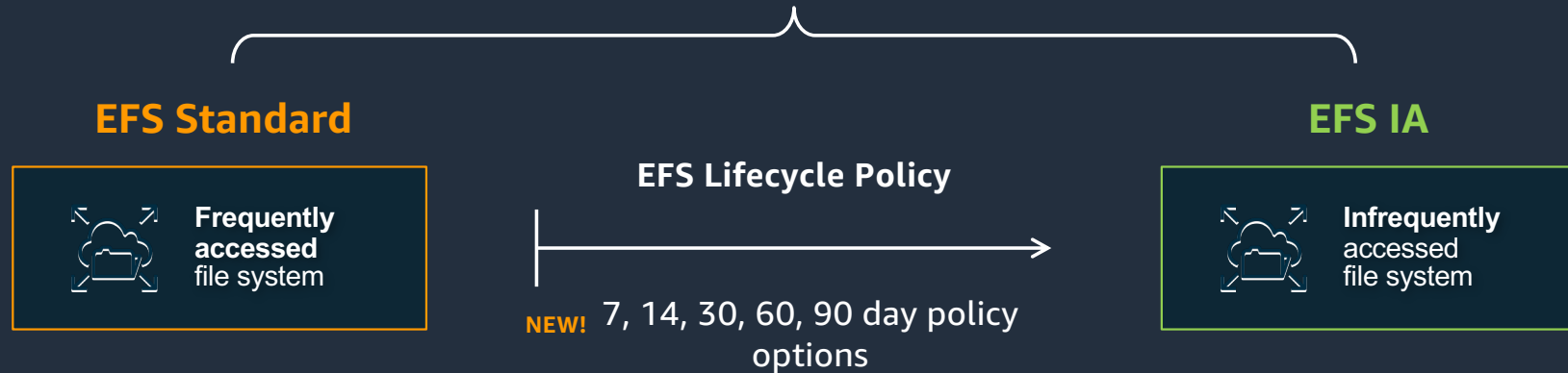
99.9% availability SLA and Designed for 11 9's of durability



# EFS Infrequent Access

Automatically lower cost storage for EFS file data as it becomes less frequently accessed

**92% savings** for files accessed <1 time per month



# Amazon EFS | Pricing



## Storage

Amazon EFS Standard:	\$0.300 per GB-month
Amazon EFS Infrequent Access:	\$0.025 per GB-month

## Throughput and Data Access

Provisioned Throughput:	\$6.000 per MBps-month
<i>(50 KB/s included per GB of Standard storage)</i>	
Amazon EFS Infrequent Access	\$0.01 per GB

## Backups

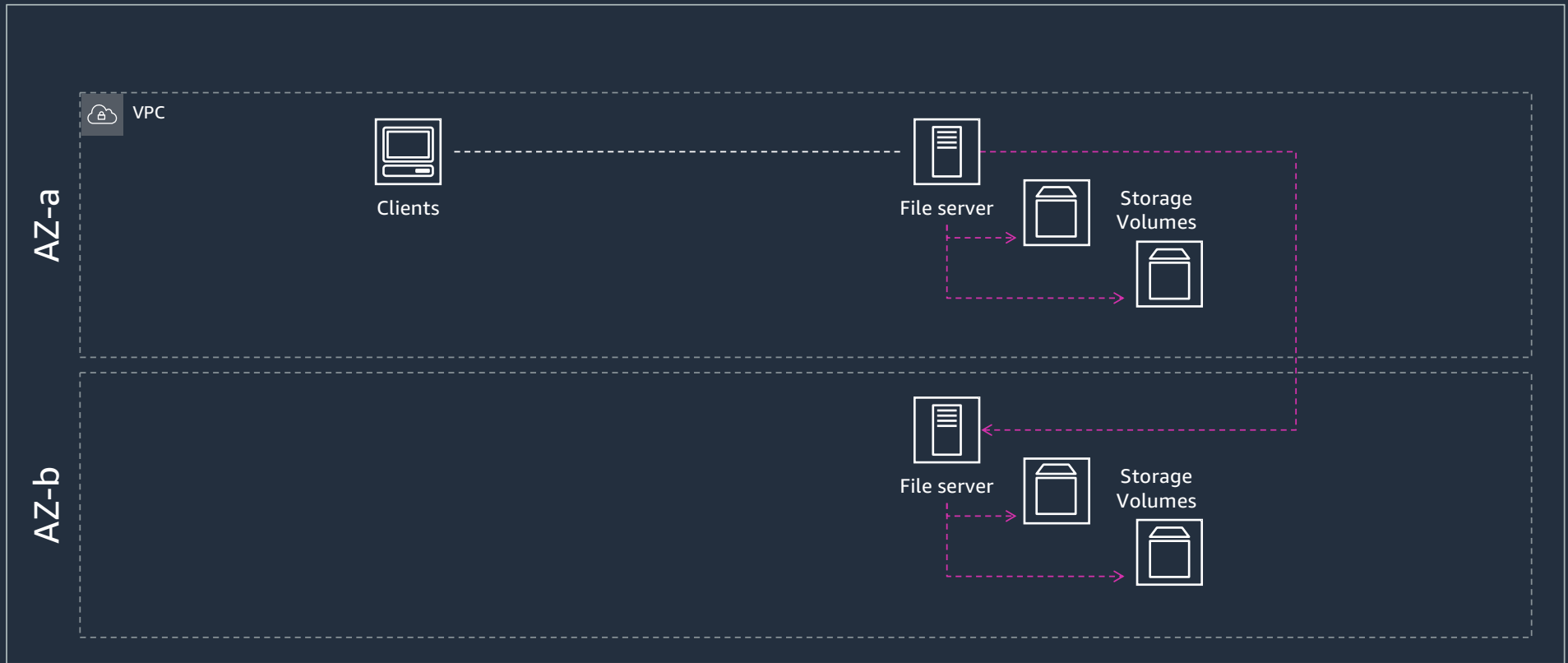
Warm backup storage	\$0.050 per GB-month
Cold backup storage	\$0.010 per GB-month

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# Before Amazon EFS... DIY shared file storage







## TCO example

### Amazon EFS

Amazon EFS cost:

Standard storage class (100 GB * \$0.30/GB-month*):	\$30 per month
Infrequent Access storage class (400 GB * \$0.025/GB-month*):	\$10 per month
Infrequent Access data access (400 GB*1*\$0.01/GB*) =	\$4 per month
<b>TOTAL:</b>	<b>\$44 per month</b>

### DIY – provisioning 600 GB of Amazon EBS (i.e., ~85% utilization)

Storage (2x 120 GB EBS gp2 volumes):	\$24 per month
Storage (2x 480 GB EBS sc1 volumes):	\$24 per month
Compute (2x m5.xlarge instances):	\$281 per month
Inter-AZ data transfer costs (est.):	\$130 per month
<b>TOTAL</b>	<b>\$459 per month</b>

\*US N. Virginia pricing

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Amazon  
EFS is  
~90% less  
than DIY



# EFS Customer Success Stories

*"We now have capacity on demand. We only pay for what we use. We are confident that we will NEVER run out of storage space. We are always on the latest hardware. Our bandwidth is no longer capped, and we don't have to worry about hitting limits. We have the added security of WAF with Advanced Shield. Best of all, we were able to get a better service, for 67% less!"*

*- Edward Zhitnitsky (Media technology manager)*



*"Amazon EFS is easy, scales, works with what we have and was key to accelerating innovation. Ultimately it speeds our time to market and enables us to help our patients faster."*

*- Lance Smith (IT director)*



*"We are a large organization with lots of applications with varying requirements for availability and performance. EFS provides us with a common storage platform that meets these requirements across the board."*

*- Amreth Chandrasehar (Principal Architect, T-Mobile)*



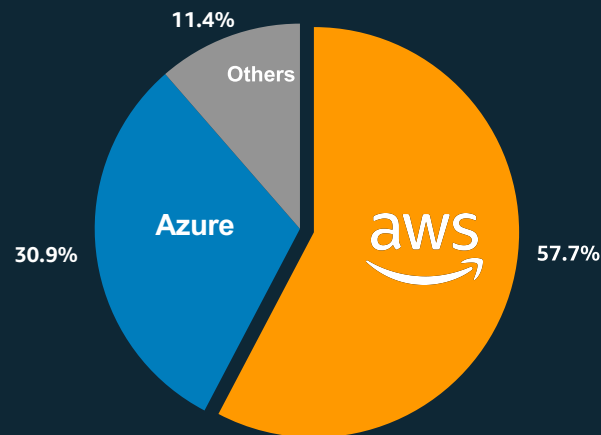
# Amazon FSx for Windows File Server

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# Almost 2/3 of Windows instances running on public cloud run on AWS

Worldwide Windows Public Cloud IaaS Instances by Cloud Provider, 2017



Note: Includes Windows instances deployed in the public cloud IaaS market during 2017. Source: IDC estimates, 2018

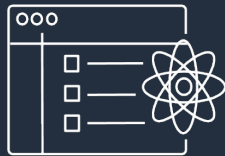
IDC, Windows Server Operating Environment Market Update, Doc # US44217118, Aug 2018

[https://d1.awsstatic.com/analyst-reports/IDC\\_Slide\\_WindowsonAWS\\_JM181015.pdf](https://d1.awsstatic.com/analyst-reports/IDC_Slide_WindowsonAWS_JM181015.pdf)

# Amazon FSx for Windows File Server

Fully managed Windows file server, built on Windows Server

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**Built on Windows  
Server**



**Lowest cost SMB file  
storage in the cloud**



**Simple and Fully  
Managed**



**Broad  
accessibility**

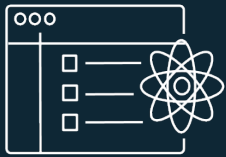


**Fast and flexible  
performance**



**Secure and  
Compliant**

# Native Windows compatibility and features



Native Windows  
compatibility



NTFS



Native SMB  
2.0 to 3.1.1



Integrates with  
Microsoft AD  
and supports  
Windows ACLs



DFS  
Namespaces and  
DFS Replication



Windows Server

# Direct integration with on-premises AD environments

## Easily Lift-and-Shift File Storage



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Extend existing Windows environments without added complexity



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Retain access control to existing users without any modifications



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Automatically replicate data between on-premises file servers and Amazon FSx

# Amazon FSx | Performance and scale

The logo for Amazon FSx, consisting of the letters 'FSx' in white on a green square background.

## Latency

Sub-millisecond latencies with SSD

## Throughput and IOPS

Direct file server access: up to 3 GB/s of throughput and hundreds of 1000s of IOPS per file share

With client-side caching: up to 10+ GB/s of throughput and millions of IOPS per file share



# Amazon FSx | Throughput capacity



- Determines speed at which the file server hosting your file system can serve file data
- Higher levels of throughput -> higher levels of IOPS and more memory for caching

Throughput capacity / Baseline throughput (MBps)	Burst throughput (MBps)
8	192
16	192
32	192
64	256
128	438
256	438
512	N/A
1,024	N/A
2,048	N/A

**You get even higher throughput with in-memory caching on the file server (600 MBps – 3 GBps)**

# Security and compliances



Data encrypted  
at-rest and in-transit

Option to enforce  
encryption in-transit



Integrates with  
your organization's  
AD and supports  
Windows ACLs



Network traffic access  
control using Amazon  
VPC security groups



Admin API  
access control  
using AWS IAM

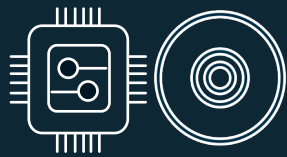


Monitor and log  
API calls using  
AWS CloudTrail



PCI-DSS + ISO-  
+ SOC + GDPR compliant  
and HIPAA eligible

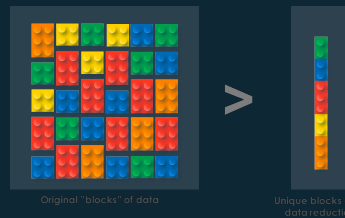
# Optimize Costs of Windows Workloads



Select SSD/HDD  
with the right  
price/performance

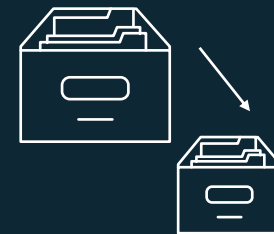
**NEW!**

**NEW!**



Up to 50% storage  
costs using Data  
Deduplication

**NEW!**





Minimum file size  
reduced to 32 GiB

# Amazon FSx | Pricing



## File Systems

Dimension		Single-AZ price	Multi-AZ price
HDD storage (per GB-mo)	 <b>NEW!</b>	1.3 cents per GB-month	2.5 cents per GB-month
SSD storage (per GB-mo)		13 cents per GB-month	23 cents per GB-month
Throughput capacity		\$2.200 per MBps-month	\$4.500 per GB-month

## Backups

Backup storage used (incremental) 5 cents per GB-month

# Example TCO

## Storage requirements

- 10 TB of storage
- With deduplication, 50% of storage needed
- Deployment type: Multi-AZ
- Storage type: HDD

## Throughput requirements

- 16 MB/s sustained, 100 MB/s burst

## Backup requirements

- Expected backup storage usage:  
1x of storage capacity

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### File system component

Storage (Multi-AZ, HDD, 5 TB @ \$0.025/GB-mo)

Throughput capacity (16 MB/s @ \$4.50/MBps-mo)

Total cost (excl. backups)

Backups (5 TB @ \$0.05/GB-mo)

Total cost (incl. backups)

### Total cost

\$128

\$72

\$200/month (or \$0.02/GB-mo)

\$256

\$456/month (or \$0.04/GB-mo)

\* US East (N. Virginia)

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# Amazon FSx for Windows File Server Customer Feedback



*"With Amazon FSx we have a **managed solution** that eliminates the need for us to manage the tasks associated with operating file storage, including performing backups and applying software patches." - Greg Bell, Senior Systems Administrator*



*"Amazon FSx for Windows File Server enabled us to migrate and store over 12 TB of content files from our on-premises data center to the cloud. Our transition to the cloud was seamless, not only was there minimal re-platforming necessary, but we were also able to move to a highly performant platform with little modification to existing processes or permissions."*



*We no longer need to worry about maintenance of the file system environment or patching of the underlying servers. This is allowing the team to **focus on more business-critical parts of our application structure.**" John Waller, Senior Engineer, DocXellent*

# Data Migration

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# AWS DataSync

Easily and efficiently transfer hundreds of terabytes and millions of files



## Fast

Parallelized transfer, 10Gbps per agent, scale-out with multiple agents



## Automated

No scripts, does validation, filtering, throttling, scheduling



## One-time migrations or on-going transfers



## Flexible

Multiple protocols (NFS, SMB) & destinations (S3 & EFS)



## AWS Integrated



## Secure and compliant



# AWS DataSync Launches

Reduced pricing, global availability, task scheduling



**68% price reduction**



**Simple predictable pay-per-use pricing \$0.0125 per GB transferred**

**Available in 20 AWS Regions globally**



**Task scheduling**



# Getting Started Resources

aws pricing calculator

Feedback

English

## AWS Pricing Calculator

The AWS Pricing Calculator is currently building out support for additional services and will be replacing the [Simple Monthly Calculator](#).

## AWS Pricing Calculator

Estimate the cost for your architecture solution.

Configure a cost estimate that fits your unique business or personal needs with AWS products and services.

### Create an estimate

Start your estimate with no commitment, and explore AWS services and pricing for your architecture needs.

Create estimate

### Getting started

[What is the AWS Pricing Calculator?](#)

How it works

<https://aws.amazon.com/blogs/>

<https://aws.amazon.com/efs/>

<https://aws.amazon.com/fsx/windows/>

<https://calculator.aws>

Blogs, Papers, Video Tutorials, CloudFormation templates

# Q&A

Erik Durand, Head of Storage BD, WWPS

# Thank you!

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