Webinar

Ditch your NAS!
Move to Amazon EFS

09/25/2018

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Solutions Architect – Amazon File Services

Ditch you NAS! Move to Amazon EFS

Phase 1:
Assess NAS workloads

Phase 2:
Choose the cloud storage platform

Phase 3:
Migrate workloads to the cloud

Phase 4:
Test, optimize, & run

Wrap Up:
Summarize & Q&A

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Phase 1:

Assess NAS workloads

Network Attached Storage (NAS) Overview

NAS

Dedicated hardware/software appliance serving shared file data to multiple clients over a LAN.

Typically provide access using network file sharing protocols (NFS, SMB/CIFS, AFP, etc.)

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NAS is not DAS

NAS

DAS

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NAS is not SAN

NAS

SAN

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Typical NAS Workloads

Home directories

Web serving

Line-of-business applications

Content management

Development environments

Disaster Recovery

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Phase 2:

Choose the cloud storage platform

What do you think about when choosing a cloud storage platform?

Storage type

Features
and performance

Economics

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Three types of storage available in the cloud

File

Block

Object

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Object storage

Object

Data is stored as an object that’s identified by a key in a flat space

Simple API to get and put data based on key

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Object storage is not NAS

Object

NAS

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Block storage

Block

Data stored as blocks on a disk or disks

Locally attached

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Block storage is not NAS

Block

NAS

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File storage

File

Data stored as files in a directory hierarchy

Shared over a network

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File storage is NAS

File

=

NAS

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Why is file storage so popular?

Works natively with operating systems

Provides shared access while providing consistency guarantees and locking functionality

Provides hierarchical namespace

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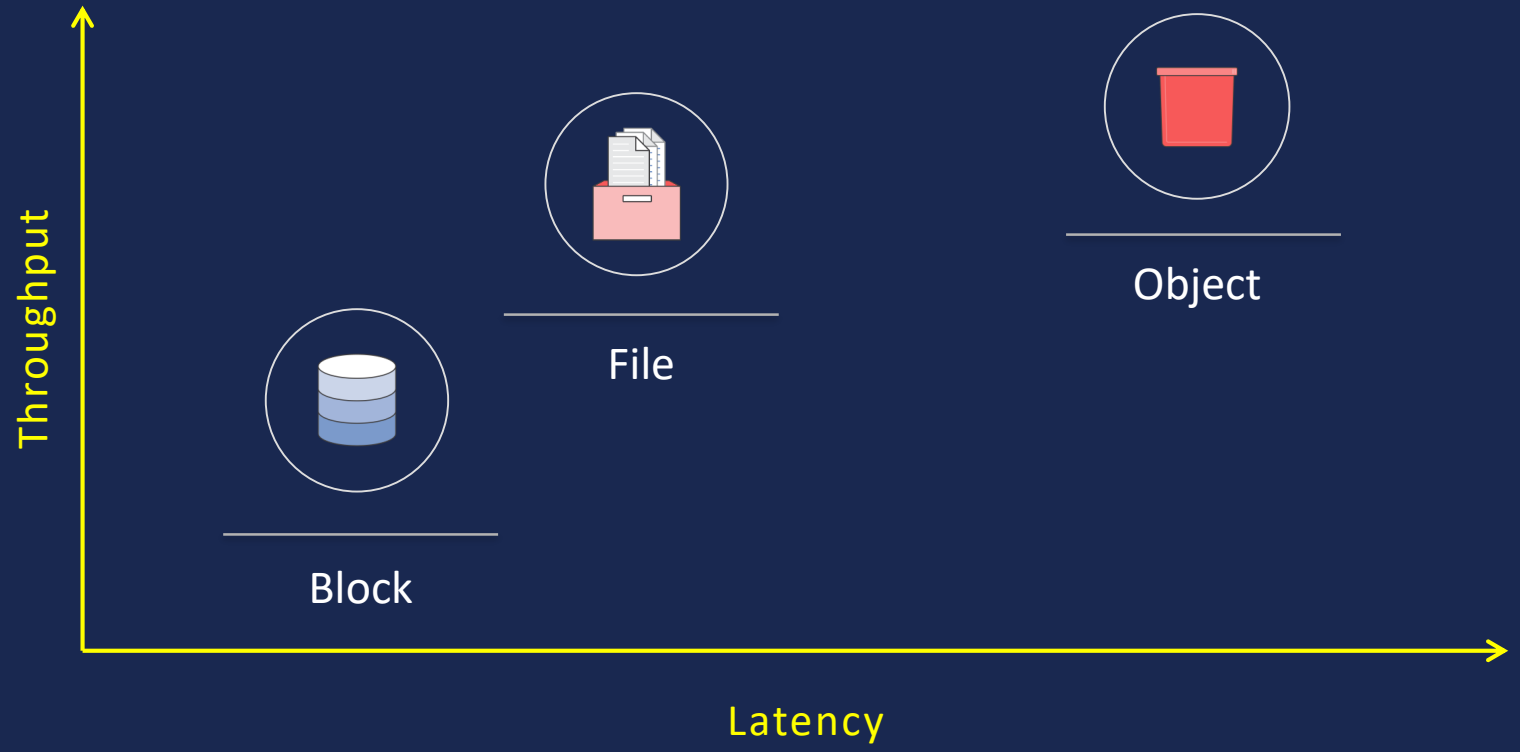
How does performance compare



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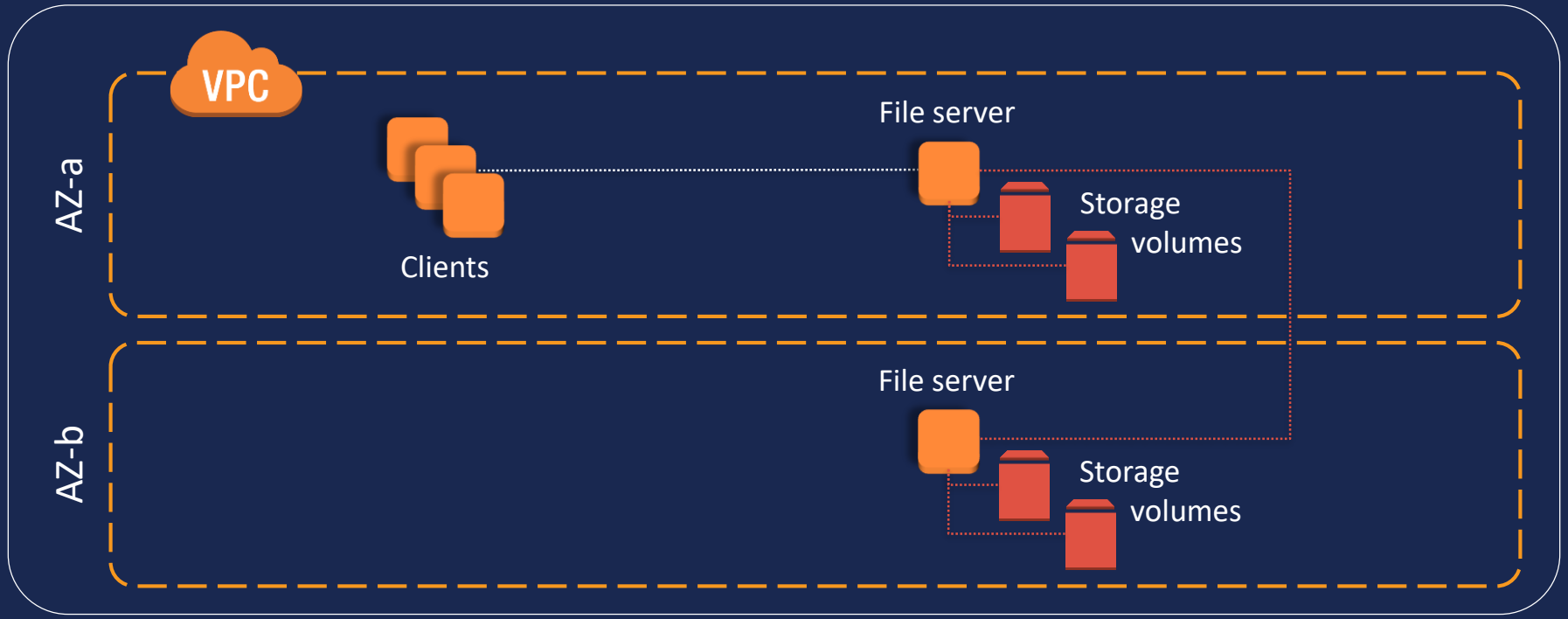
Before Amazon EFS… DIY file storage costs



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Amazon EFS

A fully managed file service

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Question: Is EFS NAS?

Amazon EFS

NAS

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Key features of Amazon EFS

Simple

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Key features of Amazon EFS

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Key features of Amazon EFS

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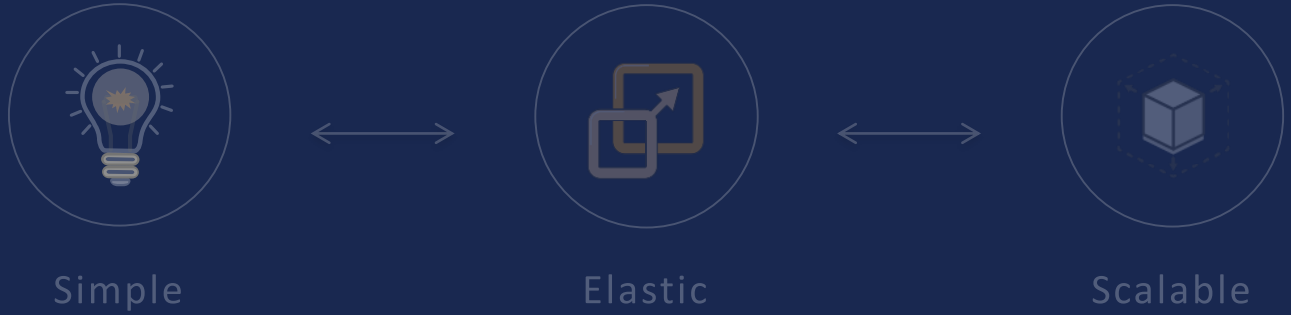
Key features of Amazon EFS



Highly available and durable

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Key features of Amazon EFS

Simple

Elastic

Scalable

Highly available and durable

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Performance modes

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Performance modes

General Purpose (default)

Recommended for the majority of workloads

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Performance modes

General Purpose (default)

Recommended for the majority of workloads

Max I/O

Recommended for scale out workloads

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Throughput modes

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Throughput modes

Bursting Throughput
(default)

Recommended for the
majority of workloads

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Throughput modes

Bursting Throughput
(default)
Recommended for the majority of workloads

Provisioned Throughput
Recommended for higher throughput to storage ratio workloads

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Security model & compliance

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Security model & compliance

Control network traffic using Amazon VPC security groups and network ACLs

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Security model & compliance

Control network traffic using Amazon VPC security groups and network ACLs

Control file and directory access using POSIX permissions

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Security model & compliance

Control network traffic using Amazon VPC security groups and network ACLs

Control file and directory access using POSIX permissions

Control administrative access (API access) using AWS IAM (action-level and resource-level permissions)

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Security model & compliance

Control network traffic using Amazon VPC security groups and network ACLs

Control file and directory access using POSIX permissions

Control administrative access (API access) using AWS IAM (action-level and resource-level permissions)

Encrypt data at rest in transit

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Security model & compliance

Control network traffic
using Amazon VPC security groups and network ACLs

Control file and directory access
using POSIX permissions

Control administrative access (API access)
using AWS IAM (action-level and resource-level permissions)

Encrypt data
at rest
in transit

Achieve Compliance
HIPAA-eligible
BAA
PCI DSS

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Where is Amazon EFS available today?

- **US West** (Oregon)
- **US West** (N. California)
- **US East** (N. Virginia)
- **US East** (Ohio)
- **EU** (Ireland)
- **EU** (Frankfurt)
- **Asia Pacific** (Sydney)
- **Asia Pacific** (Seoul)
- **Asia Pacific** (Tokyo)
- **Asia Pacific** (Singapore)

More coming soon!

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Amazon EFS economics

No minimum commitments
or upfront fees

No need to provision
storage in advance

No other fees
or charges

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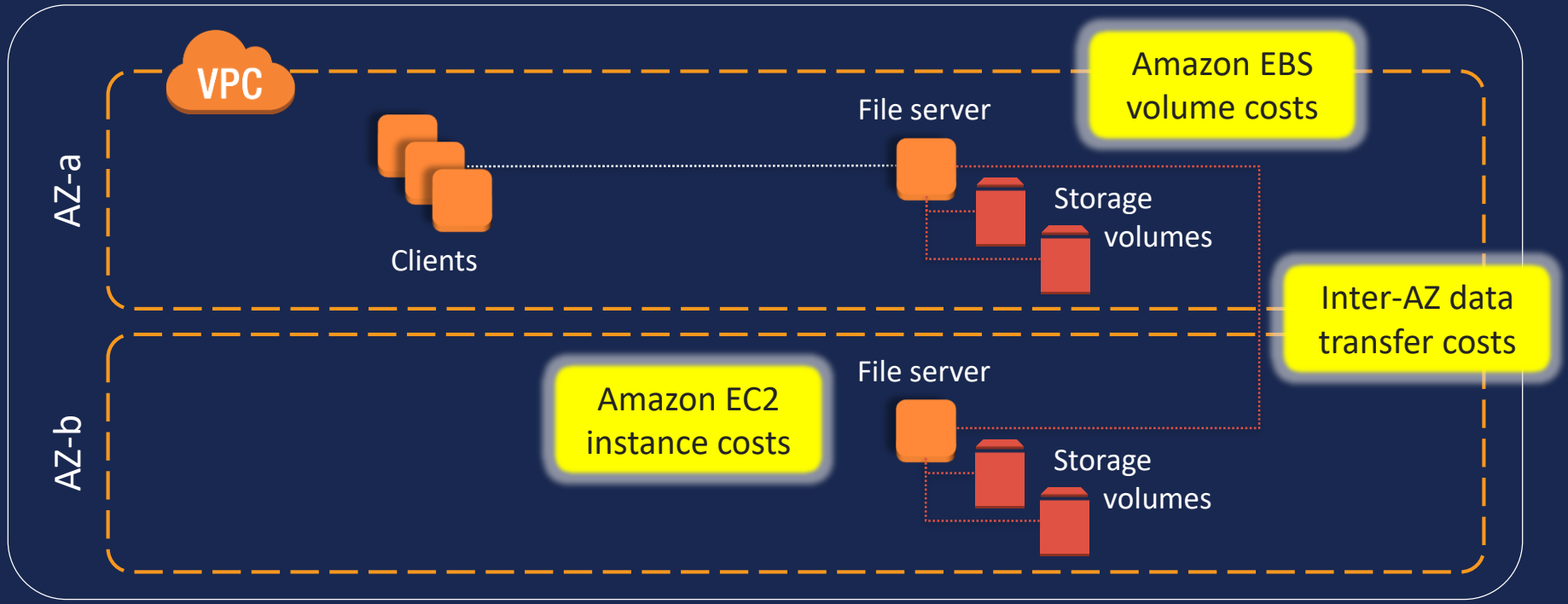
Before Amazon EFS… DIY file storage costs



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TCO example

For storing 500 GB, Amazon EFS is 70% less than DIY

Amazon EFS cost: (500 GB * $0.30/GB-month*) = $150 per month

For DIY, you might provision 600 GB of Amazon EBS (i.e., ~85% utilization):

Storage (2x 600 GB EBS gp2 volumes):	$120 per month
Compute (2x m4.xlarge instances):	$290 per month
Inter-AZ data transfer costs (est.):	$130 per month
Total	$540 per month

* US N. Virginia pricing

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Designed for a wide spectrum of needs

Analytics

Media workflows

Enterprise apps and messaging

Web serving

Content management

Database backups

Container storage

Dev tooling

Home directories

Scale-out jobs

Metadata-intensive jobs

High throughput and parallel I/O

Low latency and serial I/O

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Amazon EFS customers and partners

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Question: Is EFS NAS?

Amazon EFS

NAS

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Question: Is EFS NAS?

Amazon EFS

Yes, and more

NAS

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Phase 3:

Migrate workloads to the cloud

Typical NAS Workloads

Home directories

Web serving

Line-of-business applications

Content management

Development environments

Disaster Recovery

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Typical EFS Workloads

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Low latency and serial I/O

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What do you think about moving files to the cloud?

How to connect

How to move it as fast and easily as possible

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EFS File Sync

Sync data from existing file systems into Amazon EFS file systems

Simple
Set up and manage easily from the AWS Console

Fast
Up to 5x faster than standard Linux copy tools

Secure
Encrypted parallel data transfer to AWS

Use EFS File Sync to copy

- File systems from on-premises to EFS
- DIY in-cloud file systems to EFS
- EFS file systems between AWS Regions

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How to leverage parallelism to copy data faster?

rsync	cp	fpsync	cp + GNU parallel	fpart + cpio + GNU parallel

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How to leverage parallelism to copy data faster?

rsync	cp	fpsync	cp + GNU parallel	fpart + cpio + GNU parallel
single-threaded	single-threaded	multi-threaded	multi-threaded	multi-threaded
Poor (very chatty)	Fair	Good	Better	Best

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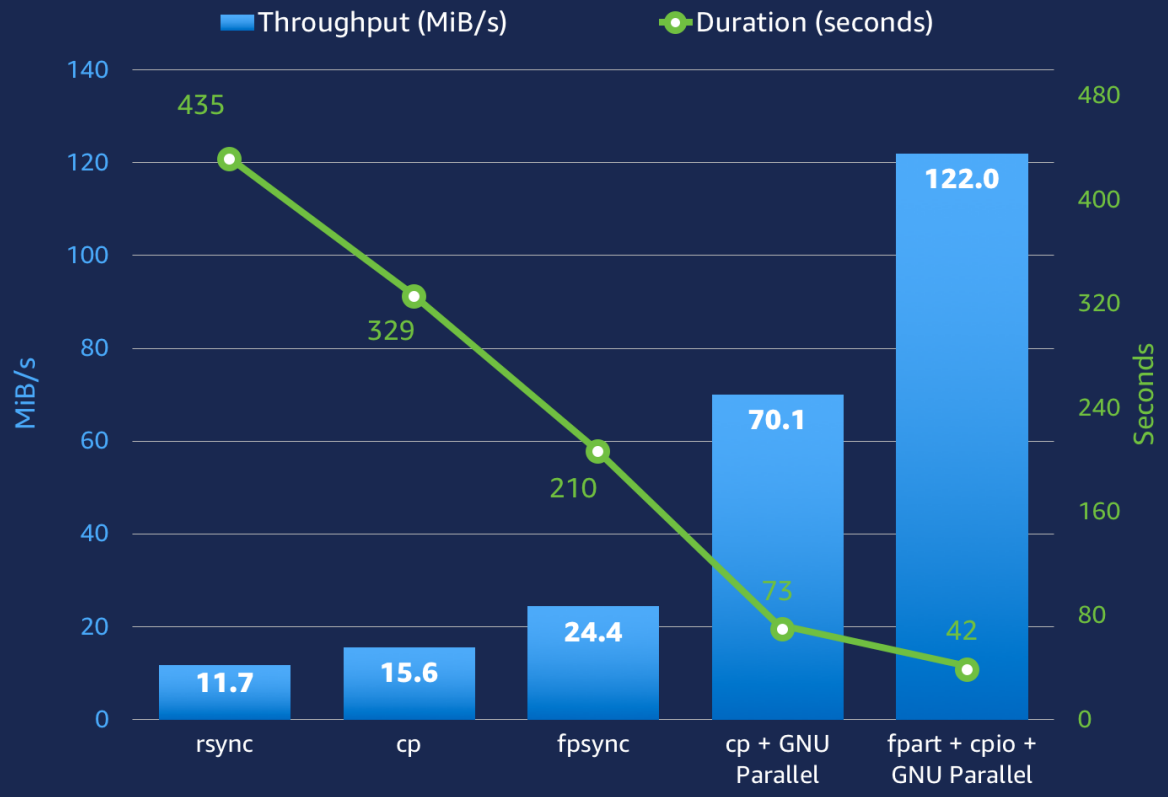
File transfer test results*



Best Practices

- Use a multiple-threaded tool
- Use a less ”chatty” tool

*tested on a single c5.large instance

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Phase 4:

Test, optimize, & run

What do you think about when testing & optimizing?

Solution architecture

Functional testing

Performance testing and optimization

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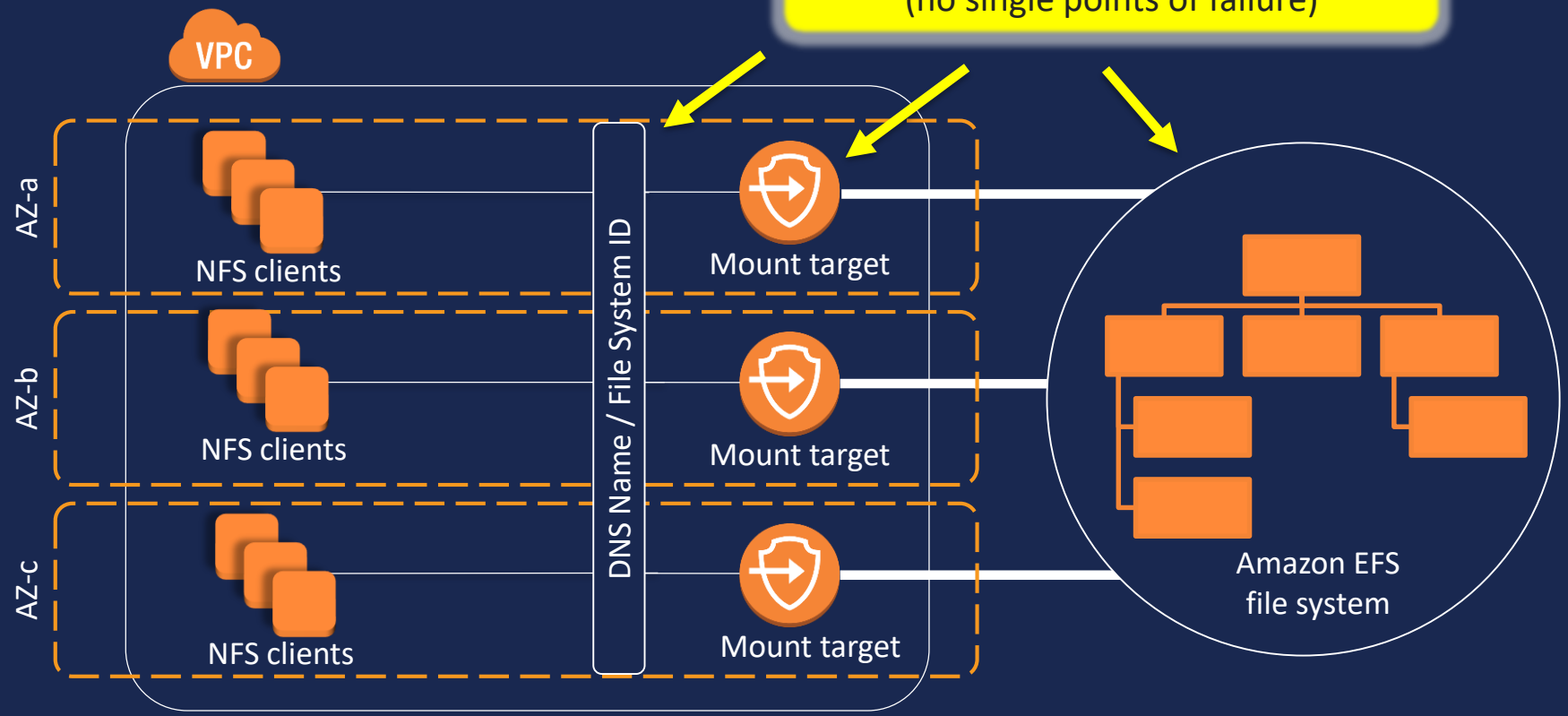
Amazon EFS architecture



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How do I test Amazon EFS?

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How to manage file systems

Create a file system

Create and manage mount targets

Tag a file system

Manage a file system

View details on a file system

Delete a file system

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Functional testing

POSIX compliant & compliant with NFS 4.0 & 4.1

But you always need to test your application

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Mount options

Recommended

NFS Mount Helper

Use for encrypted* or non-encrypted connections
* manual setup & configuration required

EFS Mount Helper

Use for encrypted or non-encrypted connections
Automatically uses recommended mount options

Standard NFS mount helper command:

```
mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,
hard,timeo=600,retrans=2 file-system-id.efs.region.amazonaws.com
efs-mount-point
```

Simple EFS mount helper command:

```
mount -t efs -o tls file-system-id efs-mount-point
```

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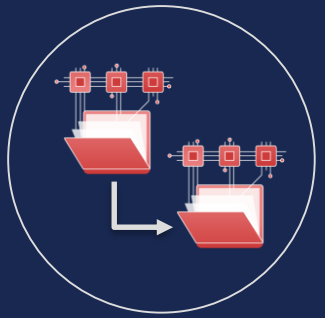
What do you think about when running EFS?

View file system metrics

AWS CloudTrail API access logs

Amazon CloudWatch metrics



Perform backups

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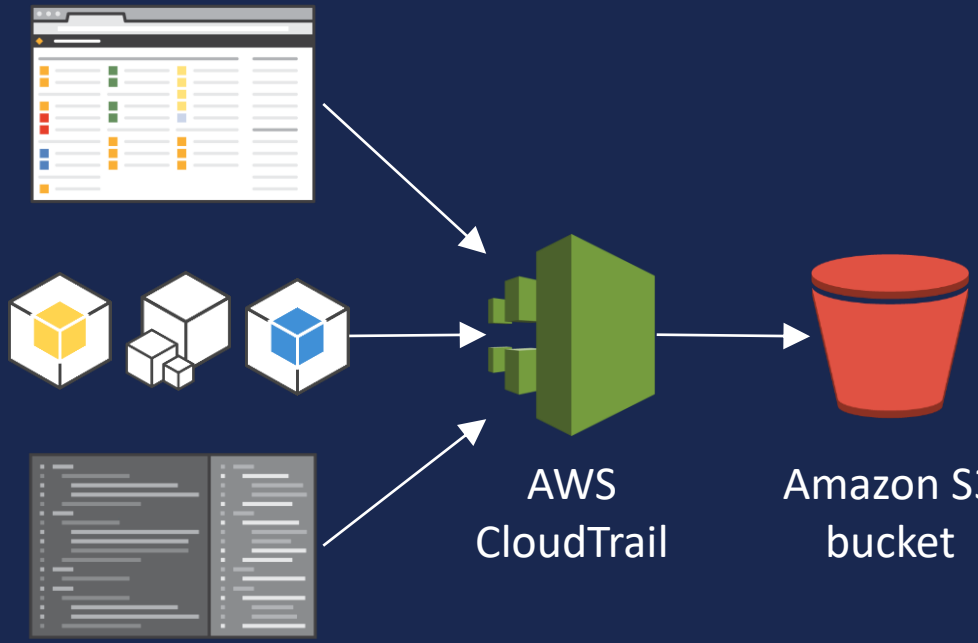
AWS CloudTrail API access logs

Logs EFS API calls from
Console, SDK, CLI



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Amazon CloudWatch metrics

DataReadIOBytes

DataWriteIOBytes

MetaDataIOBytes

TotalIOBytes

BurstCreditBalance

PermittedThroughput

ClientConnections

PercentIOLimit*

Amazon CloudWatch

* General Purpose only

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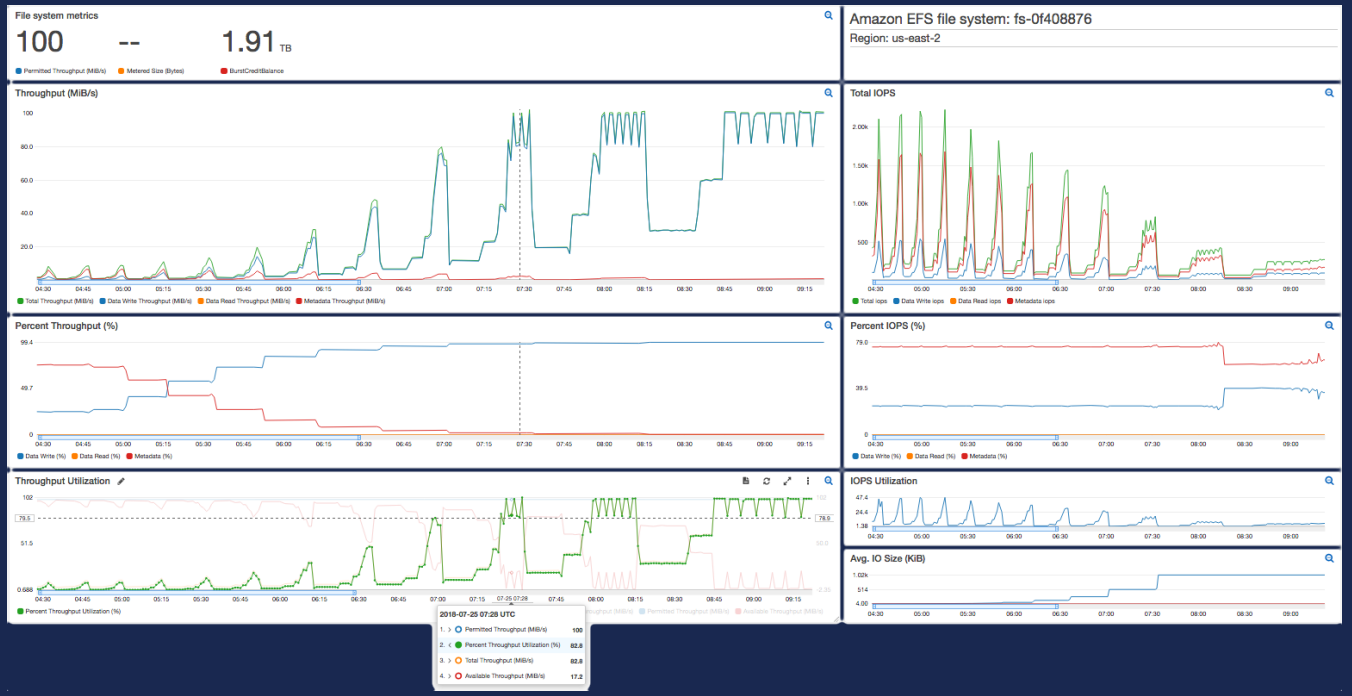
Amazon CloudWatch Dashboard



https://github.com/aws-samples/amazon-efs-tutorial/tree/master/monitoring

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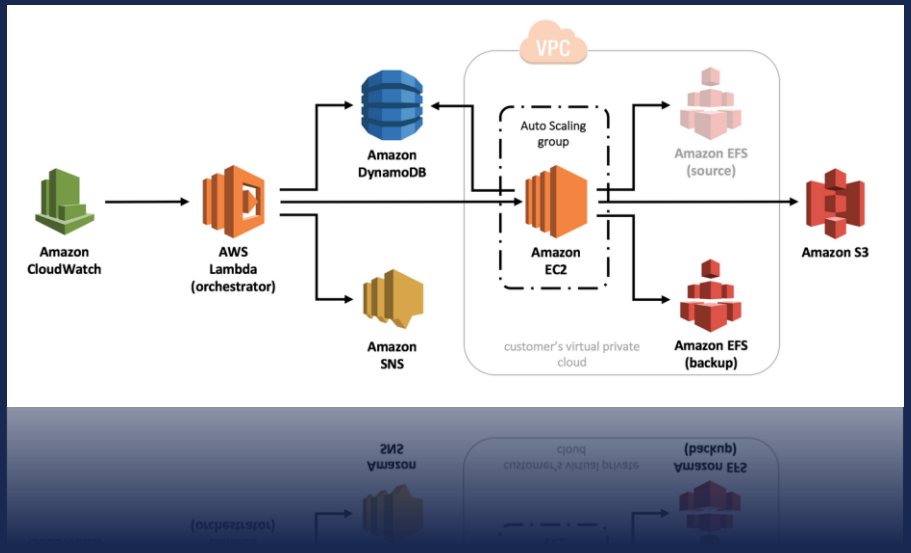
Backup solution

EFS to EFS

Automatically backs up EFS

Easy to deploy



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Wrapping up

Best practices

Test w/ General Purpose Performance Mode

Start w/ Bursting Throughput Mode

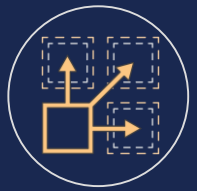
Linux kernel 4.0+

EFS mount helper (NFSv4.1)

Large IO size (aggregate IO)

Multiple threads

Multiple instances



Multiple directories

Monitor metrics

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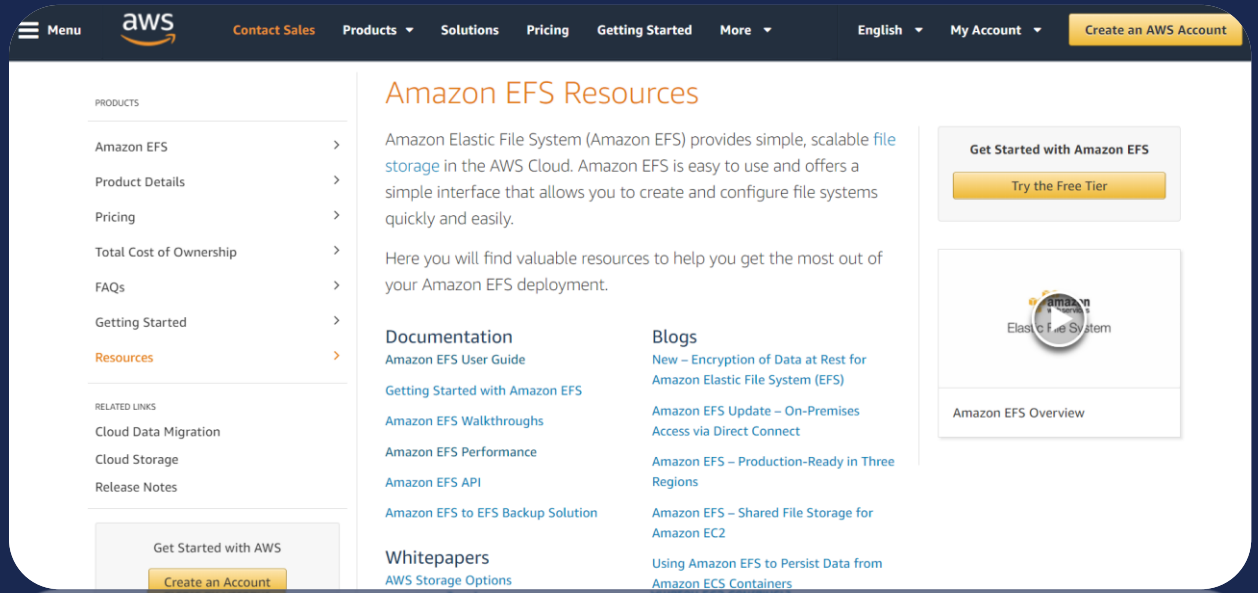
How to learn more: aws.amazon.com/efs



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- TCO calculator
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- Documentation

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Amazon EFS tutorials

https://github.com/aws-samples/amazon-efs-tutorial

README.md

Amazon Elastic File System (Amazon EFS)

Tutorials

Version 1.0.1

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Thank you

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Q & A