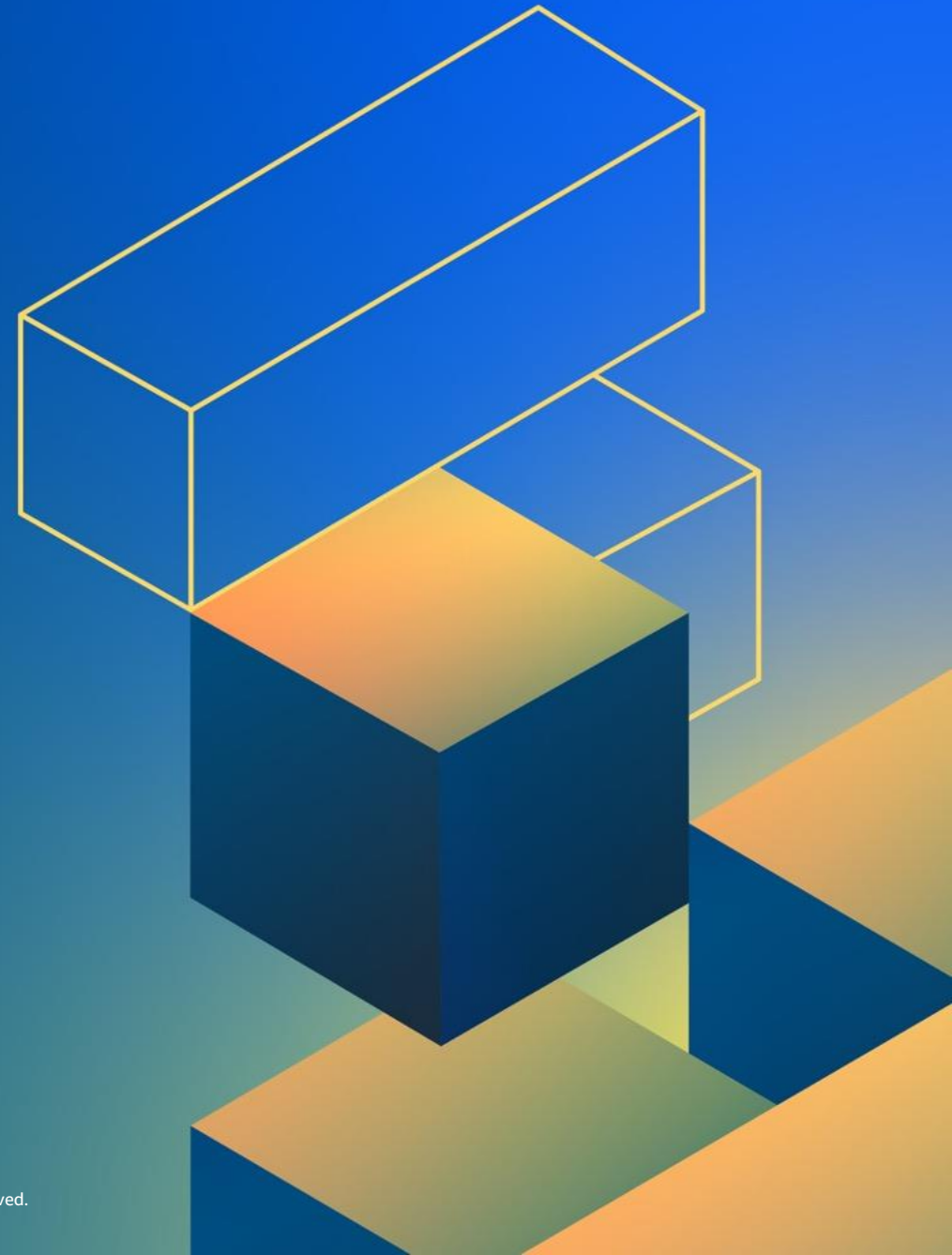**AWS Builders Online Series**

Bring AWS to you with hybrid cloud storage

Naim Mucaj

Senior Solutions Architect
Amazon Web Services

aws

Agenda

- Connectivity to AWS

- AWS Hybrid cloud storage services

- Common customer use cases and patterns

- Demo

- Resources

How much data is out there?

175 ZB

Zettabytes of data created
by 2025, globally

10^{21}

1 zettabyte is
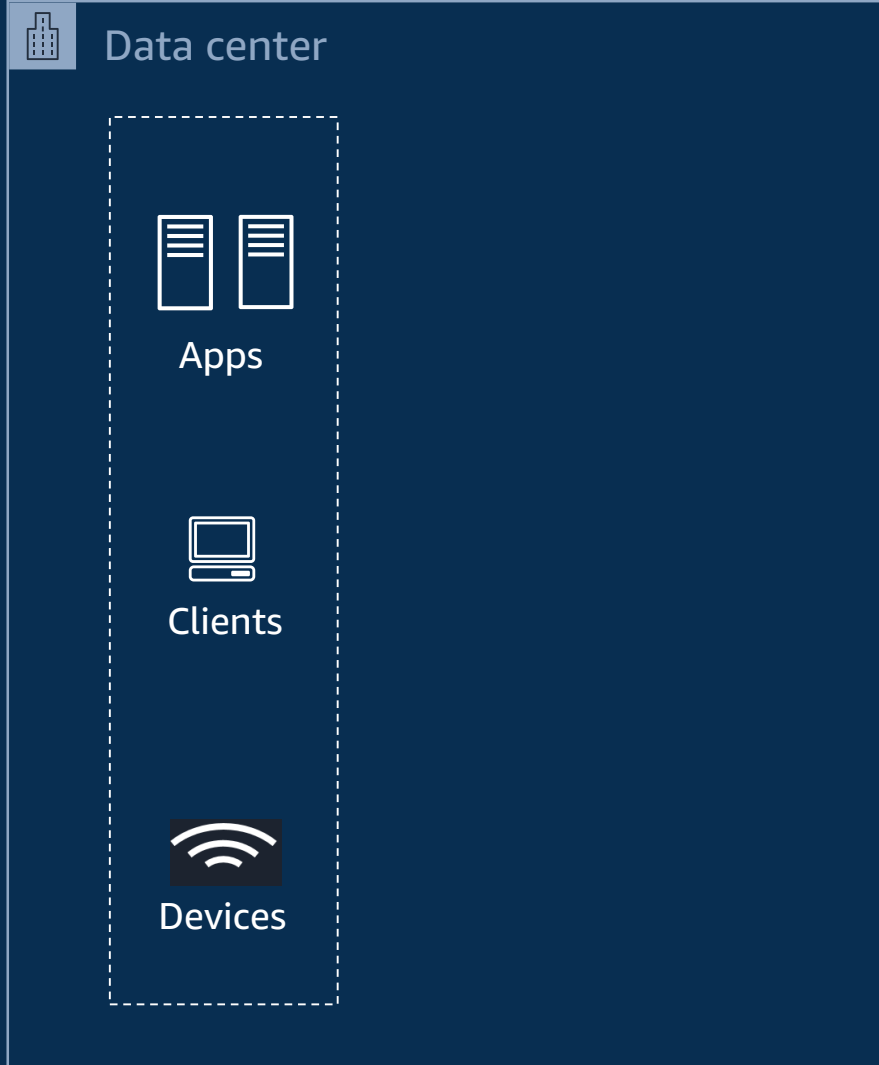1,000,000,000,000,000,000,000

Sources:
https://www.idc.com/getdoc.jsp?containerId=prUS48247121
https://www.idc.com/getdoc.jsp?containerId=US47397521

aws

Network connectivity to AWS

aws

Connecting to AWS

Connecting to AWS

Data center

Apps

Clients

Devices

Connectivity Options:

Direct Connect

AWS Cloud

Connecting to AWS

Data center

Apps

Clients

Devices

Connectivity Options:

Direct Connect

Site to Site VPN

AWS Cloud

Connecting to AWS

Data center

Apps

Clients

Devices

Connectivity Options:

Direct Connect

Site to Site VPN

Public Internet

AWS Cloud
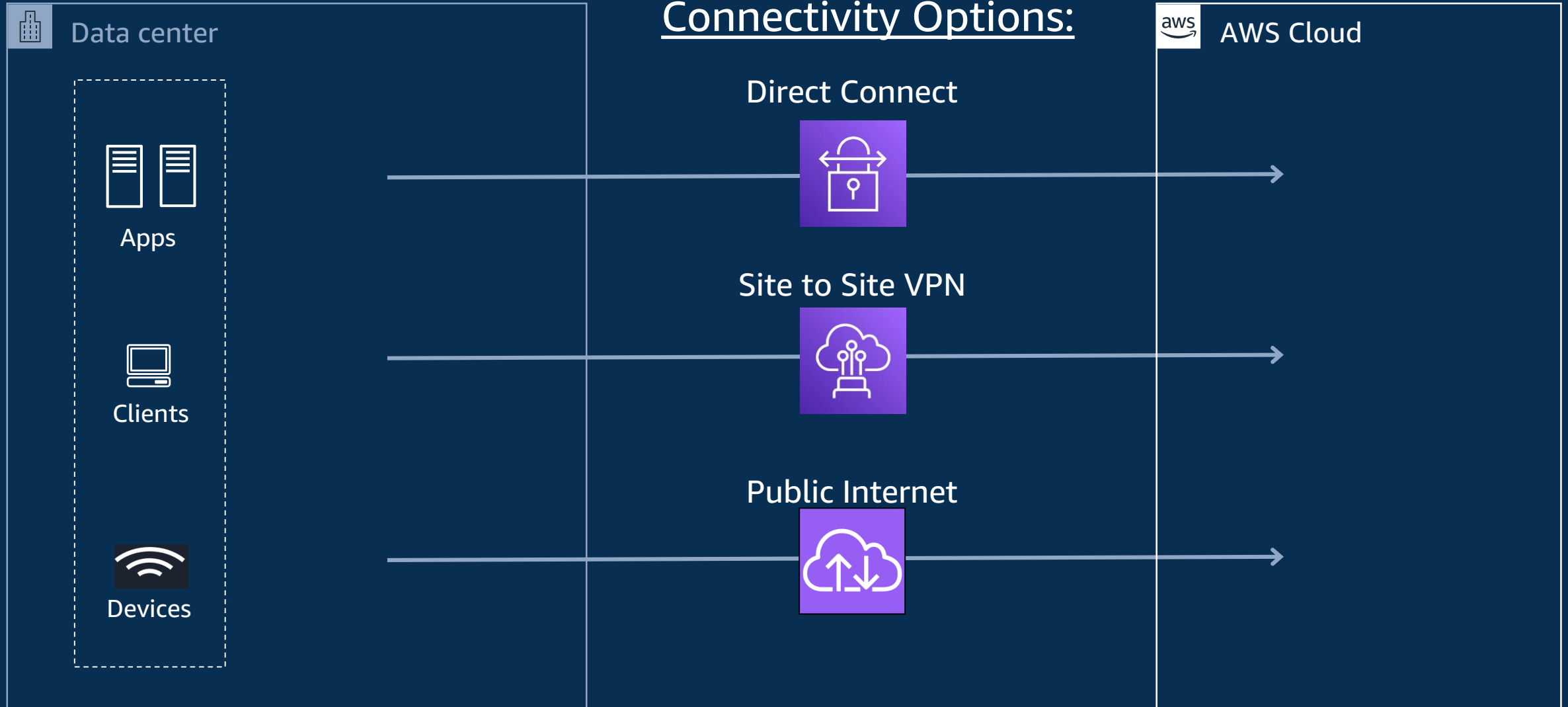
Connecting to AWS
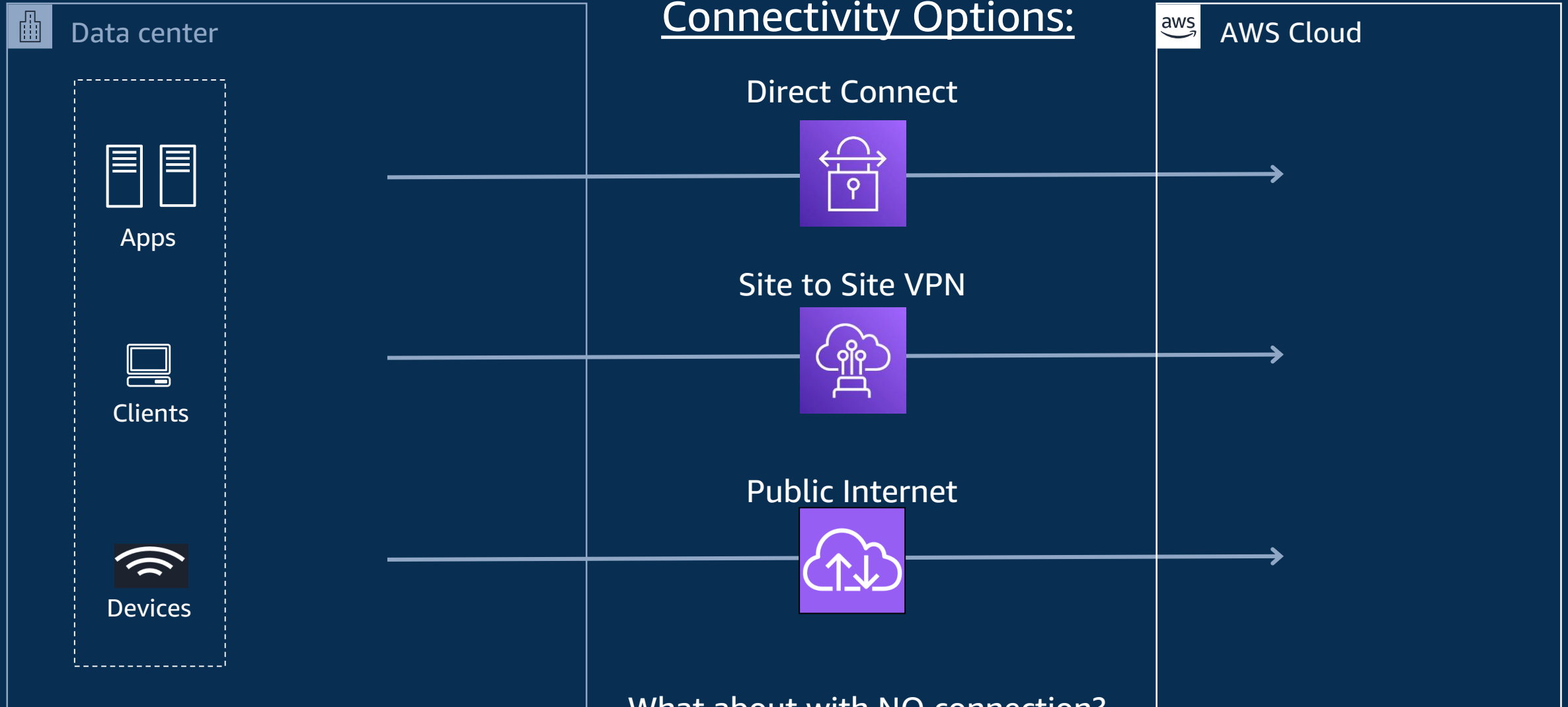
AWS storage portfolio
Data protection & resiliency

AWS Backup

AWS Elastic Disaster Recovery

AWS Resilience Hub

BLOCK

Amazon Elastic Block Store (Amazon EBS)

OBJECT

Amazon Simple Storage Service (Amazon S3) and Amazon S3 Glacier

FILE

Amazon FSx

Amazon Elastic File System (EFS)

AWS Transfer Family

AWS Snow Family

AWS Storage Gateway

AWS DataSync

AWS storage portfolio

AWS Snow Family

AWS Storage Gateway
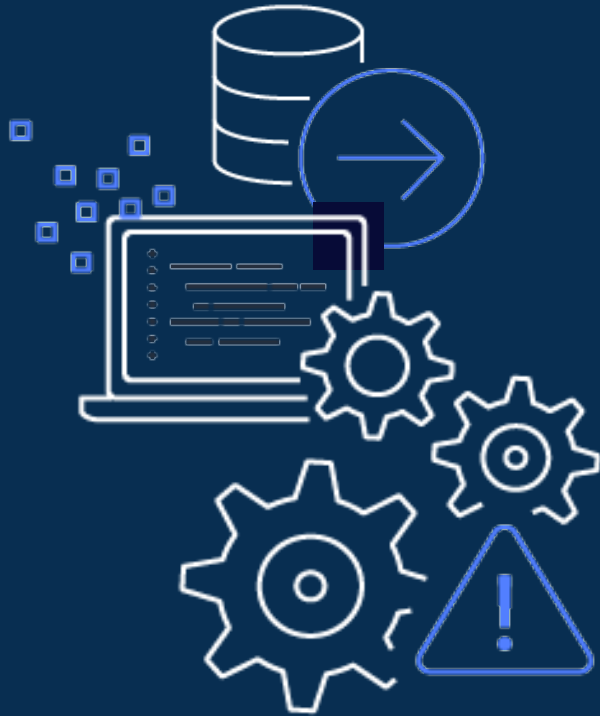
AWS DataSync

AWS DataSync

Data transfers are challenging

- Building and deploying scripts

- Encrypting and verifying data

- Recovering from errors

- Handling network availability

- Assuring performance

What is AWS DataSync?

Online data migration service
that simplifies, automates, and accelerates
copying file and object data to and from AWS storage

Fast data transfer

- Highly optimized, parallel network transfer (up to 100 TB/day)
- Transfers only incremental changes

Easy to use

- Schedule transfers
- Throttle bandwidth
- Filter by file name patterns

Secure and reliable

- End-to-end encryption
- End-to-end data verification
- VPC endpoints with AWS PrivateLink

Fully managed

- Integrates with AWS management and monitoring services
- Direct transfer into AWS storage services

Cost effective

- $0.0125/GB transferred
- No minimums

AWS DataSync use cases

Migrate
application data
to AWS

Archive
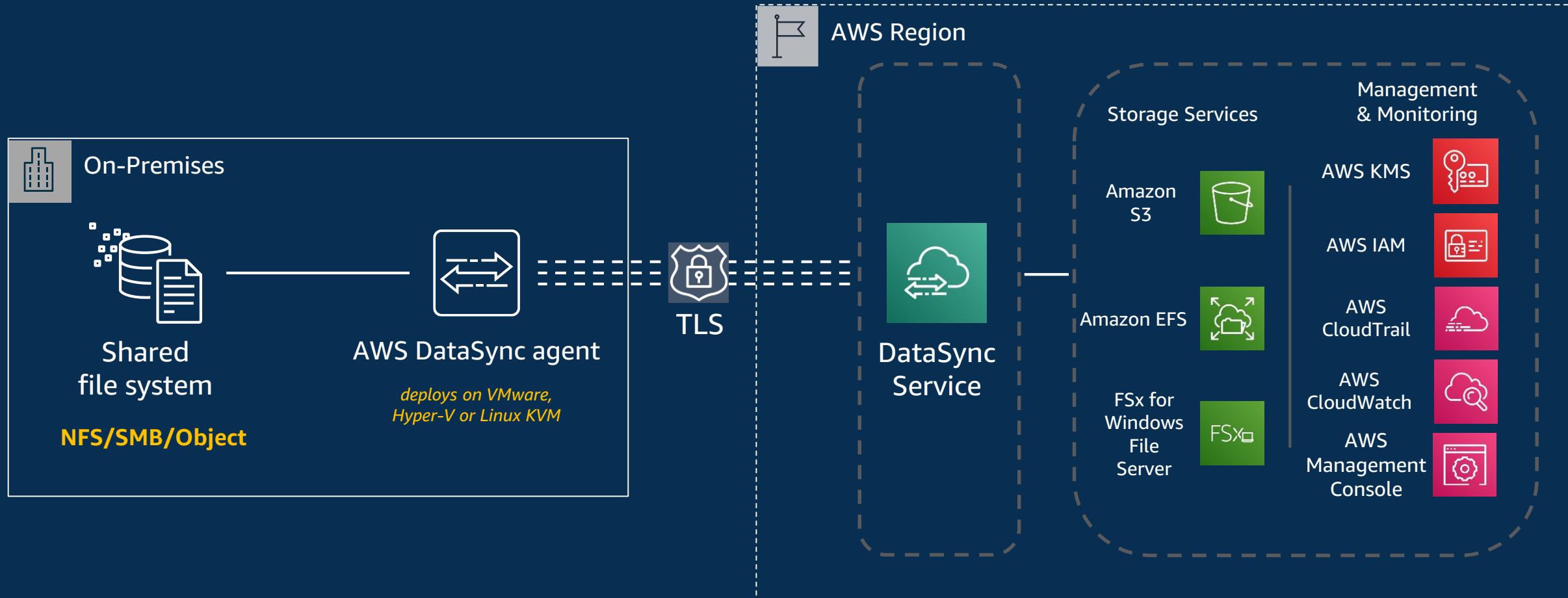on-premises
storage to free
up capacity

Replicate
for data protection
and recovery

Move
data for timely
in-cloud processing

AWS DataSync architecture

SIMPLIFIES, AUTOMATES, AND ACCELERATES DATA TRANSFER TO OR FROM AWS

AWS Region

On-Premises

Shared
file system

NFS/SMB/Object

AWS DataSync agent

*deploys on VMware,
Hyper-V or Linux KVM*

TLS

DataSync
Service

Storage Services

Management
& Monitoring

Amazon
S3

AWS KMS

Amazon EFS

AWS IAM

AWS
CloudTrail

AWS
CloudWatch
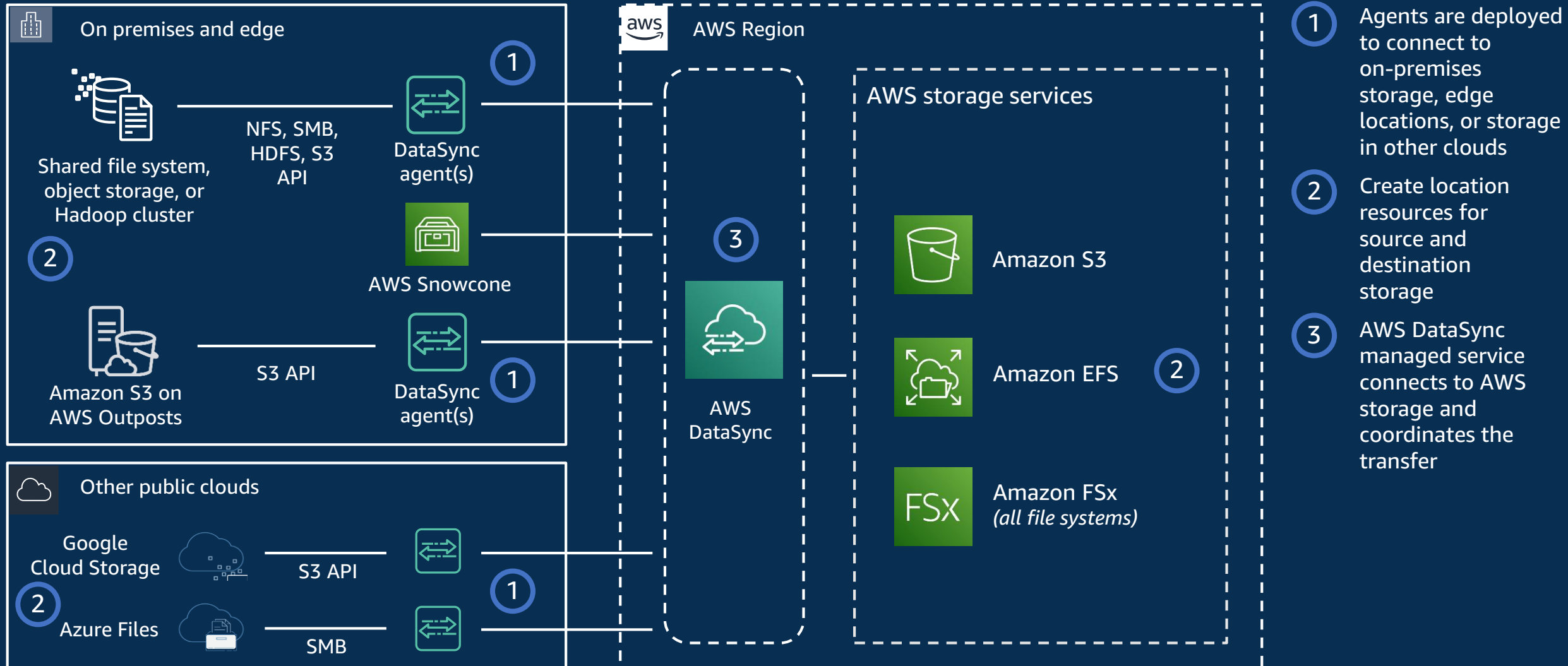
FSx for
Windows
File
Server

AWS
Management
Console

What can you do with AWS DataSync?

QUICKLY, SIMPLY, AND SECURELY MIGRATE YOUR DATA TO AND FROM AWS STORAGE SERVICES
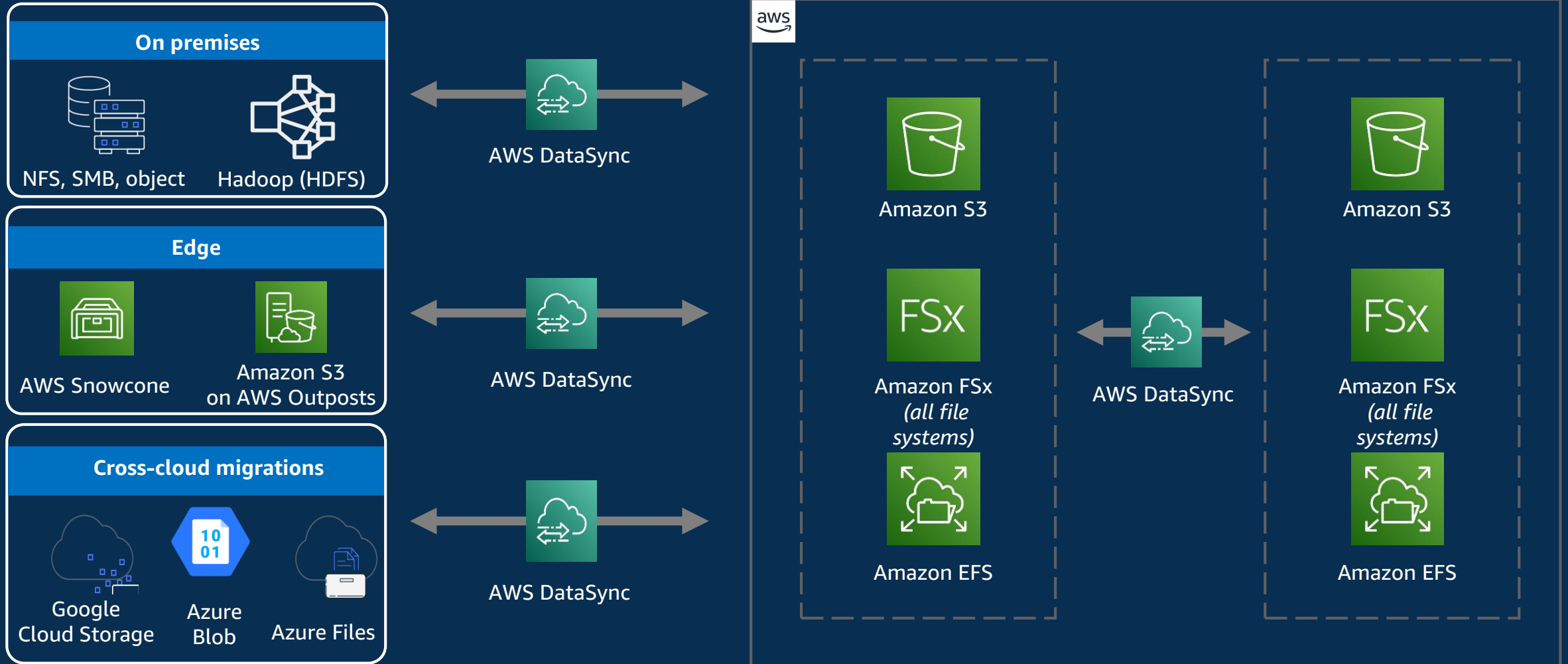
AWS DataSync: How it works

On premises and edge

Shared file system, object storage, or Hadoop cluster

NFS, SMB, HDFS, S3 API → DataSync agent(s) ①

AWS Snowcone

Amazon S3 on AWS Outposts

S3 API → DataSync agent(s) ①

②

Other public clouds

Google Cloud Storage — S3 API ①

Azure Files — SMB

②

AWS Region aws

③ AWS DataSync

AWS storage services

Amazon S3

Amazon EFS ②

Amazon FSx *(all file systems)*

① Agents are deployed to connect to on-premises storage, edge locations, or storage in other clouds

② Create location resources for source and destination storage

③ AWS DataSync managed service connects to AWS storage and coordinates the transfer

AWS Storage Gateway

The hybrid cloud model

You have **on-premises** data and applications . . .

Existing applications and data archives

New data sources

End users

AWS

. . . that want to use storage and services in **the cloud**

Hybrid cloud storage challenges

On premises

In the cloud

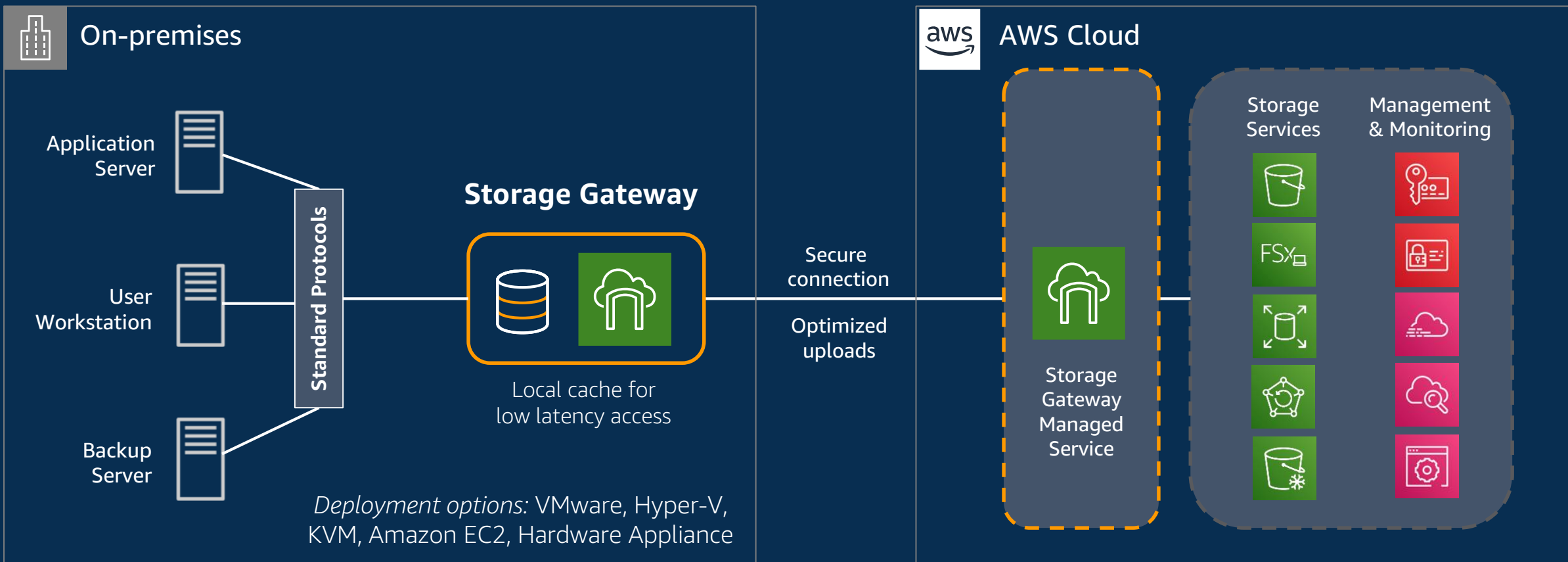|	
I am running out of on-premises storage capacity . . .	. . . and need to use scalable, durable, and secure cloud storage
I want to run my existing applications without change (files, backups, archive) . . .	. . . but leverage the infinite scale of the cloud
I need low-latency, on-premises access to data in the cloud . . .	. . . while accessing the power of cloud compute and analytics
Compliance requires that I integrate with enterprise security and management tools . . .	. . . but I want to manage and monitor from a single pane of glass

Storage Gateway architecture

PROVIDES ON-PREMISES ACCESS TO VIRTUALLY UNLIMITED CLOUD STORAGE

On-premises

Application Server

User Workstation

Backup Server

Standard Protocols

Storage Gateway

Local cache for low latency access

Deployment options: VMware, Hyper-V, KVM, Amazon EC2, Hardware Appliance

Secure connection

Optimized uploads

AWS Cloud

Storage Gateway Managed Service

Storage Services

Management & Monitoring

AWS Storage Gateway

Amazon S3 File Gateway

Native file access, SMB or NFS, to Amazon S3 for **backups**, **archives**, and ingest for **data lakes**

Amazon FSx File Gateway

Replace on-premises Windows file shares with efficient, low-latency Amazon FSx for Windows File Server based **group file shares** and **home directories**

Tape Gateway

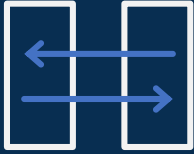**Replace physical tape infrastructure**, leveraging Amazon S3 archive tiers for long-term retention

Volume Gateway

Block storage volumes with snapshots, AWS Backup integration, and cloud recovery

Storage Gateway benefits

Standard protocols
No changes to existing apps

Local caching
Low-latency access to frequently used data

Optimized data transfers
Minimized network traffic

Provides security and supports compliance
FIPS, HIPAA, PCI, SOC*, ISO**, and encryption
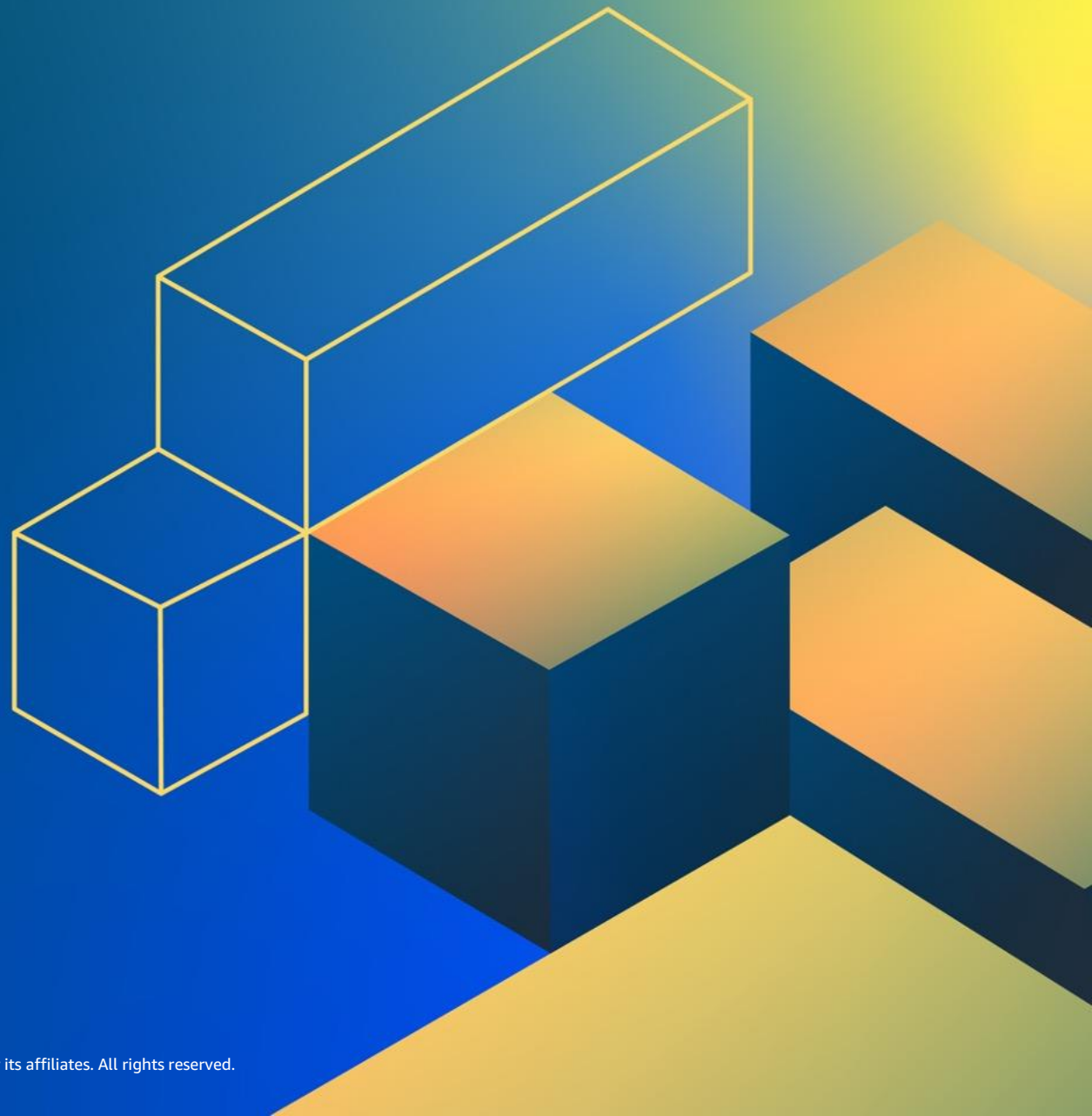
Cost-effective
Pay-as-you-go pricing

AWS integrated
Management, monitoring, and in-cloud workloads

*SOC (1, 2, 3) **ISO (9001, 27001, 27017, 27018)

aws

Demo
Amazon S3 File Gateway

Demo Scenarios – Sophia and Joe

Sophia has large data repositories stored on NAS Storage presented via **NFS** which need to be **archived and migrated** into AWS, and **still available via NFS** on-premises.

Joe manages Backups and has run out of on-premises backup storage – and has realized the **SQL backups** are taking up a large portion of their expensive primary storage.
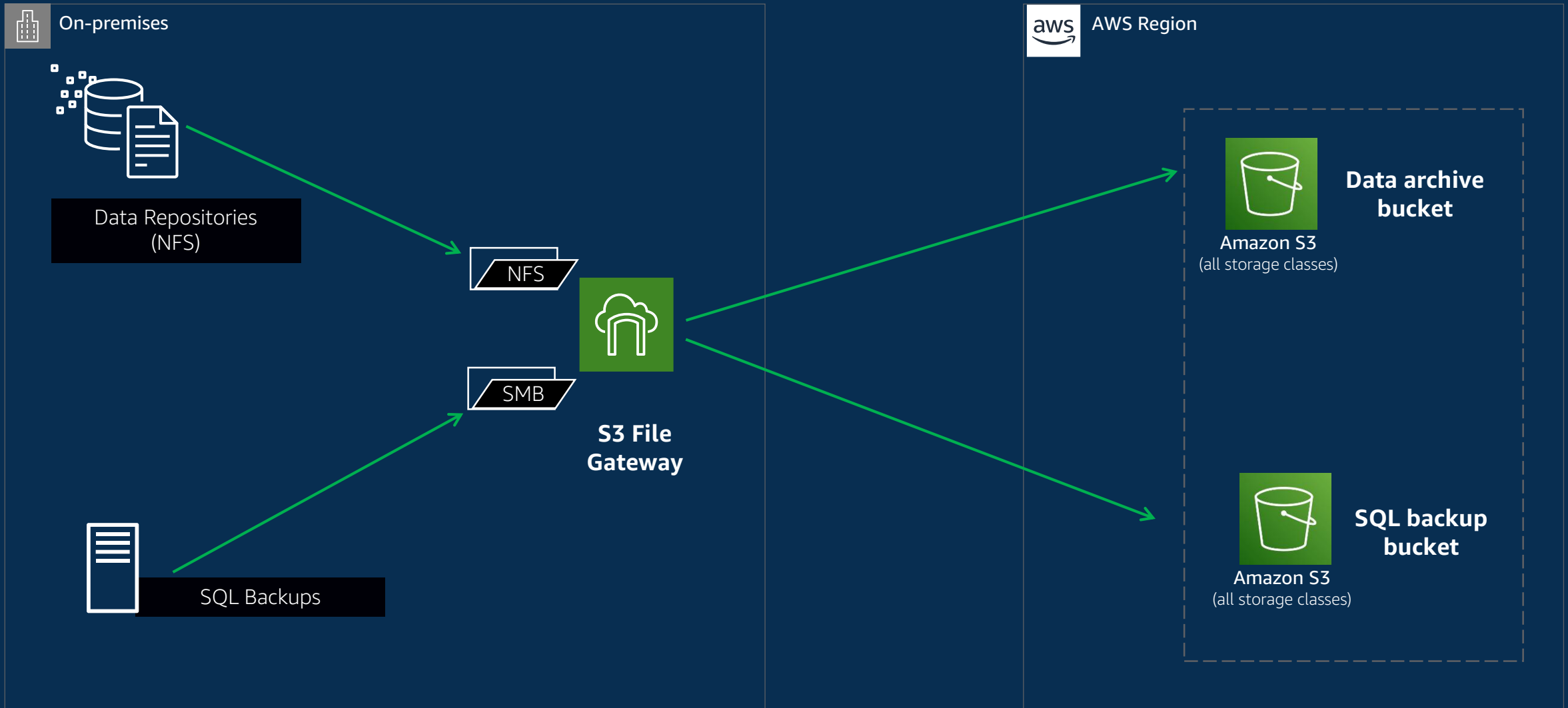
Demo set up 1 – S3 File Gateway (NFS)
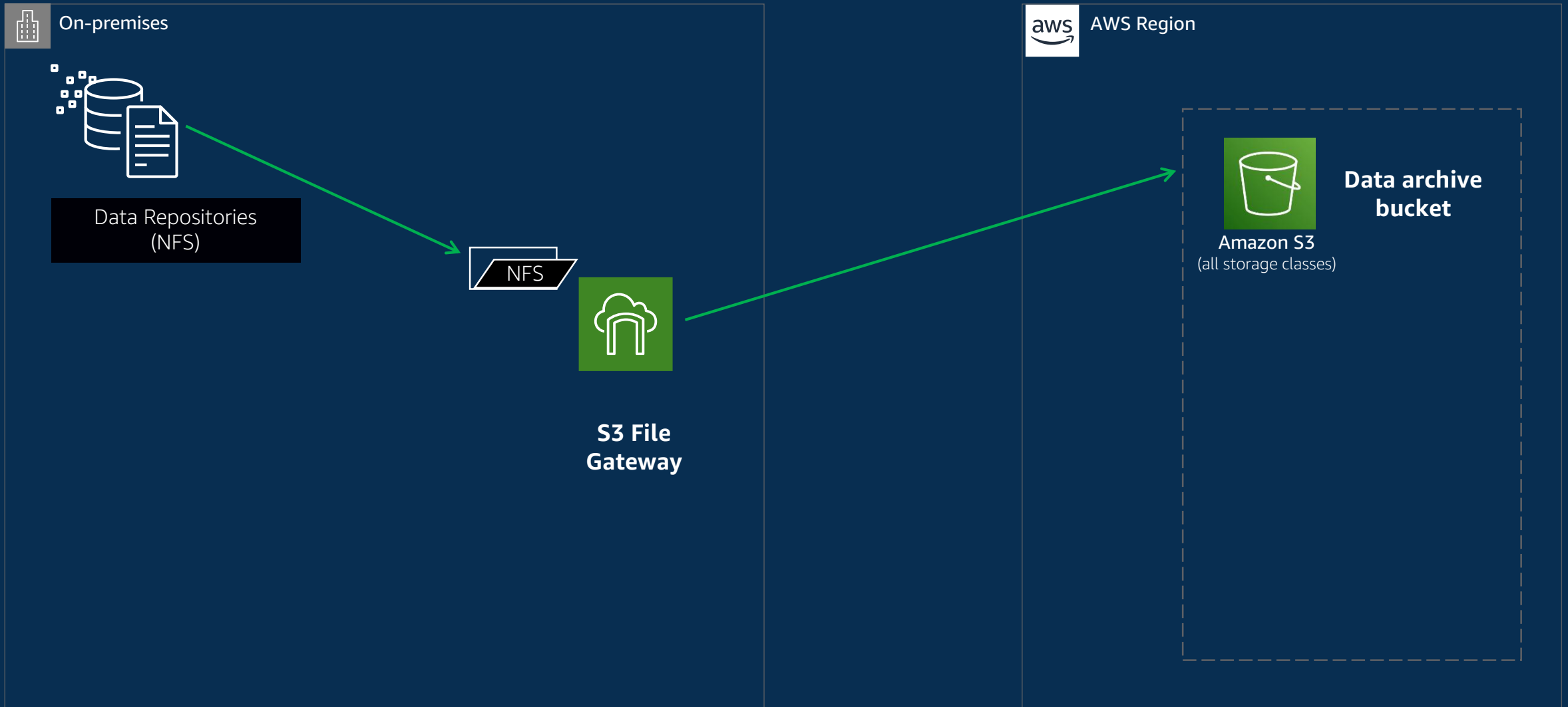
Demo set up 2 – S3 File Gateway (SMB)
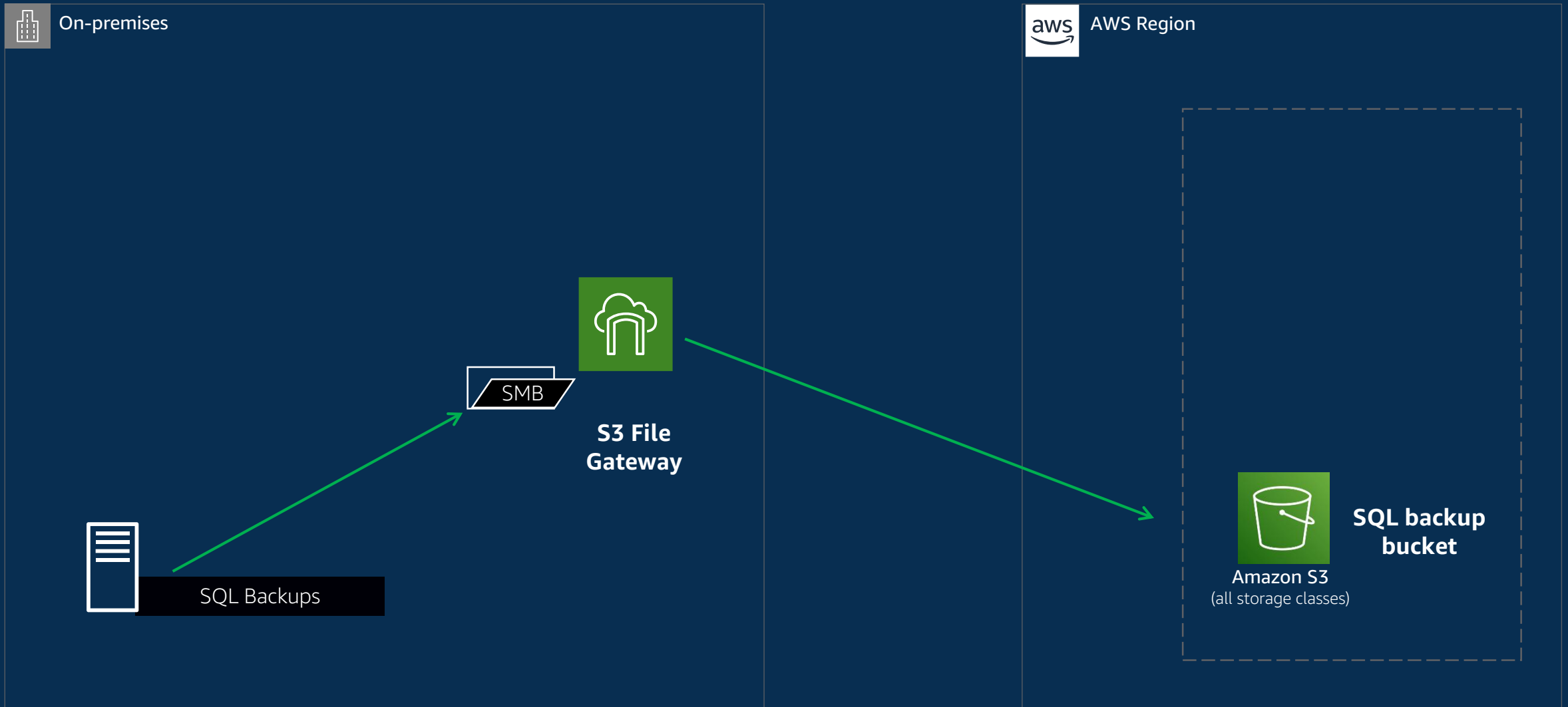
Demo set up – S3 File Gateway (NFS and SMB)

Demo recap

- Amazon S3 File Gateway was used to provide low latency access to an applications for on-premises access.

- S3 File Gateway was used to transfer / migrate data from different sources on premises (NFS and SMB) to Amazon S3

- A seamless way to connect to the cloud (via SMB / NFS) in order to store backup images as durable objects in Amazon S3 cloud storage.

- Objects written through the S3 File Gateway can be accessed directly in S3.

- A single gateway can connect to multiple buckets.

Common hybrid pattern

Archive data to the cloud

MOVE CLOUD DATA FROM EXPENSIVE ON-PREMISES STORAGE SYSTEMS TO DURABLE, SECURE LONG-TERM STORAGE
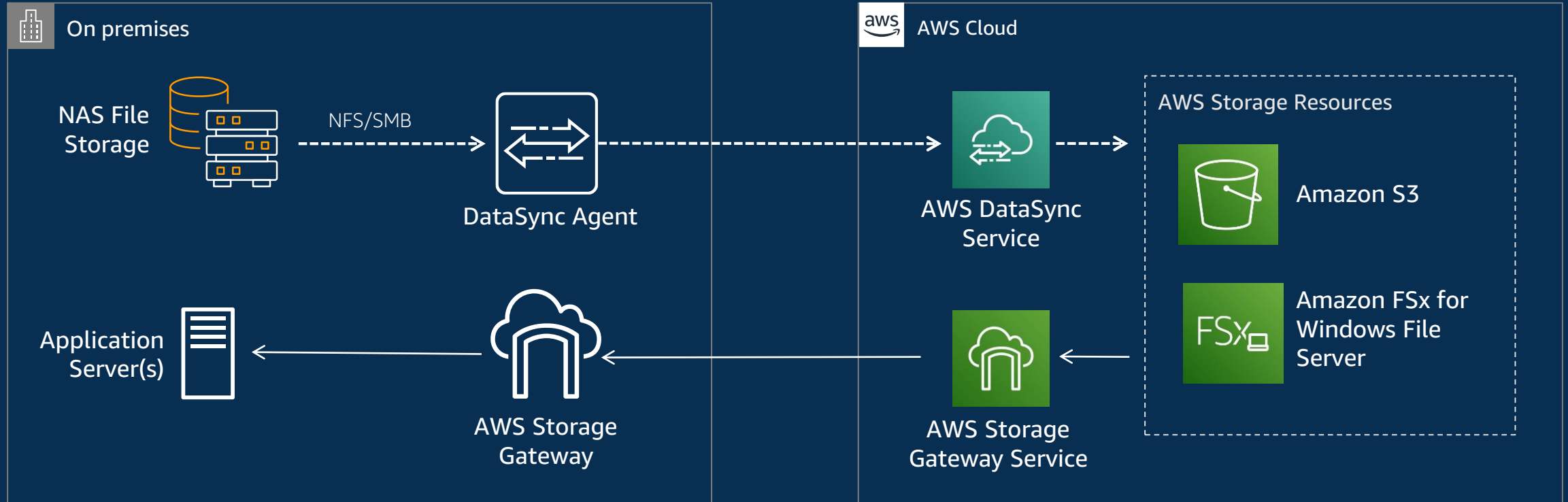
FORMULA 1 uses AWS DataSync to replicate video archive to Amazon S3

Challenge

- 400 TB video archive that needs to be backed up regularly while maintaining high accessibility

Solution

- Using AWS DataSync, FORMULA 1 copies up to 4 TB per day to Amazon S3.

- FORMULA 1 uses AWS Storage Gateway to provide standard file access to data in Amazon S3 with a local cache for low latency access.

Results

- AWS DataSync transfers data quickly and securely to Amazon S3.

- Data is stored durably and reliably in Amazon S3, and all data is encrypted at rest.

- AWS Storage Gateway gives users on-premises access to the video archive in Amazon S3, providing fast recovery from failure scenarios.

https://aws.amazon.com/blogs/storage/formula-1-transfers-race-car-data-into-the-aws-cloud-using-aws-datasync/

"**AWS DataSync synced data from our on-premises file server to Amazon S3 at an average of 4 TB per day, and did so with encryption during transfer and at rest. "**

Martynas Juras

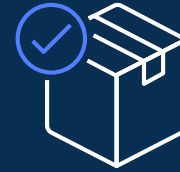Cloud Engineer, FORMULA 1

AWS Snow Family

AWS Snow Family data migration workflow

AWS Snow Family management console

Qualify SBE V3S then Create SBE V3S job

Use AWS OpsHub or AWS CLI to manage AWS Snow Family devices

Courier transport service

Secure erasure using NIST 800-88 standards

Device shipped

Data copied
1-N* days

Device arrives at AWS

1-3 days

1-2⁺ days

1-2⁺ days

1-N days

Job created & provisioned

Device arrives

Device sent to AWS

Job Complete

Courier transport service

Copy data via >1GB/s local network

Your data begins ingesting into your Amazon S3 bucket

* variable file transfer speeds | + business days

Recap

- Hybrid cloud storage services

- AWS DataSync

- AWS Storage Gateway

- AWS Snow Family devices

- Demo of using AWS Storage Gateway for NFS and SMB on-premises

Additional Resources

- AWS DataSync : https://aws.amazon.com/datasync

- AWS Storage Gateway : https://aws.amazon.com/storagegateway

- AWS Snow Family : https://aws.amazon.com/snow

- AWS Storage : https://aws.amazon.com/products/storage/

Get hands-on experience with the AWS online data migration workshop

https://github.com/aws-samples/aws-online-data-migration-workshop

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twitch.tv/aws

Thank you!

Naim Mucaj

Senior Solutions Architect
Amazon Web Services

Key takeaways

AWS DataSync moves and copies data from on premises to AWS and between AWS storage services

AWS DataSync moves data online using your network bandwidth or a VPC for added security

AWS DataSync works well with the AWS Snow Family of devices; DataSync is built into AWS Snowcone for edge use cases

Get started with AWS DataSync by visiting aws.amazon.com/datasync