
AWS
re:Invent
NOV. 27 – DEC. 1, 2023 | LAS VEGAS, NV

STG220-S

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FSx for ONTAP: Enterprise-grade unified storage for any application

Puneet Dhawan
Senior Director,
Product Management
NetApp

Trinh Tran
Storage Infrastructure
Associate Director
Gilead Sciences

Justin Wright
CTO – Platform Engineering
Thomson Reuters

Agenda

01 Amazon FSx for NetApp ONTAP overview

02 Key workloads and use cases

03 FSx for ONTAP customer panel

Storage powers a broad spectrum of applications

Storage & IT admins and app owners

Builders and data scientists

Enterprise IT applications

User shares

Line-of-business applications

Machine learning

SaaS applications

Software build environments

Backup and disaster recovery

Web serving and content management

Data science and analytics

DevOps platforms

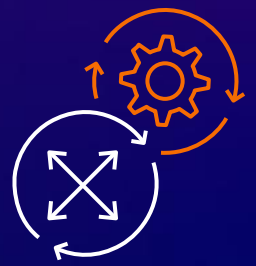
Why run your applications in the cloud?

Improve reliability without the operational heavy lifting

Raise security and data protection bar

Optimize and fine-tune TCO

Increase agility—launch and scale storage in minutes



Automate storage deployment workflows using infra-as-code

What is Amazon FSx for NetApp ONTAP?

Complete NetApp ONTAP storage

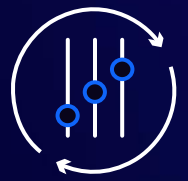
With the simplicity, agility, and scalability of a fully managed AWS service

Why FSx for ONTAP for storage in AWS?

BUILD AND RUN CLOUD WORKLOADS LEVERAGING *'THE ONLY AWS UNIFIED STORAGE SERVICE'*

ONTAP is NetApp's storage software that hosts

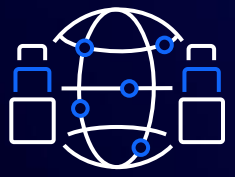
~33% of the 135 exabytes of data on premises



Fully managed, petabyte scale

Multi-protocol unified storage

AWS and ONTAP's APIs, management



Single-AZ or Multi-AZ

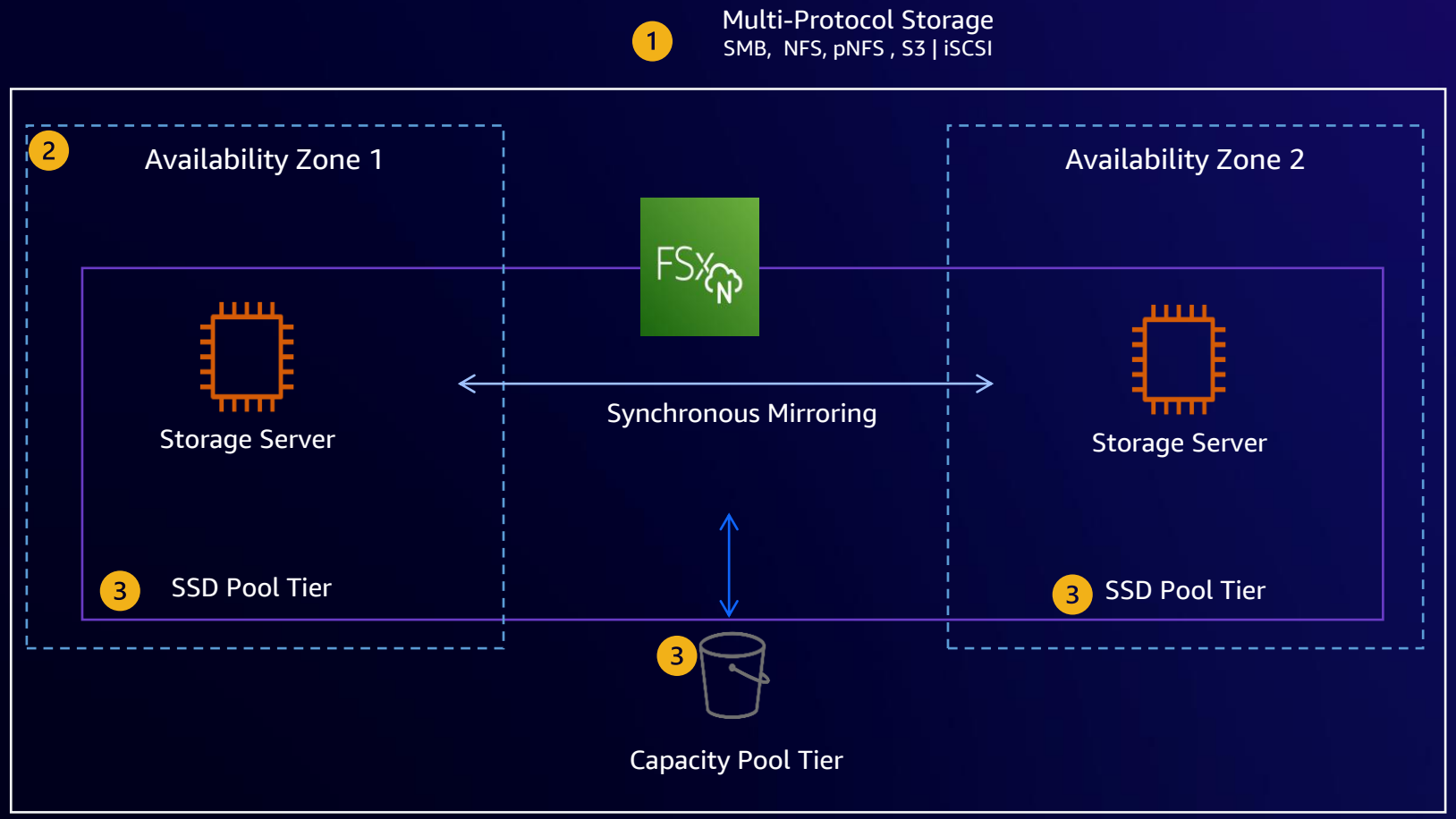
High performance & scale

Powerful data protection

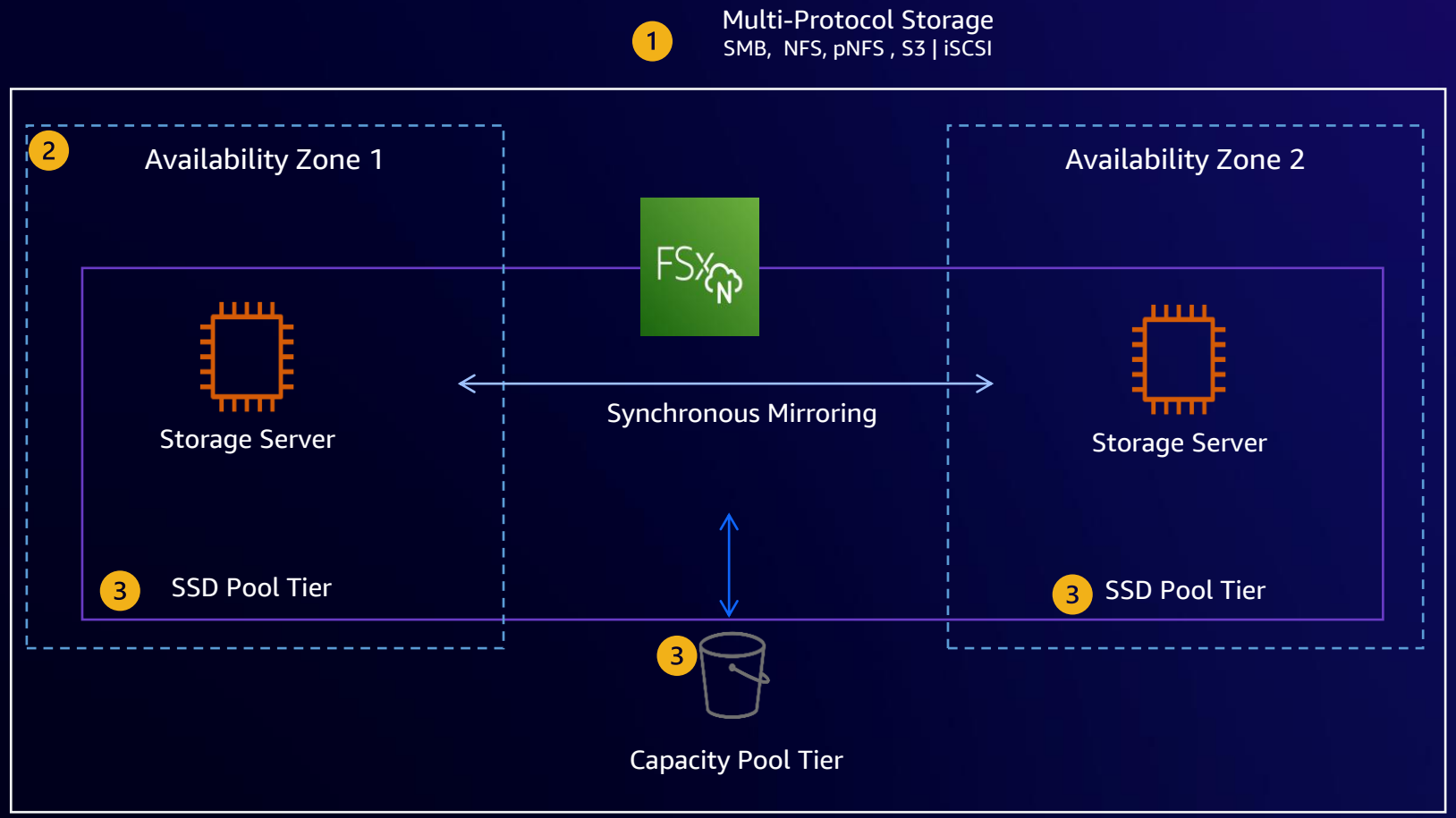
Cost efficient

FSx for ONTAP architecture

1 • Secure multi-protocol access

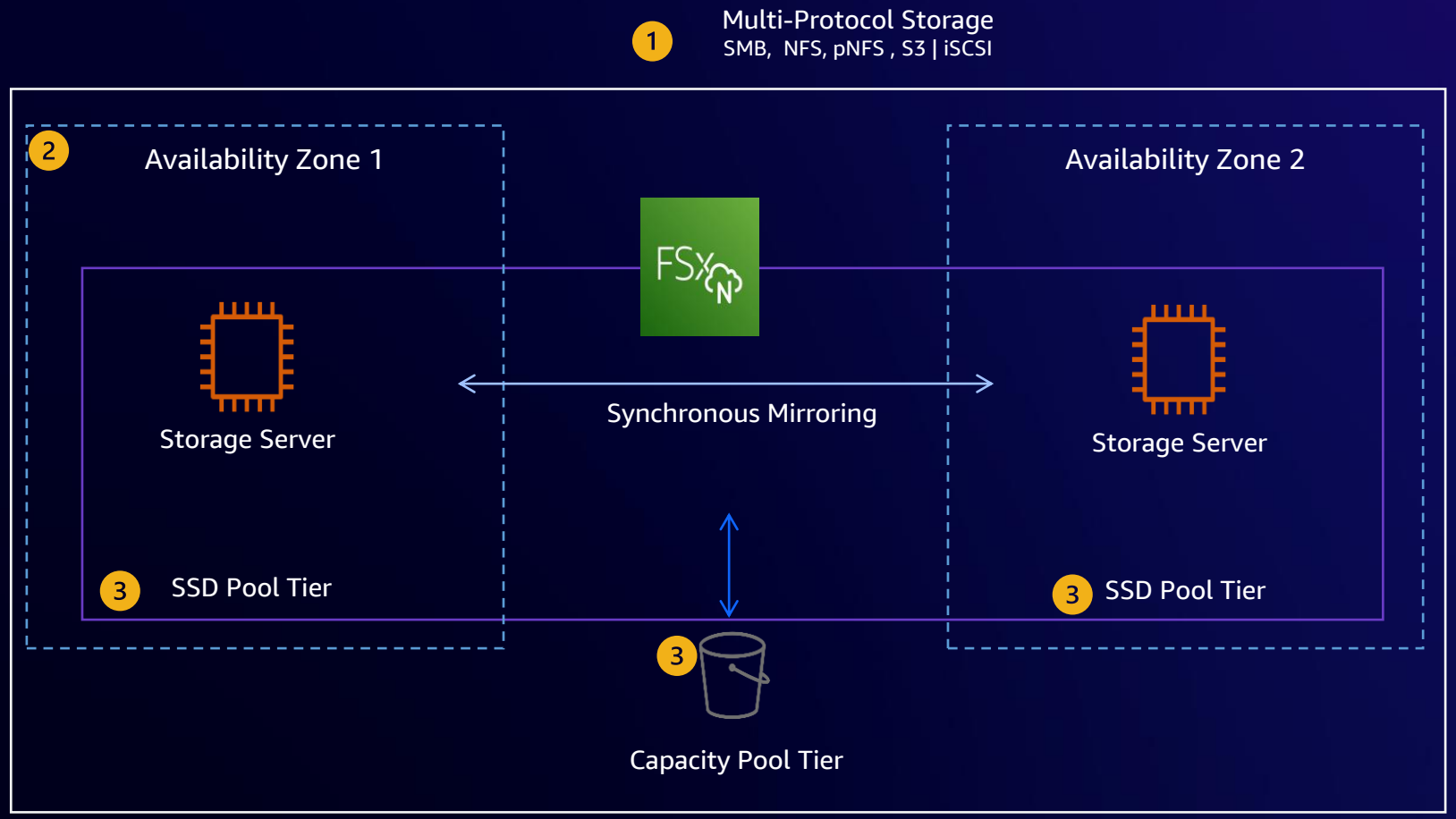


FSx for ONTAP architecture



1. Secure multi-protocol access
2. Single AZ and Multi-AZ file systems

FSx for ONTAP architecture



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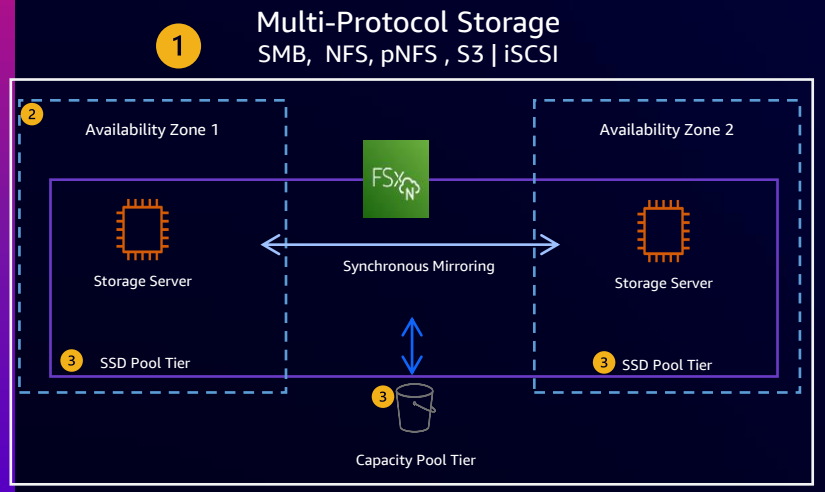
- In-memory and NVMe cache
- SSD Tier for Hot data
- Cool data tiers to Capacity Pool
- Deduplication, Compression and Compaction

FSx for ONTAP architecture



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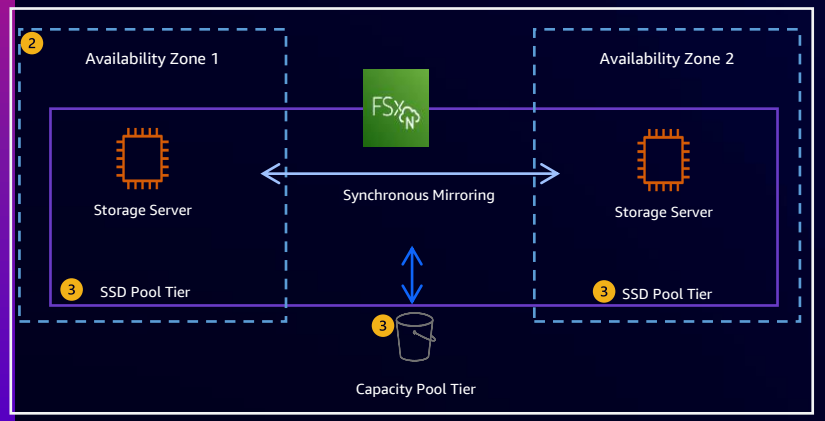
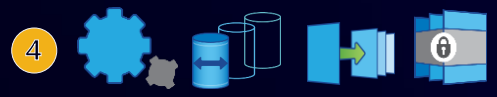
FSx for ONTAP architecture

1 Multi-Protocol Storage
SMB, NFS, pNFS , S3 | iSCSI





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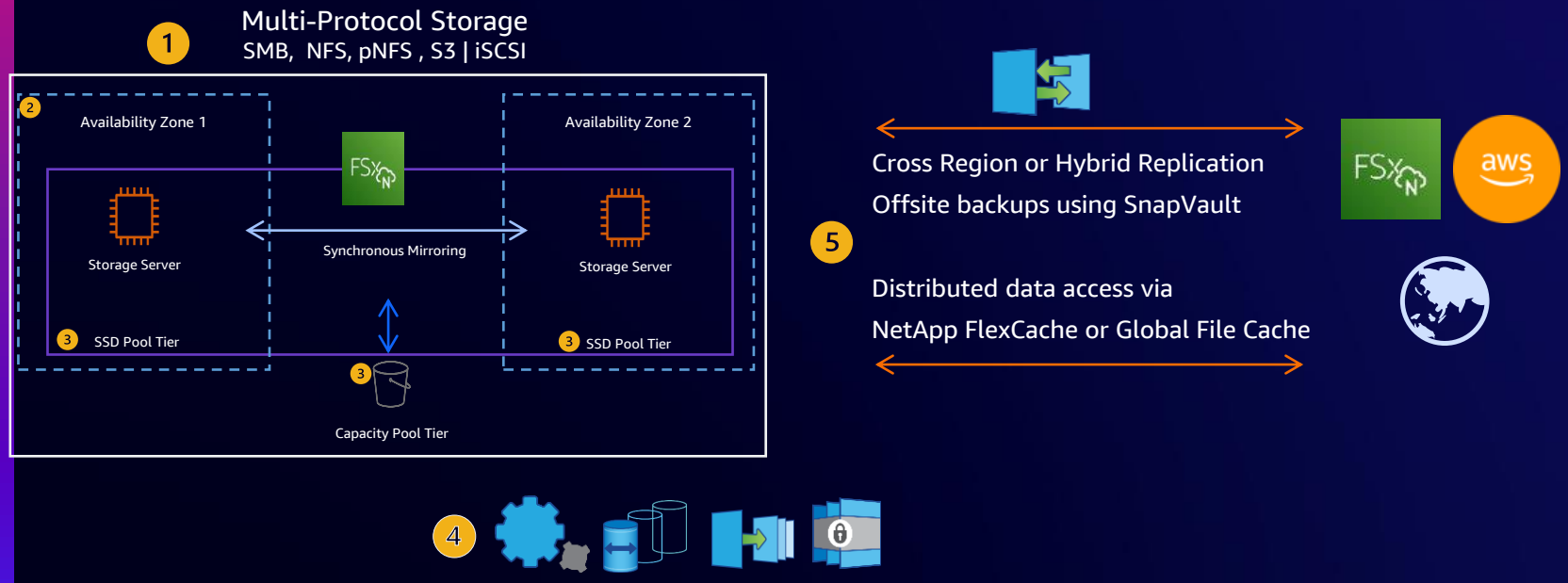
- Near Instant, space efficient Snaps
- Near Instant, thin Clones
- Robust backup protection
- Immutable storage via SnapVault

FSx for ONTAP architecture



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5. Cross-region replication and DR
   - Distributed global R/W cache across regions or on-prem

FSx for ONTAP architecture

Integrated with

CloudWatch, CloudTrail, CloudFormation, Directory Service, AWS KMS, AWS Backup, AWS ParallelCluster

6

Accessible from

Amazon EC2, Amazon EKS, Red Hat OpenShift on AWS, VMware Cloud on AWS, Amazon WorkSpaces, Amazon AppStream, AWS DataSync, AWS Snowball

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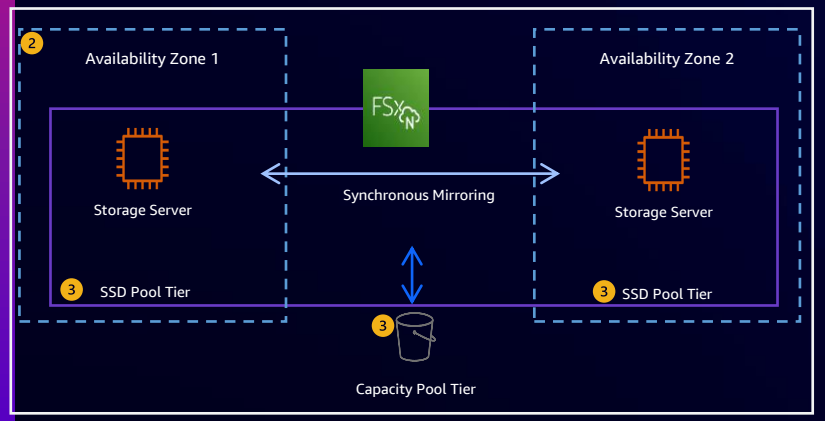

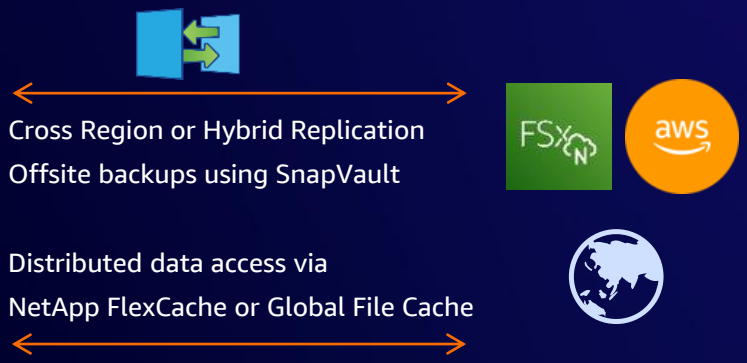

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6 • Integrated with and accessible from a wide range of AWS services

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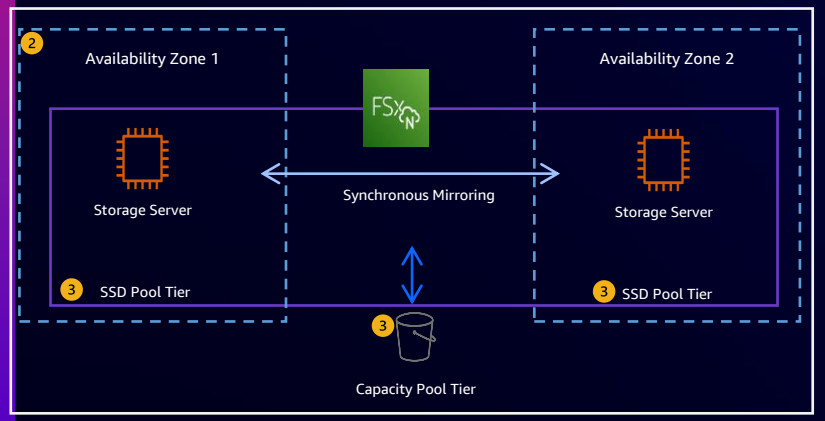

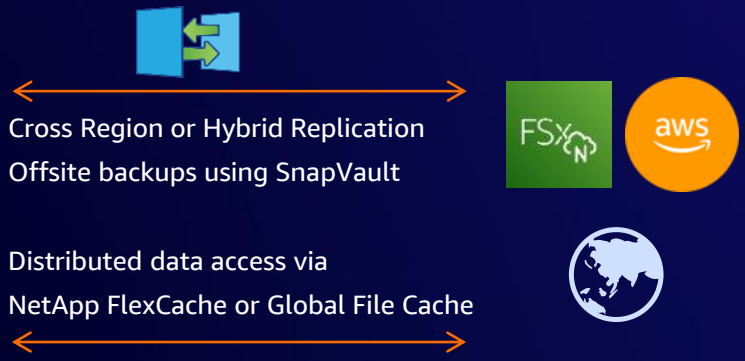

7 AWS Management Console · Amazon FSx API / SDK · AWS CLI · AWS CloudFormation · NetApp BlueXP · ONTAP CLI · ONTAP API · NetApp / AWS Provider

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6 • Integrated with and accessible from a wide range of AWS services

7 • Broad management ecosystem

High performance and scale with Scale-up

4GBps+

THROUGHPUT PER FS
(6GBps for cached data)

160K+

IOPS PER FS
(650K FOR CACHED DATA)

192TiB

SSD Tier per FS

Furthering performance with Scale-out

ACCELERATING STORAGE FOR COMPUTE AND DATA INTENSIVE WORKLOADS

New

FSx for ONTAP: 1 HA Pair

4GBps+ read
THROUGHPUT PER FS
(6GBps for cached data)

1.1GBps+ write
THROUGHPUT PER FS

160K+
IOPS PER FS
(650K FOR CACHED DATA)

192TiB
SSD TIER PER FS

FSx for ONTAP scale-out (6 HA pairs)

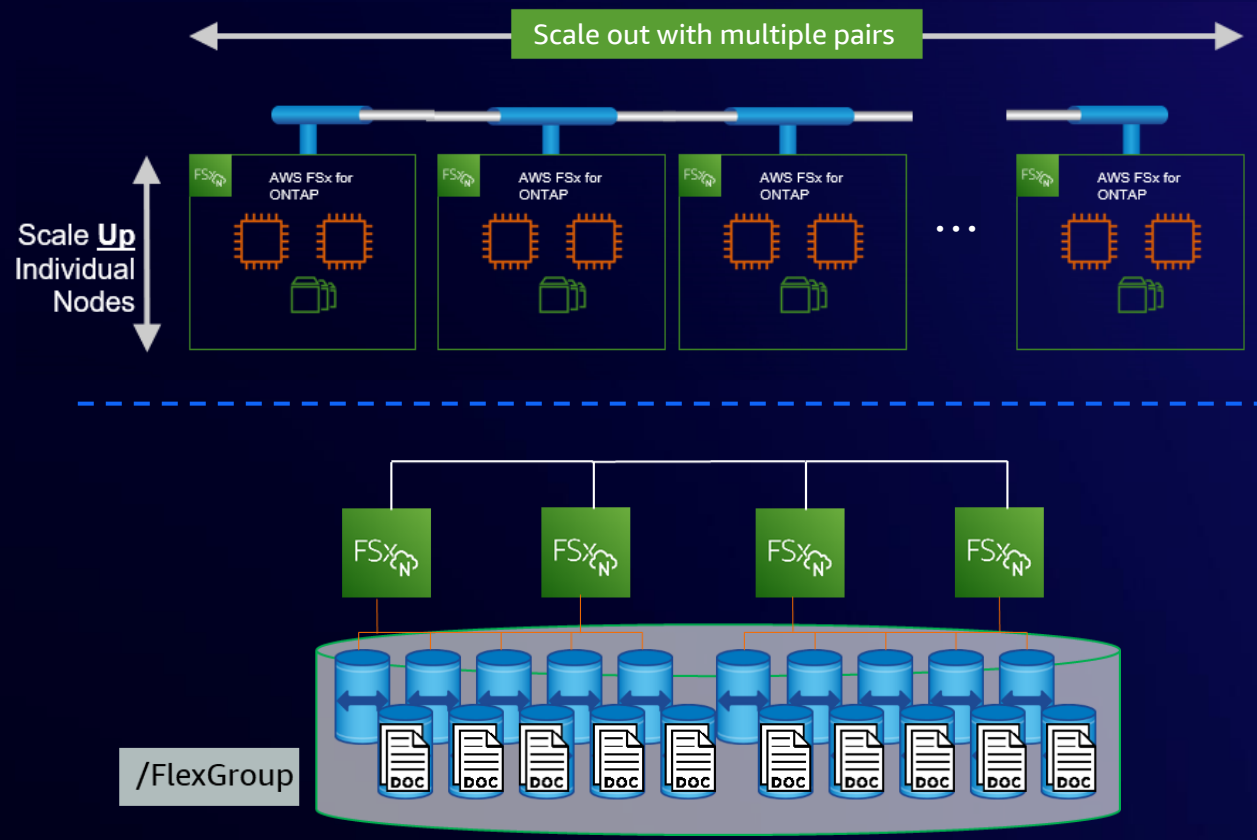
36GBps+ THROUGHPUT PER FS	9x
6.6GBps+ THROUGHPUT PER FS	6x
1.2M+ IOPS PER FS	7x
1PiB SSD TIER PER FS	5x

aws

FSx for ONTAP Scale-out

New

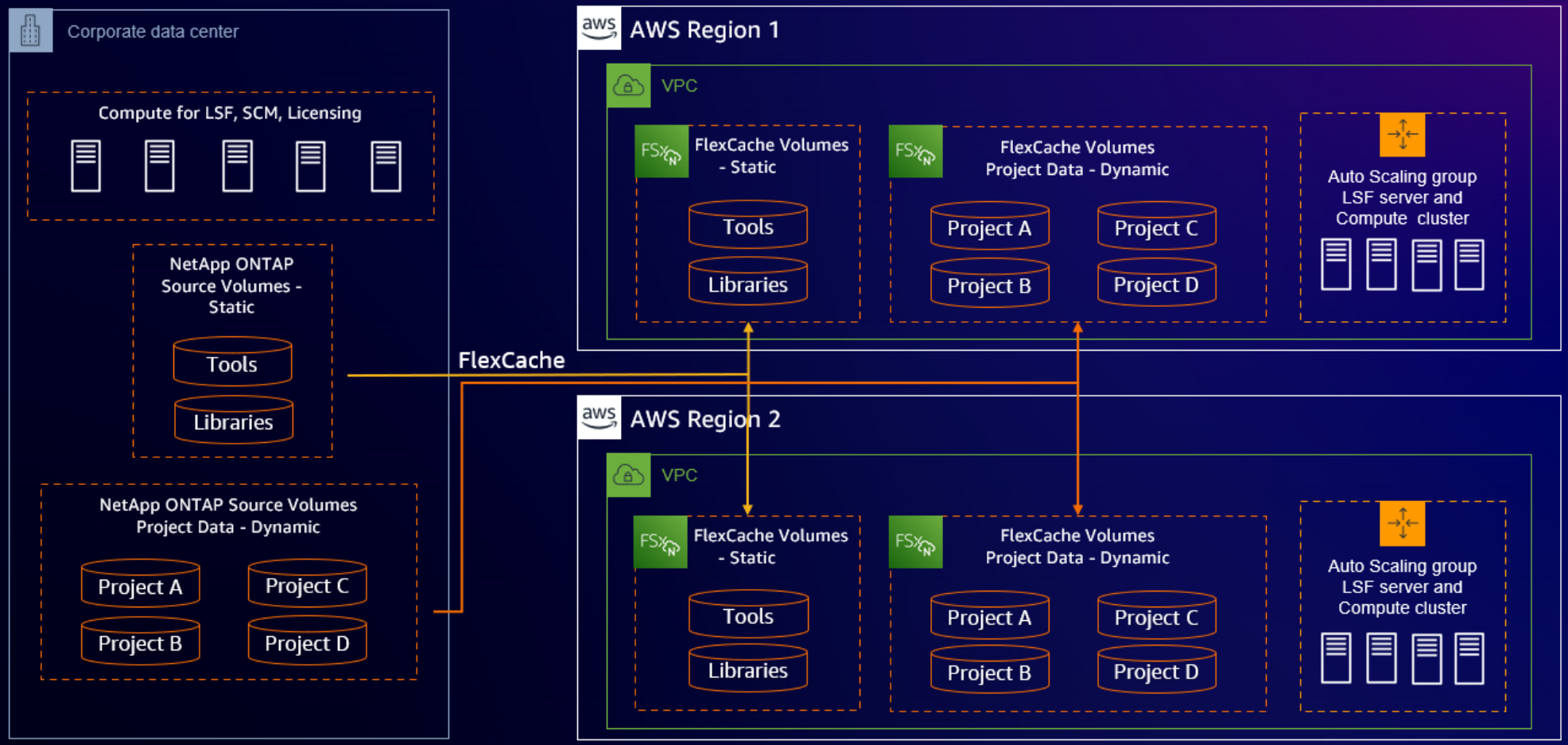
ACCELERATING STORAGE FOR COMPUTE AND DATA INTENSIVE WORKLOADS



- A single FSx for ONTAP cluster with up to 6 HA Pairs providing high aggregate performance
- SMB, NFS, pNFS access
- Up to 20PiB single namespace enabled via NetApp FlexGroups
- Billions of files
- File ingest balanced across all nodes
- Rich data services: backups, snapshots, clones replication, data efficiency features

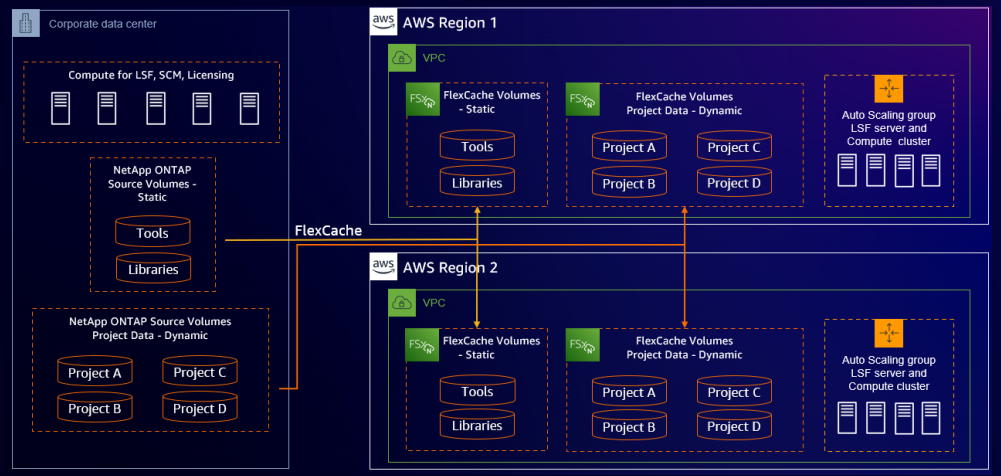
High Performance Computing | EDA | Life Sciences | VFX and Post-Production | Seismic Analysis | ML Training

FSx for ONTAP for EDA workloads



High Performance | Burst from on-premises to AWS | Efficient multi-site caching | Cost optimized

FSx for ONTAP for EDA workloads



arm

"Keeping pace with the rapid rate of cloud innovation requires agile, performant and secure solutions. In testing the new Amazon FSx for NetApp ONTAP, we're successfully leveraging the benefits of the cloud to unlock a new set of scale-out storage capabilities and higher performance for our internal HPC workloads."

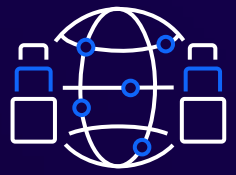
David Miller, Senior Director & Fellow, IT Architecture at Arm

High Performance | Burst from on-premises to AWS | Efficient multi-site caching | Cost optimized

Block storage with FSx for ONTAP

Applications that require **block storage** for **business and mission-critical** workloads while meeting **resilience** and **performance** requirements at **optimal cost**

Shared iSCSI block storage with QoS



Single-AZ or Multi-AZ

High performance & scalability

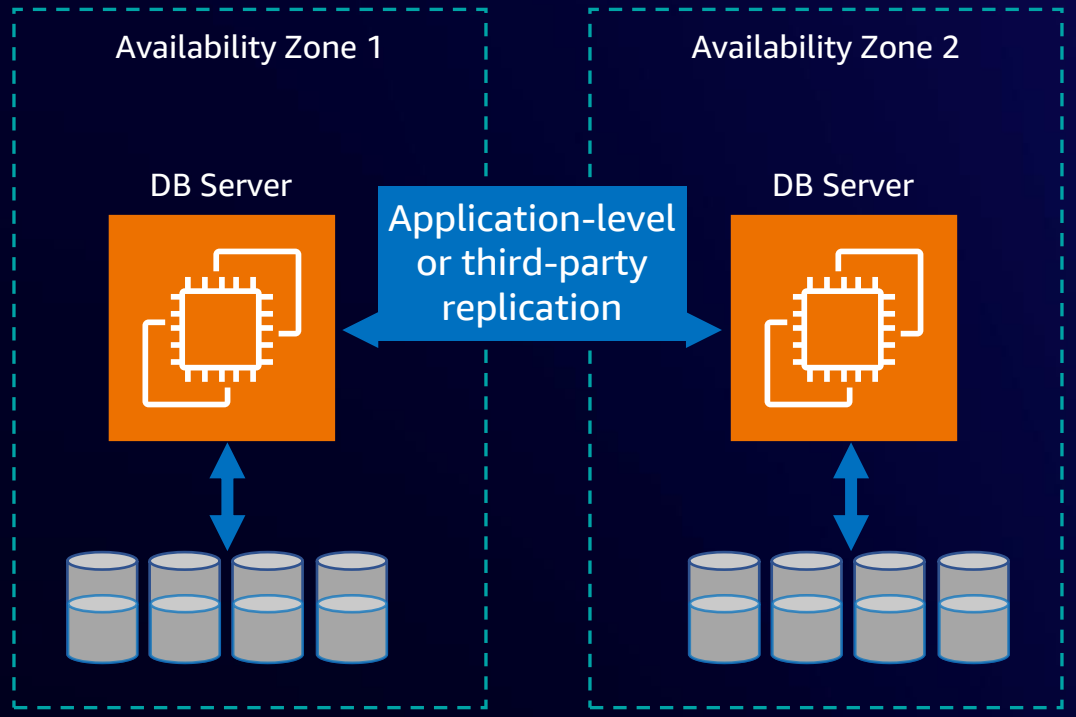
Instant and ‘thin’ Snapshots & Clones

Cross-Region Replication

Cost efficiency

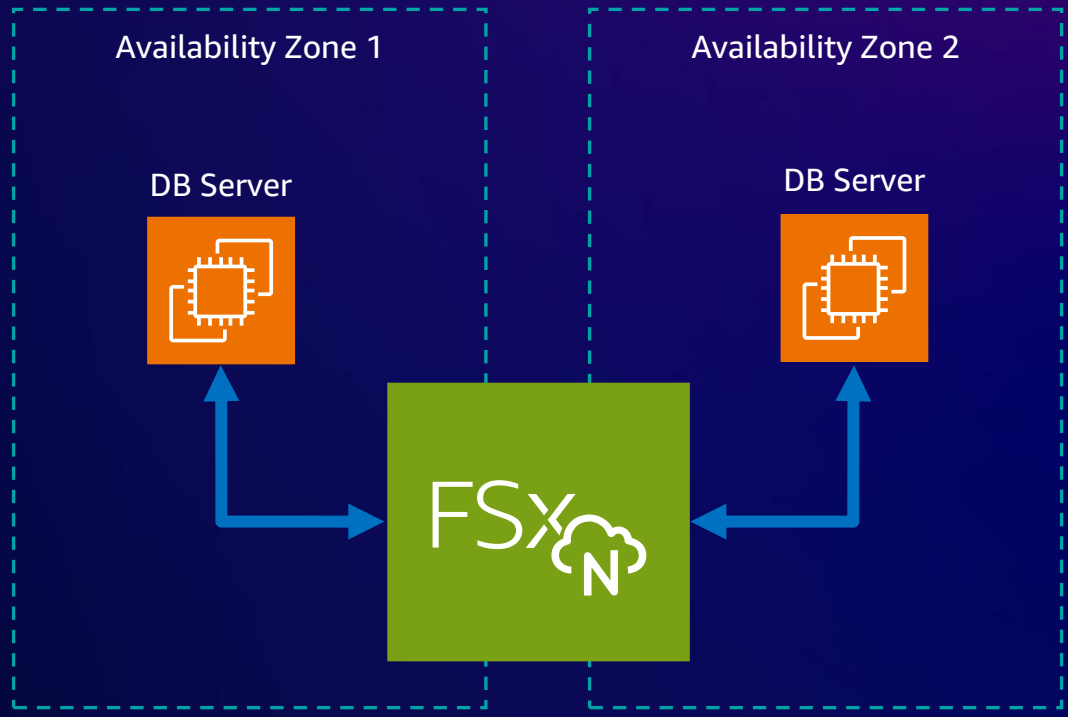
Built-in cross-AZ resiliency with FSx Multi-AZ storage

Without Multi-AZ storage



- Database-based replication adds **operational complexity** and adds **performance impact** to DB servers
- **Higher costs** (EC2 costs + software licensing costs) due to larger EC2 instances

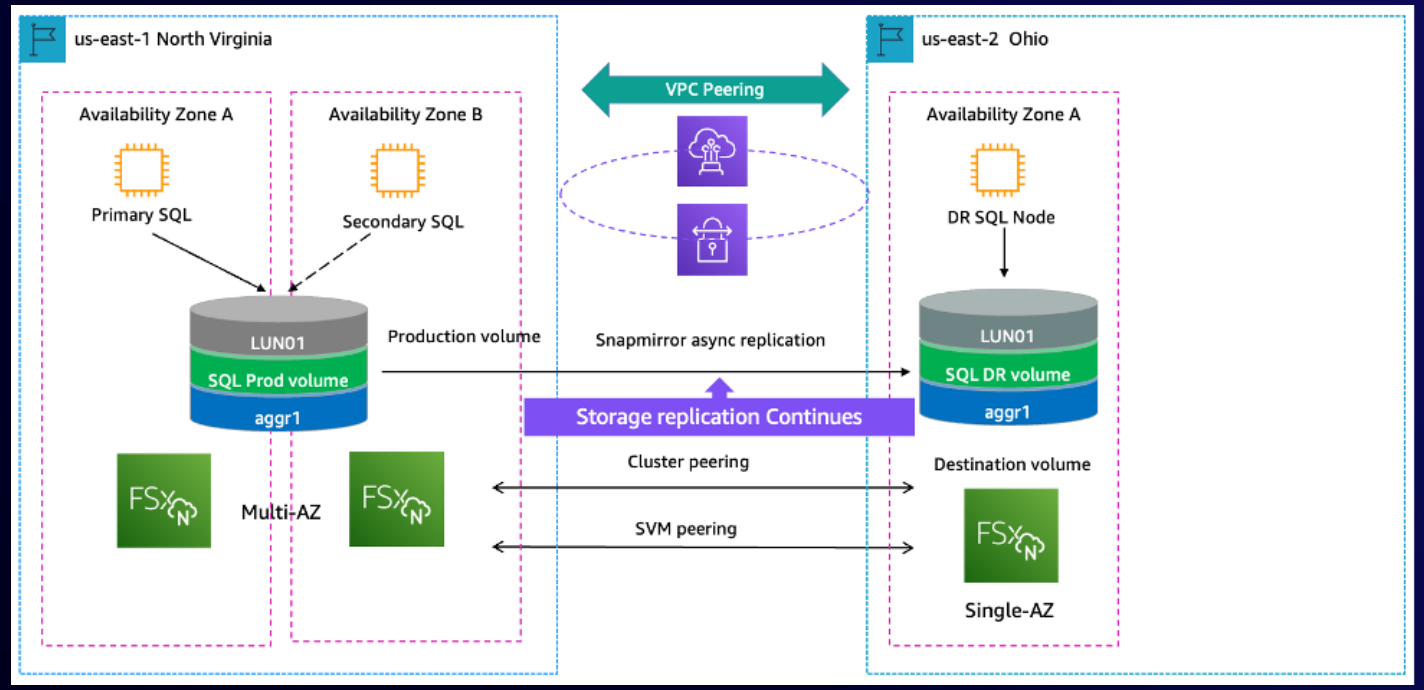
With Multi-AZ storage



- Synchronous, block-level storage replication **reduces operational complexity** and **removes replication burden** from DB servers
- **Lower costs** (EC2 costs + software licensing costs) due to smaller EC2 instances

SQL Server with FSx for ONTAP

S&P Global
Market Intelligence



100s

SQL Server databases running iSCSI Storage for Fail Over Cluster Instances (FCI)

<10m RPO

HA/DR Objective

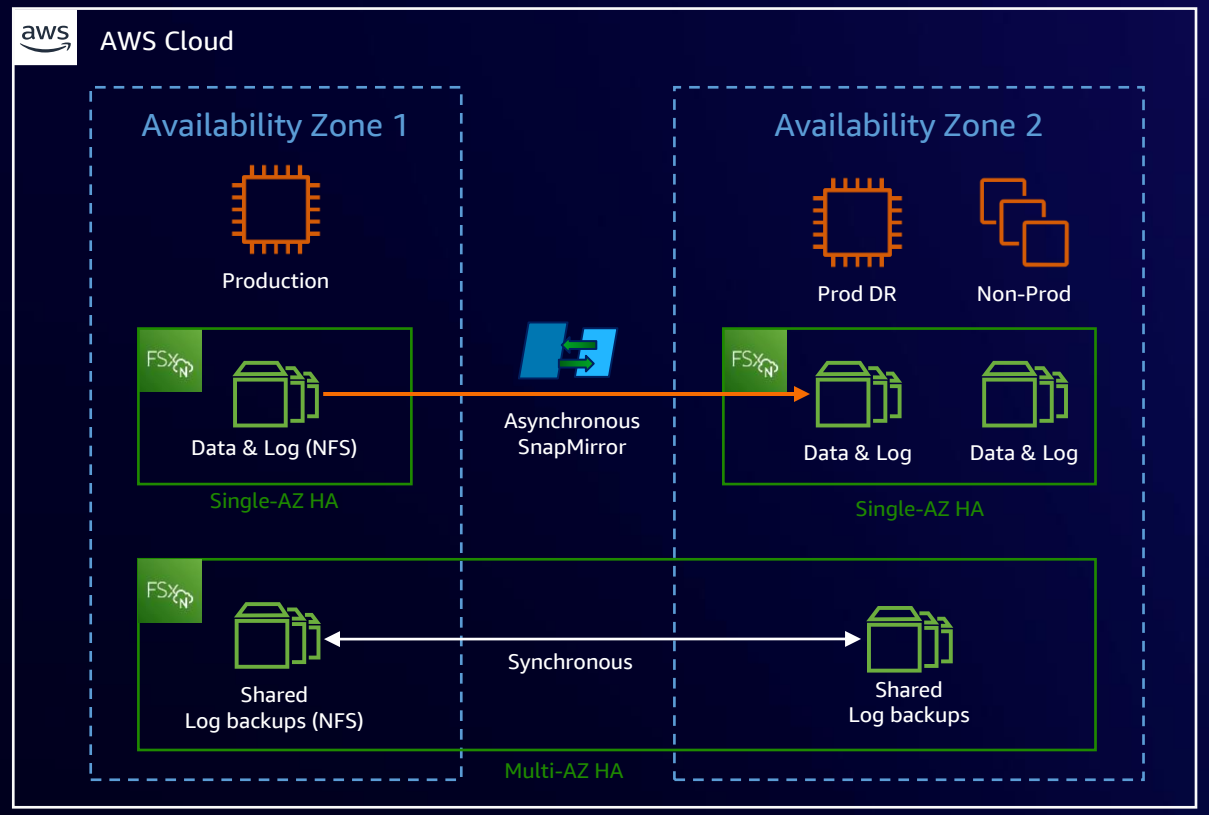
<1hr RTO

HA/DR Objective

"Amazon FSx for NetApp ONTAP provides us the ideal high-availability, cost-effective shared storage solution for our SQL Server FCI DR strategy. The SnapMirror functionality helped reduce our RPO and we only pay for the storage we use now – high availability SQL Server and DR made easy!" **Nishanth Charlakola, Associate Director - S&P Global Market Intelligence**

aws

Modernize SAP environments with FSx for ONTAP



10min RTO

To recover 9TB HANA Database

<2min

To create a HANA consistent snapshot of 6TiB database

<1min

Provision refresh and repair copies

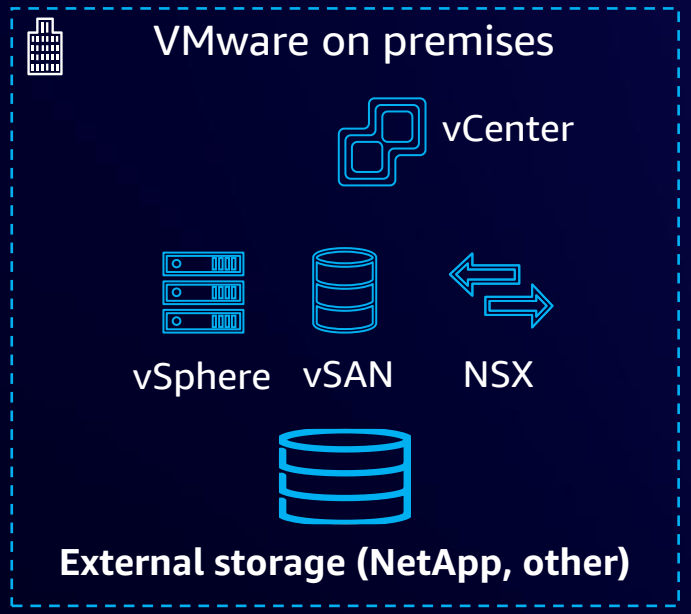
<25min

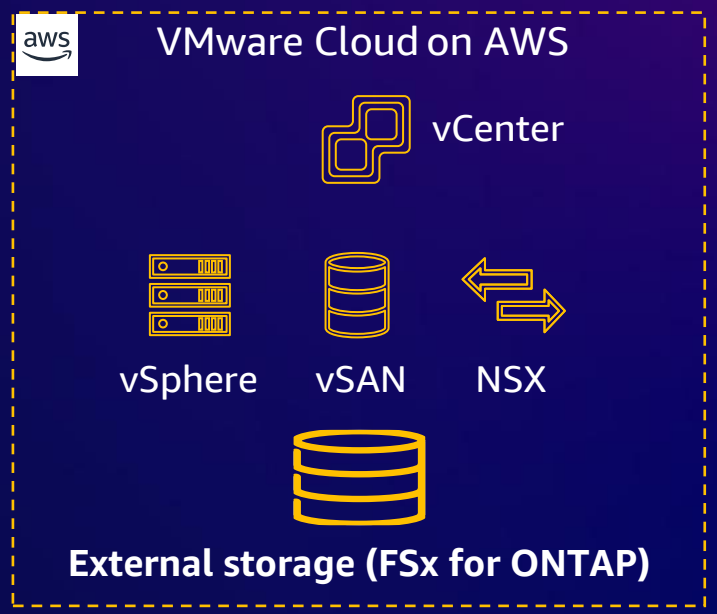
To restart DB and app servers

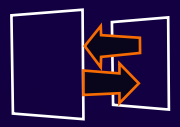
"Our stats are better than we imagined. With FSx for ONTAP, system backups of our 9TB S4 database instance take less than two minutes. We can recover the instance in 10 minutes, and we can restart our entire environment (DB + app servers) in 20 minutes." Sr. Dir Platform Engineering, A Global Apparel Company

Simplifying VMware on AWS while improving TCO

New







Simplify lift and shift

Independent compute & storage scale

M7i diskless VMC nodes improve TCO

Multi-AZ & Single AZ
Now with VPC Peering

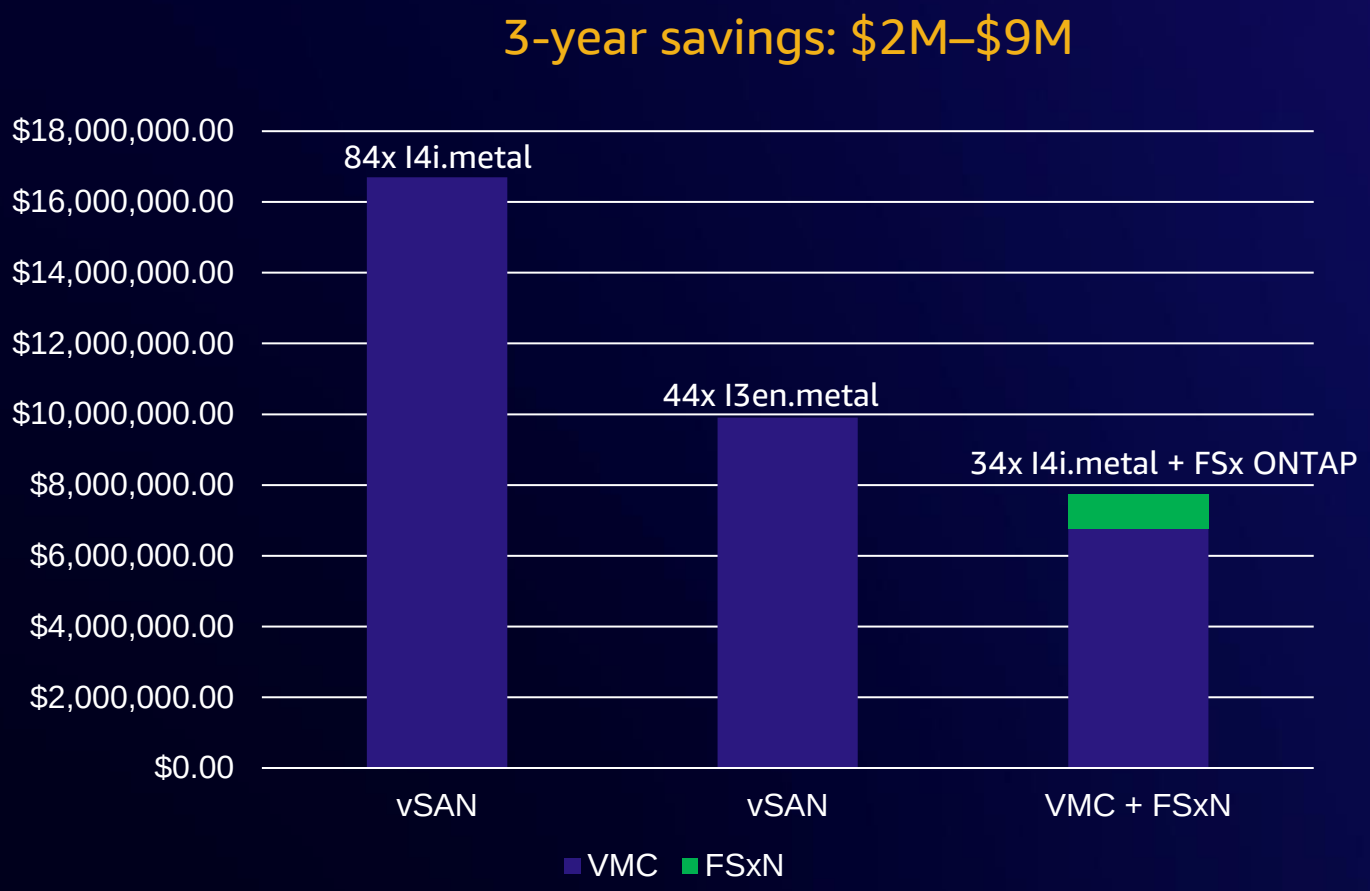
Efficient data protection
DB consistent snapshots (in-preview)

NetApp DR as a Service
(in- preview)

25-50% TCO savings

TCO example: A global manufacturing organization

22-54% lower TCO compared to vSAN



Customer Environment

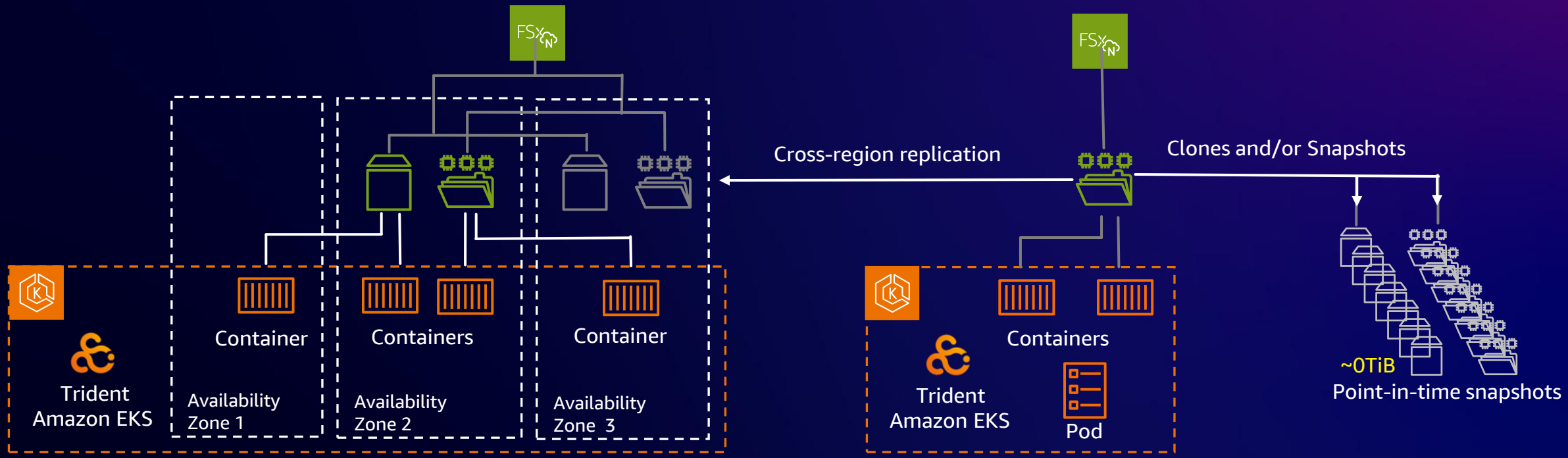
- Large enterprise: 100k+ employees
- 1930 VMs (4 vCPU/pCore, 3 vCPU/VM, 20 vRAM/VM, 534 GB/VM)
- 1006 TiB storage

Key Benefits

- Datacenter consolidation to reduce CapEx
- Reduced Opex with VMC+FSxN
- Future-proof architecture to handle storage growth independent from compute
- Unified storage architecture for VMware and cloud-native applications

Improve cost, agility, time to value for EKS

New



Provisioning via Trident CSI EKS Add-on (in preview)

Robust data protection & DR capabilities

Increased agility using Snapshots & clones

Cross namespace & cross-AZ access

Performance and capacity scalability

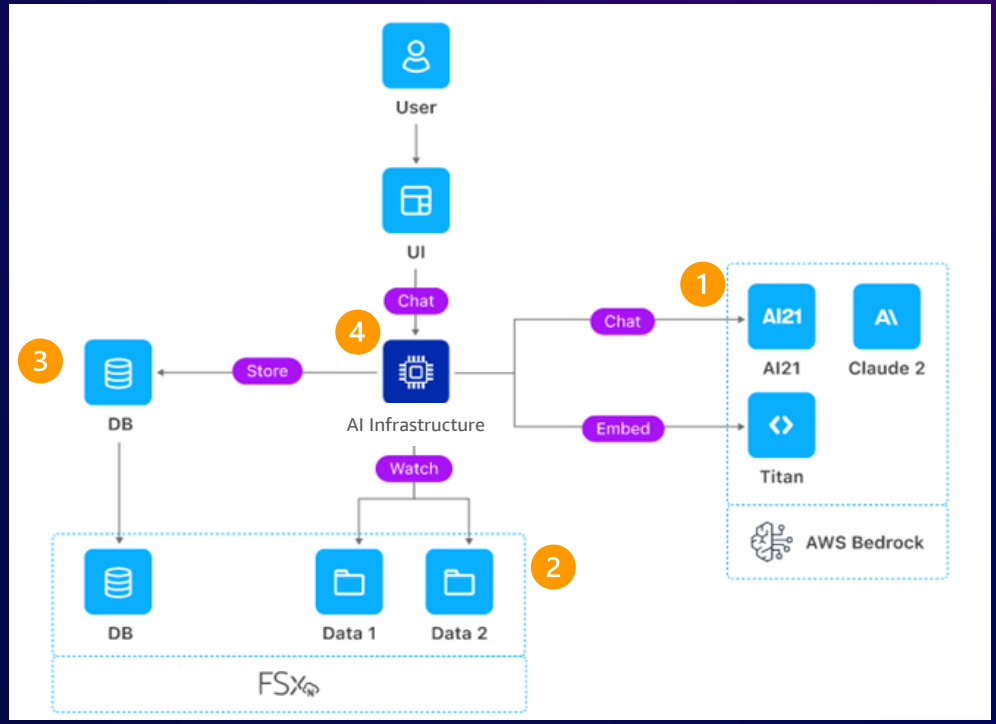
Security & performance isolation (QoS)

Inherent cost optimization

Unlock the value of generative AI with enterprise data

- Unlock true value of generative AI by integrating with enterprise data sources
- Efficient data mobility with on-prem NetApp and FSx for ONTAP to take advantage of generative AI services
- Simplify data management using a single storage infrastructure for all ML pipeline stages
- Flexible and high-performance storage for vector databases using Block, File, and S3 access
- Protect sensitive data feeding into LLMs via NetApp Cloud DataSense
- Centrally manage and protect enterprise data, vector databases, and AI infrastructure

Chatbot application using RAG framework with Amazon Bedrock

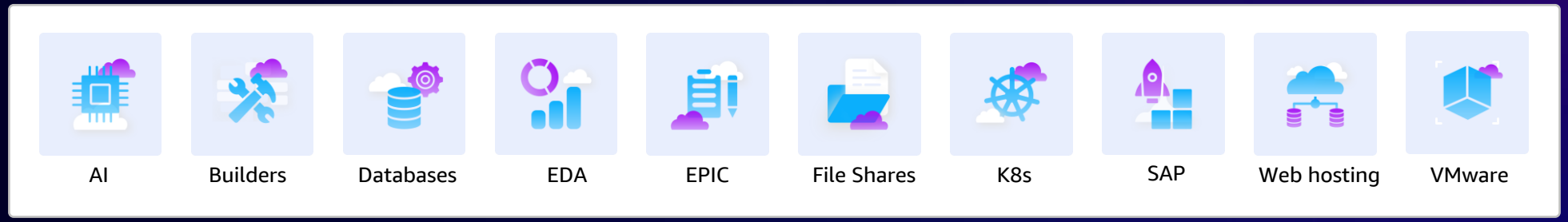


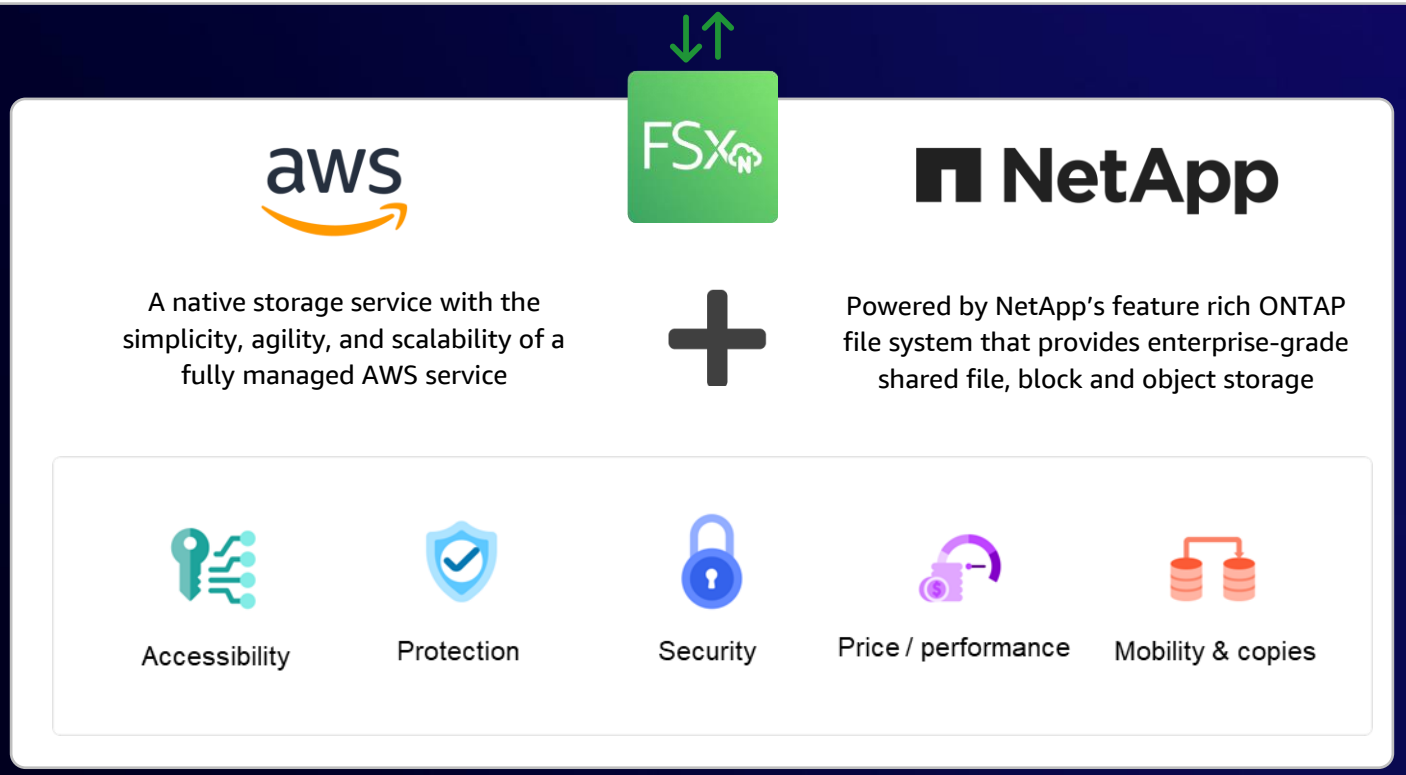
1. Amazon Bedrock generative AI Infrastructure
   - Embeddings Model
   - Conversational Model
2. Enterprise Data on NetApp
   - Data volumes (SMB shares, NFS exports, S3 access)
3. Embeddings Datastore
   - Vector DB storage on Amazon FSx for NetApp ONTAP
4. Your AI Solution
   - AI solution infrastructure

Amazon FSx for NetApp ONTAP

Enterprise-grade, unified storage for any workload

No matter your workload, Amazon FSx for NetApp ONTAP provides the most comprehensive and flexible set of storage features for delivering outstanding resilience and cost-performance





Get your hands on FSx for ONTAP Scale-out

STG355-NEW Build scale-out file systems to get up to 9x better performance

Level 300-Advanced Workshop

Friday, Dec. 1, 2023, 9:00 AM – 11:00 AM PST, Venetian

Let’s hear from our customers

Trinh Tran

Storage Infrastructure Associate Director
Gilead Sciences

Justin Wright

CTO – Platform Engineering
Thomson Reuters

Thank you!

Please complete the session survey in the mobile app

Puneet Dhawan

linkedin.com//in/puneetd/

Trinh Tran

linkedin.com//in/trinh-tran-539650b/

Justin Wright

linkedin.com//in/jwright006/