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PRT230

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Achieve enterprise greatness with Amazon FSx for NetApp ONTAP

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aws

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Agenda

NetApp and AWS partnership

Amazon FSx for NetApp ONTAP and key AWS integrations

Top use cases using FSx for ONTAP

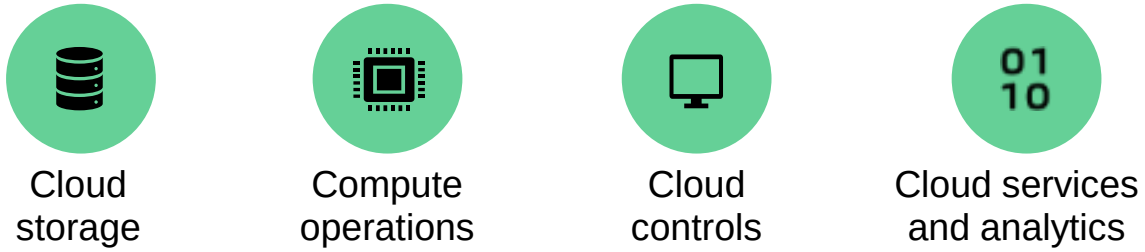
BlueXP for FSx for ONTAP

Demo

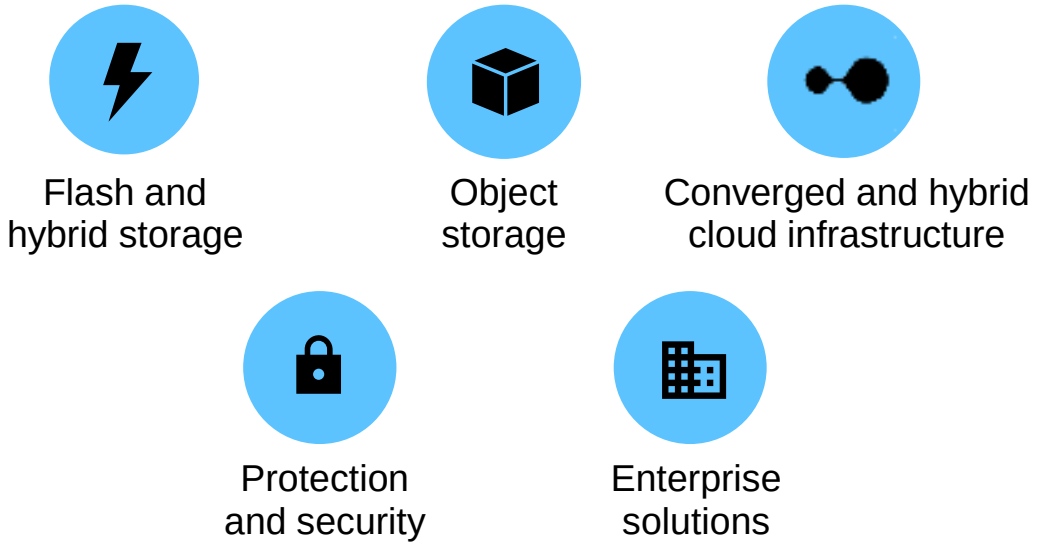
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NetApp at a glance

Industry-leading cloud data services



Industry-leading storage systems and software

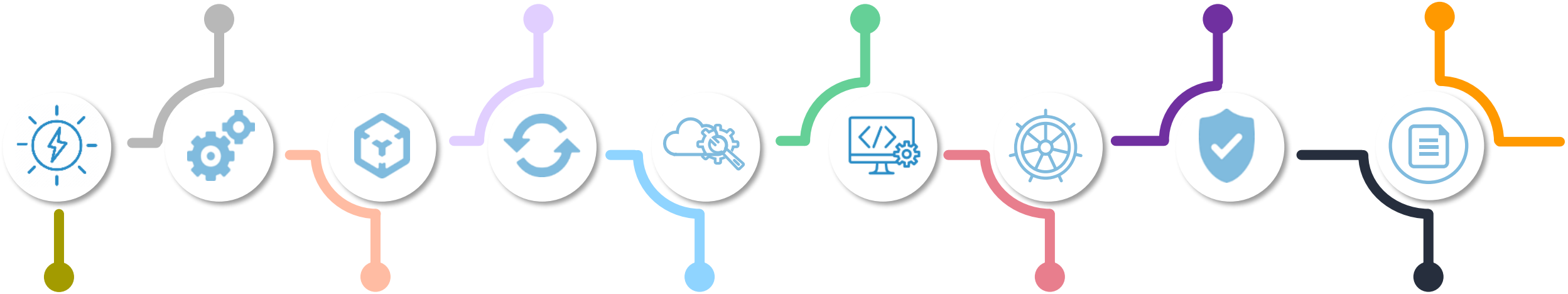


- **Global** cloud-led, data-centric software company
- **Industry-leading** software, systems, and cloud services
- **Founded in 1992**, headquartered in San Jose, California
- **$5.74B** FY21 revenue
- **11,000+ employees** and **4,000+ partners** helping organizations thrive in a hybrid multi-cloud world
- **Fortune 500 company** (NASDAQ: NTAP)

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A decade of innovation with AWS

NetApp's history of cloud innovation



2012
Partnered with AWS at re:Invent [1]

2013
NetApp NPS SaaS

2014
Cloud Volumes ONTAP

2015
AltaVault Backup to Amazon S3

2016
Cloud Sync to Amazon S3
StorageGRID to Amazon S3

2017
Cloud Orchestrator
SaaS Backup~O365

2018
Cloud Volumes Service
NetApp Astra
Cloud Insights

2019
Cloud Tiering
Cloud Backup
Cloud Data Sense

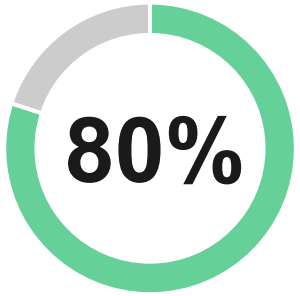
2020
Spot by NetApp
Global File Cache
Virtual Desktop Service

2021
Amazon FSx for NetApp ONTAP

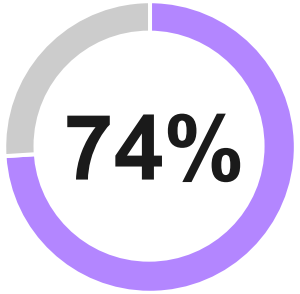
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Why FSx for ONTAP

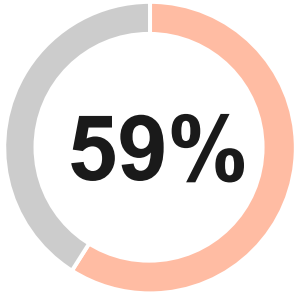
Meet cloud mandates for more hybrid and cloud-native workloads



Worldwide data will be unstructured by 2025 (as projected by IDC[1])



File-based enterprise applications are candidates to move to the cloud[2]



Organizations expect to be mostly cloud-based within the next 18 months[3]

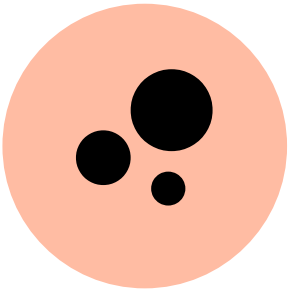
Enterprises are searching for a way to deploy file workloads in the cloud without sacrificing



Performance



Reliability



Enterprise data management

No one wants to re-factor !

1: IDC Data Management Solutions Review | 2: ESG Survey | 3: NetApp 2021 Cloud Efficiency Report

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FSx for ONTAP is a native AWS managed service delivering block and file storage integrated with NetApp's portfolio of enterprise-grade data services



Full-featured NetApp ONTAP

- Full access to ONTAP data capabilities
- Proven enterprise-grade features, management performance, data protection, and efficiencies
- Access to the full NetApp cloud portfolio
- Integration with existing ONTAP systems



In a native AWS managed service

- Sold, managed, and supported by AWS
- Built with the latest AWS compute, disk, and networking to provide maximum performance
- Tightly integrated with AWS services
- Easily managed using AWS Console, AWS CLI, or SDK

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FSx for ONTAP: New performance enhancements

NEW

2x

higher SSD
throughput and IOPS

2 → 4 GB/s throughput
80K → 160K IOPS

NEW

NVMe

Read Caching
Now available for Single-AZ

Up to 6 GB/s throughput and 650K IOPS
(for cached data)

aws
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FSx for ONTAP: New ease-of-use capabilities

NEW



Access Multi-AZ file systems from on premises without additional routing changes

NEW



Nitro-based encryption in transit, with no additional setup required (in supported regions)

NEW



Additional data management via the Amazon FSx Console/API and AWS CloudFormation

aws

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Double-click on top use cases of Amazon FSx for ONTAP

A. Improve flexibility & ROI for VMware Cloud

B. Extend or migrate storage to the cloud

C. Manage SAP HANA lifecycle

D. Deploy and run MSSQL and Oracle

E. Optimize K8s MAZ workloads

F. Manage multiple ONTAP sites with BlueXP

aws

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FSx for ONTAP – The only VMware Cloud certified NFS storage

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Not all workloads scale uniformly

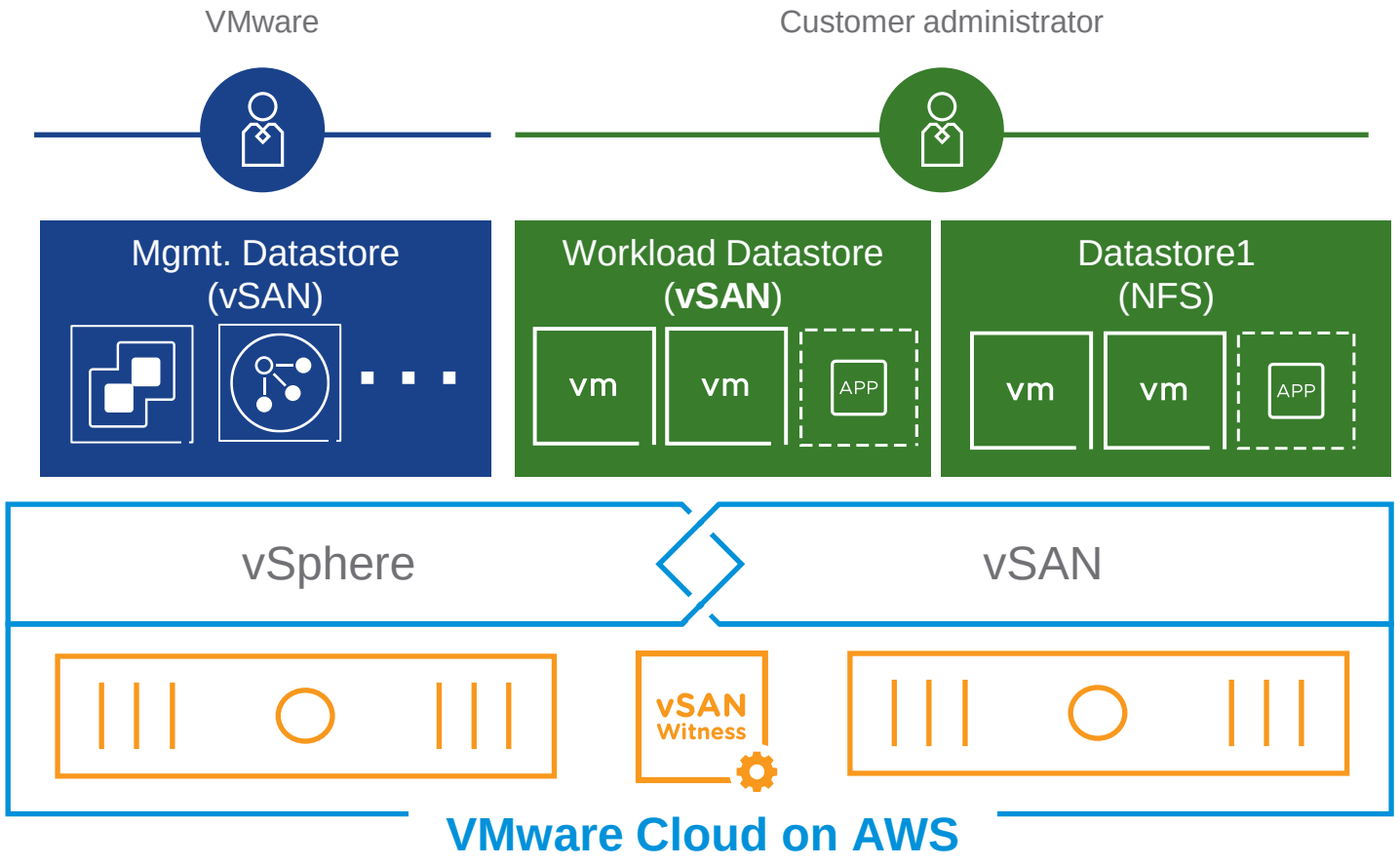
Hyperconverged sizing is based on the most used resource



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NFS datastore support

VMware Cloud on AWS



Outcome

NFS datastore support

- Four datastores per cluster

VMware Cloud certified NFS storage

- FSx for ONTAP

VMware Cloud API and UI integration

Benefit

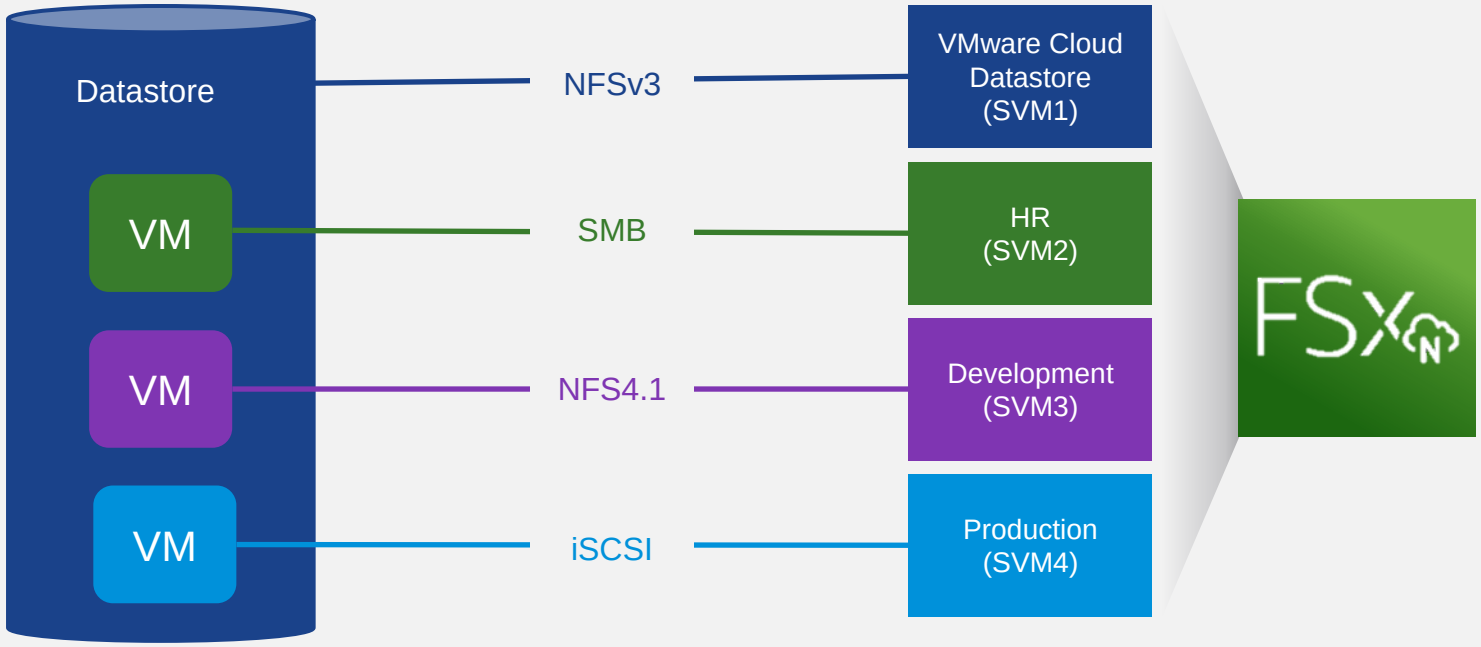
Right size storage to control cost

Full access to array based rich data management

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Beyond datastore support

FSx for ONTAP: multi-tenant and multi-protocol



Multi-tenant via storage virtual machines (SVM)

Multi-protocol:

- NFS
- iSCSI
- SMB

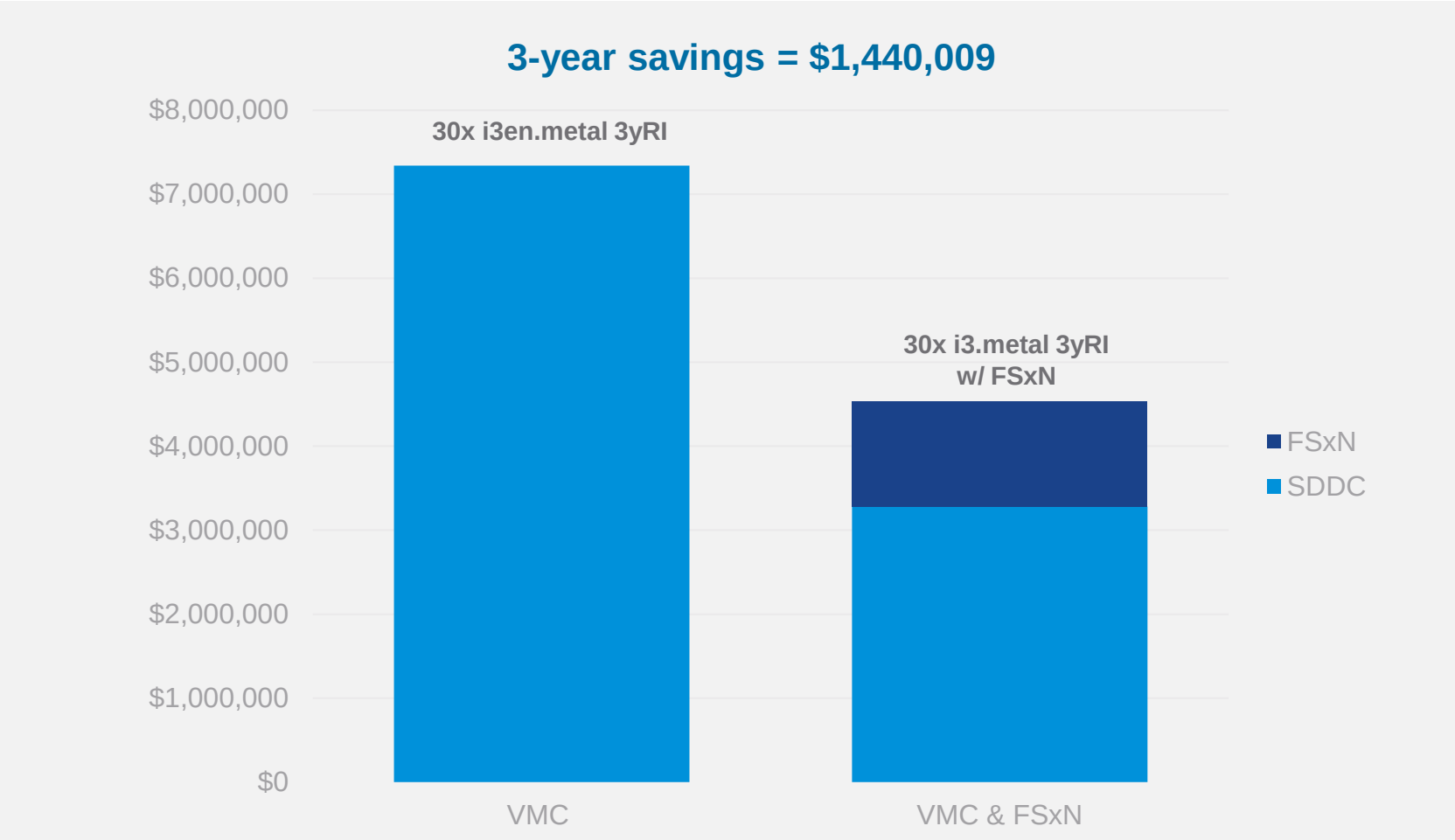
Data management

- Snapshots
- Clones
- Replication
- QoS
- Cloud tiering

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Midsize enterprise large filesystem workload

49% lower TCO



Customer environment

Midsize enterprise ~5,000 employees

~400 VMs (90 TiB)

150 TiB storage

Benefits

Address cloud mandate to reduce cost and increase agility

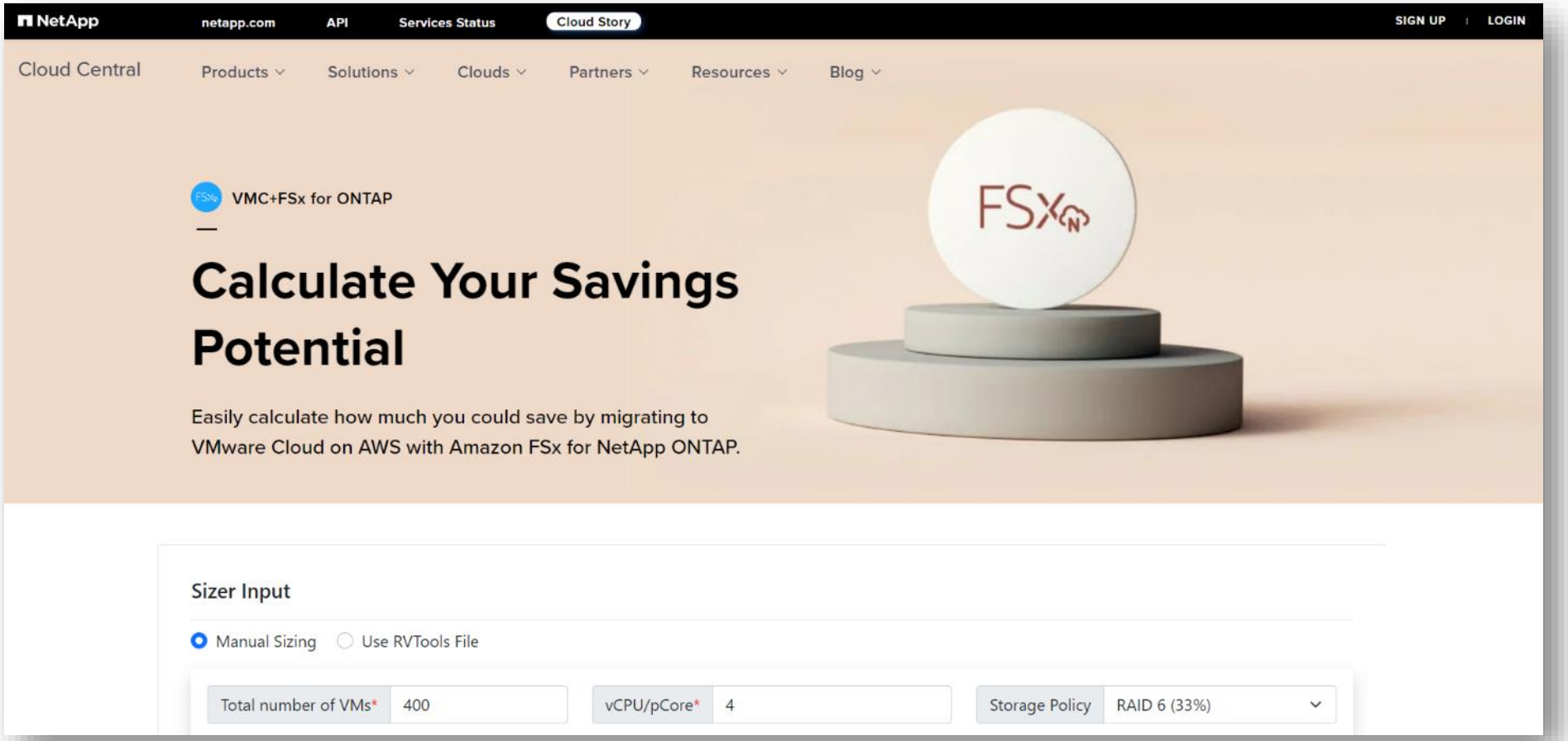
Migrate file and VMs to common cloud architecture for simplicity and consistency of operations

VM workload assumes 20% efficiency savings with 100% SSD, 2048 MB/s
File server assumes 65% efficiency with 20% SSD, 1024 MB/s

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TCO calculator for VMware Cloud on AWS

All you need is a browser



https://cloud.netapp.com/vmc-aws-fsx-ontap/roi

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The easiest way to migrate or extend ONTAP to the cloud

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Data protection strategies

Backup and recovery



Backup data copied offsite. Requires restore of applications and data from backup.

Pilot Light disaster recovery



Backups and active data replicated to DR site. Applications recovered through machine images or application install.

Warm Standby disaster recovery



Backups and active data replicated to DR site. Application servers already online. Traffic redirected to DR site upon failover.

Time of recovery (RTO) and time between backups/replication (RPO)

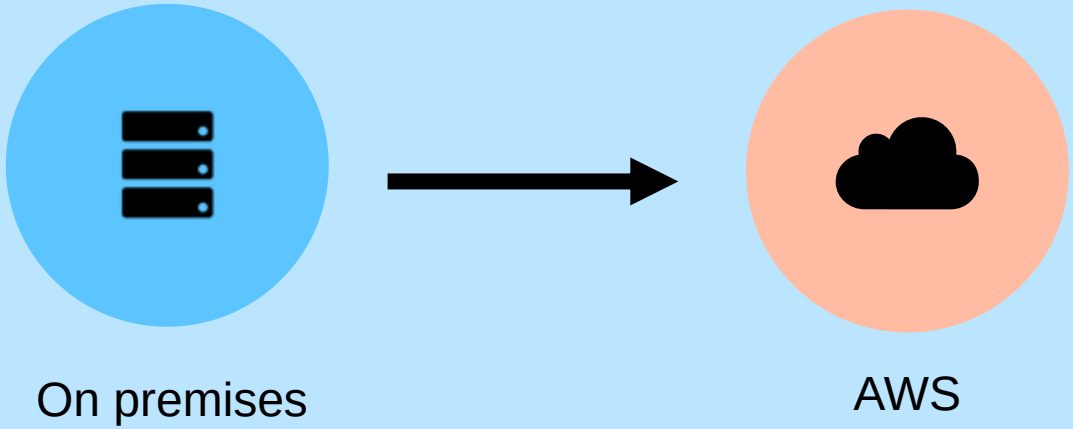
Total cost of disaster recovery solution

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B

The NetApp advantage

ONTAP data management unlocks the value of cloud



- Security hardening
- Built-in DR, backups, replication
- Automated tiering to low-cost storage
- Enterprise resiliency, reliability
- All storage efficiencies are preserved
- Scale up, scale out, all protocols

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NetApp ONTAP delivers enterprise-grade data protection

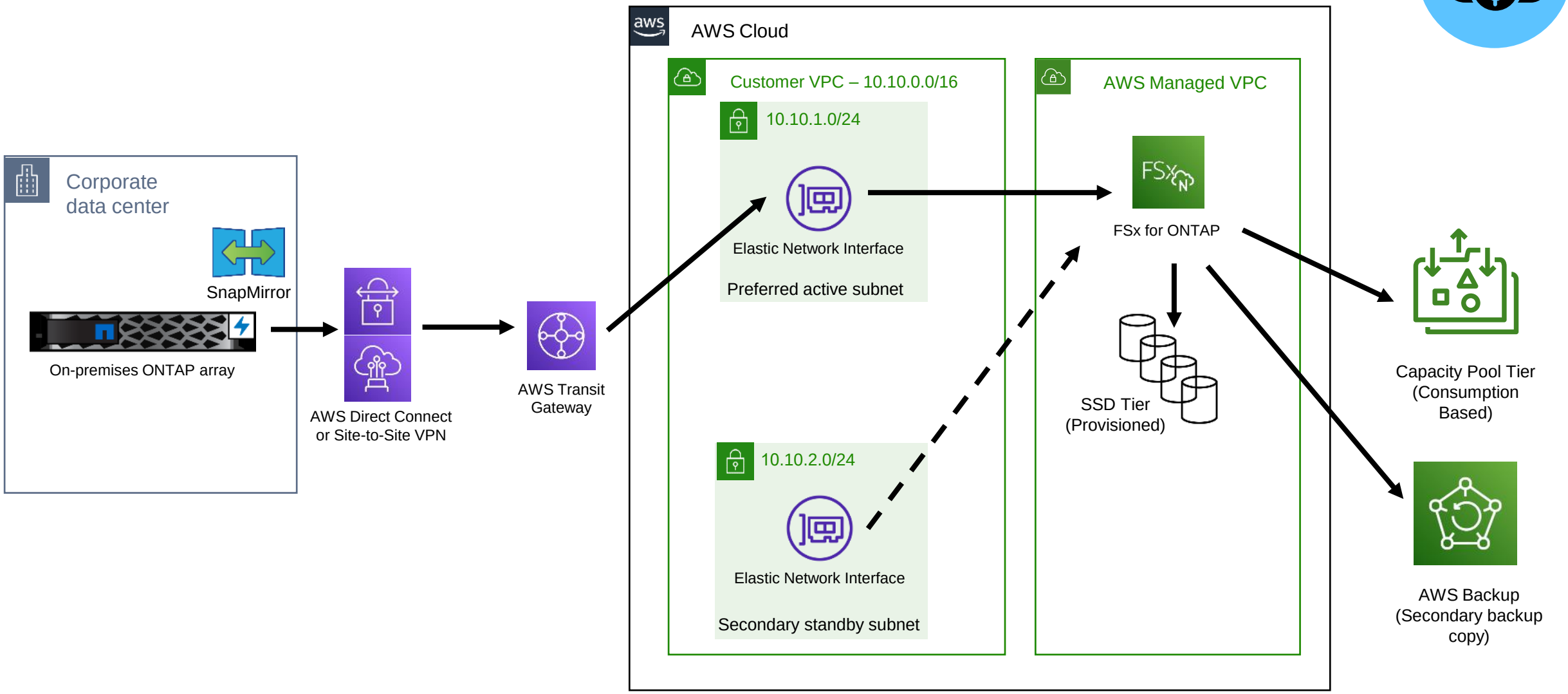
- **Snapshot** – immutable, space-efficient, pointer-based data copies to prevent data corruption, disasters, and threats of ransomware encryption
- **SnapVault** – efficient archive of data to secondary storage
- **SnapMirror** – efficient disaster recovery technology, designed for failover from primary storage to secondary storage at a geographically remote site
- **FlexClone** - point-in-time, writable copy of the parent FlexVol volume with zero storage impact
- **SnapCenter** – centralized, scalable platform providing app-consistent data protection for app, databases, host file systems, and VMs
- **SnapRestore** - Snapshot copy restoration for accelerated data recovery





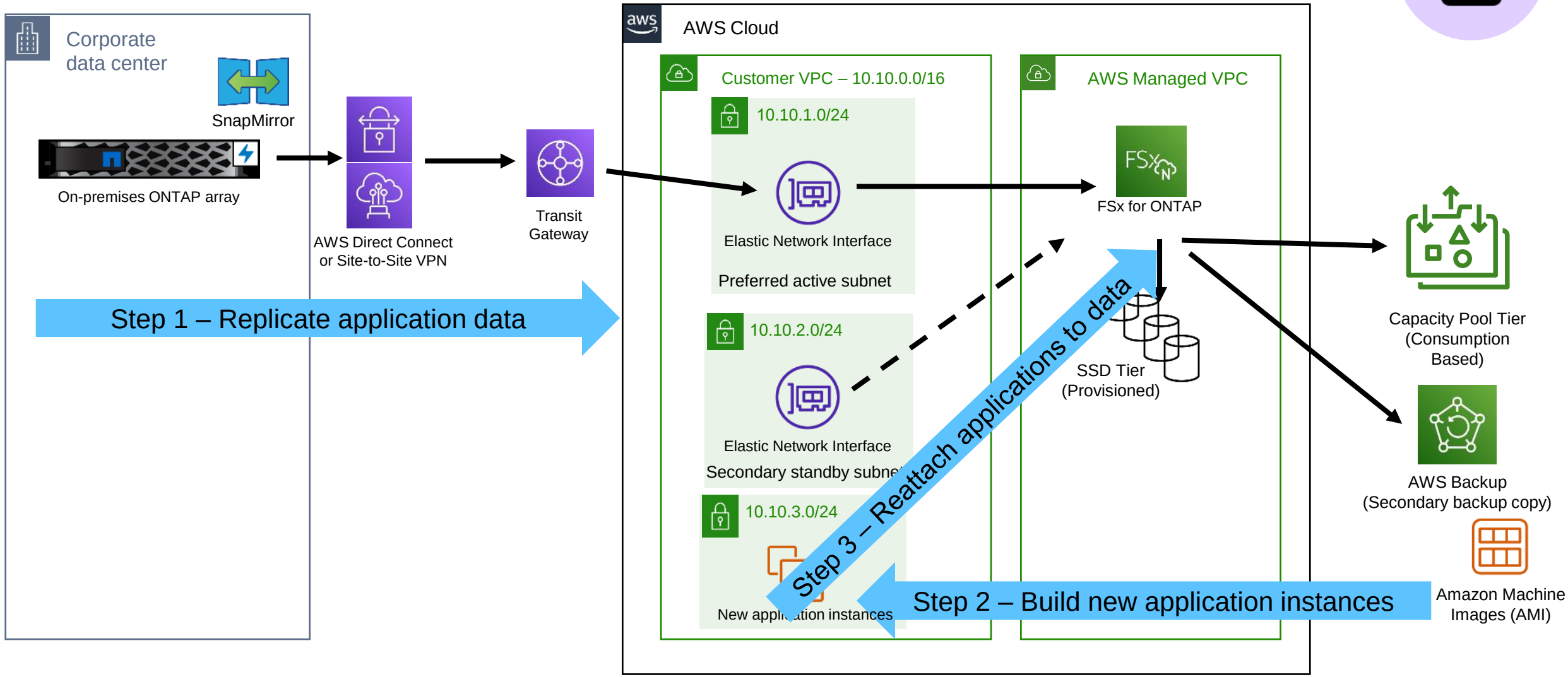
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Backup: Offsite copy of snapshots using FSx for ONTAP



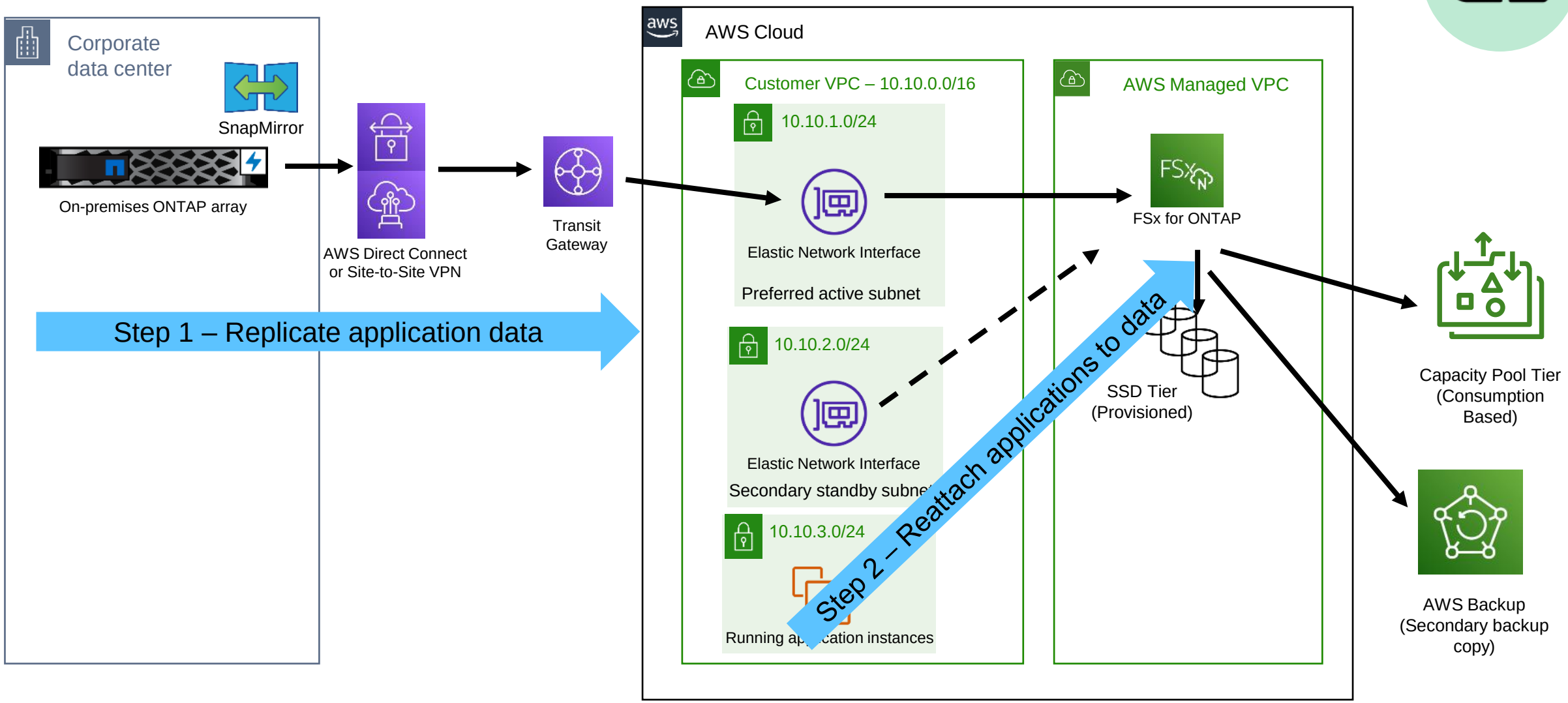
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Pilot light: Using SnapMirror replication with FSx for ONTAP



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Warm Standby: Using SnapMirror replication with FSx for ONTAP



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B

Pearsons improves agility and RTO/RPO

Challenges

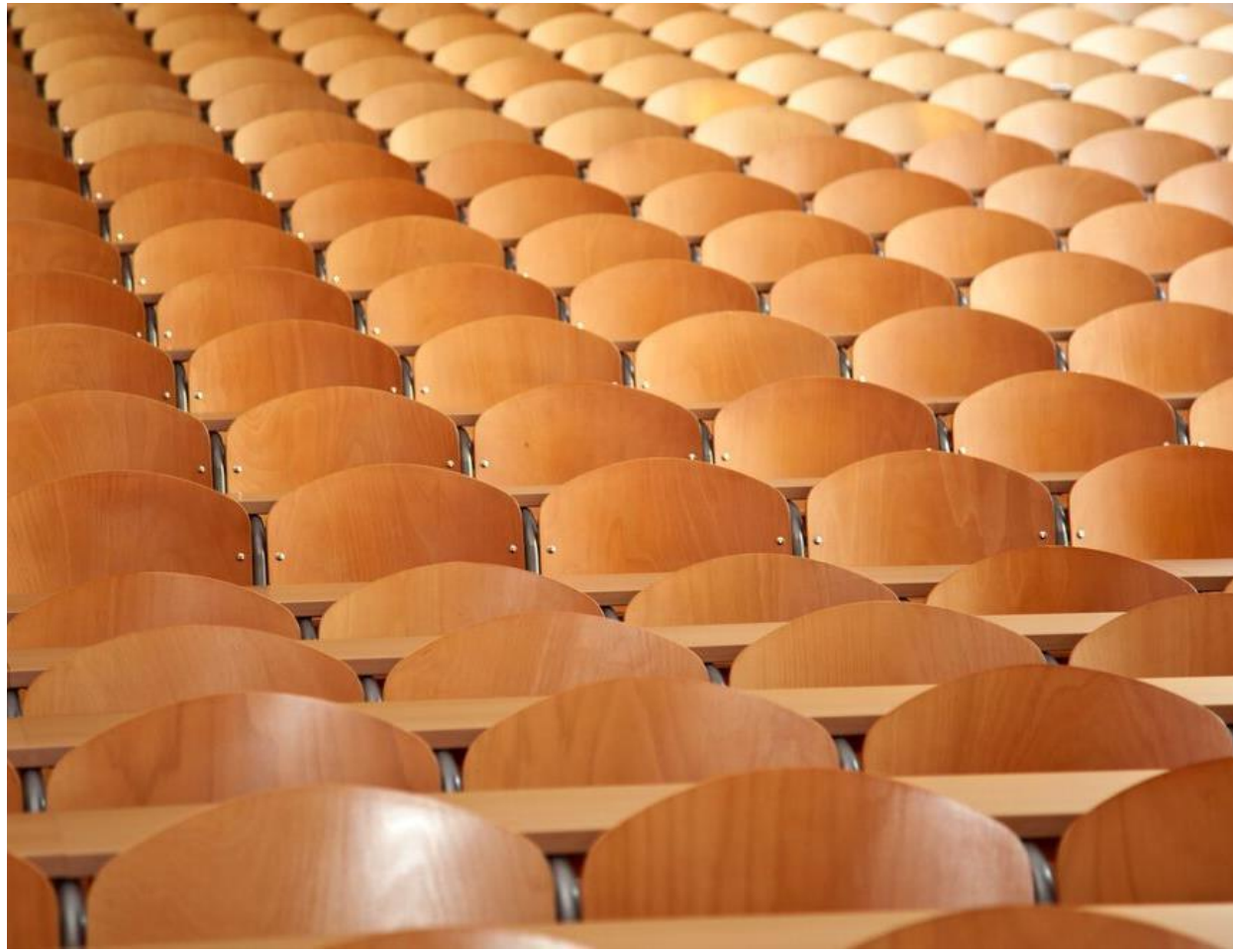
- Experienced application recovery time (RTO) and recovery point (RPO) challenges with their previous storage solution for their mission-critical financial and HR workloads

Solution

- FSx for ONTAP
- NetApp ONTAP data management features in FSx for ONTAP – SnapMirror, Snapshots, and FlexClones

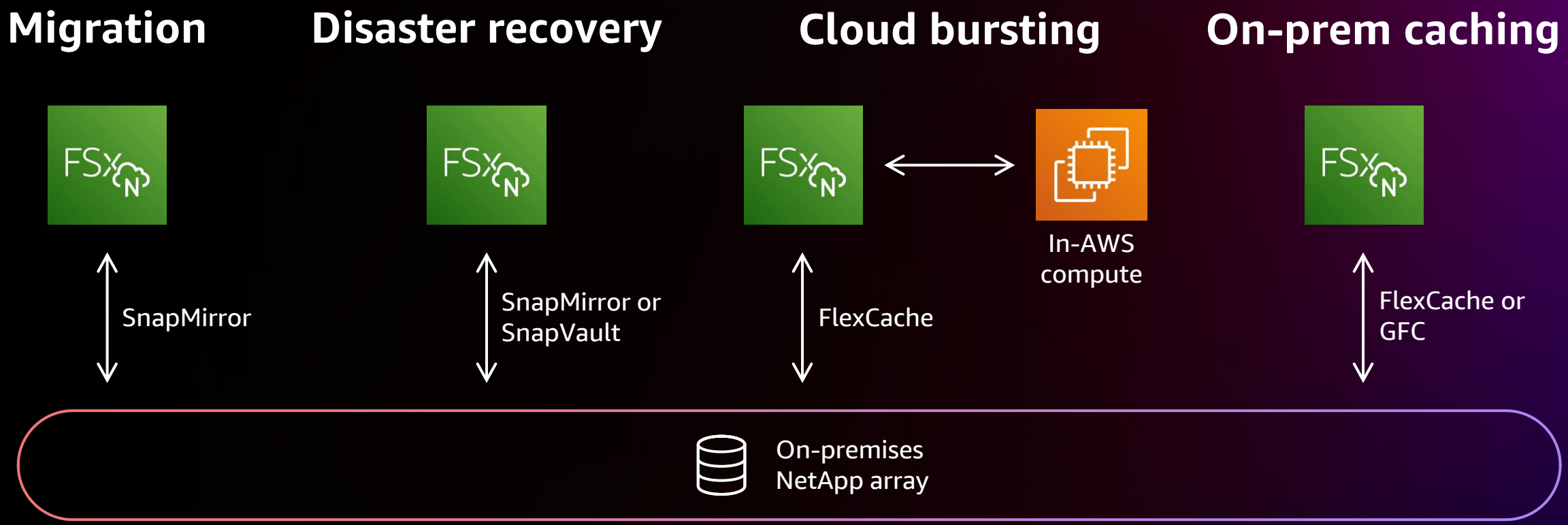
Business outcomes

- Migrated millions of files without re-architecting or re-platforming or learning new skillsets
- 10x faster data refresh on mission-critical ERP application
- Reduced RTO/RPO from hours to minutes
- Freed up resources to spend time on improving the customer experience and value



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FSx for ONTAP: easily extend ONTAP to the cloud



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C

The only shared file system certified for SAP HANA

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The only HANA Certified shared file system in AWS – FSx for ONTAP

https://launchpad.support.sap.com/#/notes/1656250

SoH, S/4HANA, BW/4HANA

SAP HANA database

Single host

Multiple host

SuSE
RHEL

Amazon EC2 instances from 512 GB to up to 12 TB RAM

NFSv4.1

FSx for ONTAP Single-AZ

SAP HANA certifications web site

SAP CERTIFIED AND SUPPORTED SAP HANA® HARDWARE DIRECTORY

Certified IaaS Platforms | Supported Intel® Systems | Supported Power® Systems

Filter by: Deployment | Vendors | CPU Architecture | Memory Size | More

IaaS Platform

u-6tb1.112xlarge

Amazon Web Services

aws.amazon.com/sap/contact-us/

Title	u-6tb1.112xlarge
Certification status	certified
Certification released	2021-07-05
Certification expires	
RAM	6 TiB
Application Type	OLTP, Scale-Out
CPU Architecture	Intel Skylake SP
Certification Scenario	HANA-IAAS 2.0
Operating System *	RHEL 8.1 for SAP Solutions , RHEL 8.2 for SAP Solutions, RHEL 8.4 for SAP Solutions, SLES 12 SP4, SLES 12 SP5, SLES 15, SLES 15 SP1 , SLES 15 SP2, SLES 15 SP3
Sockets	8
Virtual/logical CPUs	448
Sizing **	Standard Sizing
Restriction & Comments	Workload (Single node): - OLTP (incl. S/4HANA & SoH) Workload (Scale-out up to 4 nodes: 1 master, 3 worker and NO standby node) - OLTP (incl. S/4 HANA) Beside AWS EBS (GPx,IOx) Amazon FSx for NetApp ONTAP (NFS based) can be used for this instance. See SAP Note 1656250 (Storage prerequisites) for details
Product Information	aws.amazon.com/ec2/instance-types/high-memory/
Instance Launch URL	aws.amazon.com/ec2/instance-types/high-memory/
Documentation URL	aws.amazon.com/en/sap/solutions/saphana/

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Backup, restore, and cloning of a 4 TB database (8 TB RAM)

Backup

99% reduction

4 hours 40min

2 min

Restore and recovery

70% reduction

8 hours 10min



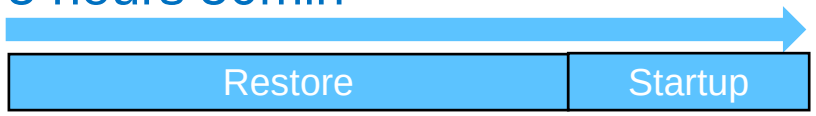
1 hour 40 min *



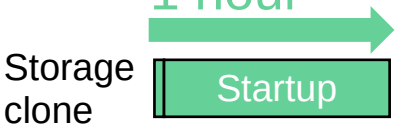
SAP system refresh

70% reduction

5 hours 50min



1 hour



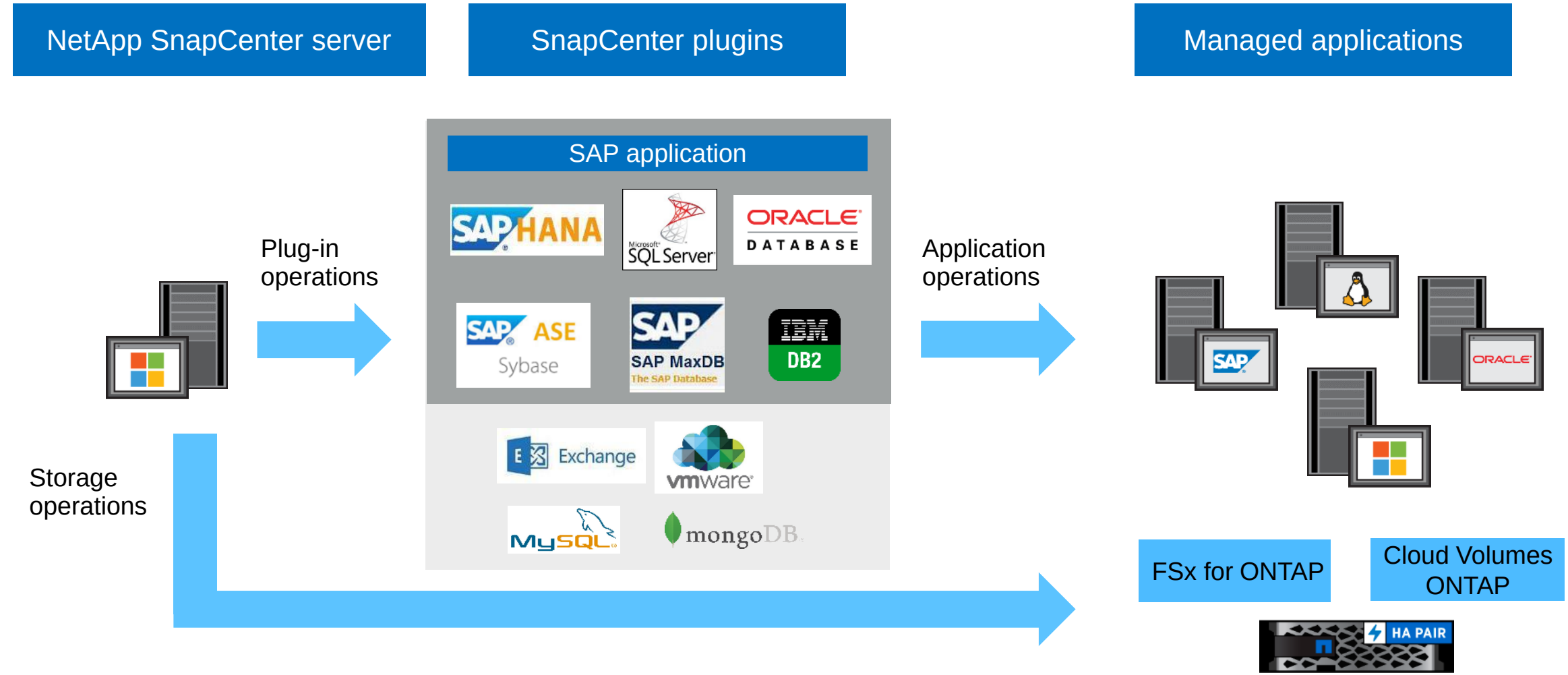
(Recovery to a specific backup or Snapshot copy)

* with 4 NetApp Snapshot backups per day



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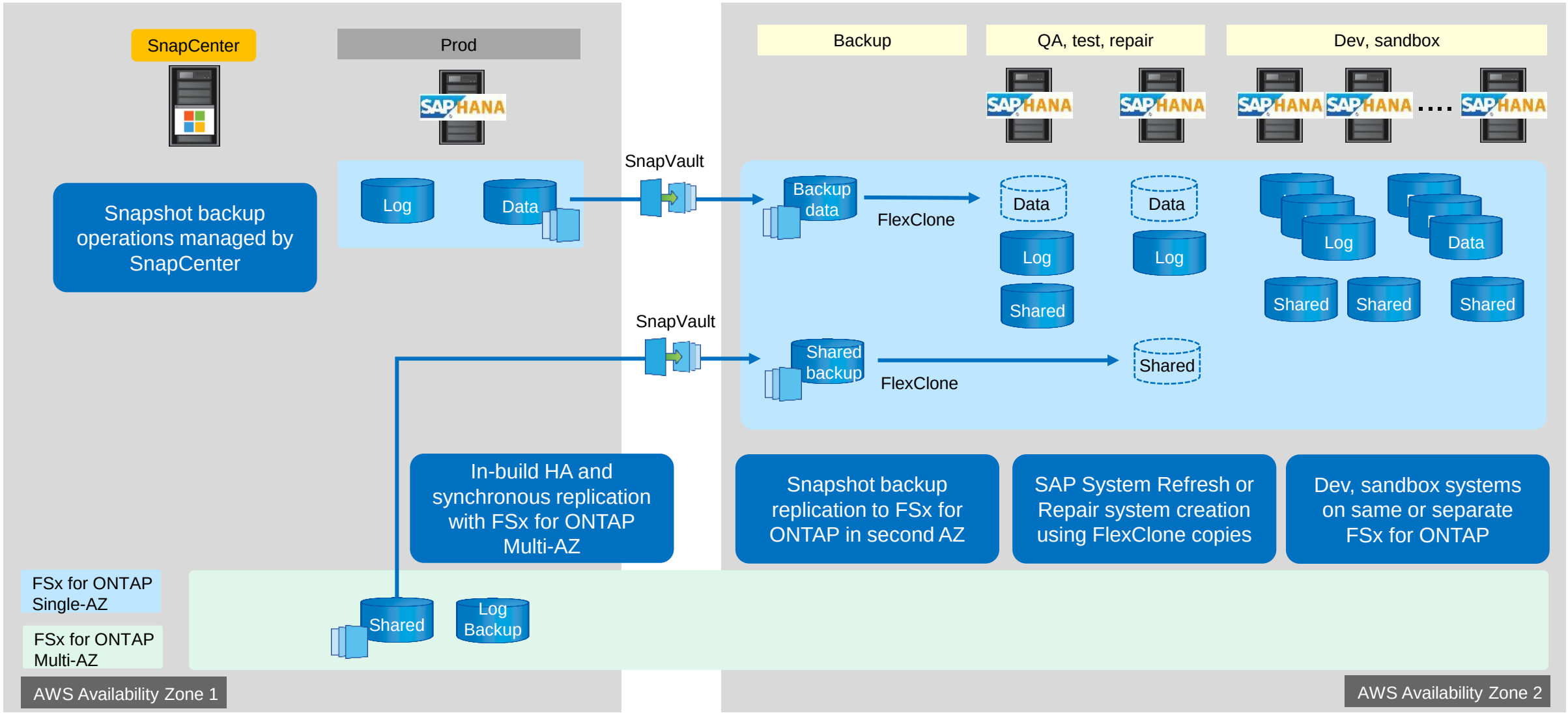
Application integration with NetApp SnapCenter



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Single SAP system landscape – production, QA, development

Snapshot Backup and block-delta replication to backup storage



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D

MSSQL and Oracle – better performance and lower TCO

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D

Why?

- Enterprise customers require enhanced data management and data protection capabilities for their database workloads without sacrificing reliability and cost/performance

Use cases

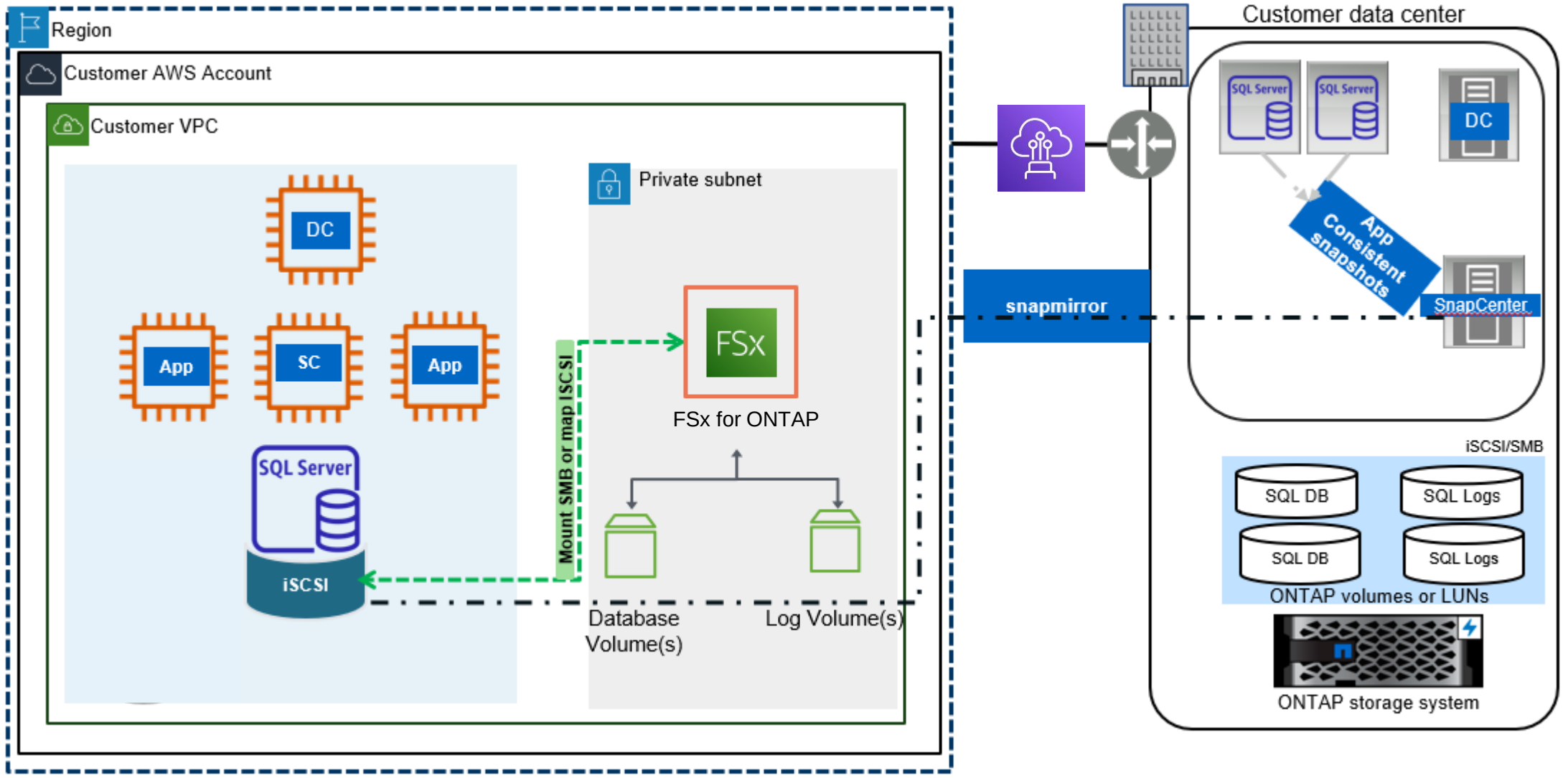
- **Accelerate migration** for self-managed databases from on premises to AWS
- Instant and cost-efficient **database aware cloning** for dev/test/pre-prod environments and **accelerate innovation**
- **Fast and efficient consistent database backup and restore for AWS**
- **Bi-directionally disaster recovery** for database instances (on premises/AWS)
- **Highly efficient cross region** disaster recovery for AWS deployed databases

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Migrate highly performant, highly available SQL/Oracle database instances from on-premises infrastructure to AWS

D

Migration using SnapMirror for smooth transition

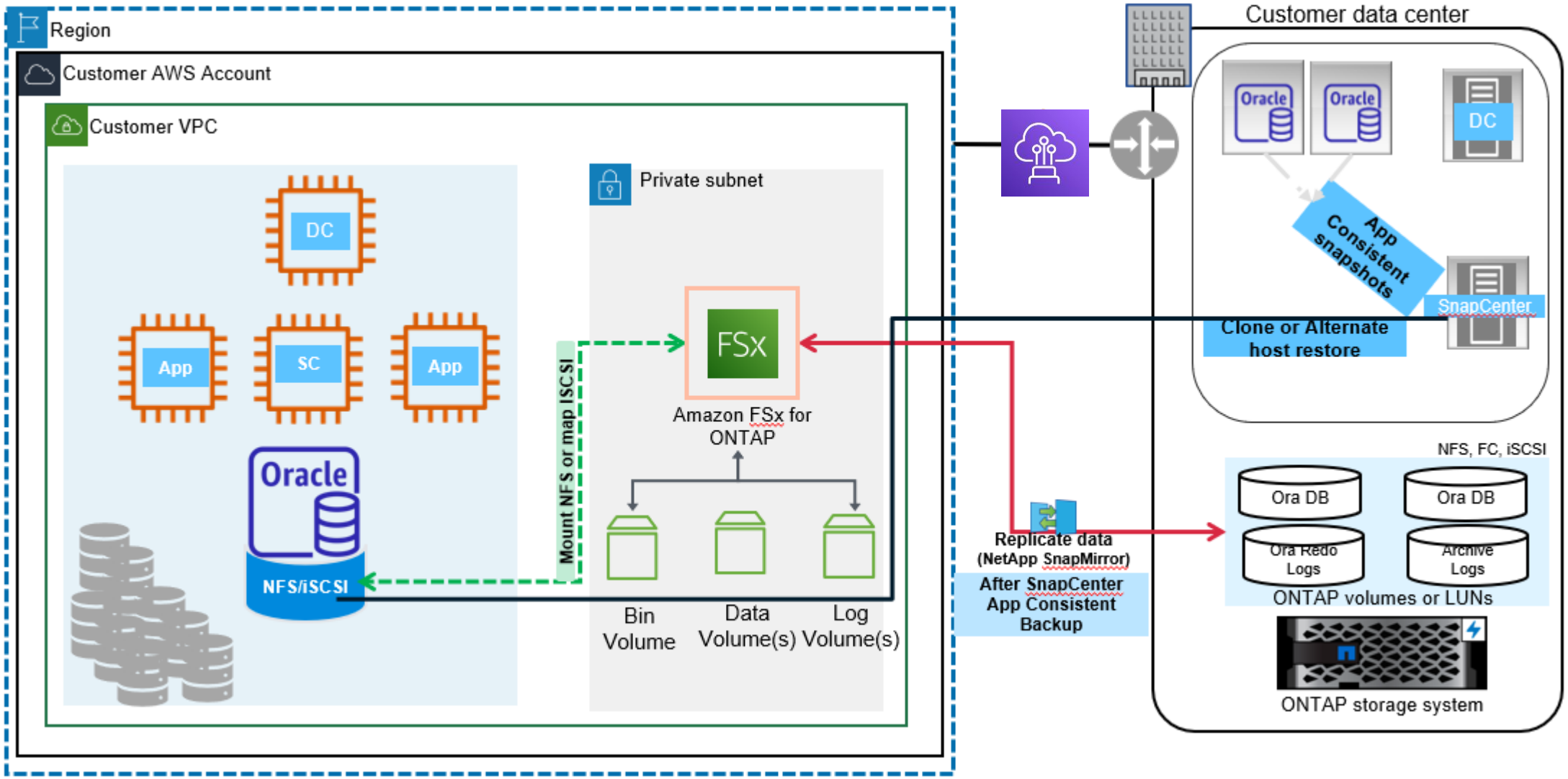


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Cloning on-premises database systems for use in cloud for test and development environments

D

Instant snapshot in seconds (any DB size) and clone functionality in SnapCenter

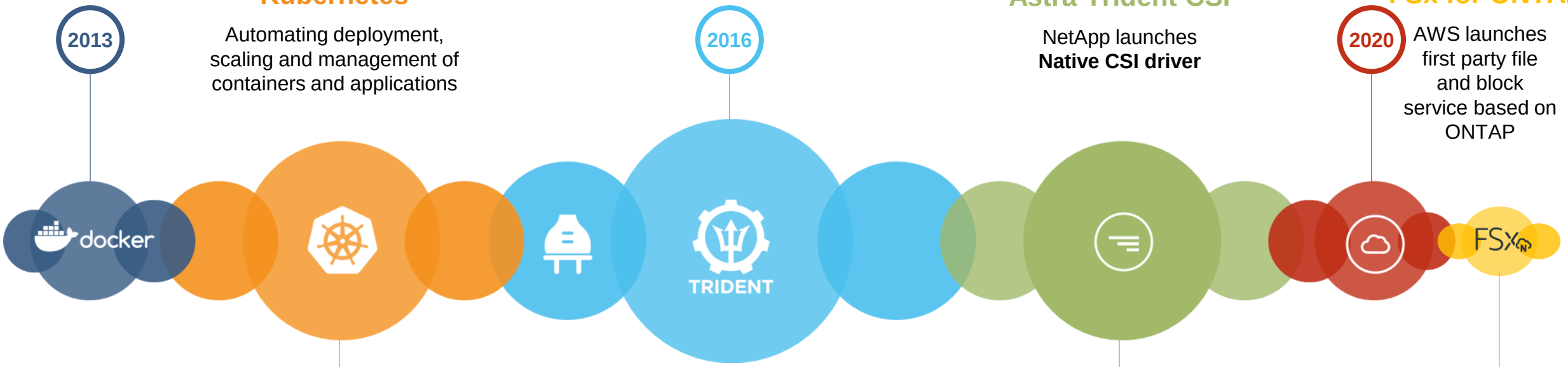


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A complete solution for K8s MAZ and SAZ workloads

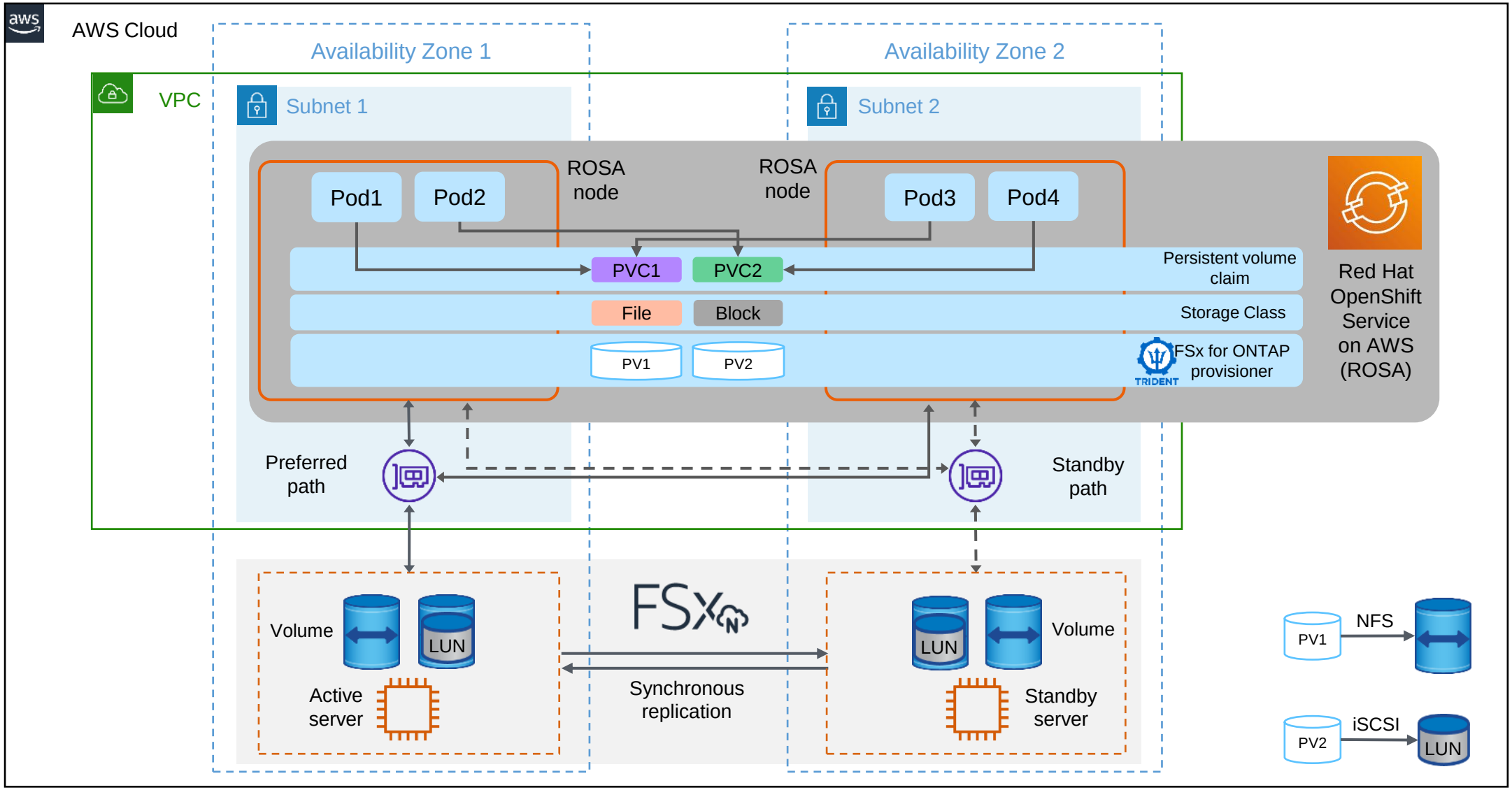
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NetApp early adoption history to the K8s ecosystem



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Detailed reference architecture: ROSA with FSx for ONTAP



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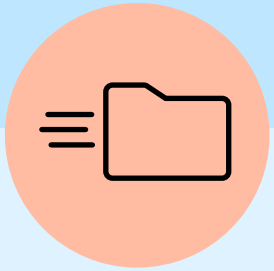
BlueXP with FSx for ONTAP

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NetApp BlueXP lets you build, protect, and govern your hybrid cloud data estate



Storage
Discover, deploy and manage storage on the cloud and on premises



Mobility
Move data as needed by syncing, copying, tiering, and caching



Data protection
Protect against data loss, human errors, unplanned outages, ransomware, and other cyberthreats



Analysis & control
Monitor, map, and optimize data storage and infrastructure

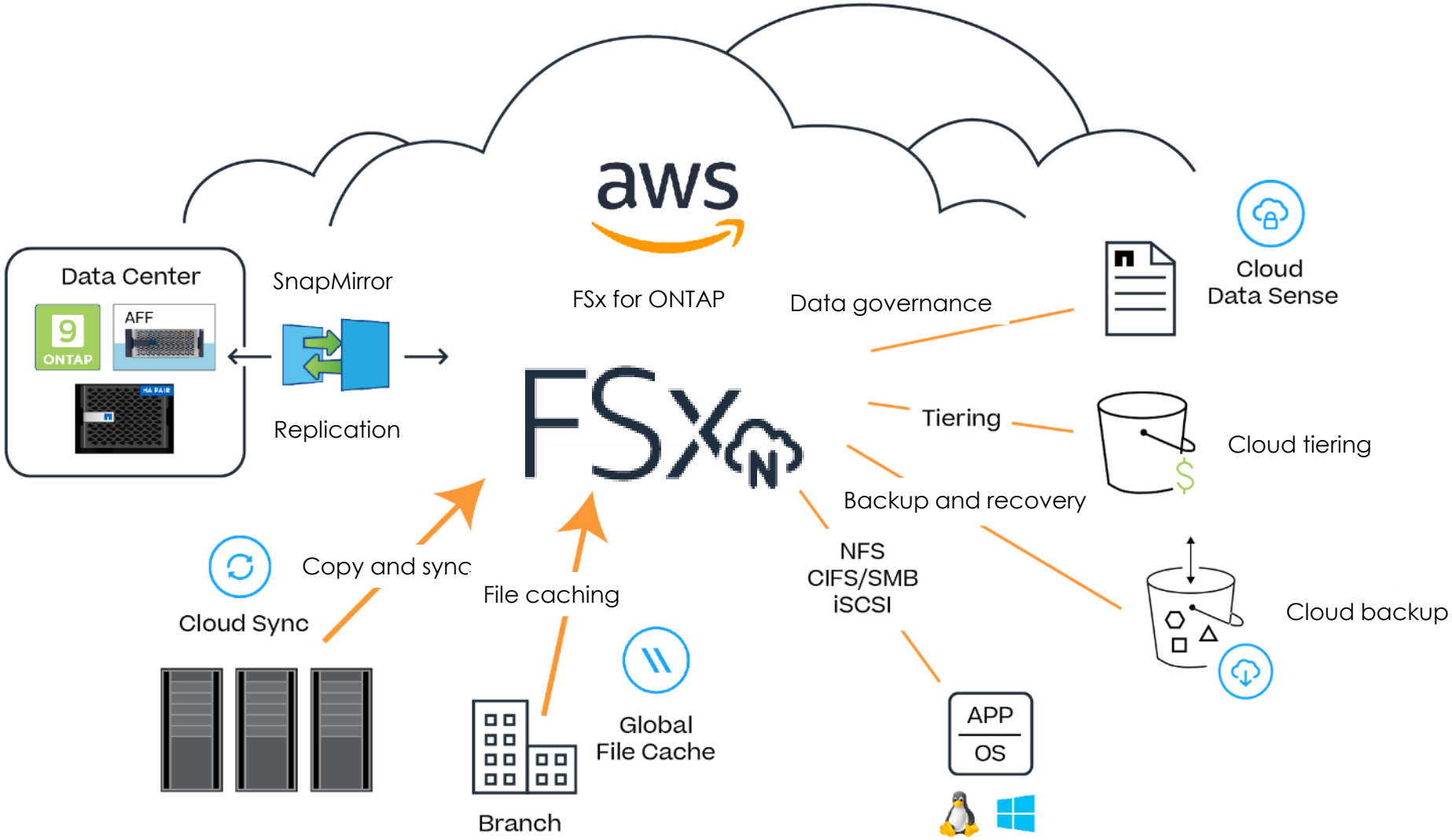




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Key BlueXP integrations

Accessible to the complete NetApp cloud data services portfolio



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NetApp BlueXP - Data Estate O | Amazon FSx for ONTAP | NetA | VMC and FSx for ONTAP TCO | NetApp BlueXP | NetApp BlueXP

https://bluexp.netapp.com

NetApp BlueXP | netapp.com | spot.io | Trust Center | API | Services Status | Cloud Volumes | Yuval

Product | Pricing | Resources | Blog | Go to console

Storage
- NetApp On-Premises
- Cloud Volumes ONTAP
- FSx for ONTAP
- Azure NetApp Files
- Cloud Volumes Service

Mobility
- Copy and sync
- Tiering
- Edge caching

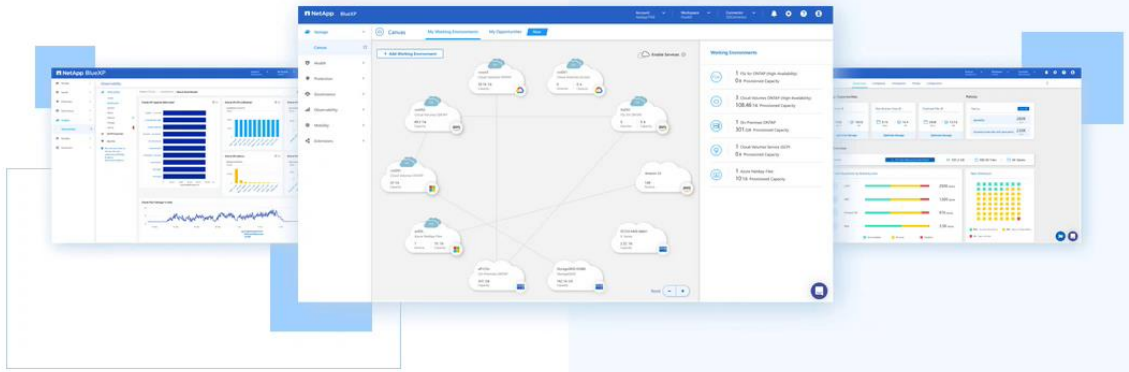
Protection
- Backup and recovery
- Replication
- Ransomware protection
- Kubernetes

Analysis and control
- Observability
- Classification
- Digital advisor

BlueXP: Modern data estate operations made simple

Build, protect, and govern your hybrid multicloud data estate

Go to console | Watch Video

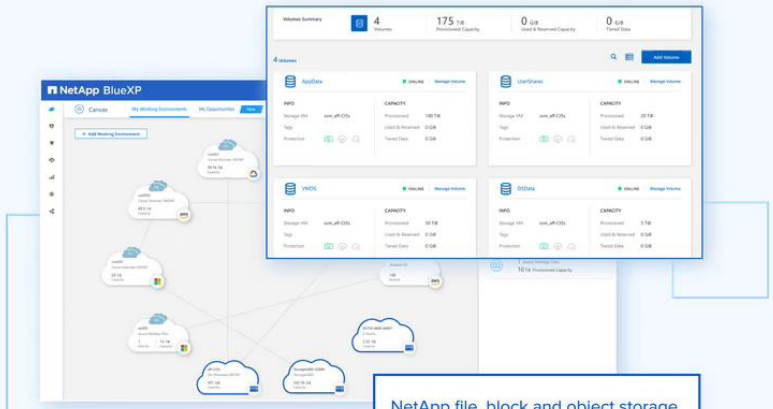


NetApp BlueXP lets you build and operate an efficient, resilient, secure, and performant hybrid multicloud data estate through a single control plane:

Storage | Mobility | Protection | Analysis and control

BlueXP allows you to discover, deploy and operate storage on AWS, Azure, Google Cloud and on-premises

- **NetApp On-Premises**
  - Cloud Volumes ONTAP
  - Amazon FSx for ONTAP
  - Azure NetApp Files
  - Cloud Volumes Service



Amazon FSx for NetApp ONTAP



The only complete, fully managed ONTAP file system in the cloud



Easiest path to migrate or extend storage to AWS



Enhance your FSx for ONTAP experience with BlueXP Capabilities



Full support for ONTAP data management features and APIs—no re-training or re-tooling required



Maximize your cost savings with support for ONTAP's storage efficiency savings capabilities



The easiest storage service to extend on-premises ONTAP data to the cloud

aws

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Thank you!

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