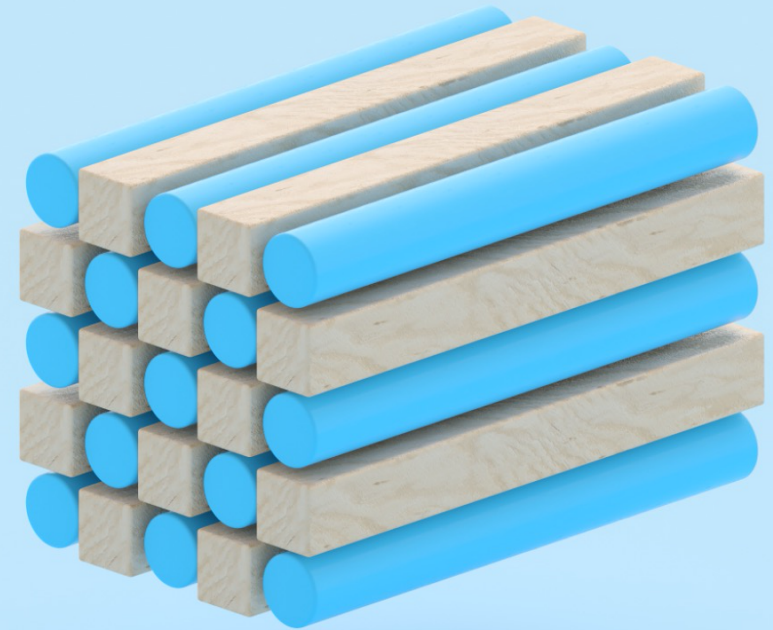# Cloud Volumes ONTAP®

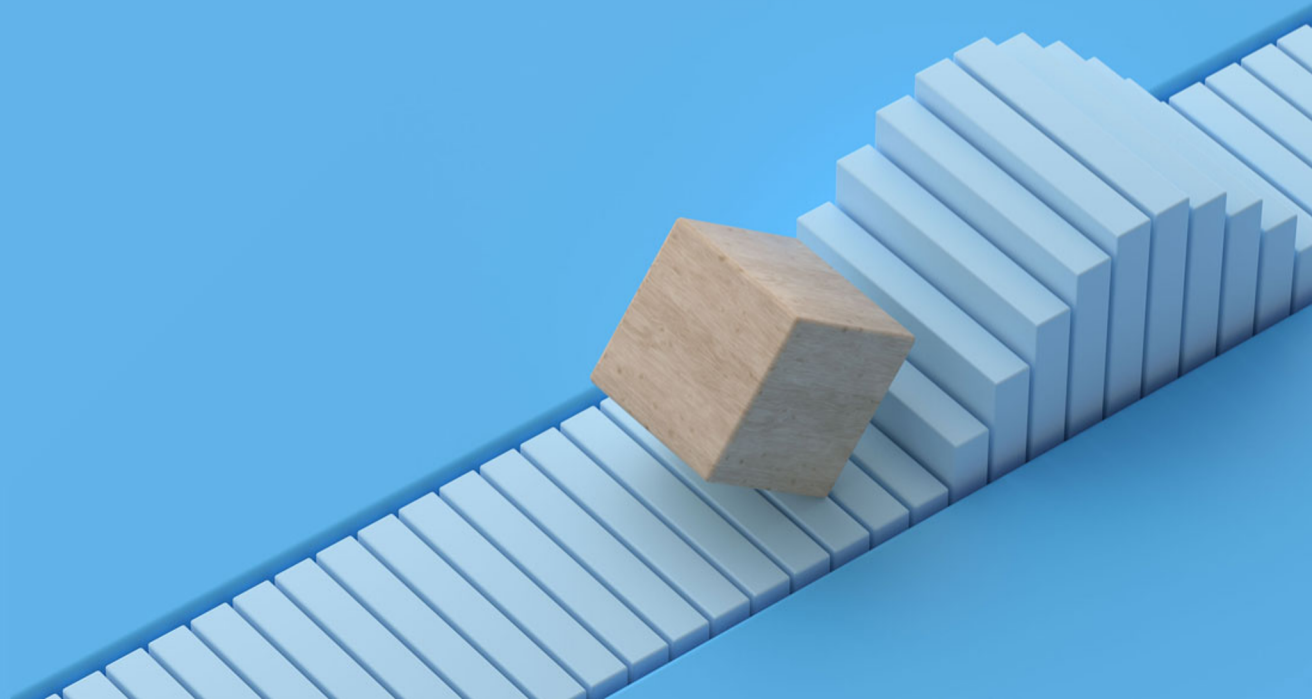Introduction and TCO advantages review

∏ NetApp

Zhang Gang
Technical Partner Manager
December 2020

Agenda

- Key drivers and challenges of cloud storage

- What is Cloud Volumes ONTAP® (CVO)

- Cloud Volumes ONTAP use cases

- Technologies behind the TCO advantage

- TCO advantage examples

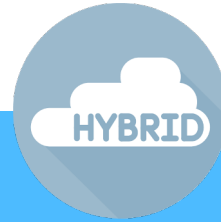# Key drivers and challenges of cloud storage

The IT landscape is quickly changing

Digital Transformation

63% of IT leaders have a hybrid cloud infrastructure today

Of the remaining 37%, 54% plan to have one within the next 24 month

Modern Data Workflows

Containers growing at 30% year on year

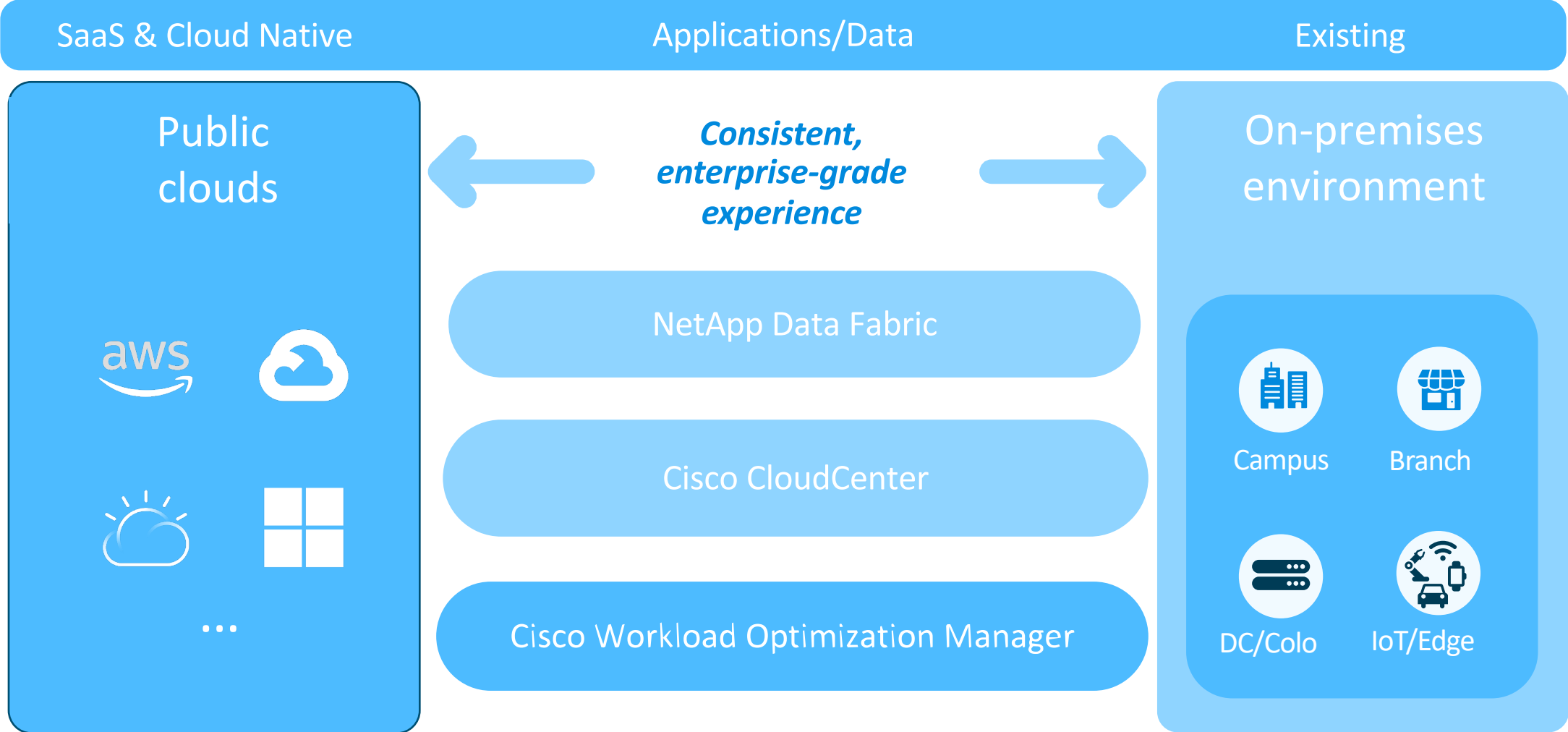69% of organizations considering or using containers
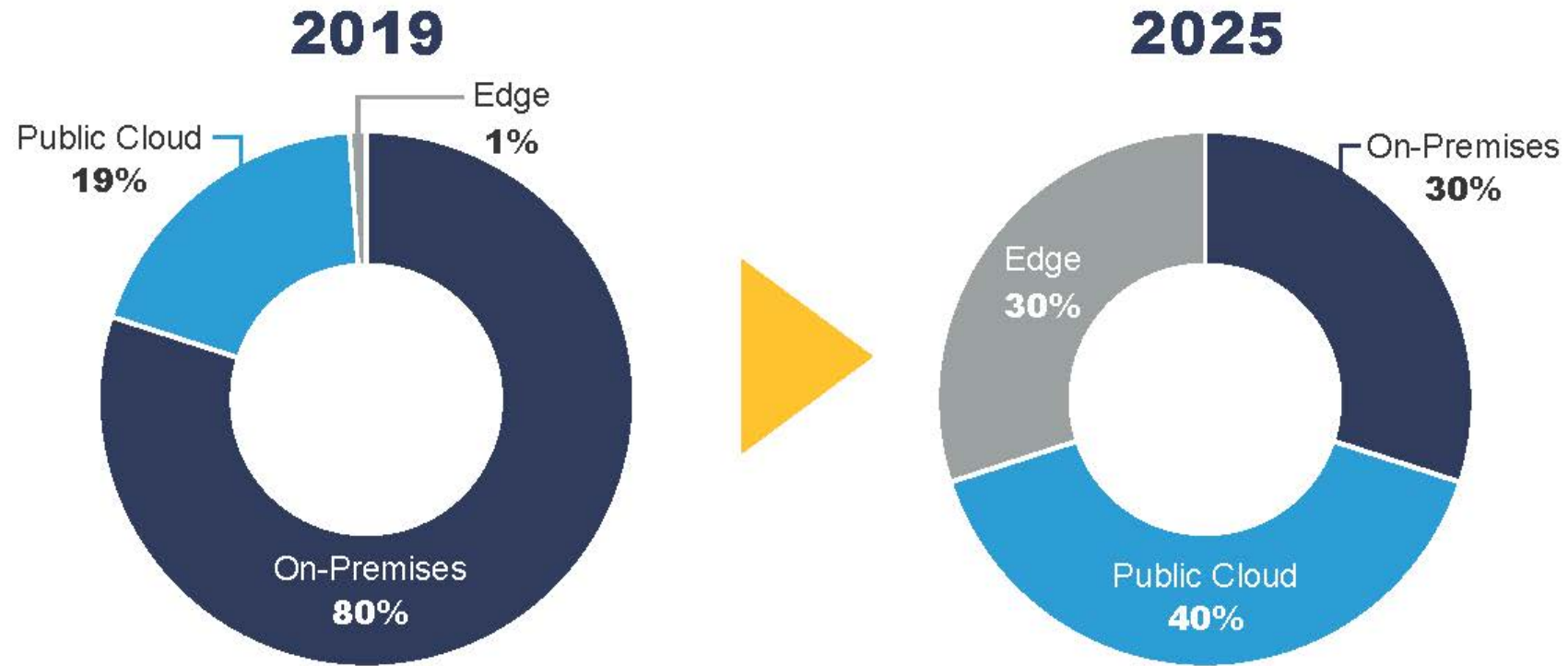
Changing Expectations

Serve end users with secure, trusted IT for all applications

Continue running traditional applications alongside newer workloads

NetApp

FlexPod streamlines this IT landscape

SaaS & Cloud Native — Applications/Data — **Existing**

Public clouds

aws

Consistent, enterprise-grade experience

On-premises environment

NetApp Data Fabric

Cisco CloudCenter

Cisco Workload Optimization Manager

Campus   Branch

DC/Colo   IoT/Edge

NetApp

Where Will Workloads Reside In 2025?

Gartner

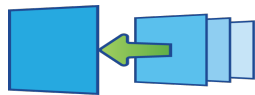# Moving to public cloud is enabling, but what if you need to do more?

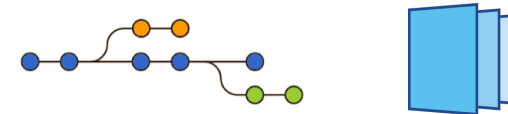Move an on-premises workload to the cloud?

Share files between Linux and Windows clients in the cloud seamlessly?

Provide blazing-fast snapshot-based backup and restore for your applications?

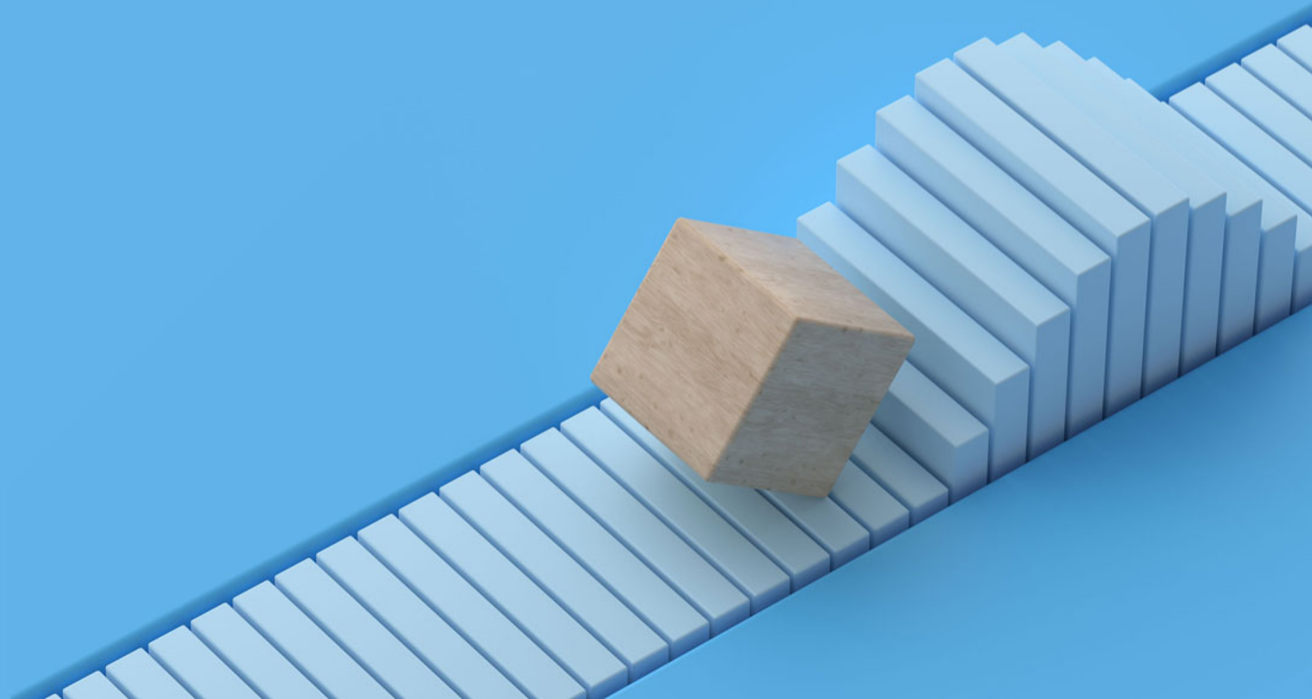Instantly and space-efficiently clone a database for dev/test?

Easily set up cross AZ and cross-region disaster recovery?
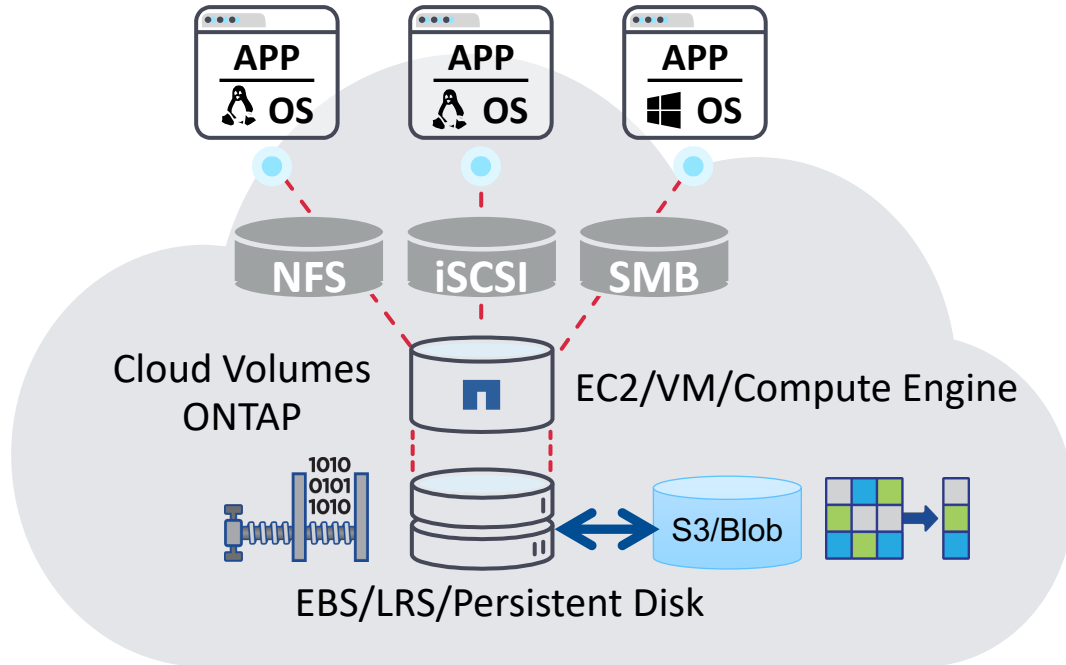
Achieve all this without breaking the bank?
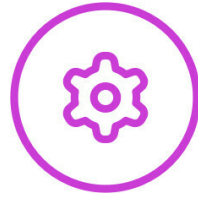
What is Cloud Volumes ONTAP?

Cloud Volumes ONTAP - What Is It?

- A fully-fledged version of ONTAP running natively in the cloud

- Consumes native cloud storage

- Same ONTAP tools and processes

- Mature, proven technology

- Deployed by over a thousand customers globally

- Consumed by the hour (PAYGO) or up front (BYOL)

Cloud Manager

Automate data management and application deployment from the edge, to the core, to the cloud.

- Let you deploy NetApp® Cloud Volumes ONTAP® instances in minutes

- Let you manage your data replication from the data center to the cloud

- Offers data security choice through NetApp managed encryption

- Facilitates hybrid environments that include Cloud Volumes ONTAP and physical NetApp ONTAP systems

- Enables management automation through full REST API support

- Intuitive user interface

**Cloud Manager** gives you a simple deployment and management suite for Cloud Volumes ONTAP
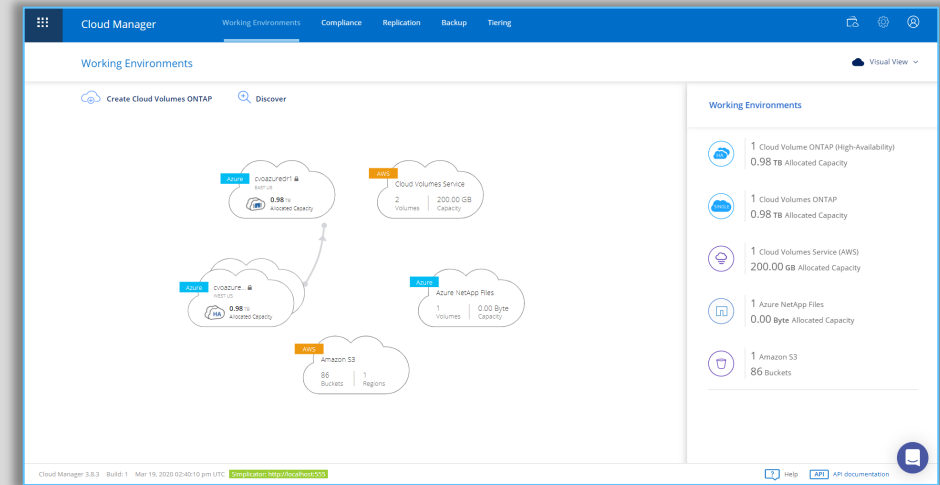
Powerful data services

Store	Protect	Optimize	Classify	Analyze	Develop

Azure NetApp Files
Cloud Backup
Global File Cache
Cloud Compliance
Cloud Insights
Project Astra

Cloud Volumes Service
Cloud Tiering
NetApp Trident

Cloud Volumes ONTAP®
Cloud Sync

Use Cases and Examples
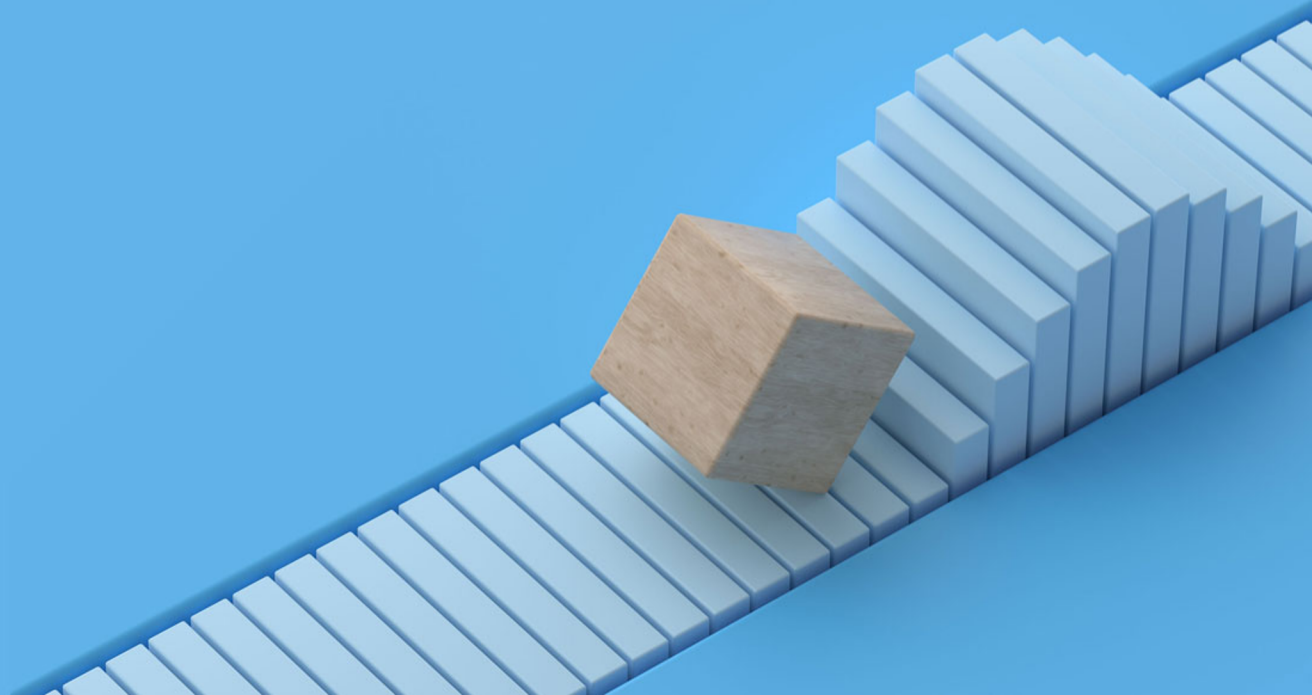
Why Cloud Volumes ONTAP?

👍 Cloud Volumes ONTAP brings enterprise class data management for the public cloud

🕐 Launch new systems in **minutes**

🔄 Seamlessly migrate your data across your hybrid cloud resources and across multiple public cloud providers

☁️ Moving to public cloud is easy

$ Cost savings using compression, deduplication, thin provisioning, and storage tiering

SnapVault® ⇄ **SnapMirror**®

Data Center
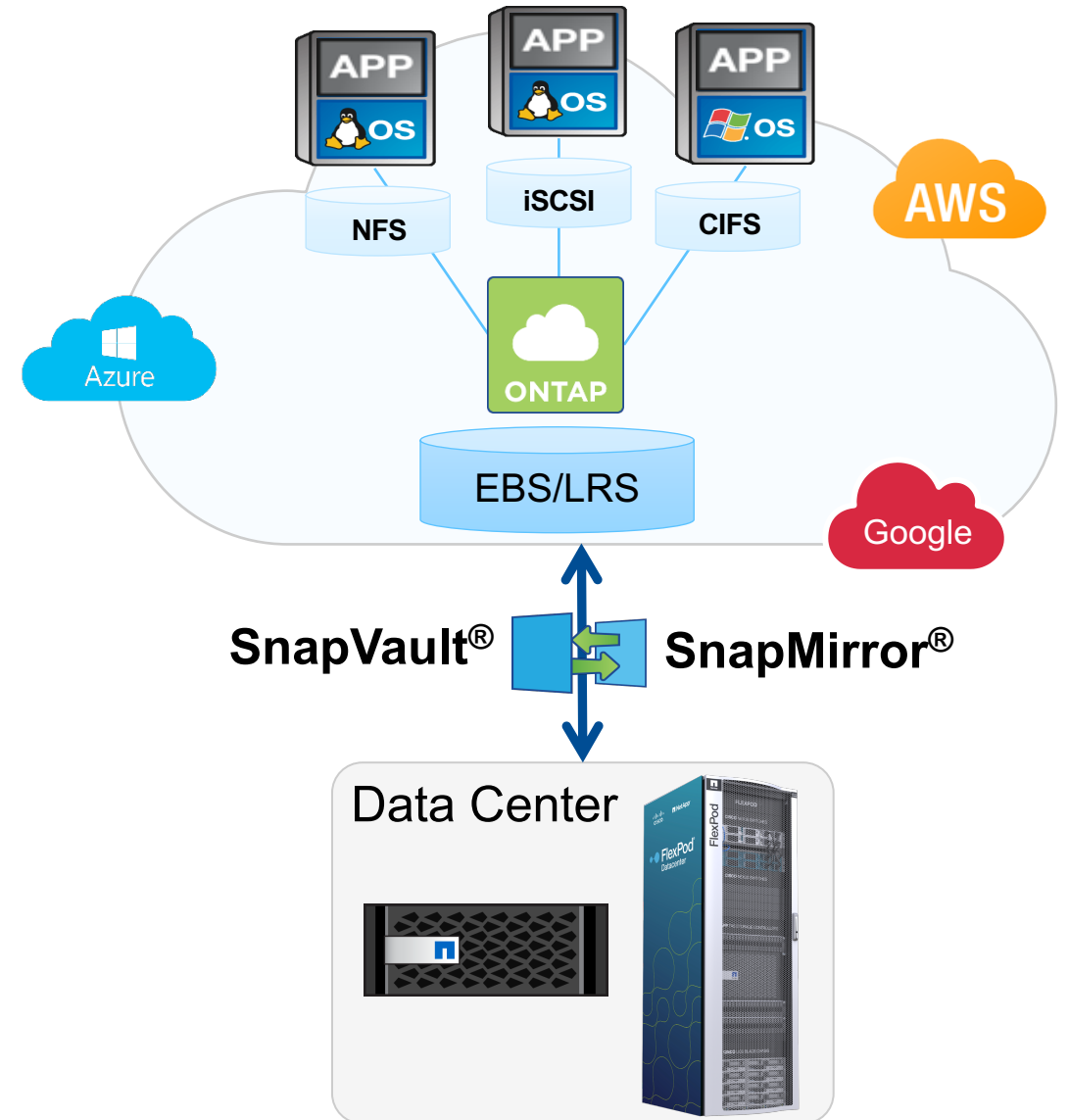
Example – Existing NetApp Customer

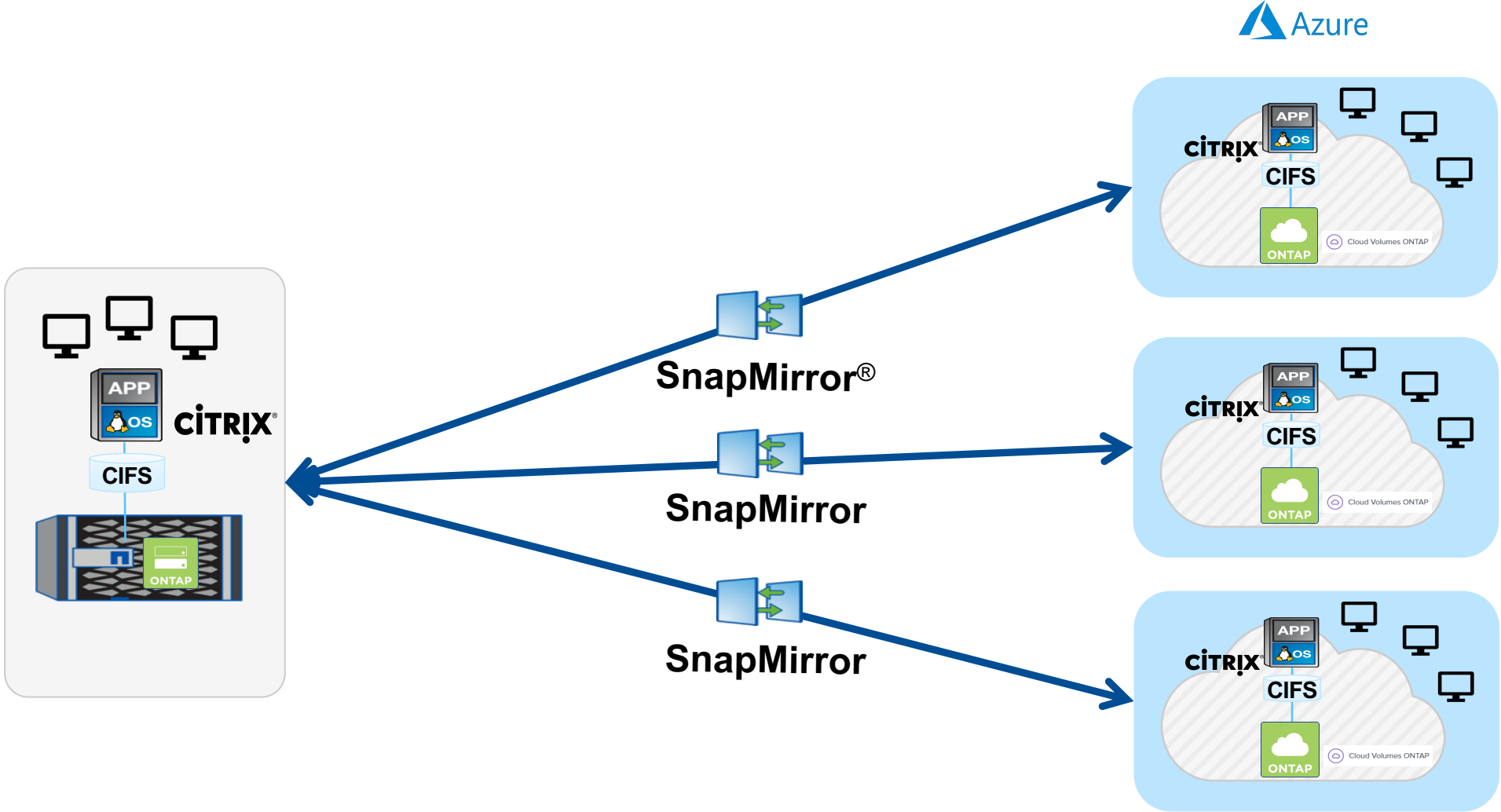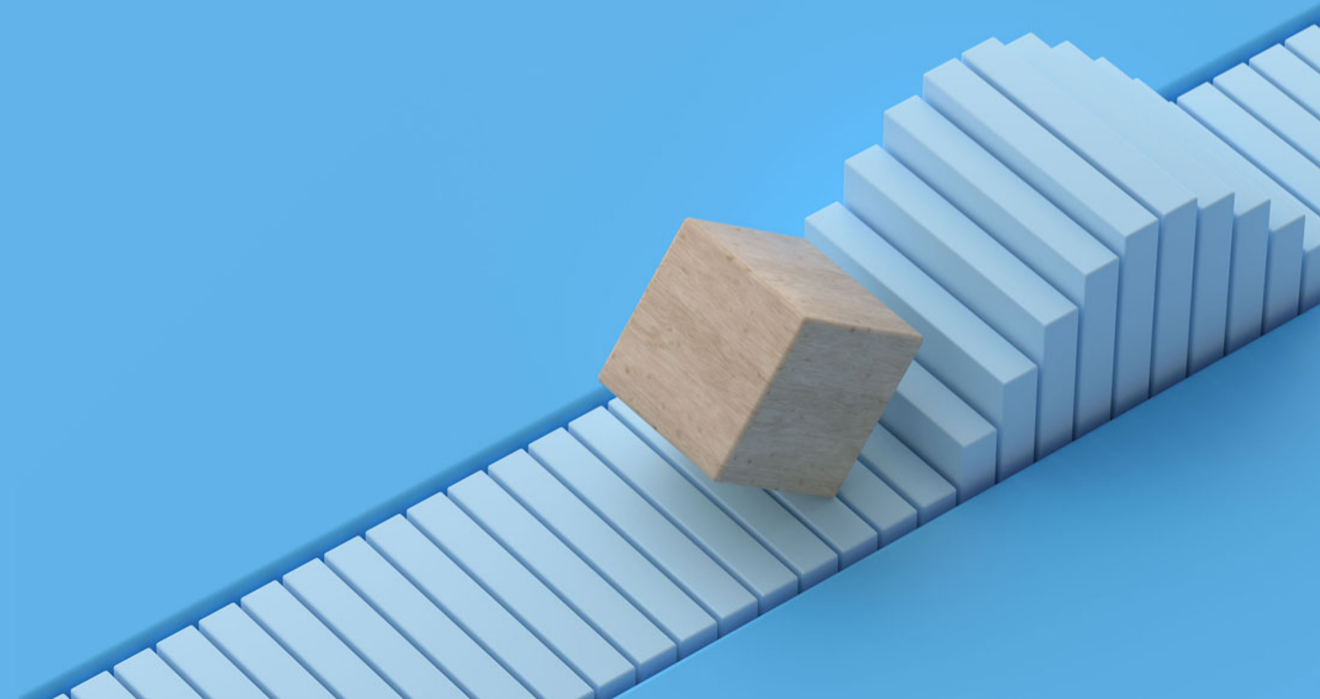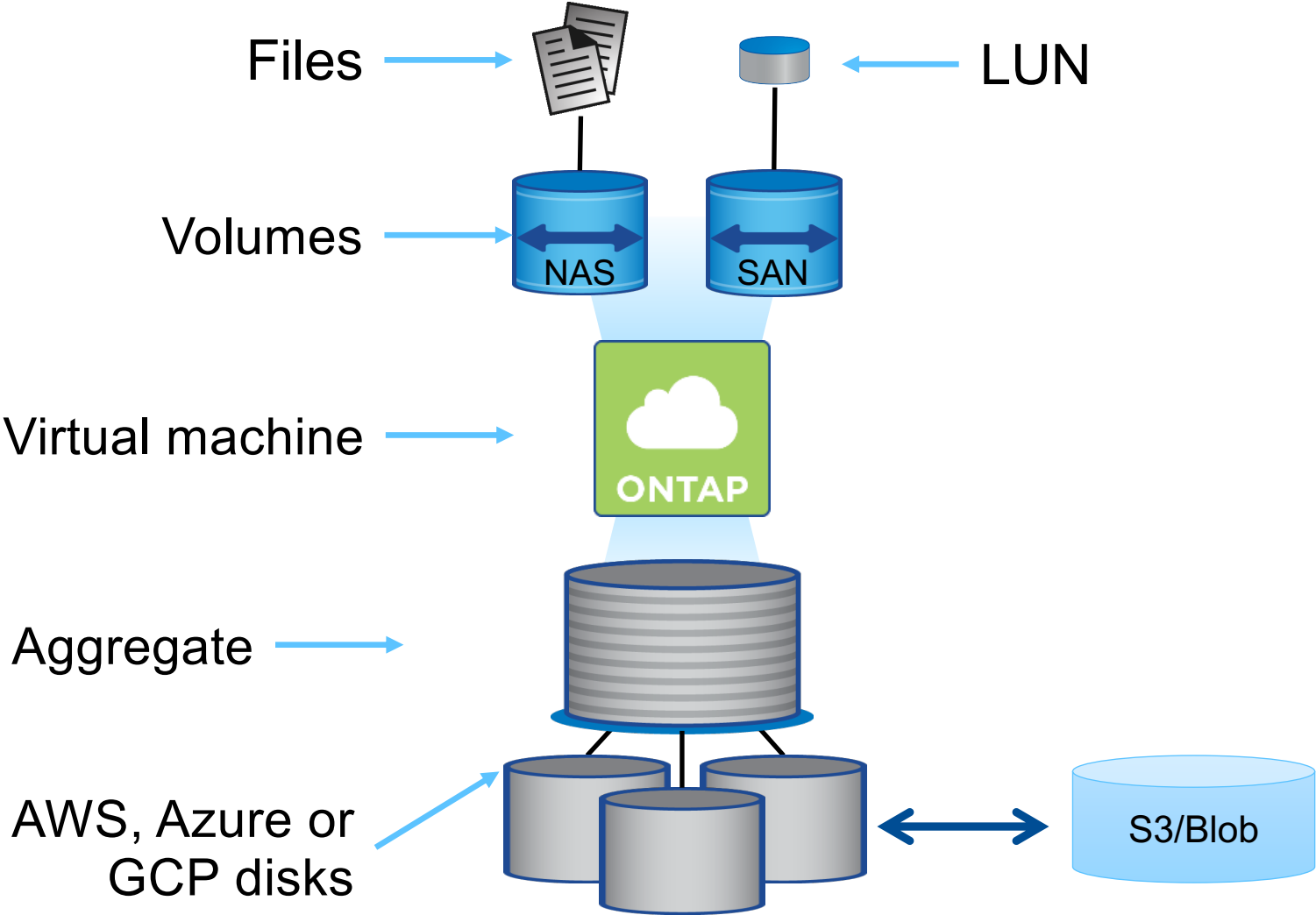|	
The Scenario	• IT Department was tasked with the expansion of their Citrix VDI environment to support the many thousands of employees that will be asked to work remotely due to the COVID-19 virus. • The increase in VDI capacity <u>needed to be in a full production state within 48 hours</u>
The Solution	• **3 PAYGO** instances of Cloud Volumes ONTAP Premium • Purchased in marketplace to avoid prolonged PO process
The Result	• Deploy three new instances of CVO across three different Azure regions • Replicate their on-premises VDI data to the cloud instances • Configure the instance parameters to match their on-premises environment, ensuring that the company's global standards are maintained • **Just over 24 hours**

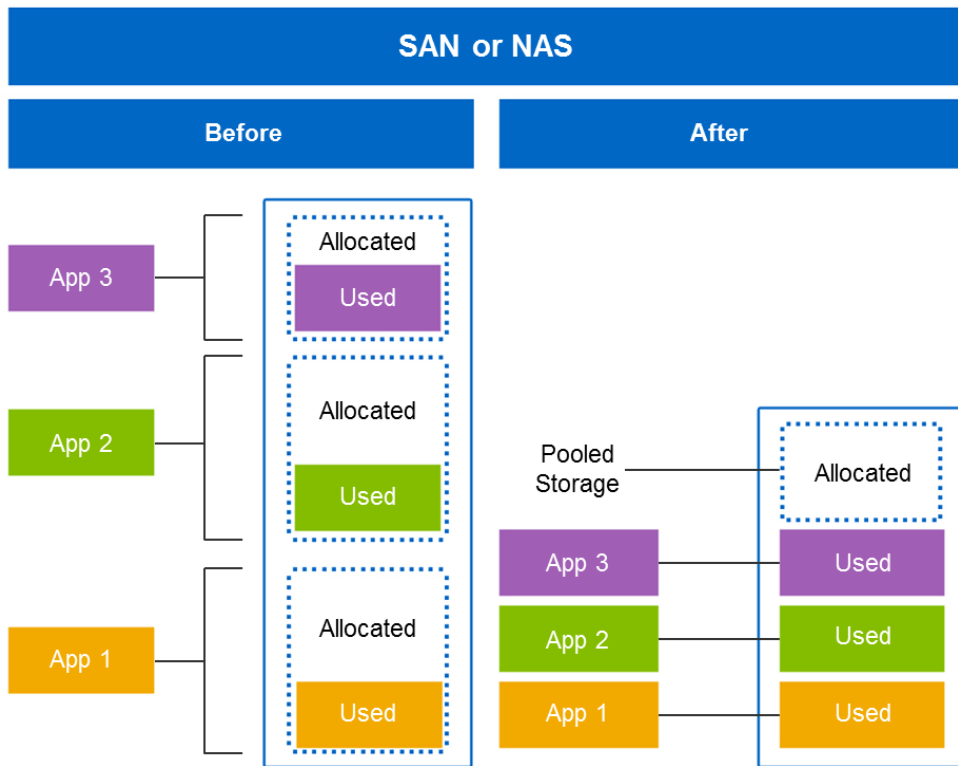# Example – Existing NetApp Customer

Technologies Behind the TCO Advantage

Cloud Volumes ONTAP
Storage architecture

Files

LUN

Volumes

NAS

SAN

ONTAP

Virtual machine

Aggregate

AWS, Azure or
GCP disks

S3/Blob

NetApp

Thin Provisioning

- **Thin provisioning** allocates storage to files in an on-demand fashion. Thick provisioning pre-allocates the entire volume size, resulting in unused islands of allocated storage.

- Cloud-native block storage is thick provisioned. The user is billed for the entire volume size provisioned regardless of how much (or how little) data is actually written to it.

- Cloud Volumes ONTAP effectively allows "over-subscription" of the cloud-native block storage, automatically adjusting the amount of underlying cloud-native storage as the amount of used data blocks increases.

Compression
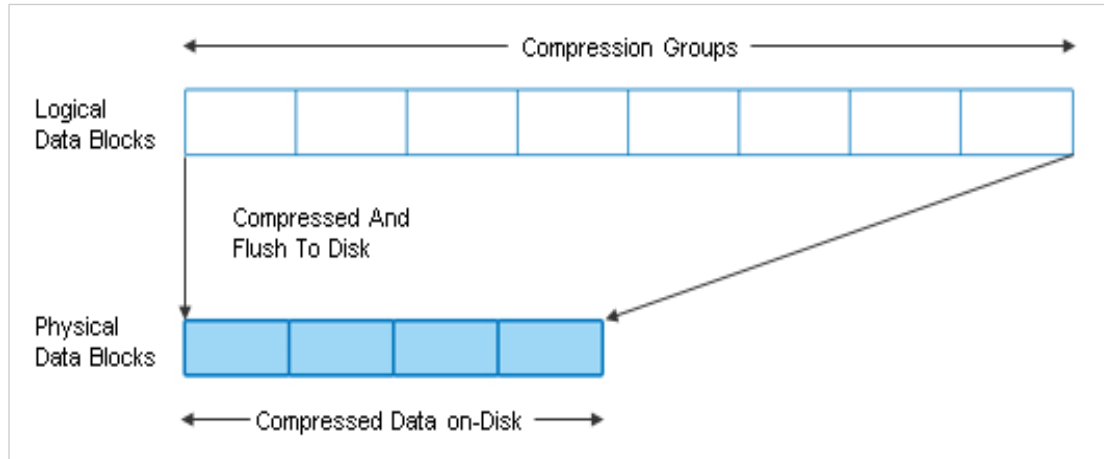
NetApp compression algorithms reduce the bits necessary to represent data.

Deduplication
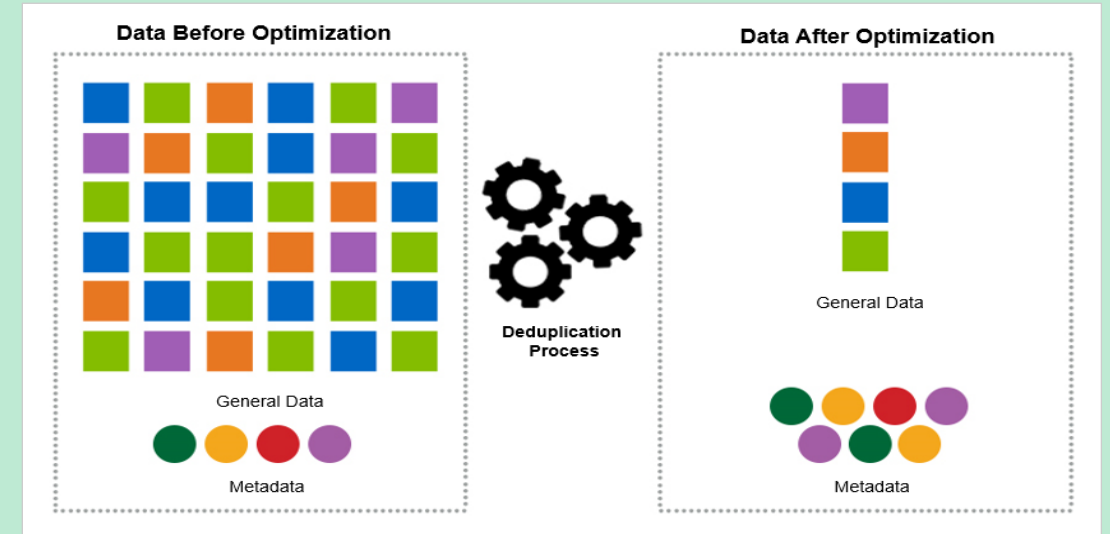
Deduplication removes redundant data blocks and uses metadata to reassemble the data on reads.

NetApp

NetApp Space-Efficient Snapshots

A   B   C   C'   D
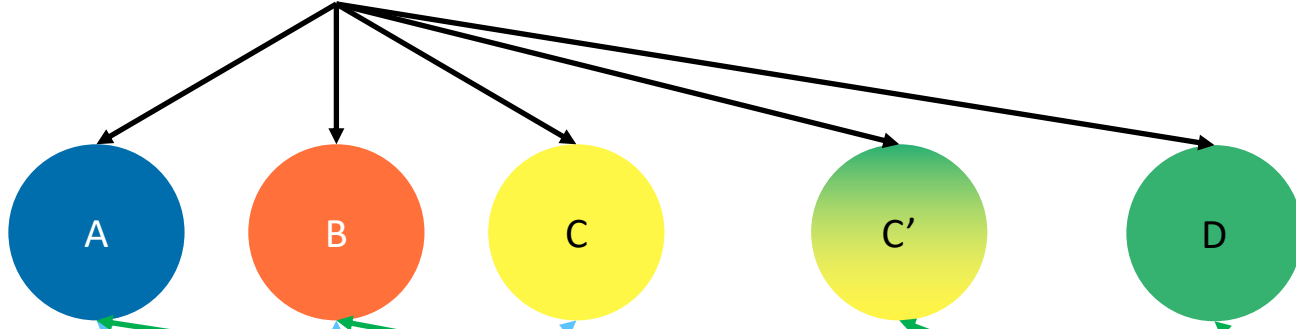
Fast
No performance impact
Space-efficient

10:00

10:25

10:00   10:13   10:25

NetApp

Storage Tiering with NetApp FabricPool

On-Premises Footprint

Before

After

FabricPool

Local Tier

Cloud Tier

Object Storage

Active Data   Inactive Data
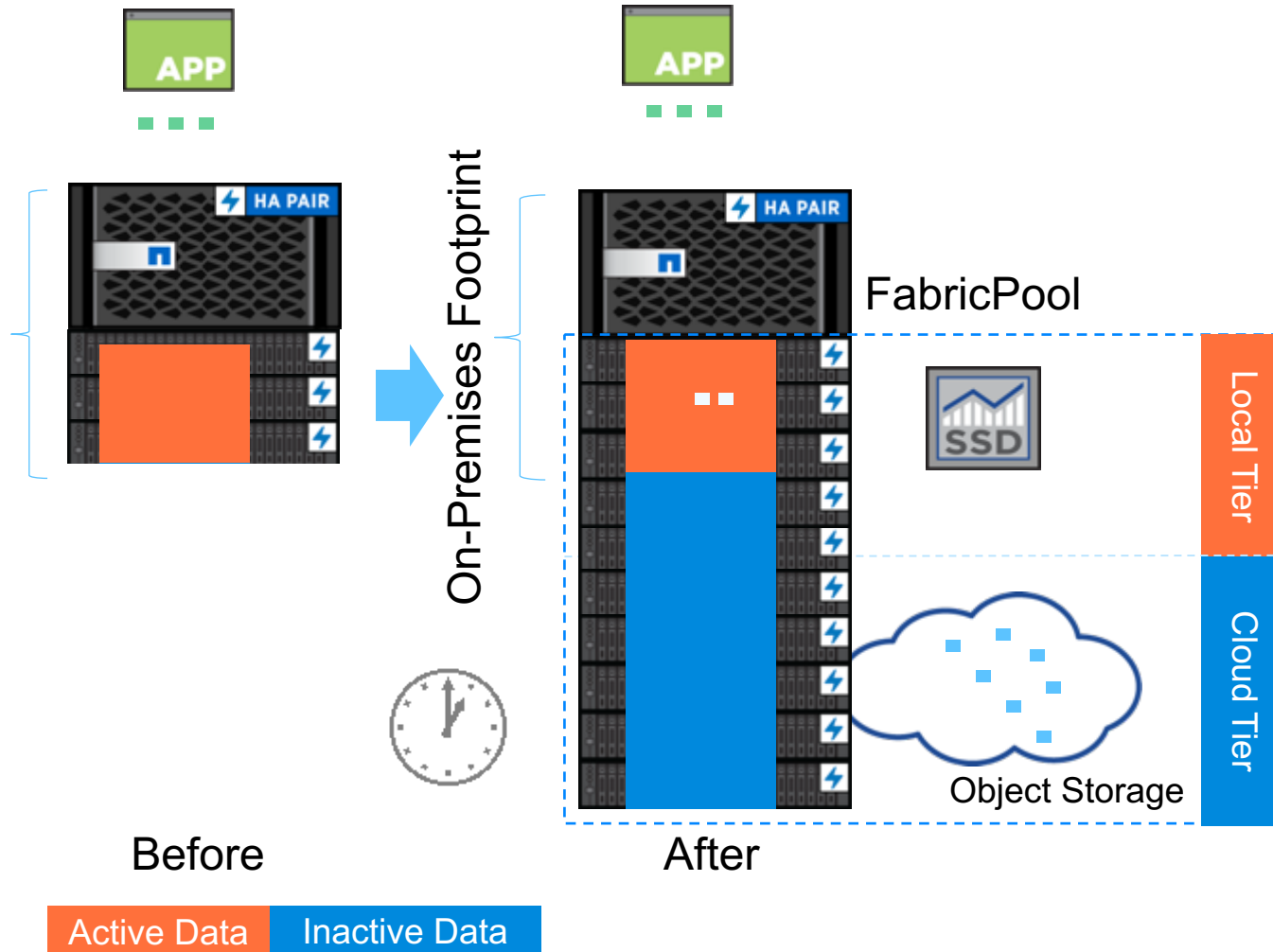
Automatic tiering

Zero-touch management

Preserves file system

Lower cost of ownership

Choice of object tier locations

Private Cloud

Public Cloud

StorageGRID®

IBM Cloud Object Storage

amazon web services™ | S3

Microsoft Azure Blob Storage

IBM Cloud Object Storage

Google Cloud

Alibaba Cloud

NetApp
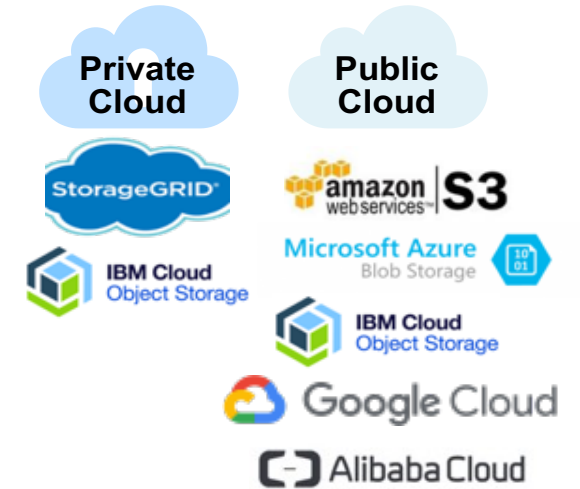
TCO Advantage Examples
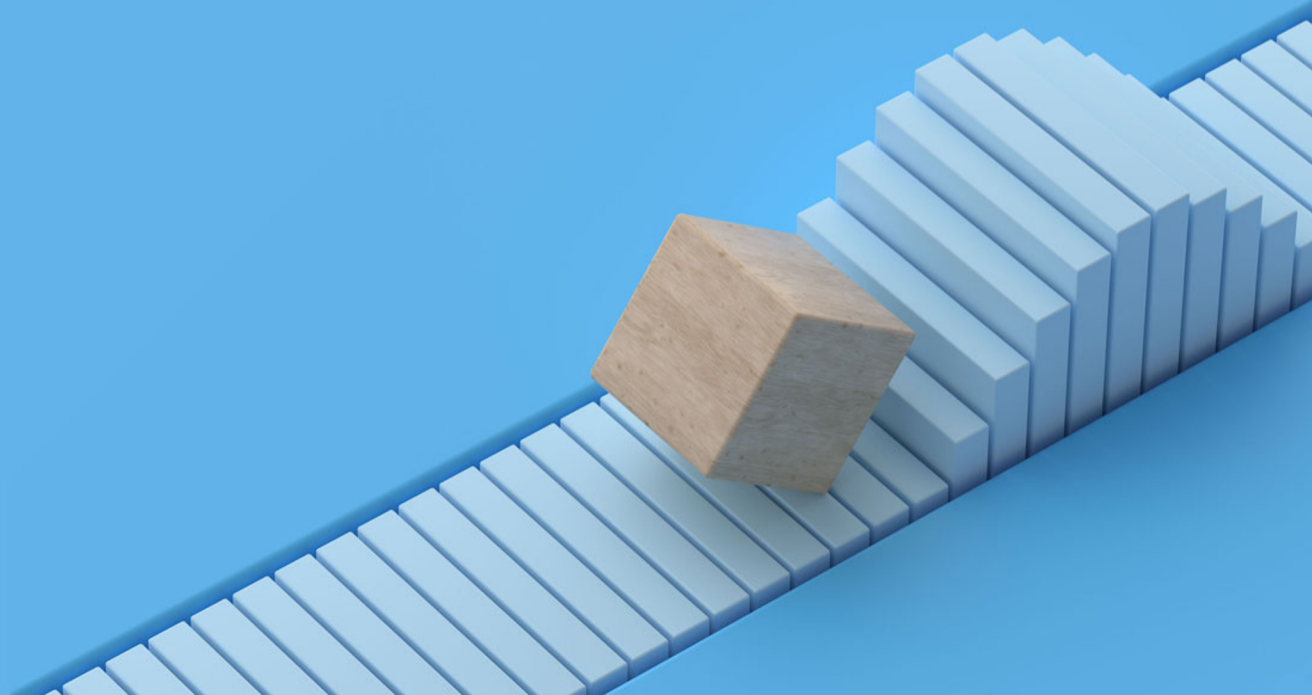
TCO Calculator

- Cloud Volumes ONTAP TCO Calculators available for AWS, Azure, and Google clouds

- Simple, easy-to-use interface with appropriate detail

- Itemized cost data helps you see where you'll save

- Support for pay-as-you-go and BYOL license models

Plan your savings with NetApp Cloud Volumes ONTAP on NetApp Cloud Central.

Cloud Volumes ONTAP

Examples of potential cost savings by deploying CVO with native cloud storage

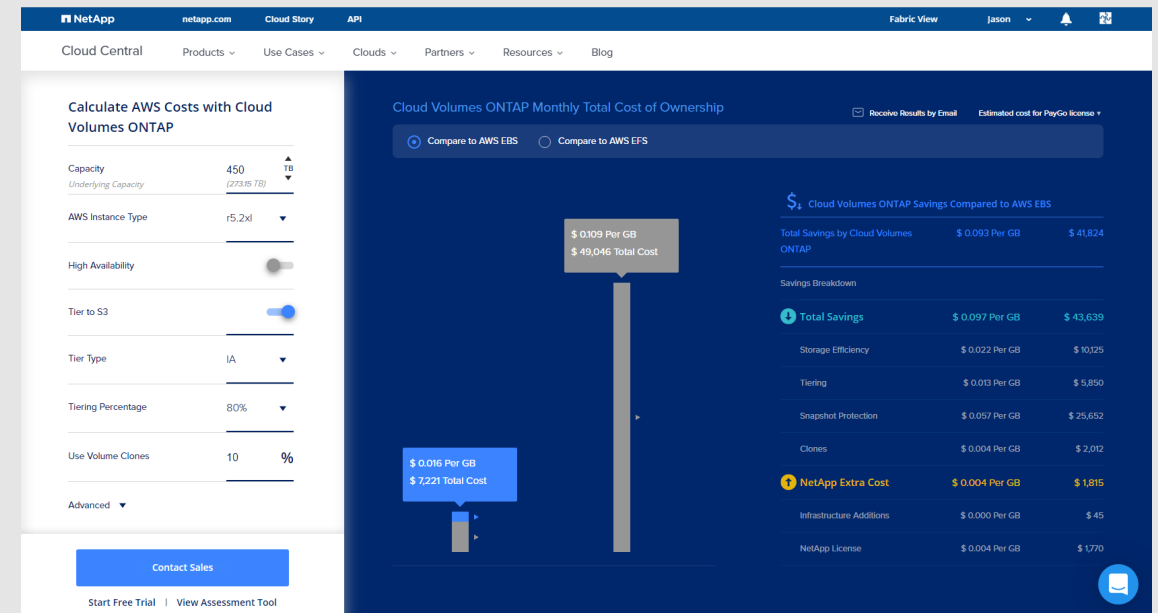| Use Case	CVO License	Raw Capacity	Cost/Mo – Native Cloud Storage	Cost/Mo – Native Cloud Storage w CVO	Potential Cloud Storage Cost Savings / Month	Approx. # of mo to recoup 1yr CVO BYOL license cost
Backup and Disaster Recovery*	Single node, 12-month CVO license*	50 TB	$5,536	$2,353	$3,183	6.1
		100 TB	$10,512	$2,557	$7,955	2.5
Enterprise Application**	High Availability, 12-month CVO license**	50 TB	$17,950	$7,311	$10,639	3.0
		100 TB	$35,900	$10,525	$25,375	1.2

- A Cloud Volumes ONTAP license could pay for itself in a few months, depending on the use case!

- Use the online Cloud Volumes ONTAP TCO calculator for AWS / Azure / GCP to estimate potential cost savings for your customer's specific scenarios

*License: 1yr BYOL; Compared to AWS EBS; Instance Type: m5.4xl; Tier to S3: Yes; Tier Type: IA; Tiering Percentage: 95%; Use Volume Clones: 0%; EBS Disk Type: STI; Storage Efficiency: 50%; Uptime Percentage: 20%; Annual Commitment: Yes; License Type: BYOL, BYOL Cost: $1,500; Number of retained daily snapshots: 7; Daily change rate of the primary data: 3%

**License: 1yr BYOL; Compared to AWS EFS; Instance Type: c4.4xl; High Availability: Yes; Tier to S3: Yes; Tier Type: Standard; Tiering Percentage: 50% Use Volume Clones: 0%; EBS Disk Type: GP2; Storage Efficiency: 50%; Uptime Percentage: 100%; Annual Commitment: Yes; License Type: BYOL, BYOL Cost: $1,500; Number of retained daily snapshots: 7; Daily change rate of the primary data: 3%

Cloud Volumes ONTAP Purchase Options

Bring your own license (BYOL)

1yr, 2yr, or 3yr subscriptions from NetApp
368TB

Purchase
annual subscriptions

Through NetApp Distribution

Pay as you go (PAYGO)

Subscriptions from Amazon, Azure, GCP Marketplace
up to 368TB

Pay only for what you use, by the hour

Through Cloud Provider Marketplace

- ONTAP SnapMirror® included in license
- High Availability (HA) pair = 2 licenses
- NetApp Cloud Manager included

Promotion for 2020

AFF systems combined with Cloud Volumes ONTAP

AFF A300, A400, A700, A800:
Cloud Volumes ONTAP included with the ONTAP "Flash" software bundle

Configuration details:

- Through April 30, 2021 (MetroCluster added June 29, 2020)

- 2-year, premium single-node Cloud Volumes ONTAP license

- Manage up to 368TB capacity on your choice of cloud:
  AWS, Microsoft Azure, Google Cloud

- Requires cloud resources from your cloud provider

Key takeaways

CVO extends the capabilities of cloud native storage

Advanced storage efficiencies, replication, multi-cloud support

CVO is easy to install and manage via Cloud Manager

A single interface to discover and manage CVO, Cloud Volume Service, Global File Cache, Cloud Compliance and other services across multiple cloud providers and on-premise devices.

CVO can lower Total Cost of Ownership of cloud adoption

Compression, deduplication, tiering, thin provisioning, space-efficient snapshots

Thank You

■ NetApp