

NetApp INSIGHT 2023

Always On

数据存储与管理前沿技术系列课程

第一讲：NetApp ASA C系列存储产品简介和 ONTAP 9.14.1 Highlight

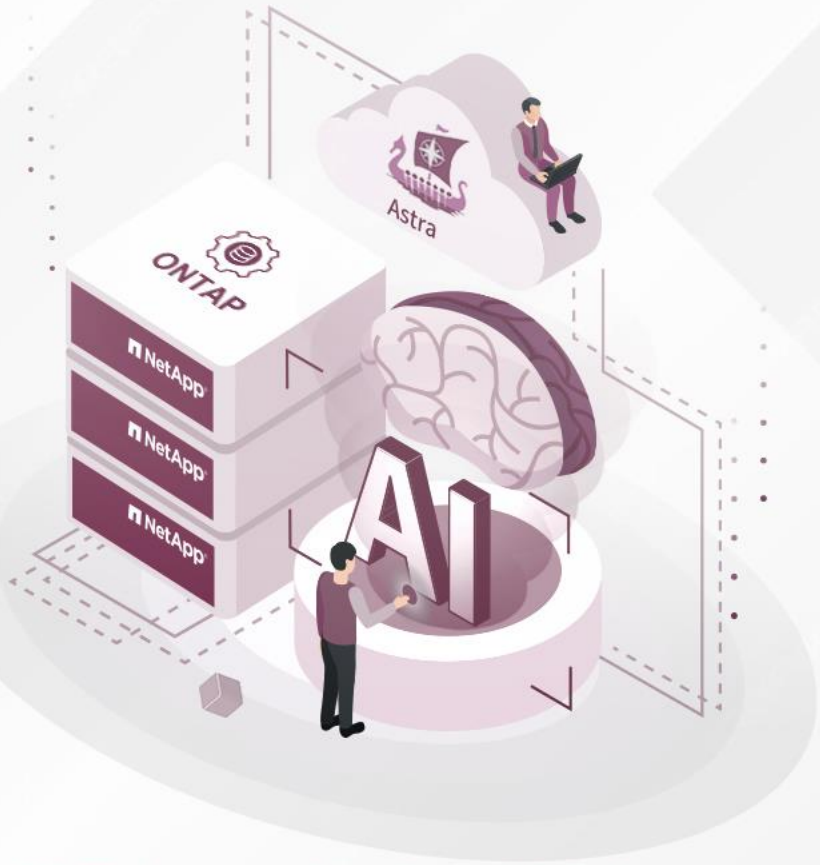
赵巍巍

2023年11月21日



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ASA C系列存储产品简介

ONTAP产品家族-满足任意需求

For lowest cost,
secondary use cases

HYBRID FLASH

FAS



For best price/
performance

CAPACITY FLASH

AFF C-Series



For best performance
On Tier1 workloads

PERFORMANCE FLASH

AFF A-Series



Unified

Block
Optimized

ASA C-Series **NEW**
(Coming soon)



ASA A-Series



ONTAP

Comprehensive data management software delivering automation, efficiency, data protection, and security capabilities for file, block, and object



ASA C-Series产品解读

ASA (All SAN Array)

C-Series



NetApp ASA介绍

ASA A-Series



Superior performance for the most demanding workloads
with sub-millisecond latency

ASA C-Series



Unmatched sustainability and savings for business-critical
workloads

Availability Performance Efficiency Sustainability Savings

ASA A-Series 型号

A wide range of performance and capacity offerings



	ASA A150	ASA A250	ASA A400	ASA A800	ASA A900
HA system	<ul style="list-style-type: none"> 15.2TB–547TB raw Up to 2.1PB effective 2U base w/24 drives 	<ul style="list-style-type: none"> 15.2TB–1.1PB raw Up to 4.4PB effective 2U base w/24 drives 	<ul style="list-style-type: none"> 15.2TB–14.6PB raw Up to 58.6PB effective 4U base + 2U24 drive shelf 	<ul style="list-style-type: none"> 22.8TB–6.6PB raw Up to 26.3PB effective 4U base w/48 drives 	<ul style="list-style-type: none"> 22.8TB–14.6PB raw Up to 58.6PB effective 8U base + 2U24 shelf
Cluster	<ul style="list-style-type: none"> 91.2TB–3.3PB raw Up to 13.1PB effective 	<ul style="list-style-type: none"> 91.2TB–6.6PB raw Up to 26.4PB effective 	<ul style="list-style-type: none"> 91.2TB–87.6PB raw Up to 351.6PB effective 	<ul style="list-style-type: none"> 136.8TB–39.6PB raw Up to 157.8PB effective 	<ul style="list-style-type: none"> 138TB–87.6PB raw Up to 351.2PB effective
Protocols	<div style="border: 2px solid red; border-radius: 15px; padding: 5px; display: inline-block;"> NVMe/FC, NVMe/TCP, FCP, iSCSI </div>				

Bezel mock-up; not final; initial shipments may use older bezel.

ASA C-Series 型号

A model for every price point and workload



ASA C250



ASA C400



ASA C800

HA system

- 122TB–734TB raw
- Up to 2.9PB effective
- 2U base

- 122TB–1.46PB raw
- Up to 5.9PB effective
- 4U base + 2U drive shelf

- 182TB–3.7PB raw
- Up to 14.7PB effective
- 4U base

Cluster

- 122TB–4.4PB raw
- Up to 17.5PB effective

- 122TB–8.8PB raw
- Up to 35.5PB effective

- 182TB–22.2PB raw
- Up to 88PB effective

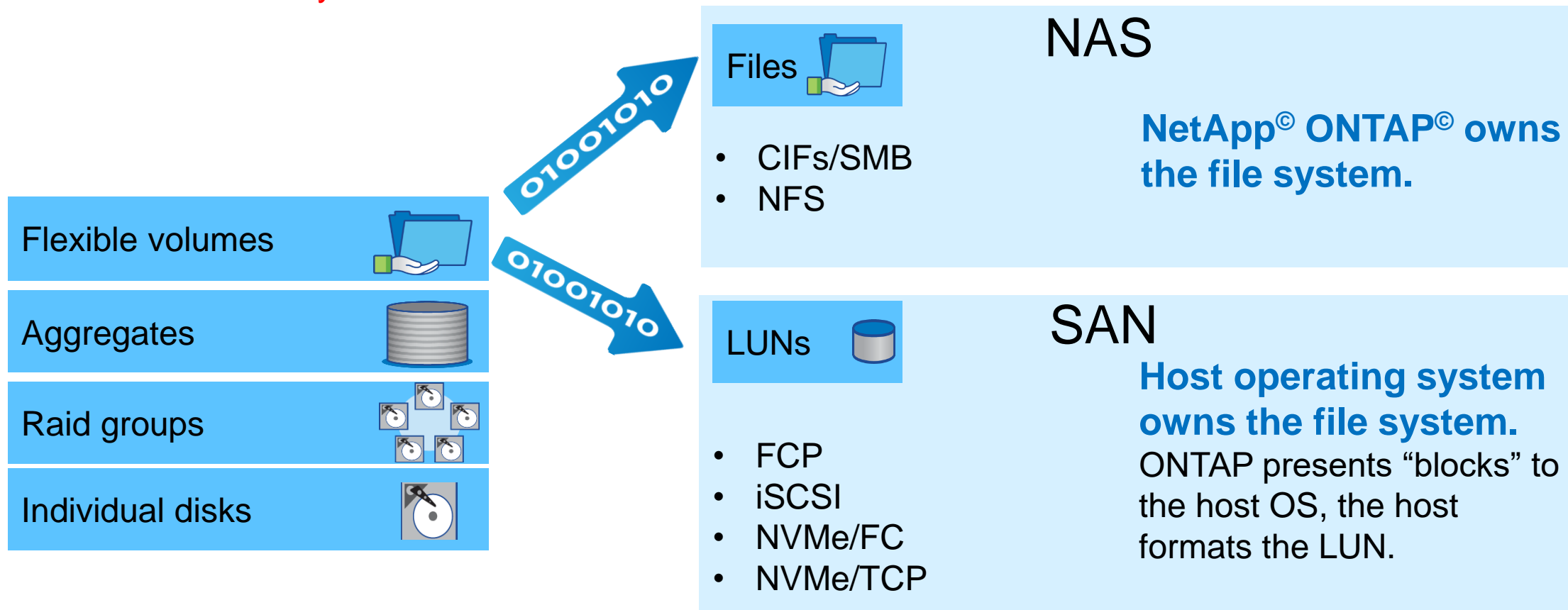
Protocols

NVMe/FC, NVMe/TCP, FCP, iSCSI

ASA (ALL SAN Array)介绍

What is SAN?

Who owns the file system!



ASA (All SAN Array) 应用场景






- App and VM integrated snapshot backups
- 99.9999% availability for critical infrastructure
- Instantly create thin clones of VMs and DBs
- Native integration with VMware vSphere and Cloud Foundation



Magic Quadrant

Figure 1: Magic Quadrant for Primary Storage



Magic Quadrant for Primary Storage

Published 18 September 2023 - ID G00780941 - 30 min read

By Jeff Vogel, Joseph Unsworth, [and 1 more](#)

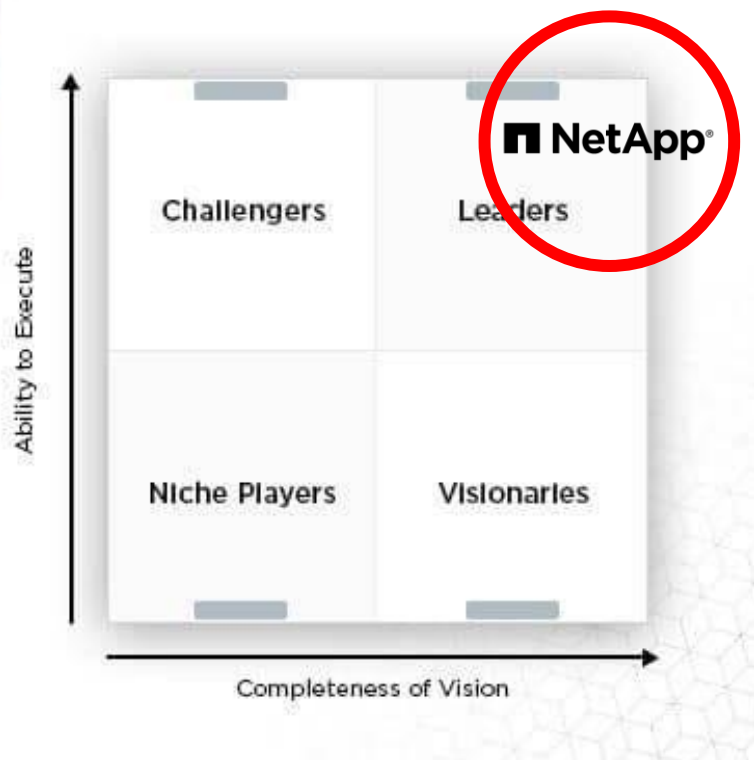
Primary storage users are embracing infrastructure consumption-based services for hybrid, multidomain, mission-critical applications, and to align costs to business demands. I&O leaders should use this research to automate operations, reduce complexity and churn, and transform IT operations.

Flash领导者象限

Ongoing proof points from Gartner

WHAT'S CHANGED

Gartner
Magic Quadrant for
Primary Storage Arrays



**A Gartner Magic
Quadrant Leader**

7

Years in a row*

* Combination of all-flash and primary storage MQ reports

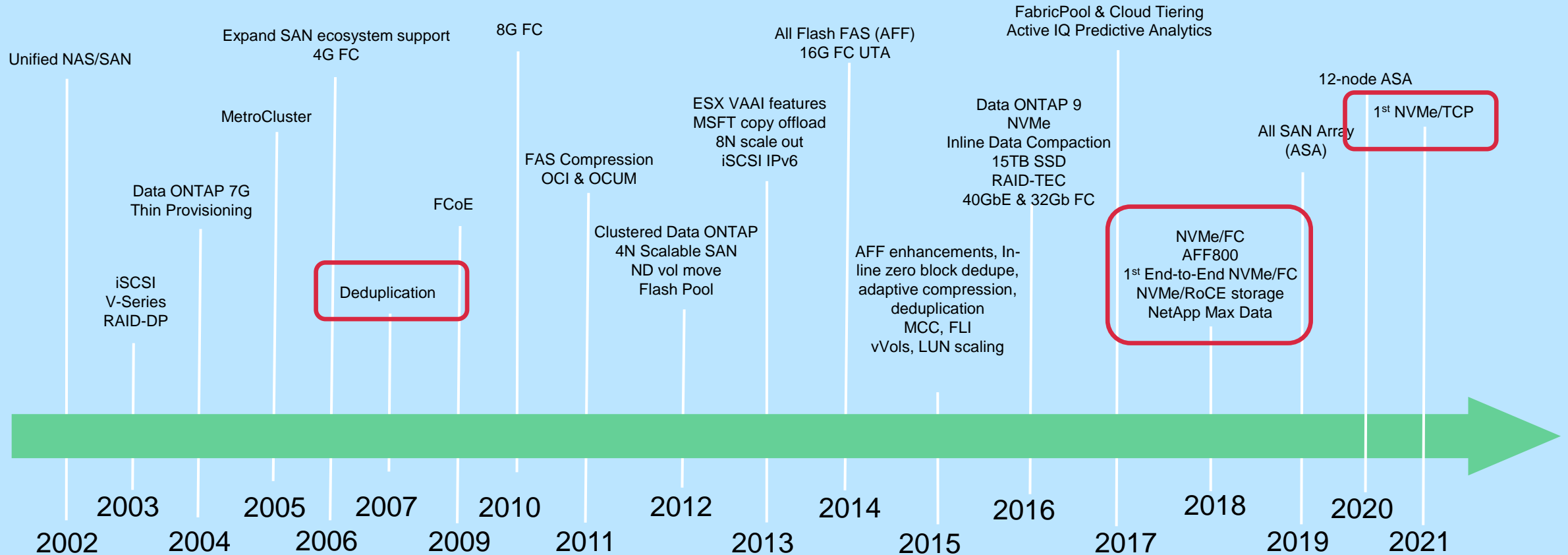
ONTAP SAN journey

Traditional data centers

Server virtualization

Flash, SCM/PMEM

Cloud, hybrid cloud, data fabric



ASA 6个9高可用性担保



White Paper

Meeting the High Availability Requirements in Digitally Transformed Enterprises

Sponsored by: NetApp

Eric Burgener
March 2022

Empirically Proven "Six-Nines Plus" Availability

Using the Active IQ Unified Manager (as well as inputs from Cloud Insights where relevant), NetApp monitors system-level reliability and data availability across its entire installed base. More than 80% of the ONTAP systems in the field leverage Active IQ's cloud-based predictive analytics capabilities (both those sold direct and through NetApp channel partners are included in this data). Across the installed base, NetApp collects hundreds of billions of data points per day on the status of their arrays, including statistics about application and data availability. IDC has reviewed NetApp ONTAP system availability statistics between January 2019 and December 2021, noting that the data indicates a minimum of 99.9999x% availability across over 100,000 controller pairs running ONTAP 9 software.

This population includes NetApp AFF80x0 and AFF A-Series systems as well as FAS25xx, FAS26xx, FAS27xx, FAS8xx0, FAS9000, and FAS500f systems. Clearly, NetApp can deliver "six-nines plus" availability and has done so consistently in mixed enterprise workload environments that include both block- and file-based applications.



Six Nines Data Availability Guarantee

This slide is an overview only. The Six Nines Data Availability Guarantee requires agreement with certain terms and conditions. Please refer to the Terms & Conditions for full details. The guarantee requires use of NetApp Cloud Insights to validate compliance. Bezel mock-up; not final; initial shipments may use older bezel.

ASA 防勒索数据恢复担保

Ransomware Recovery Guarantee

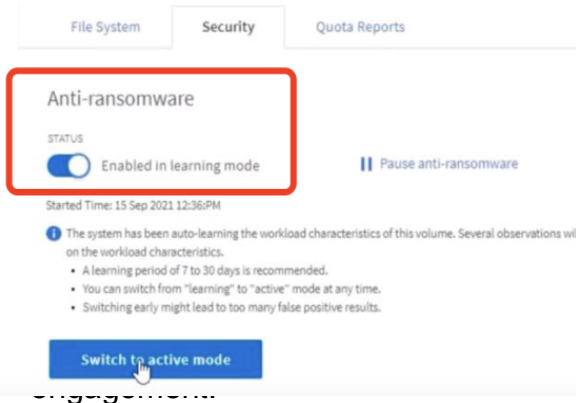
On-box anti-ransomware

ONTAP 9.10.1 and later introduces a brand new form of ransomware detection and prevention in its anti-ransomware feature. It leverages **built-in on-box ML** that looks at volume workload activity plus data entropy to automatically detect ransomware. It also monitors for activity that is different from UBA so that it can detect attacks that UBA does not.

ONTAP anti-ransomware protection is provided as part of the Security and Compliance software bundle. Customers who already have the bundle only need to upgrade to the latest version of ONTAP (ONTAP 9.10.1) to take advantage of the feature. It's configurable through the ONTAP built-in management interface, System Manager, and is enabled on a per-volume basis.

The anti-ransomware feature starts in learning mode. NetApp recommends a period of at least 30 days so that the ML has a chance to understand the typical workloads on the NAS volumes. When anti-ransomware is put into active mode, it starts looking for the abnormal volume activity that might potentially be ransomware.

Figure 6) Enable anti-ransomware in learning mode for a recommended 30 days before setting to active mode.



Terms and conditions apply.



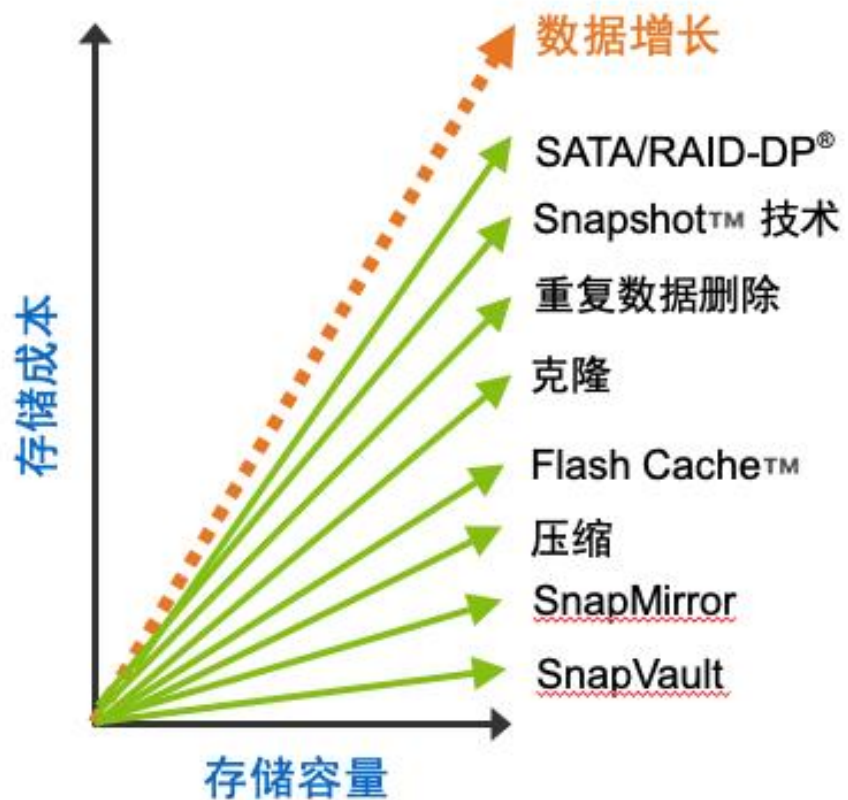
FOR ENTERPRISE
PRIMARY STORAGE

Ransomware Recovery Guarantee

ASA存储效率担保

The simplest effective guarantee in the industry

减少资本支出和运营支出



Storage Efficiency Guarantee
on all ASA systems

ASA 强大的性能

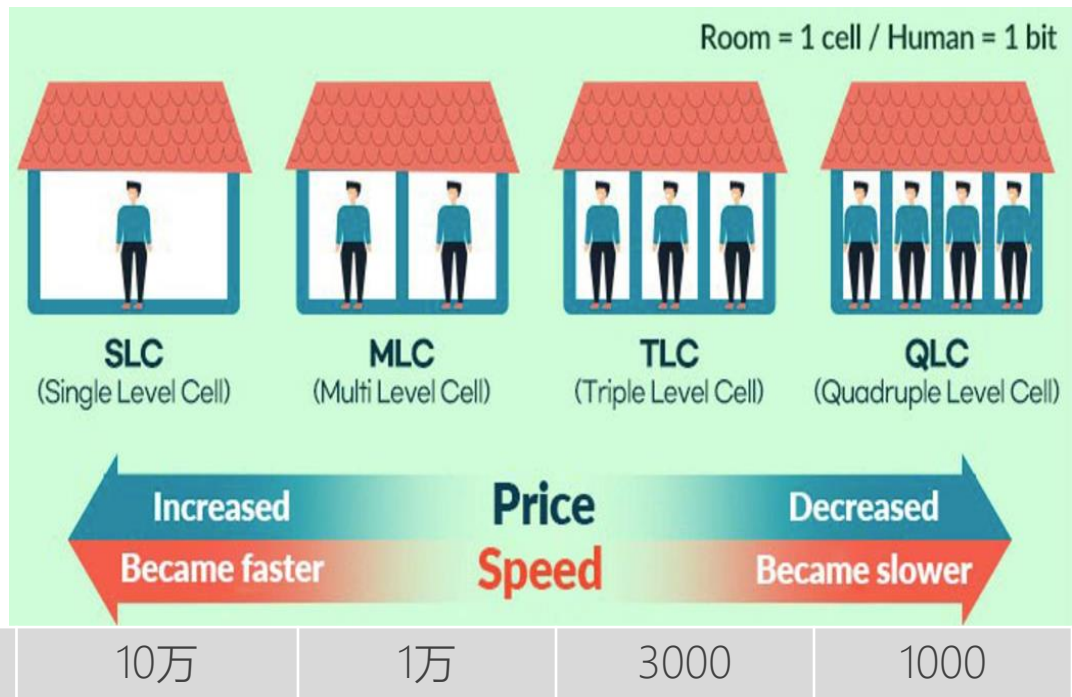
Accelerate your critical workloads

- Accelerate enterprise apps with end-to-end NVMe storage
 - Extremely low latency (as low as 100 μ s)
 - Millions of IOPS in a cluster
- Future-proof with NVMe-oF technology, high-bandwidth network connectivity
 - NVMe/FC
 - NVMe/TCP
- Reduce data center costs by consolidating workloads on high-performance and high-density storage



End-to-end NVMe block storage

C系列和A系列差别



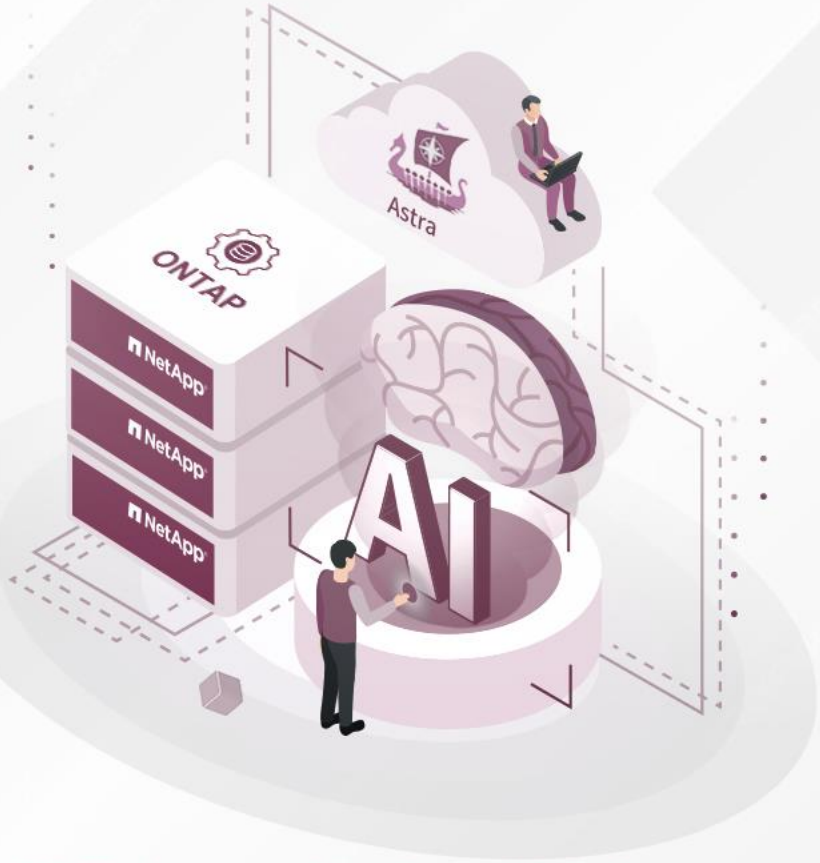
C系列使用QLC硬盘

A系列使用TLC硬盘

1. 磁盘可擦写次数是 ∞ ，Google对现实情况分析后（2016），发现SSD可靠性比磁盘更高，而SLC并不优于MLC
2. 过去从SLC到MLC再到TLC，都会重现这种争论。然而事实胜于雄辩。
3. 目前主流是TLC，但QLC在2020年已经开始应用，也是大势所趋。Gartner预计到2025，QLC会占到一半份额。
4. 保内坏盘，全部免费更换

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NetApp ONTAP 9.14.1 Highlights

ONTAP持续创新

The industry's most comprehensive data management platform

More than **88 feature enhancements** in ONTAP 9.14.1 deliver added value in the areas that matter most to customers



DATA PROTECTION

12

updates around capabilities including consistency groups, DR rehearsal, data replication, ransomware defense

SECURITY

12

updates around key management, MFA, security policies, authentication

COST OPTIMIZATION

18

updates including improvements with QoS, storage efficiency, future media support, caching, tiering, infrastructure reduction

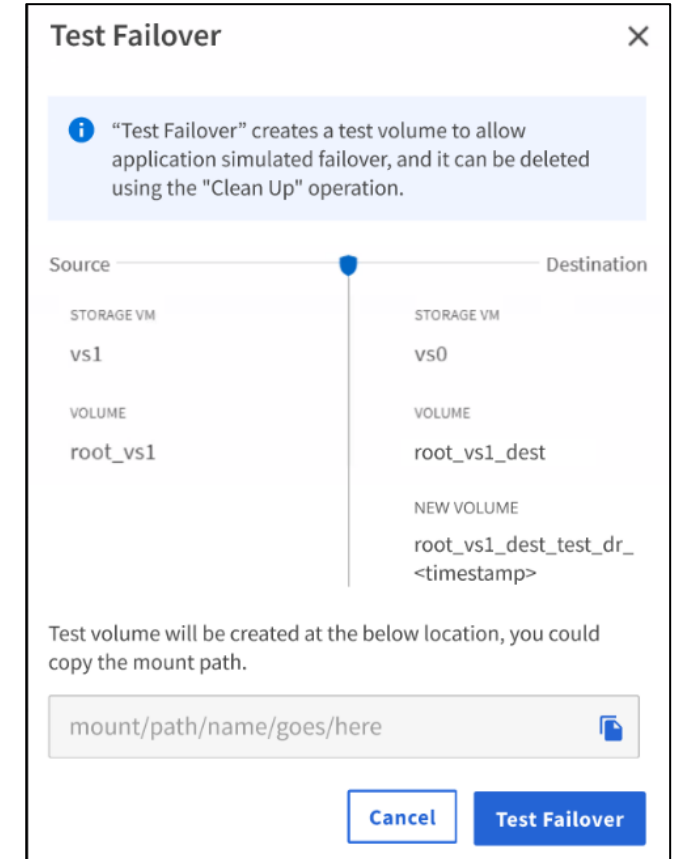
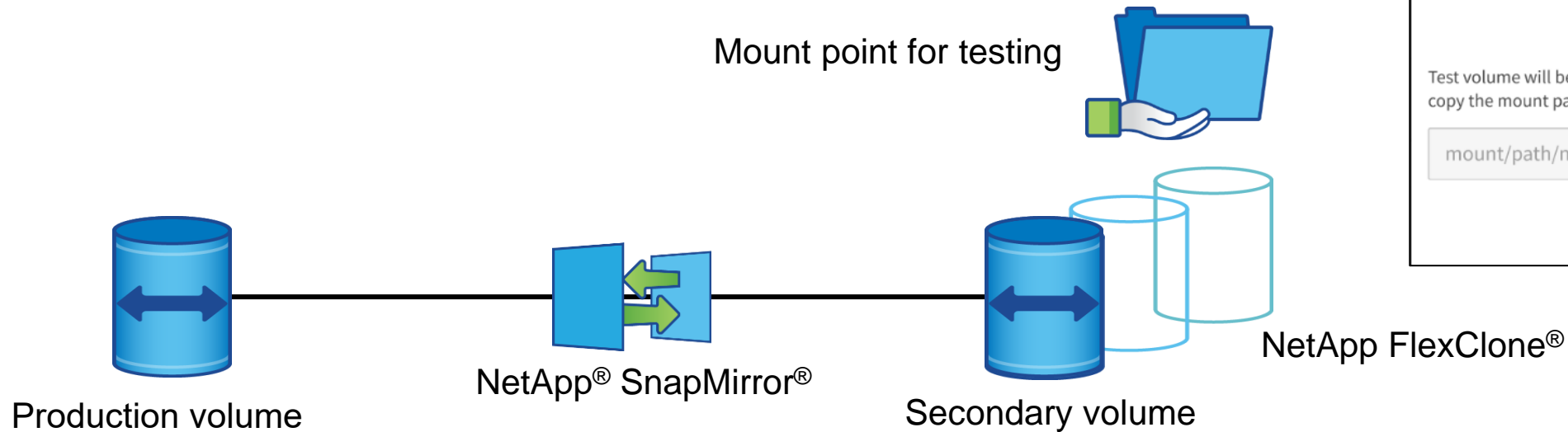
NetApp ONTAP 9.14.1: 数据保护和安全增强

ONTAP is the most comprehensive data-protection platform and most secure platform available



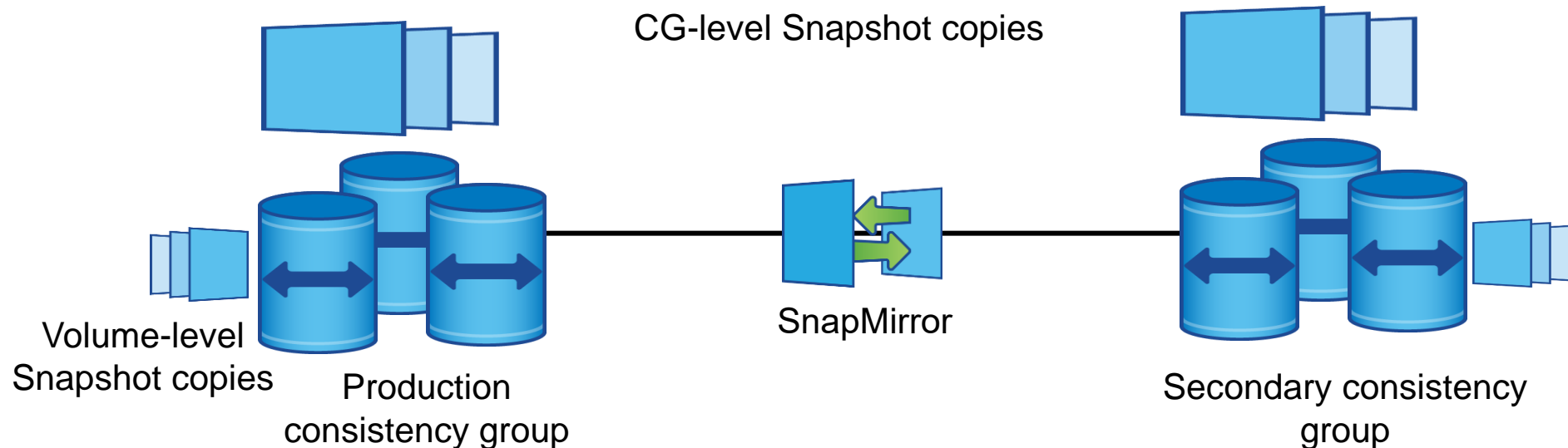
自动化灾难恢复演练

- Simple testing of the recovery of a volume at an alternate site
- Includes creating a mount point for simple testing
- Does not interrupt regular replication schedule
- Easy clean up when completed



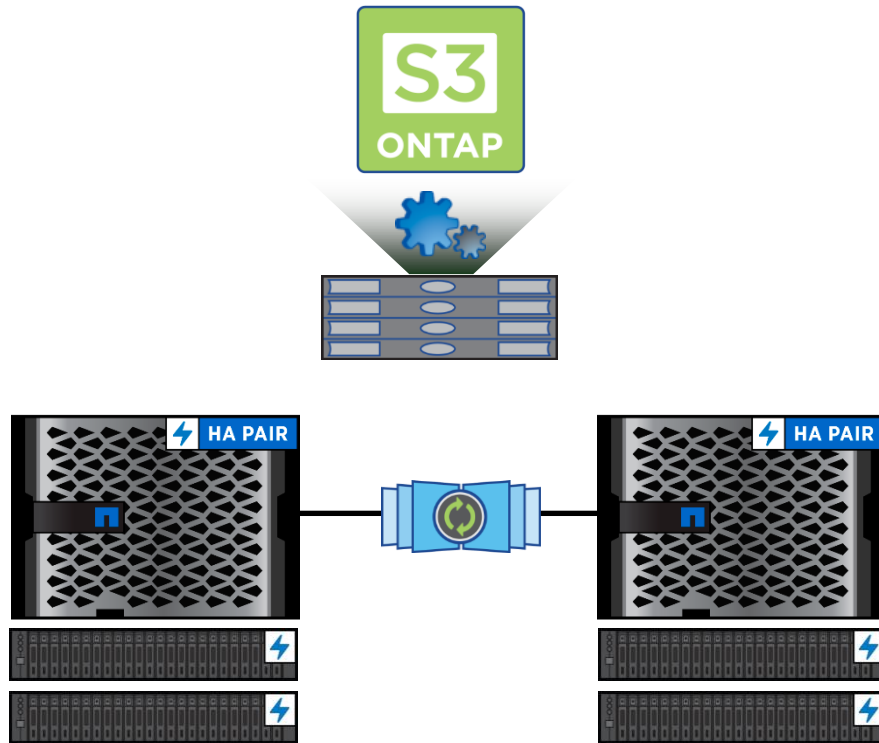
一致性组支持SnapMirror异步模式

- Consistency groups (CG) were originally developed to protect block workloads with synchronous NetApp® SnapMirror®
- Expanded to protect NAS workloads and with NetApp ONTAP® 9.13.1 to add support for asynchronous SnapMirror
- ONTAP 9.14.1 enhances consistency-group support with asynchronous SnapMirror with NetApp Snapshot™ Symmetry, replicating both CG-created Snapshot copies and volume-level Snapshot copies
- Facilitates volume-level recovery points in combination with application-level recovery points
 - e.g. Database logs



NetApp ONTAP S3 支持镜像聚合

Delivering high availability for object data



- NetApp® ONTAP® 9.13.1 added support for ONTAP S3 data on non-mirrored aggregates
- ONTAP 9.14.1 extends that support to include mirrored aggregates, providing RPO zero and near RTO zero availability to object data on ONTAP

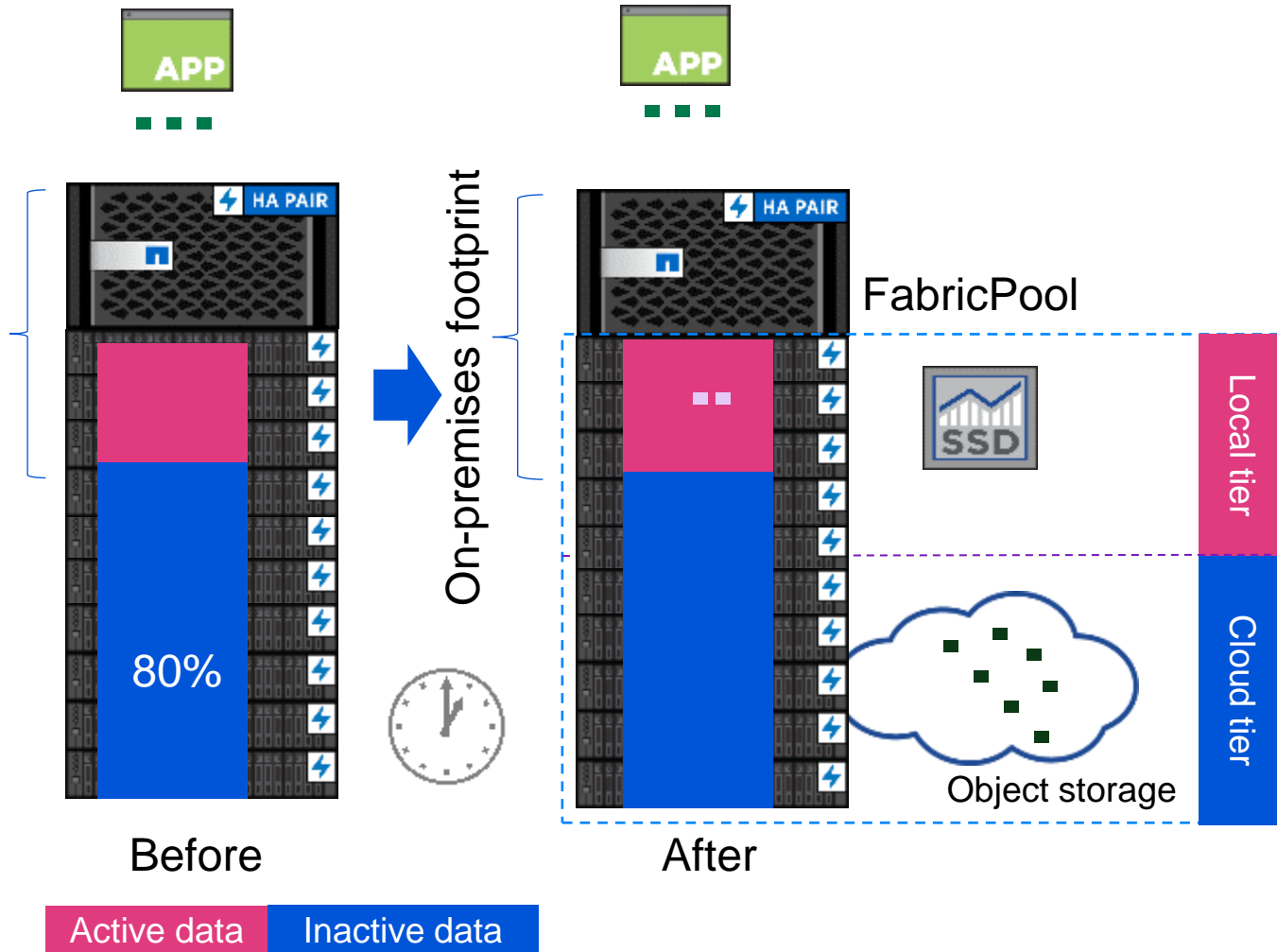
成本优化

Continuously driving down the cost of data



FabricPool 解决方案

What is FabricPool?

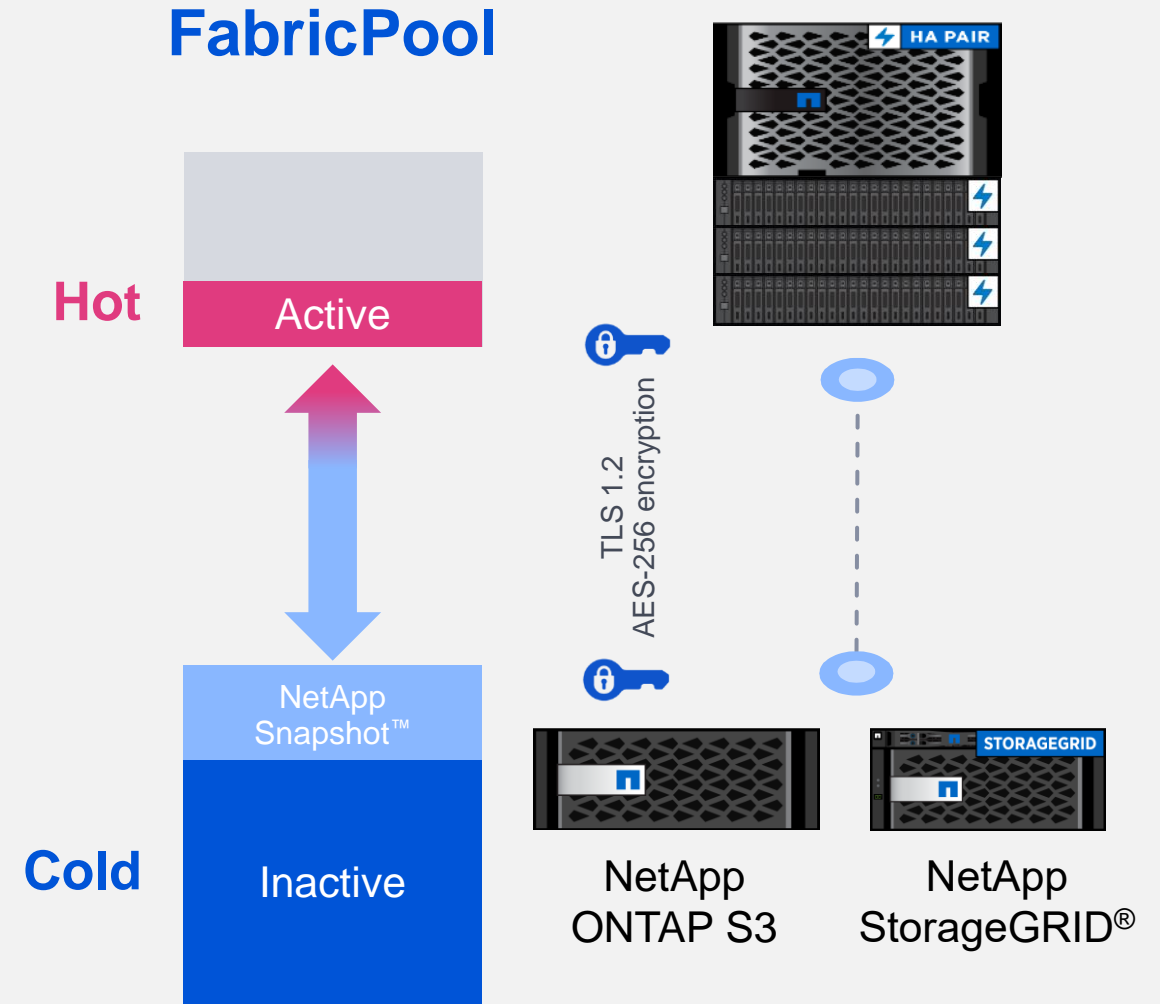


- Automatic tiering
- Zero-touch management
- Preserves file system
- Lower cost of ownership
- Over 1 EB tiered with FabricPool

ONTAP 9.14.1中的FabricPool 增强功能



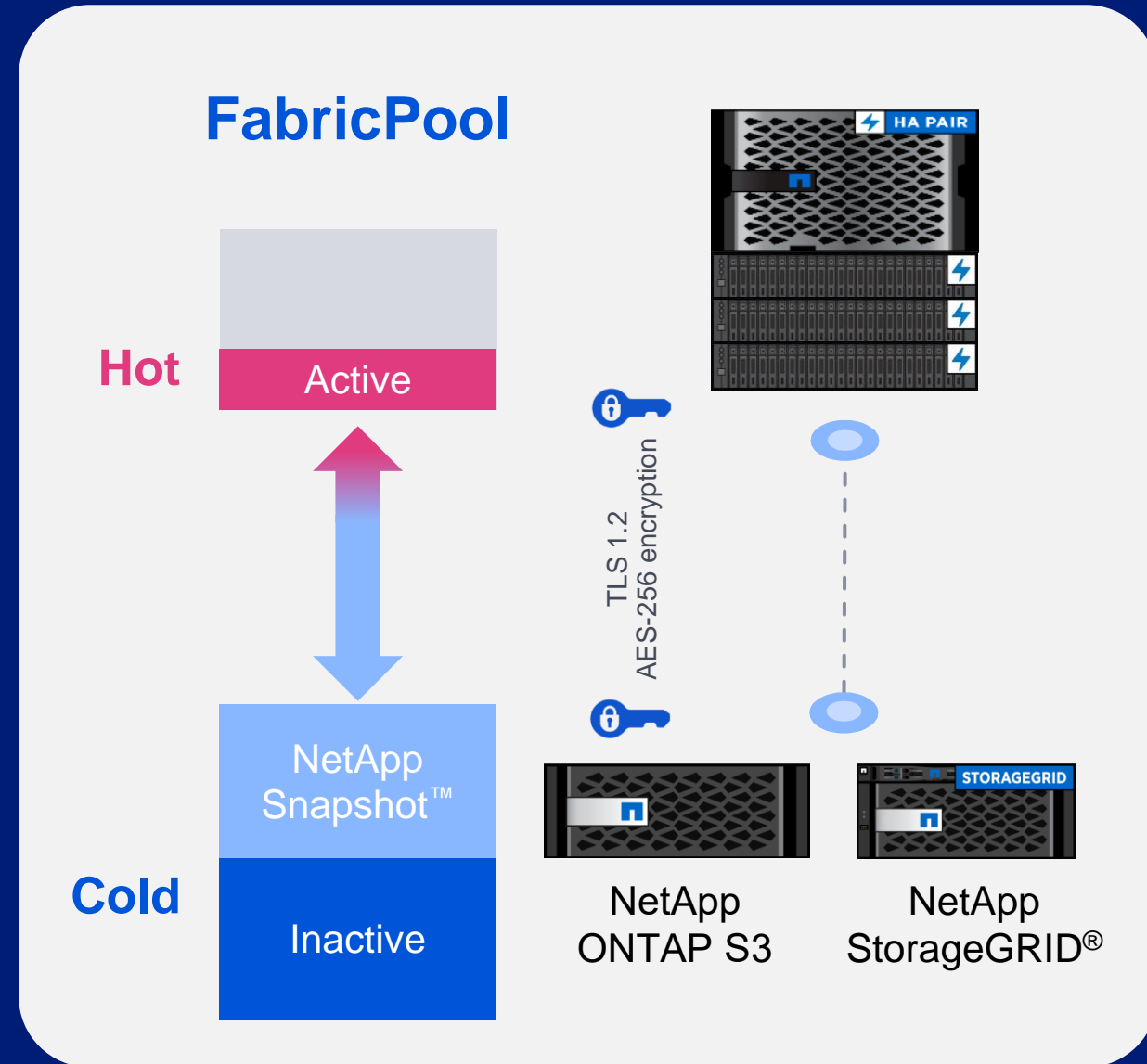
- Dynamically increase FabricPool priority if the local tier is approaching full
- Can prevent disk-full condition by more aggressively finding and tiering data
- Cloud write, bypass the local tier to facilitate large data migrations
 - NFS only in NetApp® ONTAP® 9.14.1
- FabricPool on-premises optimized mode



性能优化FabricPool



- Read performance increased by increasing the rate of and size of GET commands
 - Sequential read performance
 - Single file—up to 500% improvement
 - Multi-file—up to 85% improvement
- Write performance increased by increasing the rate of PUTs sent to the object store
- Up to 70% improvement multi-volume write throughput
- Impact to the on-premises object store should be considered



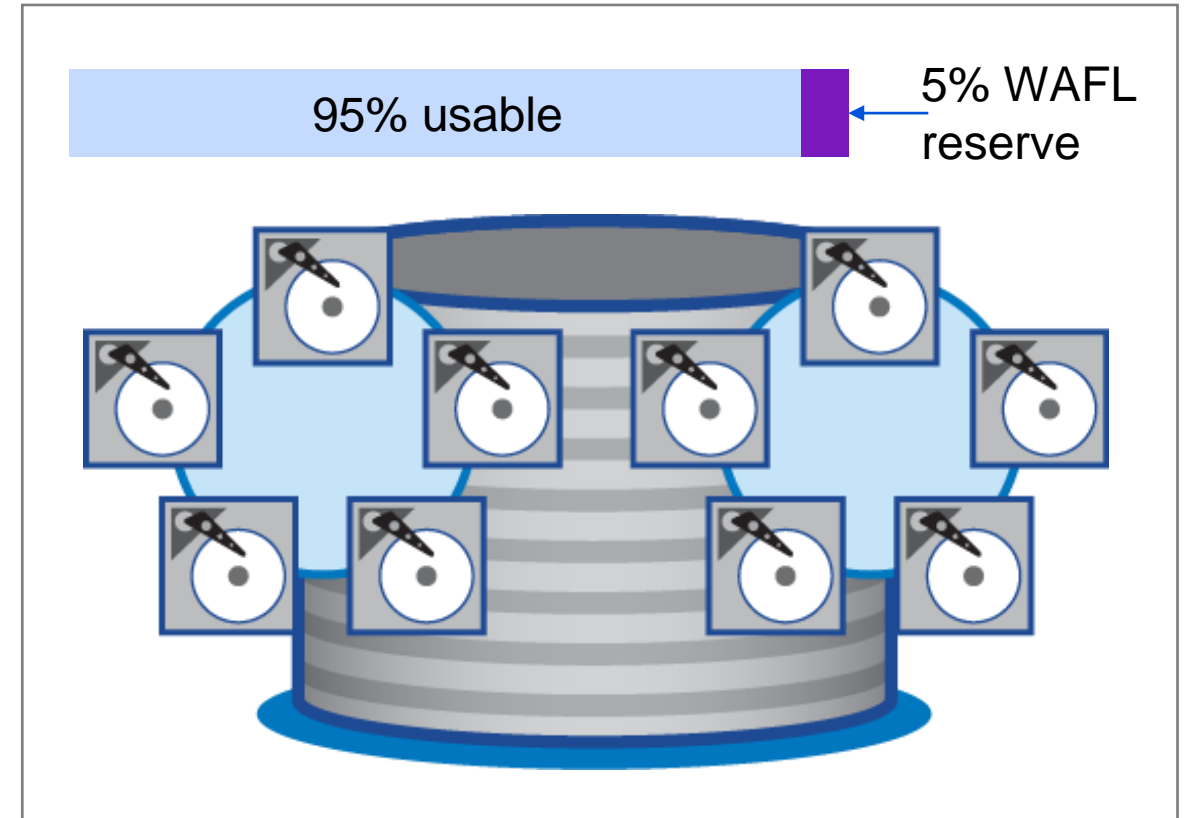
其他NetApp ONTAP 9.14.1优化

NetApp® WAFL® reserve reduction on FAS and NetApp Cloud Volumes ONTAP® (CVO) to 5%

- Reduced on NetApp AFF and ASA in ONTAP 9.12.1

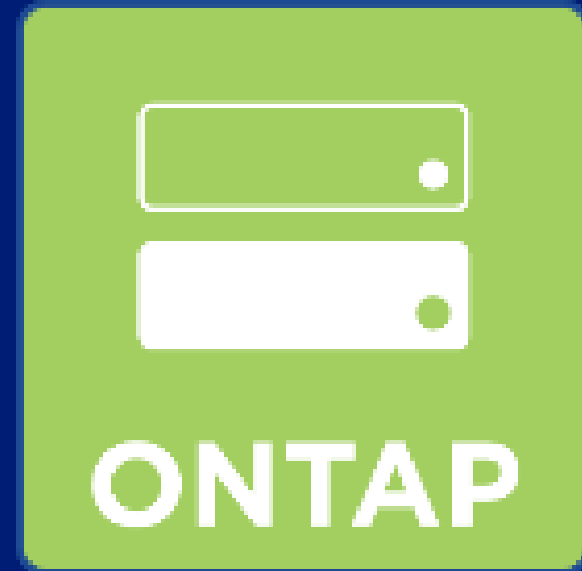
Ability to share single set of Cisco 9336 switches between multiple ONTAP clusters

- No storage connection in ONTAP 9.14.1



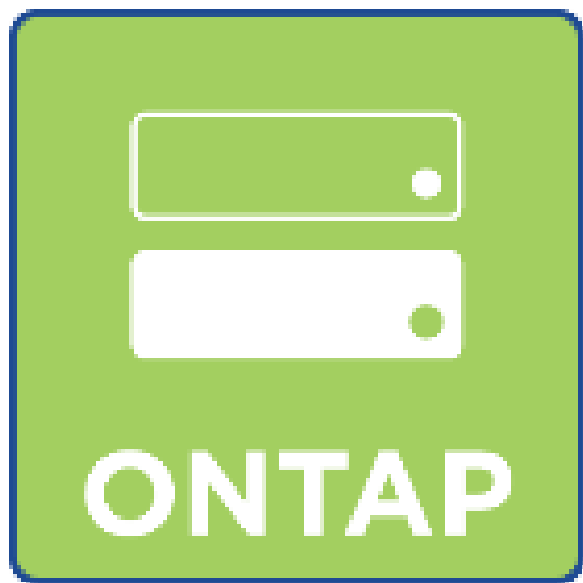
NetApp ONTAP Select

- NetApp® ONTAP® 9.13.1 GA version of ONTAP Select adds:
 - Expansion of single-node Select clusters to 2-node HA clusters
 - Support for vSphere 8
- ONTAP 9.14.1 to add support for KVM hypervisor to ONTAP Select and Select Deploy
- ONTAP 9.14.1 Select Deploy images will no longer contain the [vSphere plugin](#)
 - Customers will not be able to manage the ONTAP Select Deploy UI directly through vSphere and will need to access it through the ONTAP Select Deploy VM's address instead



ONTAP - Select

小结



- 新增容灾切换演练功能
- 新增SnapMirror异步复制一致性组
- ONTAP S3功能支持镜像聚合
- FabricPool功能、性能加强
- WAFL文件系统开销从10%降低为5%，磁盘可用空间增大
- Ontap Select支持KVM版本

谢谢!

联想凌拓官方联络方式

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服务热线: 400-828-3001 (呼叫中心)

400-116-0099 (销售热线)

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