



Hewlett Packard
Enterprise

2023 HPE **Data Services Innovation** Day

일시 2023년 6월 13일(화), 09:10~16:50

장소 포시즌스 호텔, 그랜드볼룸 (3F)

Mid에서 High까지 성능과 용량을 자유롭게 확장하는
차세대 스토리지 아키텍처

우정학 매니저 | Hewlett Packard Enterprise

20 Year

(Storage Experience)

20년 이상 스토리지에서 변하지 않은 것들

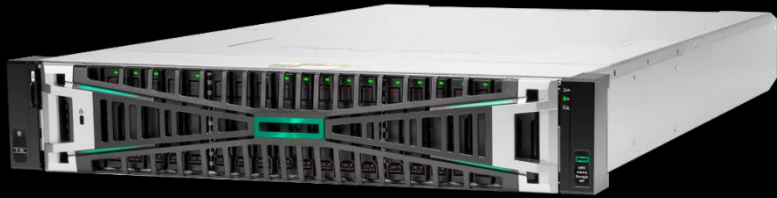
기본 아키텍처

확장 방식

이중화 기반의 가용성

스토리지의 유연성과 안정성을 향상 시킨

New : HPE Alletra MP Storage Line



HPE Alletra MP **Block** Storage

2U로 시작하는 Mission Critical Storage

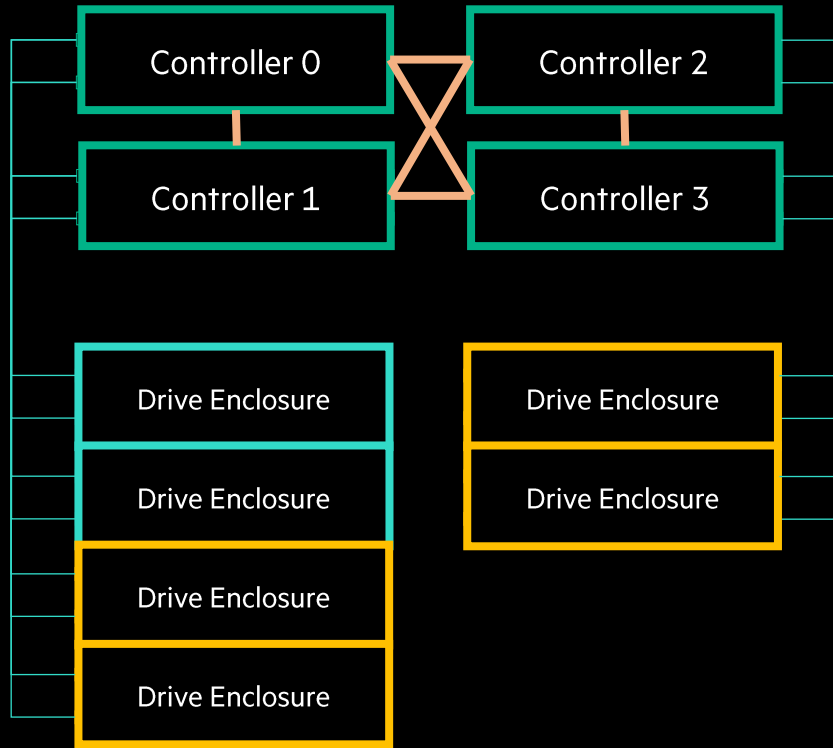


HPE Alletra MP **File** Storage

NVMe 기반의 고성능 Scale-out NAS

지금까지 스토리지 아키텍처는

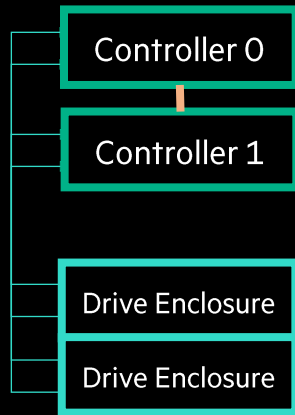
Scale-up
(용량만 증가)



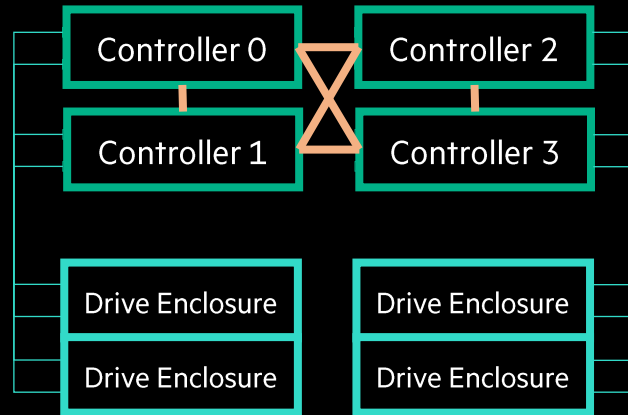
Scale-Out
(성능과 용량 같이 증가)

디스크를 소유하고 있는 Controller 구조

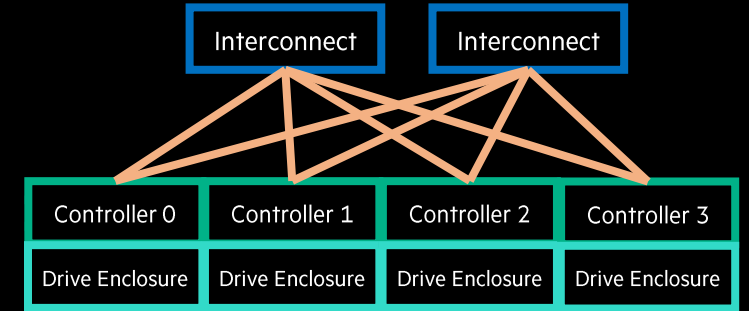
- 현재 **Storage Architecture**



Scale-up
Mid-range Block, Unified Storage



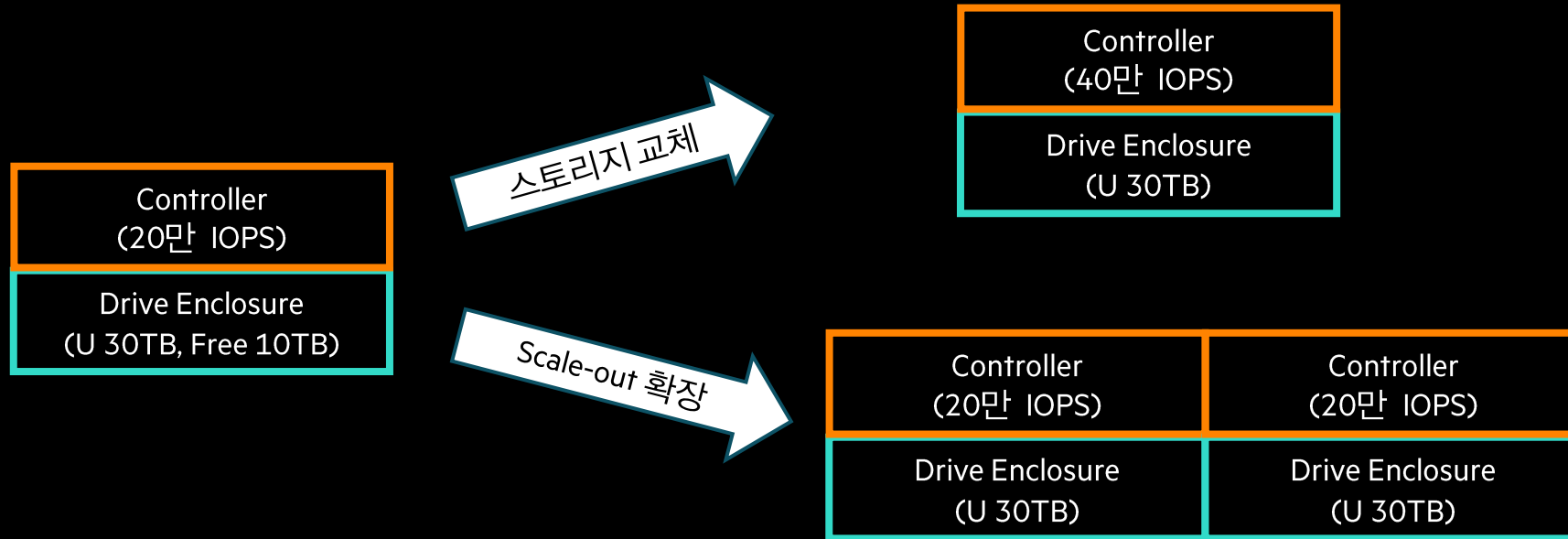
Scale up & out
High-end Block



Scale-Out
Scale-out NAS & Object

운영 중에 용량 증가 없이 추가 성능만 필요하다면?

- 증설 방식의 제약

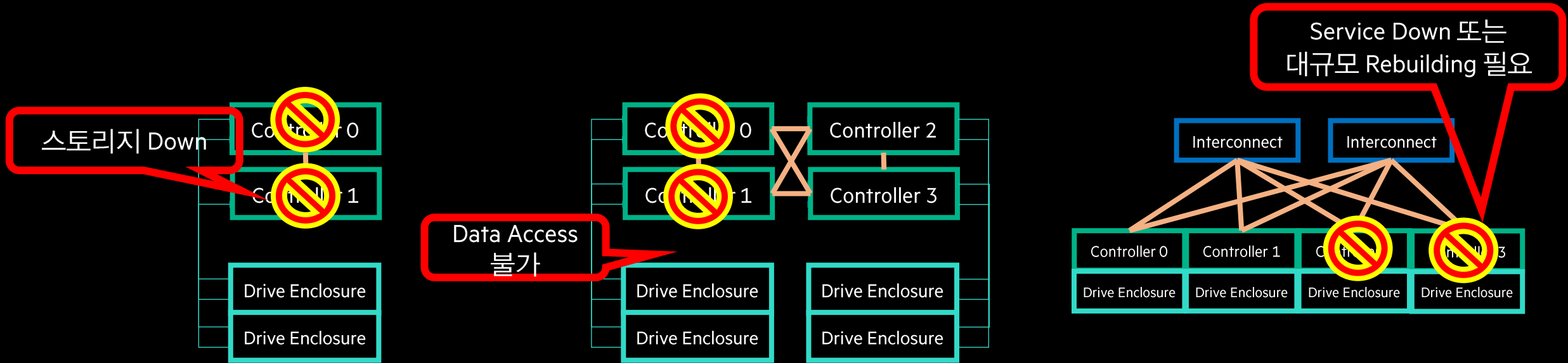


- 상위 모델로의 교체

- 컨트롤러와 용량을 동시에 증설

이중화된 노드가 Down되면 서비스 장애 또는 대량의 Rebuilding 발생

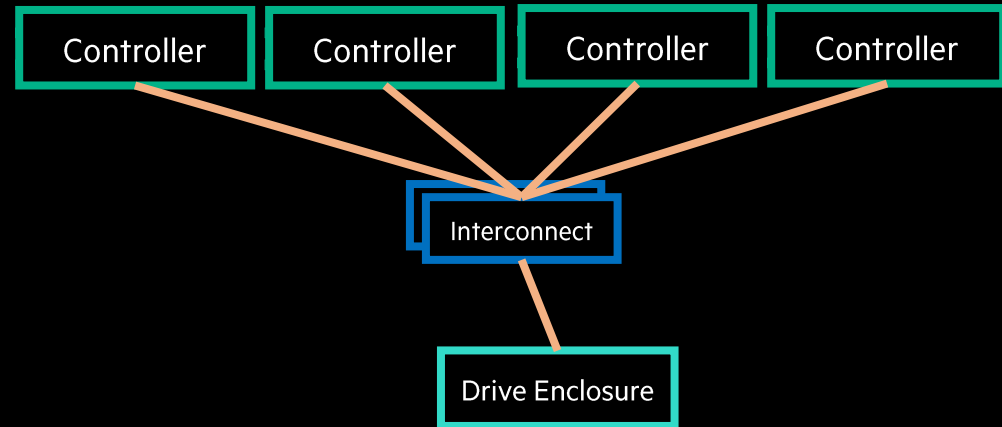
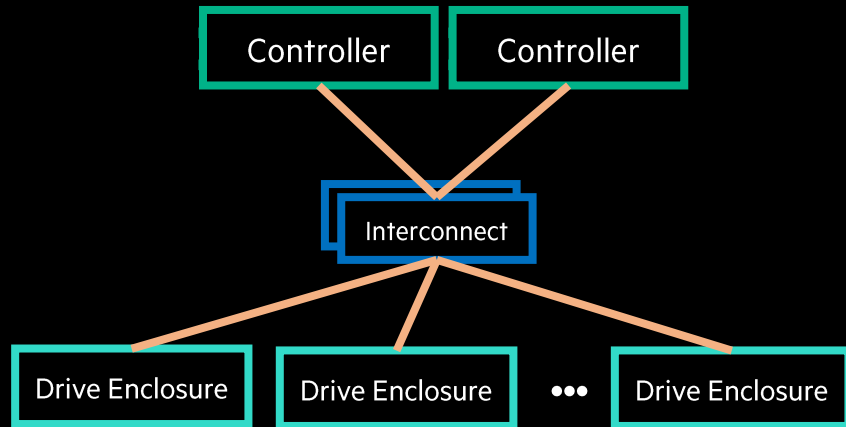
- 현재 **Storage Architecture**의 또 다른 제약



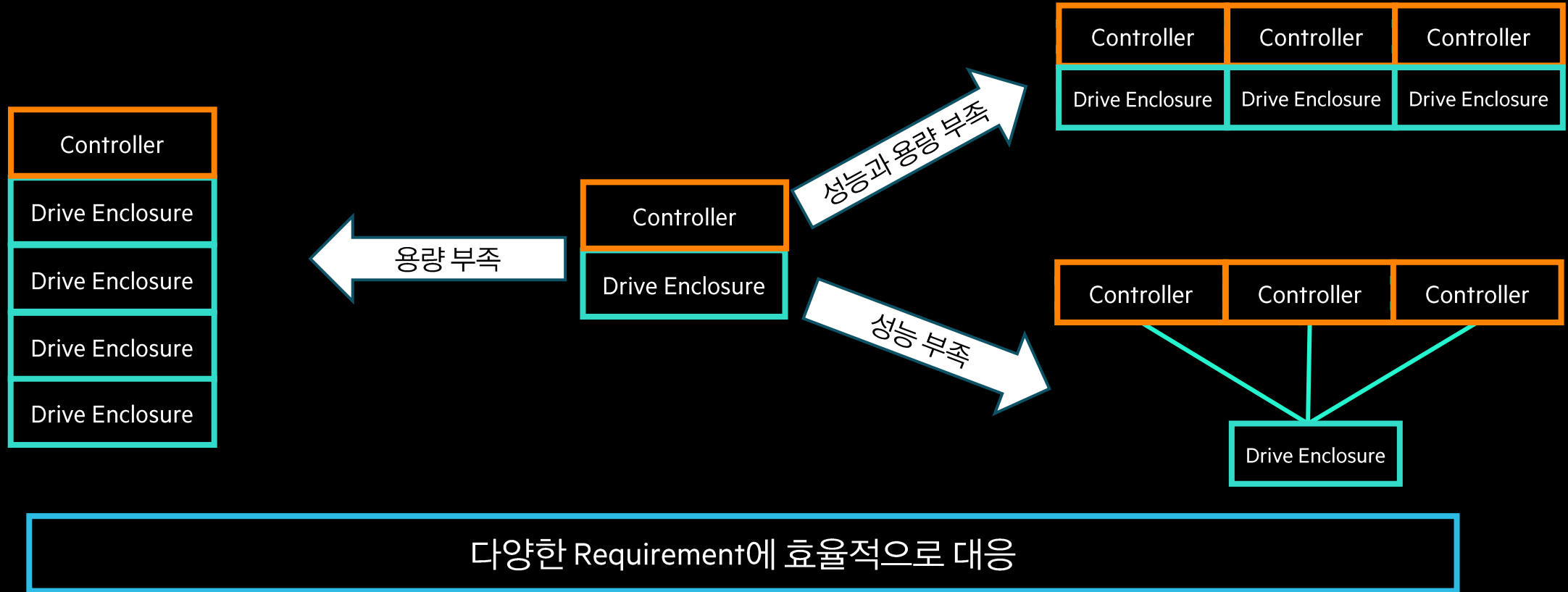
Enclosure (Disk)의 데이터가 정상적이라도 서비스 이슈 발생

HPE Alletra MP 제품군은
Disaggregated 아키텍처를 기반으로
기존 스토리지 아키텍처의 **제약을 극복**합니다.

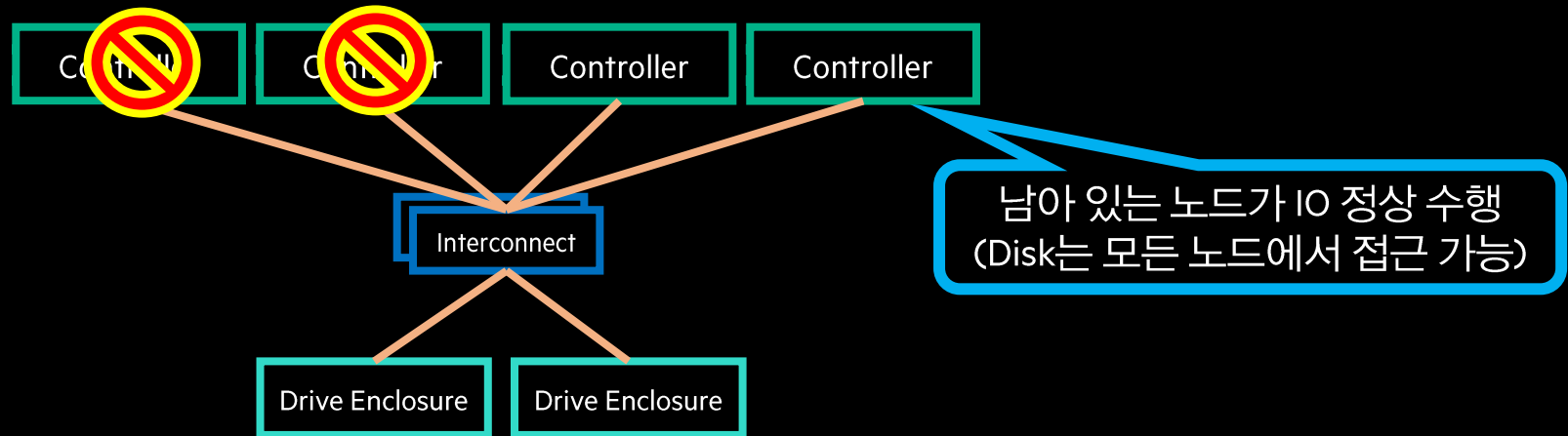
Disaggregated Storage는 Controller와 Disk의 종속성을 해제합니다.



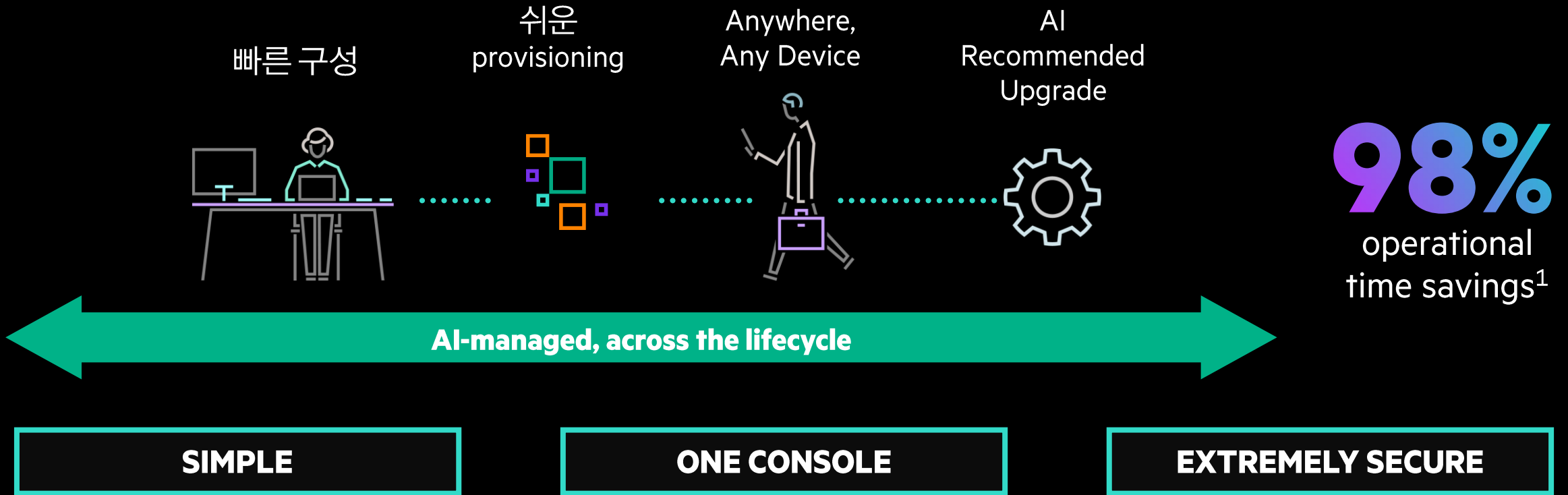
성과와 용량의 독립적인 확장



Disaggregated Storage는 2개 이상의 노드 장애시에도 서비스를 유지

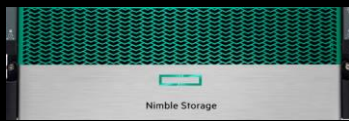
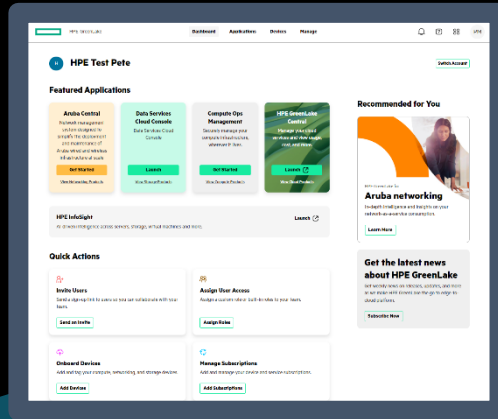


AI가 관리하는 Cloud 기반의 Management 지원



1. Comparison of infrastructure lifecycle management of HPE Alletra vs. ESG Market Research, April 2021

AI가 관리하는 Cloud 기반의 Management : One Console



Nimble Gen5



Primera



Alletra 9K, 6K, 5K



Alletra MP Block



Alletra MP File

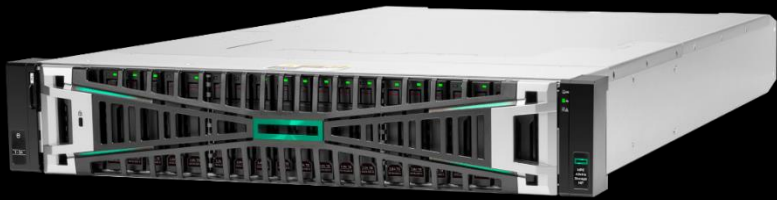


dHCI

Alletra MP Block

- **Mid-range**의 경제성으로 제공되는 **Mission-critical storage**

HPE Alletra MP Block Storage : Mission Critical Block Storage



HPE Alletra MP Block Storage

Always on

100% availability

Guaranteed as standard benefit

1

가장 진보된 DR 과 HA

Active stretch cluster

Always fast

Massive parallelization

All-active and multi-node

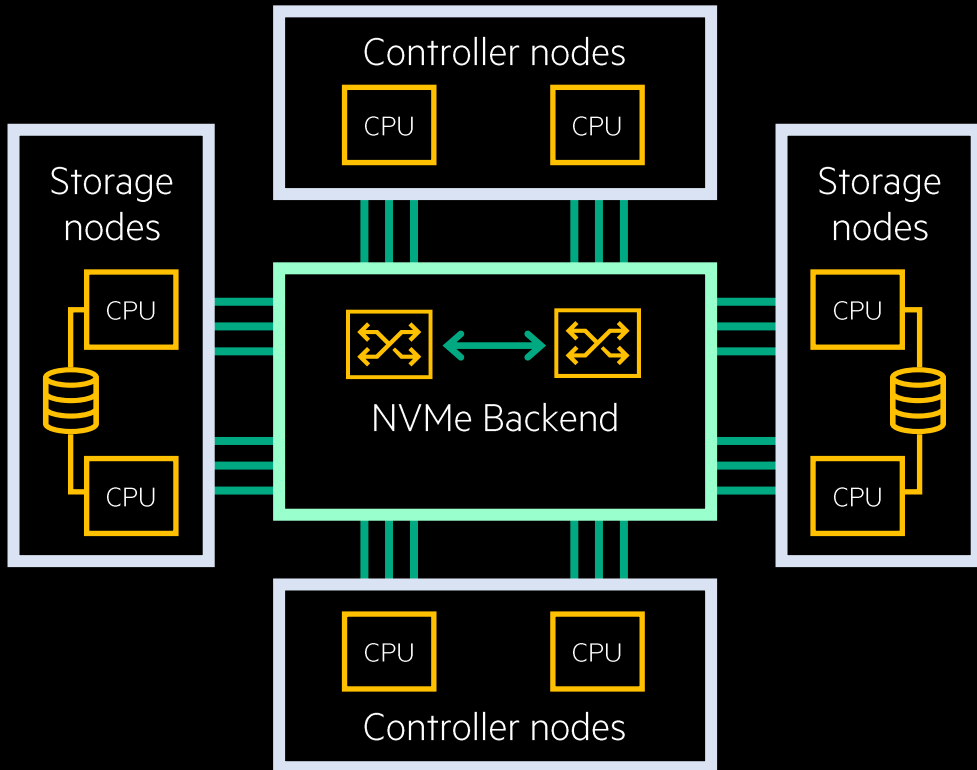
높은 성능 집적도

Ideal for mixed workloads

AI-driven

Infrastructure를 위한 가장 진보된 시 기능 탑재

초고속 성능을 위한 All-Active 아키텍처



Built for NVMe

일관된 빠른 성능과
ultra low latency

Multi-tenancy at scale

응답시간 보장을 위한 QoS

No tuning required

모든 자원은 항상 균형을 유지
System Wide Striping

Instant failover

고가용성을 위한 True Active-Active

Small Start → Large High-end (성과와 용량의 독립적인 확장)

2 Controller Node
8 NVMe SSD

2U



무중단
(모델 변경, 증설)

4 to 8 Controller Node
수 PB+

High-end



Key Feature : Tier-0 스토리지가 제공하는 기능들을 모두 기본 제공

Connectivity

SCSI/FC, NVMe-oF/FC, iSCSI*

Replication

Synchronous, Asynchronous

Disaster Tolerance

Veeam, Commvault, B&R, Zerto

Security

Data At-Rest Encryption

Data Services

중복제거, 압축, 내부복제, 스냅샷, Thin Provisioning

Interoperability

다양한 범용 OS 지원

Autonomous Priority Optimization

AI 기반의 QoS 및 Workload 최적화

Data Migration from Old Storage

Peer Motion, PDMM – 무중단 데이터 이관

Automatic Transparent Failover

Active Peer Persistence – 무중단 이중화

Ransomware Protection

Virtual Lock (Immutable Snapshot), Zerto

100% Availability Guarantee

No more disruption

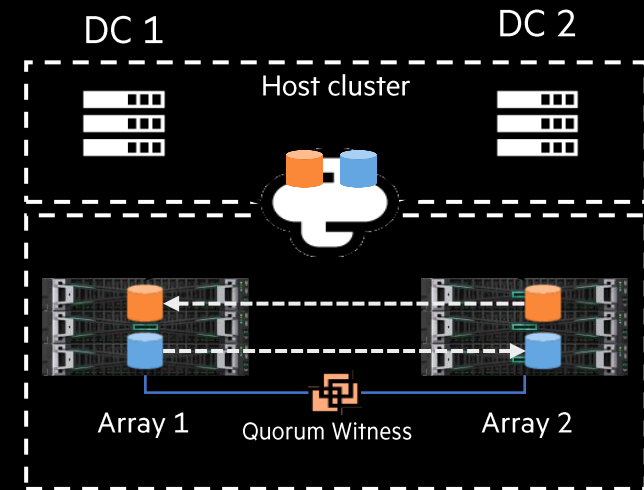
Data Efficiency

Data Reduction, Data Compaction

Active Peer Persistence

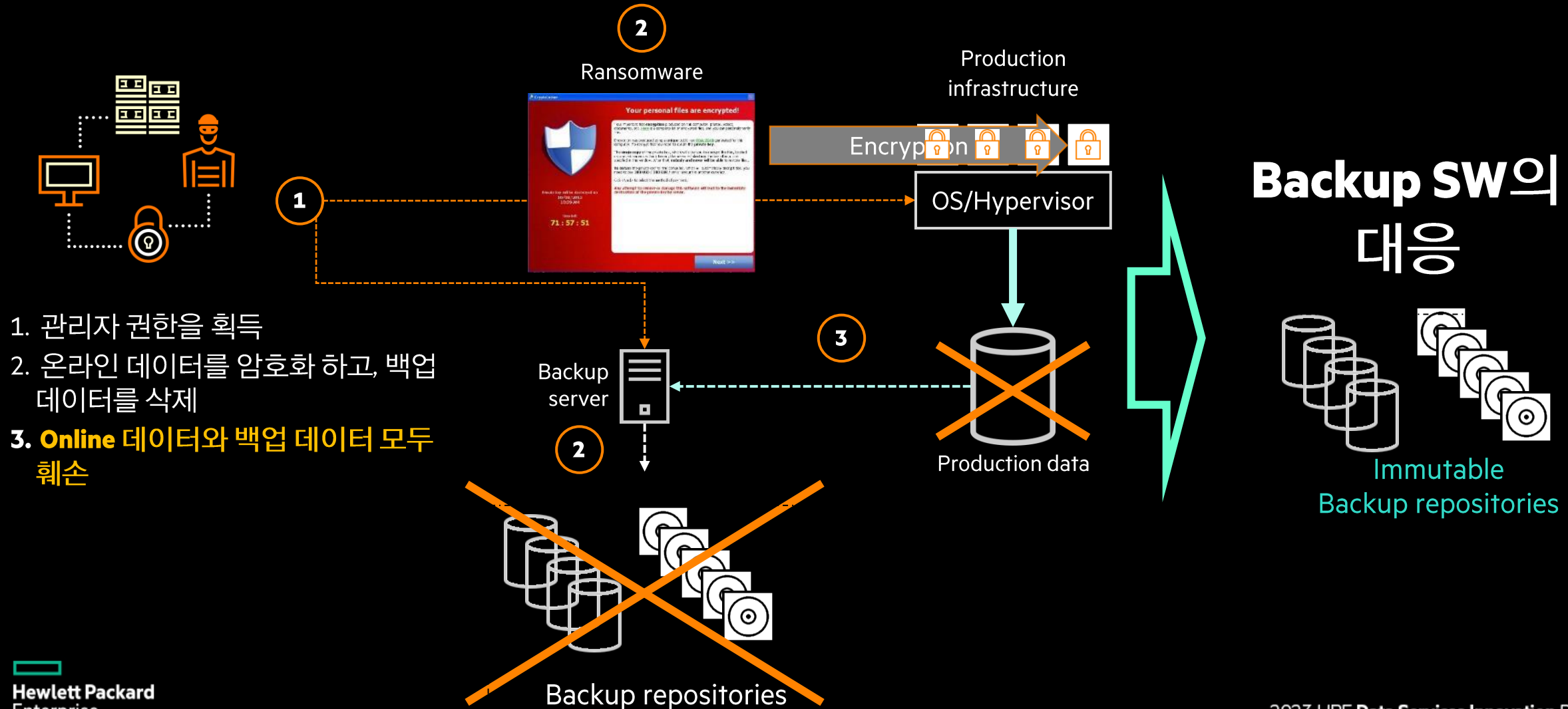
RPO and RTO = 0

Active-Active Data Center



RPO and RTO = 0

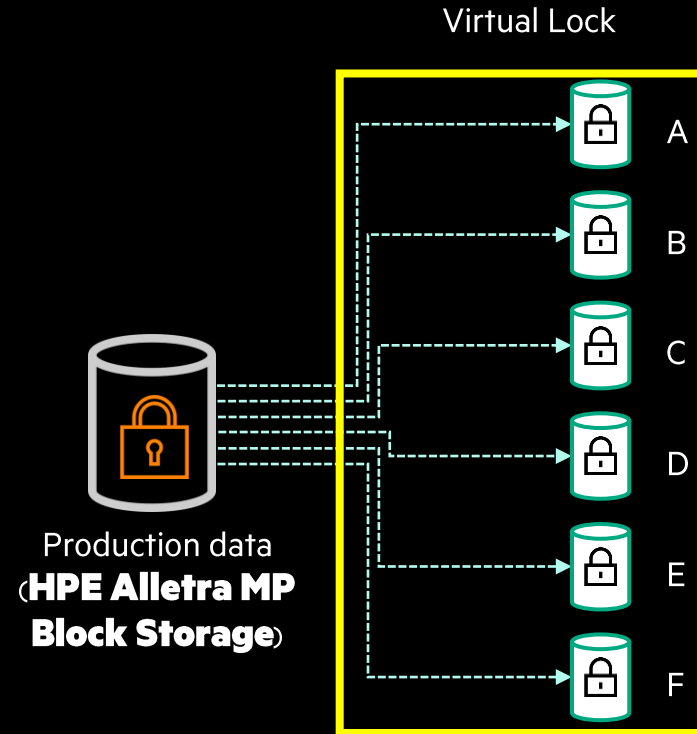
Cyber-attack Trend : 백업 데이터까지 삭제



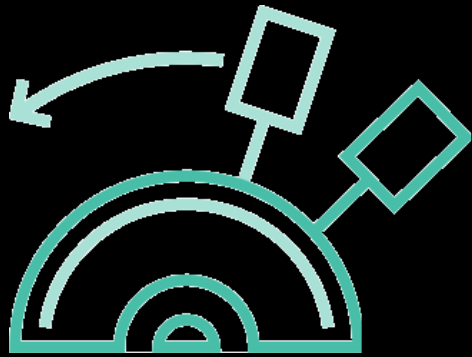
간단하게 대비하는 Cyber-attack (with Alletra MP Block)

- 설정된 기간까지 절대 삭제되지 않는 복사본

Immutable Snapshot



진보된 Quality of Service (QoS)



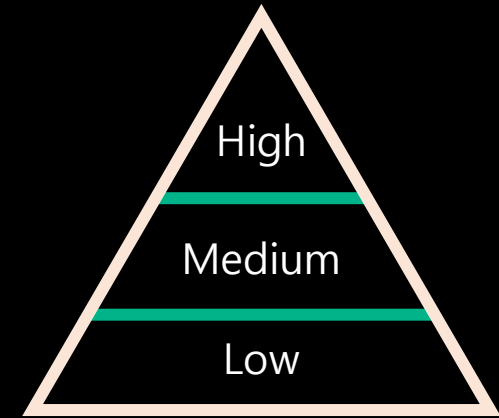
Implement limits

볼륨, 볼륨 Set, 가상 Domain에 대한
IOPS and/or bandwidth 제한을 통한
성능 보장



Set goals

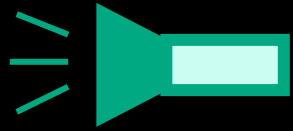
IOPS, bandwidth 및 latency에 대
한 Goal 설정 기능
볼륨 Set 또는 TB당 설정



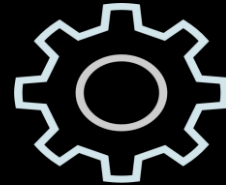
Prioritize

부하에 따른 성능 차등 제한을
위한 3단계의 Priority 설정: high,
medium and low

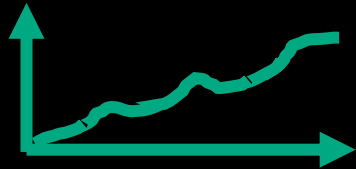
AI에 의해 제어되는 INTELLIGNET QoS



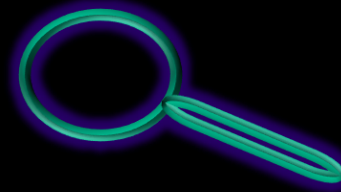
Avoid Noisy Neighbor



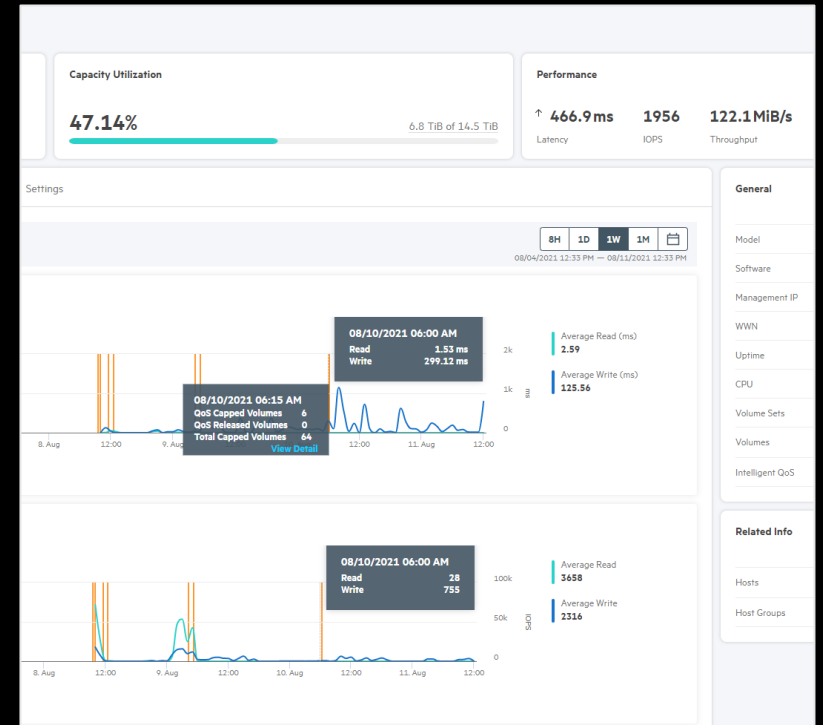
Easy Setting



Continuous Trend analysis



Bully volume identification

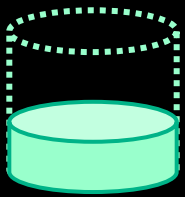


효율성 향상을 위한 아키텍처

Designed for total system efficiency
to lower TCO

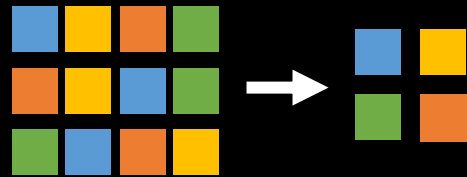
- 볼륨별로 설정 가능한 Data reduction
- 스토리지 OS에 내장된 용량 절감 추정 모델링 기술

1



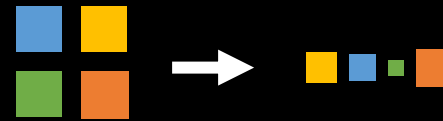
Thin provisioning
Reservation-less

2



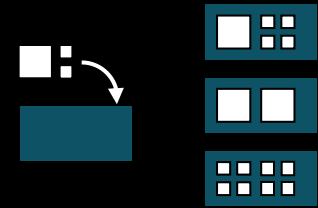
Deduplication including Zero Detect
Prevent storing duplicate data

3



Compression
Reduce data footprint

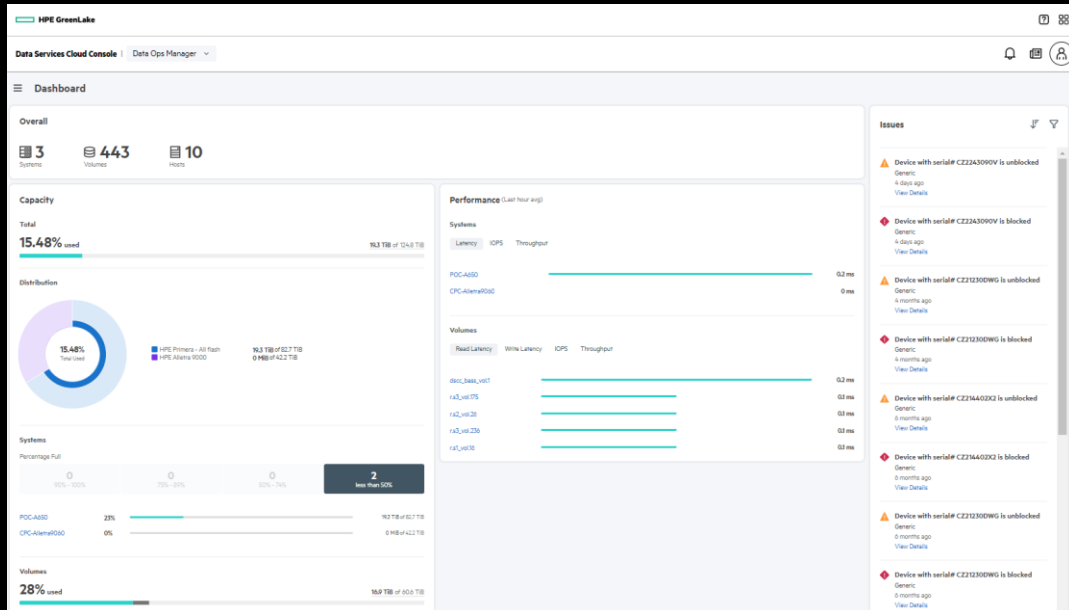
4



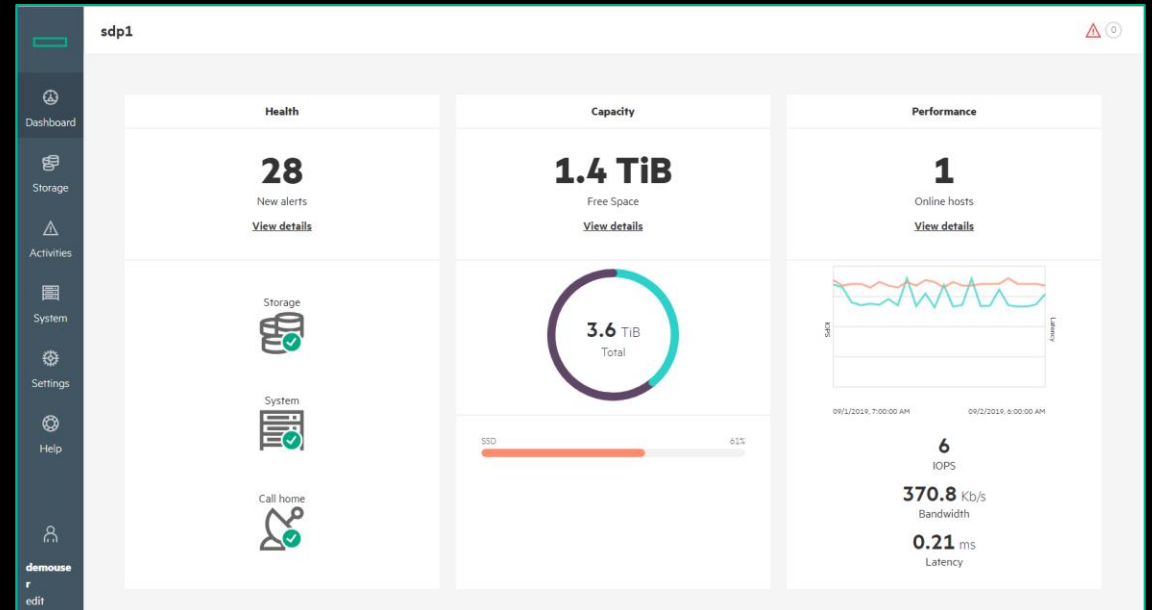
Data packing
Pack multiple pages together

Express Indexing + Express Scan

Cloud 기반 관리와 On-Premise(Local) 관리 기능을 동시에 제공



Cloud 기반 통합 Management
(Data Services Cloud Console : DSCC)



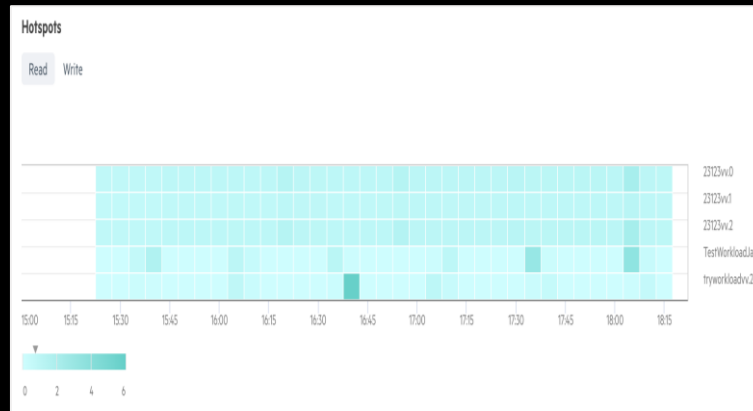
On-Premise 기반 개별 제품 관리

인프라 병목 진단을 위한 Performance Insight

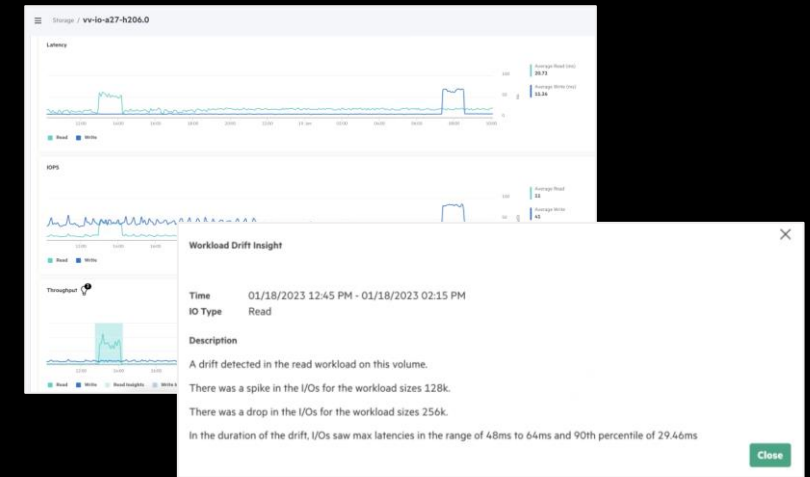
Headroom Utilization Analysis



Volume Hotspots by Latency



Workload Drift Insights



- 워크로드의 정상 수행 여부 및 과부하에 기여하는 애플리케이션 또는 볼륨에 대한 분석

- 비정상적인 서비스 응답 시간 확인 및 볼륨 특정

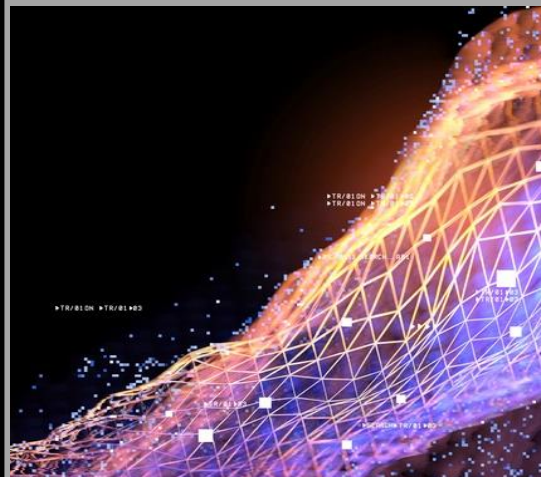
- **Workload** 레벨에서의 IO 패턴 및 데이터 액세스 패턴을 포함한 워크로드를 추적 및 측정하여 변경 사항 식별

고객 만족을 위한 다양한 프로그램



100% 가용성 보장

**Best-in-Class &
Standard Benefit**



Store More Guarantee

**Data Reduction
Data Compaction
Effective Capacity**



30 일 만족 보장

**Try for 30 Days with
No Risk**

Key use cases

One platform

for every mission-critical app
of today and tomorrow



Alletra MP Block Storage는

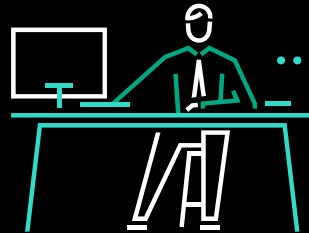
100%

데이터 가용성
보장¹



2U

작게 시작하는
Mission Critical
Storage



66%

더 향상된 가격대
성능비²



2x

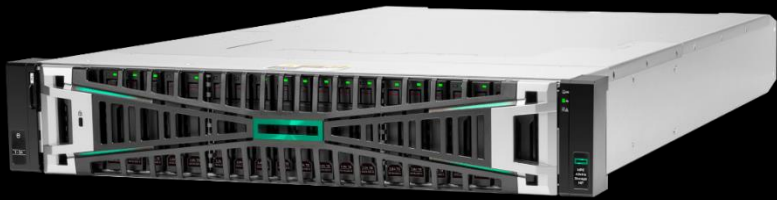
빠른 성능³



Alletra MP File

- 고성능 **Enterprise grade, scale-out File Storage**

HPE Alletra MP File Storage : High-Performance NAS



HPE Alletra MP File Storage

**Disaggregated
Shared Every Thing**

**Un-matched
Data Reduction**

High Availability

Scale-out Architecture

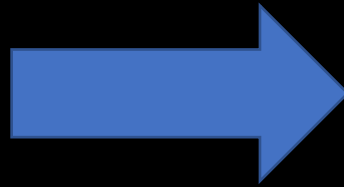
All NVMe

Enterprise 급 성능 및 확장성

Small Start → Large Enterprise (성과와 용량의 독립적인 확장)

2 Node

2 Compute Node
24 NVMe SSD



무중단

Large Enterprise

10+ Compute Node
60PB+ Effective Capacity
1000+ NVMe SSD

Key Features : File Service에 필요한 다양한 기능 제공

Architecture/protocols

NFS v3.0, v4.1

w/ RDMA*, GPUDirect*, byte-range locks
w/ POSIX ACLs, Kerberos

SMB 2.1 (Resilient SMB)

Stateful file services; stateless servers

Multi-protocol namespace

Easily traverse between NFS & SMB

Automation plugins

Kubernetes CSI, OpenStack Driver

Security

Encryption at rest

FIPS 140-2 Validated

Access audit

User Access (NFS, SMB), Admin audit

Enterprise authentication

Support for LDAP, AD, NIS

Performance

Load balancing

Internal DNS services

Protocol server pools

with view policies for data isolation

Capacity

Similarity based data reduction

최고의 스토리지 효율성
데이터 인식 압축

Quota management

Directory & user quotas

Data protection

Replication to cloud / S3

Snapshot to an S3 endpoint of choice

Native replication

Industry-low levels of RPO (15s)

No-overhead snapshots

With optional immutability

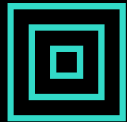
Locally-decodable data protection

Unrivaled resilience, only 2.7% overhead

뛰어난 Flash Efficiency

Data foresight

Flash longevity



All NVMe storage

- Foresight 엔진은 데이터를 지능적으로 분류하고 예상 수명에 따라 Stripe에 배치

Locally decodable erasure codes

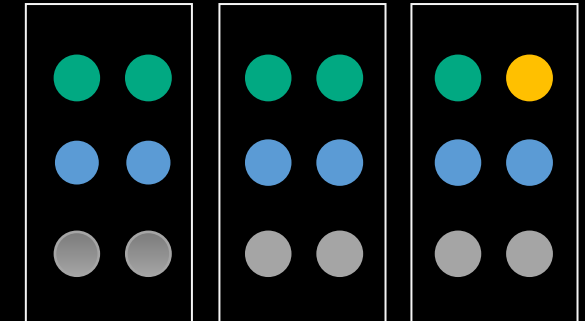
lowest protection overhead

1	2	3	4	5	6	7	8	9	P1
10	11	12	13	14	15	16	17	18	P2
19	20	21	22	23	24	25	26	27	P3
28	29	30	31	32	33	34	35	36	P4

- 데이터 손실 걱정 없는 60M년 이상의 MTDL

Similarity-based data reduction

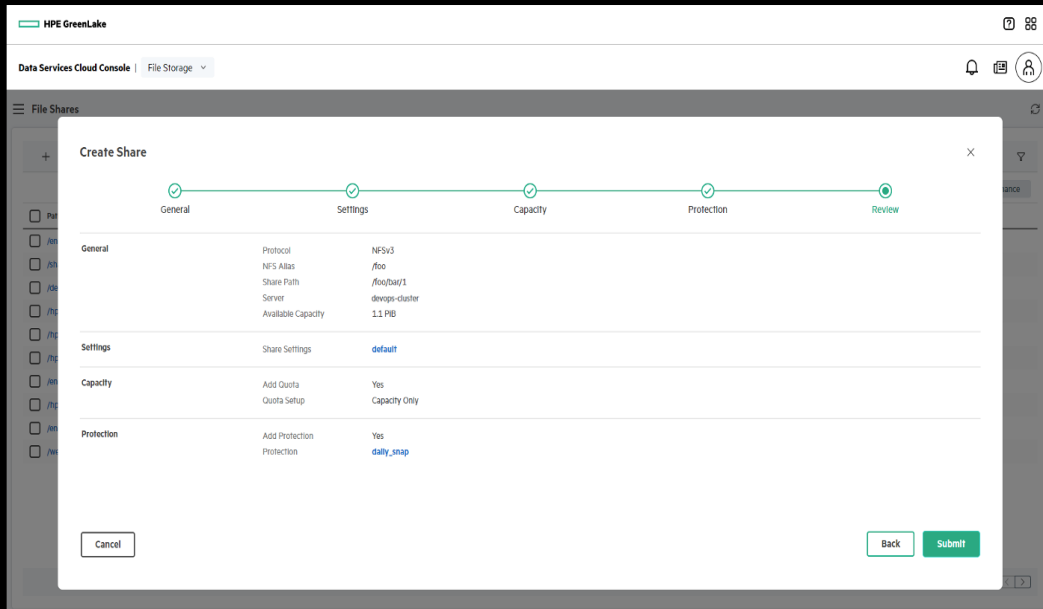
Global, fine-grained compression



- 3:1~2:1 – pre-reduced backups, Pre-compressed Log Files, HPC data, Animation Data 등

On-prem control with a cloud experience

- Cloud 기반 관리와 On-Premise(Local) 관리 기능을 동시에 제공



Cloud 기반 통합 Management
(Data Services Cloud Console : DSCC)

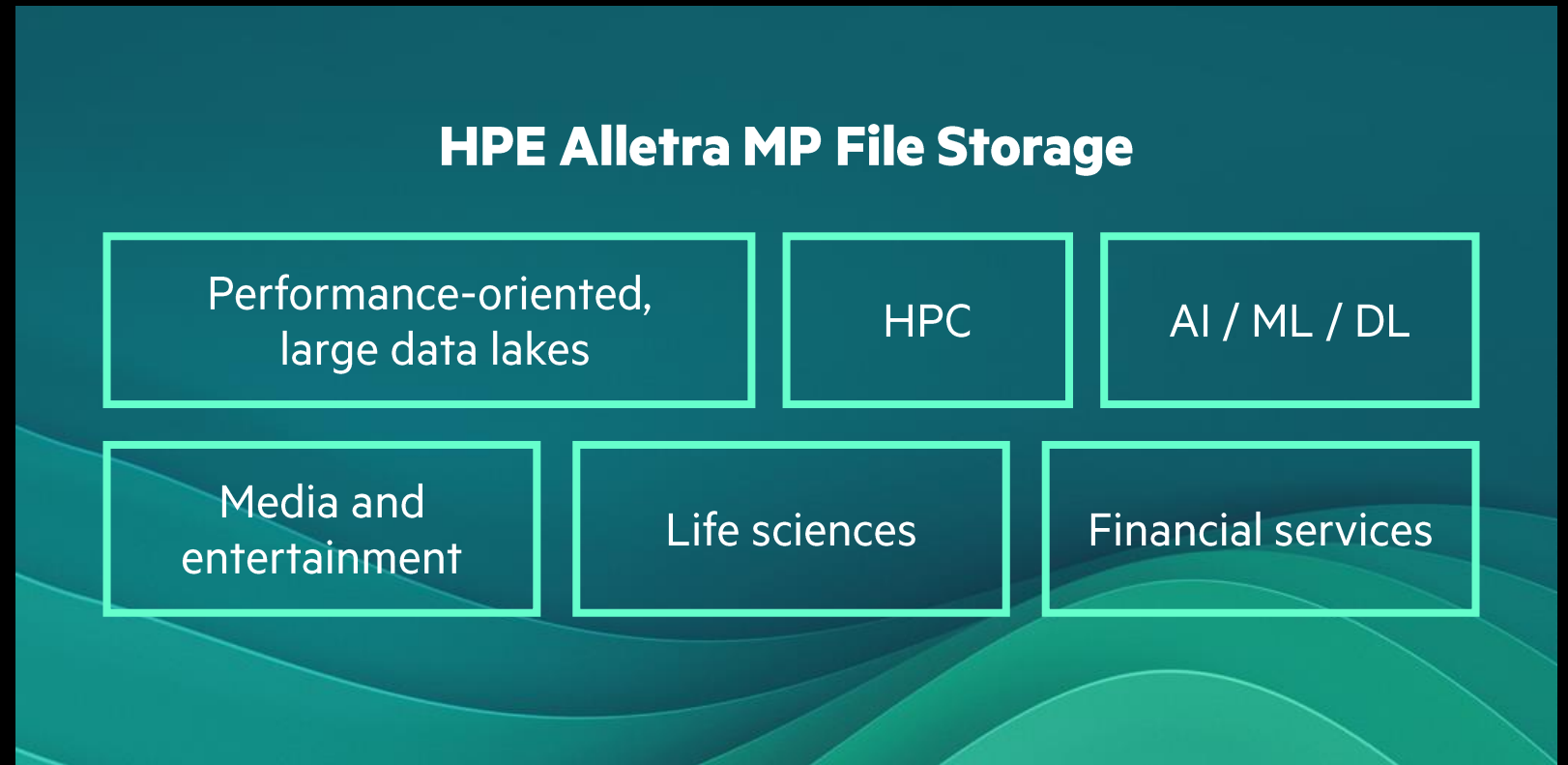


On-Premise 기반 개별 제품 관리

Target use cases and workloads

One platform

for data-intensive workloads
and modern applications



HPE Alletra MP File Storage는



80x

legacy NAS 대비 80x 더 빠른
NFS read 성능¹

100s

수백 GB/sec 의 처리량¹



Six 9s

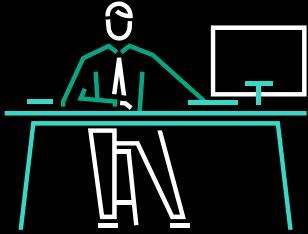
availability¹

Superior data reduction

2:1 life sciences data¹

3:1 HPC and animation data; pre-reduced backups; pre-compressed log files¹

8:1 uncompressed time-series data¹



¹ HPE Storage Substantiation

Summary

HPE Alletra MP 제품 Line-up은



HPE Alletra MP **Block** Storage



HPE Alletra MP **File** Storage

- **Disaggregated** 아키텍처를 기반
- 성능과 용량의 독립적인 확장
- **Multi-Node** 장애시에도 서비스 유지
- **Cloud 기반 통합 Management (DSCC)**

HPE Alletra MP **Block Storage**

- 2U 부터 High end까지
- Mission critical storage
- 100% data availability 보장
- 더 높은 가용성과 유연성 (Disaggregated)

Better
economics

66% better price for
performance

HPE Alletra MP **File Storage**

- 2노드 부터 수십 PB까지
- AI/ML을 위한 고성능 NAS
- 뛰어난 데이터 절감 효과
- 더 높은 가용성과 유연성 (Disaggregated)

Performance
at scale

100s of GB/sec
throughput

THANK YOU