

Case Study

HPE와 함께 하는 스토리지 고민 해결

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단순한 역할의 Storage

데이터 저장

데이터 관리

데이터 보호

하지만 가장 중요한 장비일 수 있습니다.

- ✓ 장애시 영향이 가장 큰 시스템
- ✓ 데이터 손실은 치명적

Store

Manage

Protect

Store



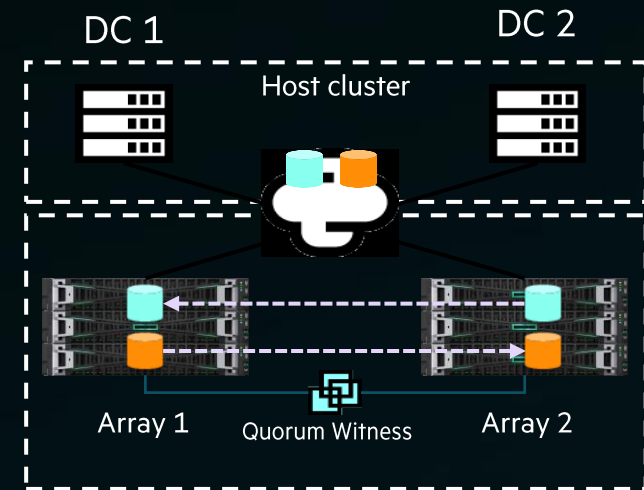
Case 1. 스토리지 이중화, 효과가 있을까?

RPO and RTO = 0

무중단이라니 좋은데...

- 더 많은 인프라가 필요?
- 복잡한 구성?
- 우리에게도 필요할까?

Active-Active Data Center

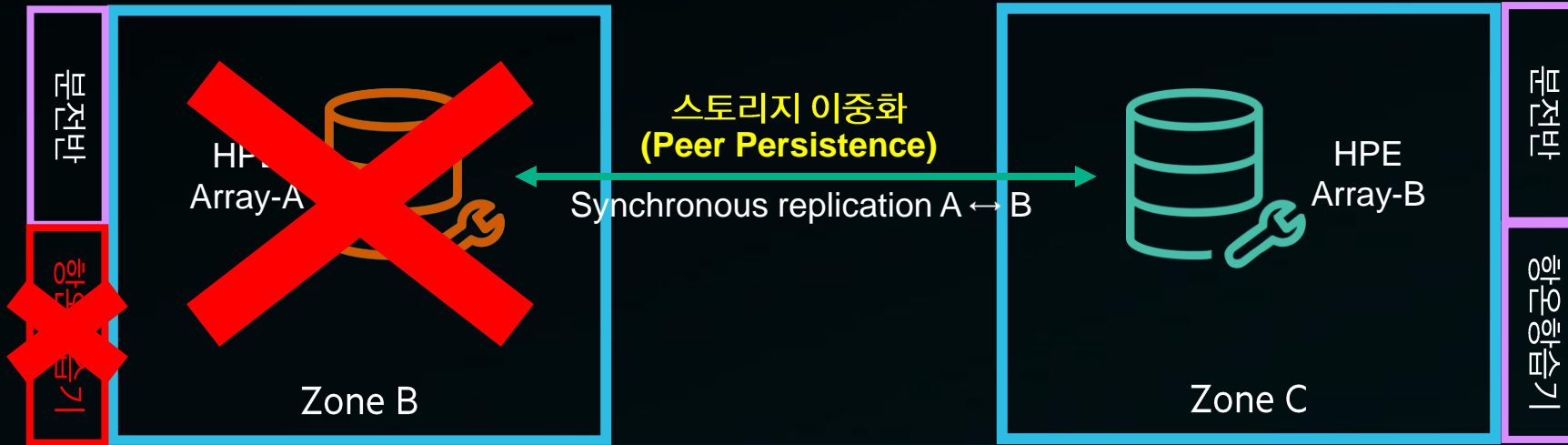


RPO and RTO = 0

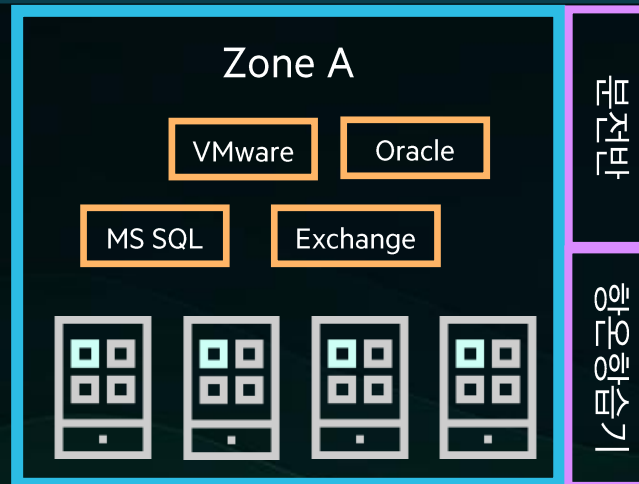
Case 1. 고객 사례



Case 1. 고객 사례



Figure



No Impact !!!!



스토리지 이중화, 제대로 하려면?

구성은 단순하게

- 기존 운영 환경에 바로 적용
- 단순한 구성이 장애 요소를 제거

선택적 IO 옵션

- 업무별 / Host별 요건에 맞게
- 각 센터별 성능 최적화

다양한 Case 대응

- 스토리지 이중화 목적에 맞게

단순해서 더 안전하게

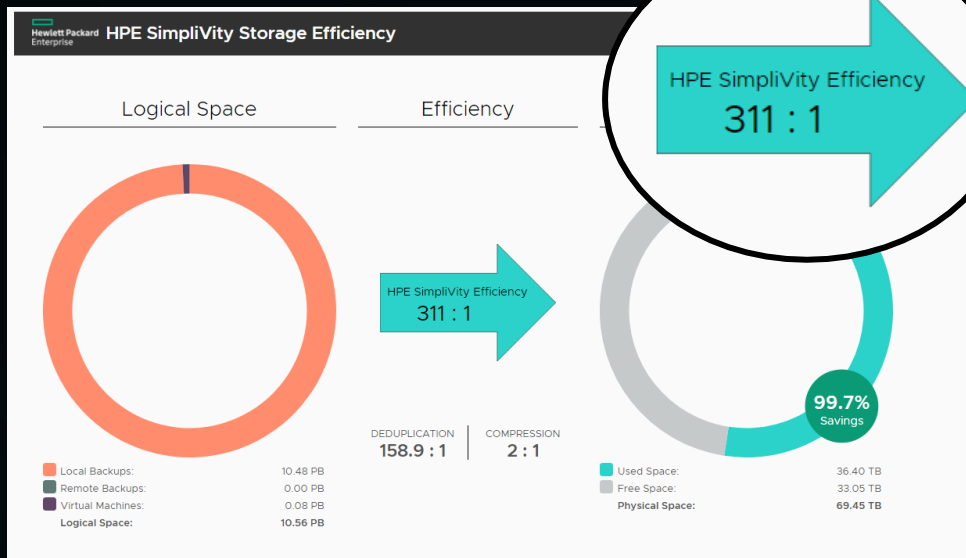
- ✓ Mid-range부터 High-end까지
- ✓ 기존 Remote Copy와 동일한 구성
(Sync <-> Active/Active)
- ✓ 추가 장비, License 불 필요

- ✓ Host별 IO path 최적화
(위치, 용도, 그룹)

- ✓ Always Online
- ✓ 스토리지 장애 뿐만 아니라 실수에 의한 shutdown, rebooting까지
(Array Fail, Raid Fail, Meta Fail, Host link fail, reboot/shutdown 등..)

Case 2. 효율적으로 저장하기

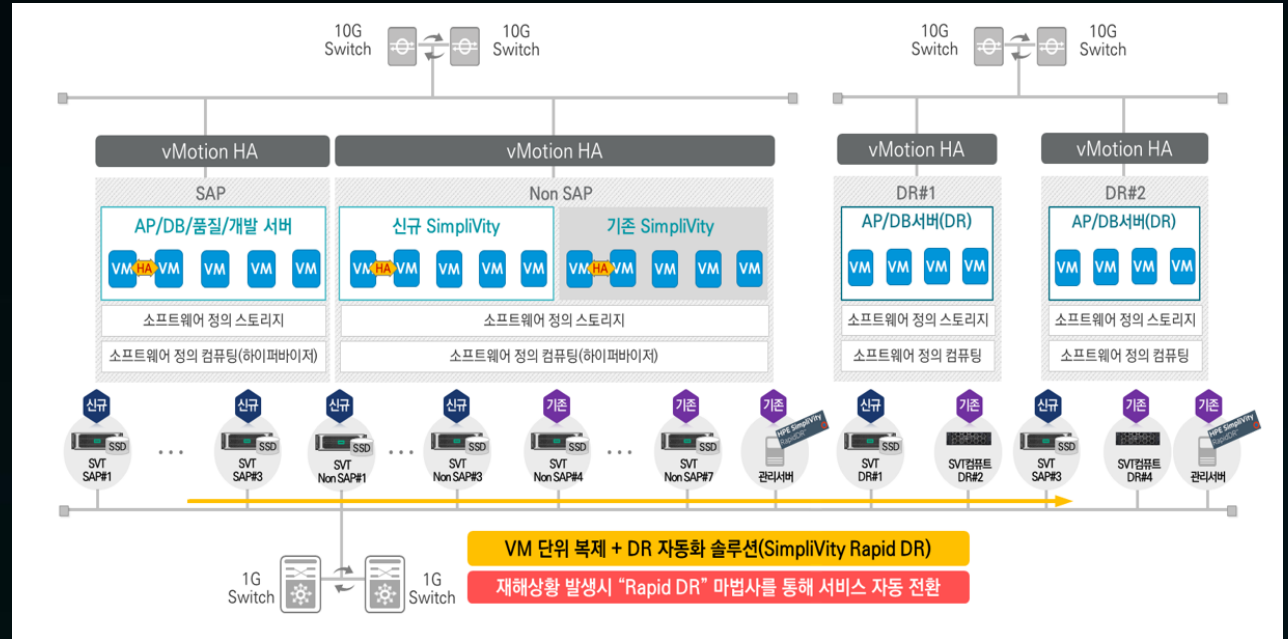
311 : 1



- 실고객 사례
- HCI (Simplivity)
- 압축 및 중복제거로 한 번!
- 백업 통합으로 또 한 번!

Case 2. 효율적으로 저장하기

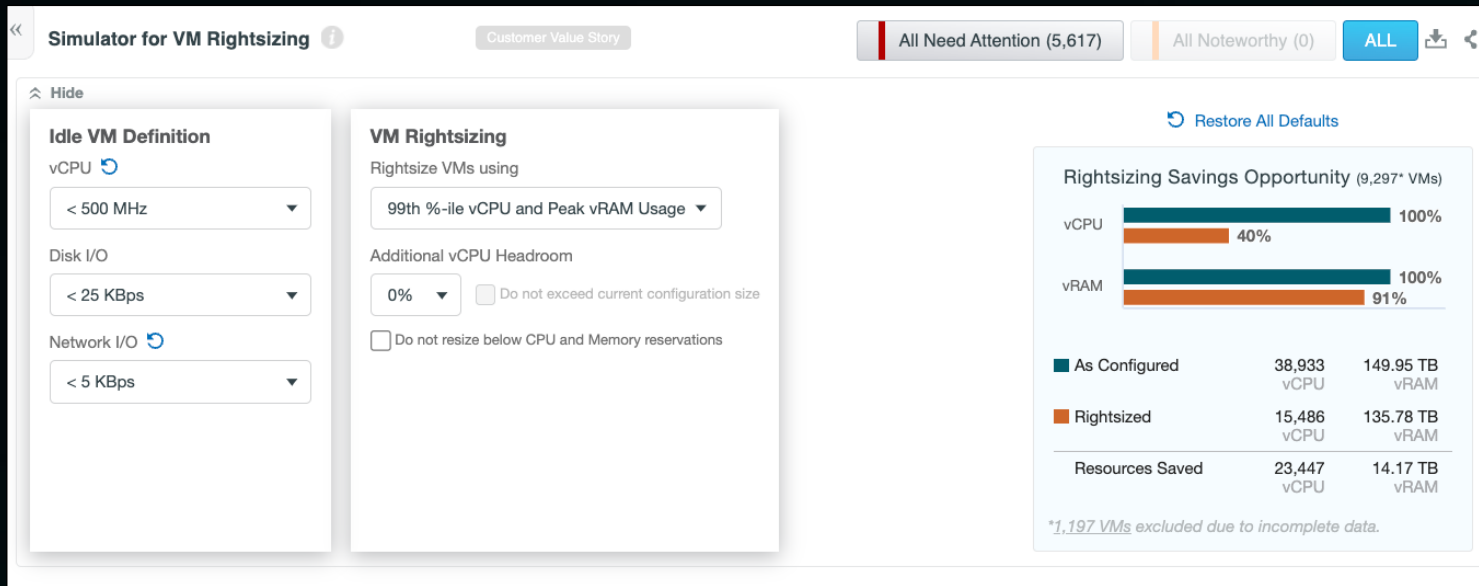
- ✓ VDI가 아닙니다.
- ✓ 도입 초기가 아닙니다.
- ✓ 중복제거 기본 내장



또 하나의 절감 : 정확한 분석을 통한 최적 시스템 도입

“right-sizing” : HPE Cloud Physics

(Accelerate Decision Making Through Visibility)



Saving Point :

30 – 50%

또 하나의 절감 : “right-sizing” HPE Cloud Physics

5500

Assessments/Year



200 Trillion

Data Samples ¹

8 Million

VM Instances WW



200+

Metrics and Data Points

vCenter Summary	Host Analysis	Guest OS Analysis	Host License Inventory	VM Right-sizing Simulator	Snapshots Space Saver
Datastore Space Analysis	Guest Space Analysis	vDisk Space Saver	VM I/O Contentions	Datastore Contentions	Host Resource Commitment
Share Storage Analysis	HA Simulator	PCI I/O Device Analysis	HCI Sizing Analysis	Aggregated Infrastructure Performance	Aggregated Power Consumption

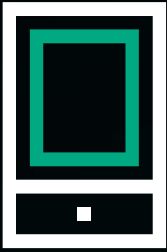
Virtualization Analysis & Infrastructure Analysis

¹ Based on HPE internal study with respect to data capture and usage, 2021

Manage



Case 1 : 업무 지연이 있었는데.....



- 업무가 느려졌는데, 원인을 분석해 주세요.

성능 모니터링 Enable
해 주세요

성능 데이터 수집해
주세요

```
##### LUN 성능  
srstatv lun -btsecs -7d
```

```
##### 스토리지내 블록 성능  
srstatv -btsecs -7d
```

```
##### Host 서비스용 Port 성능  
srstatport -port_type host -btsecs -7d
```

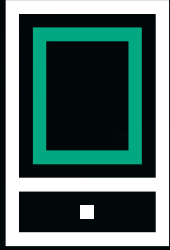
```
##### Backend Port 성능  
srstatport -port_type disk -btsecs -7d
```

```
##### CPU 성능  
srstatcpu -btsecs -7d
```

```
##### Disk 성능  
srstatpd -btsecs -7d
```

```
##### Cache성능  
srstatcmp -btsecs -7d
```

Case 1 : 그 때는 정말로 느렸었는데...

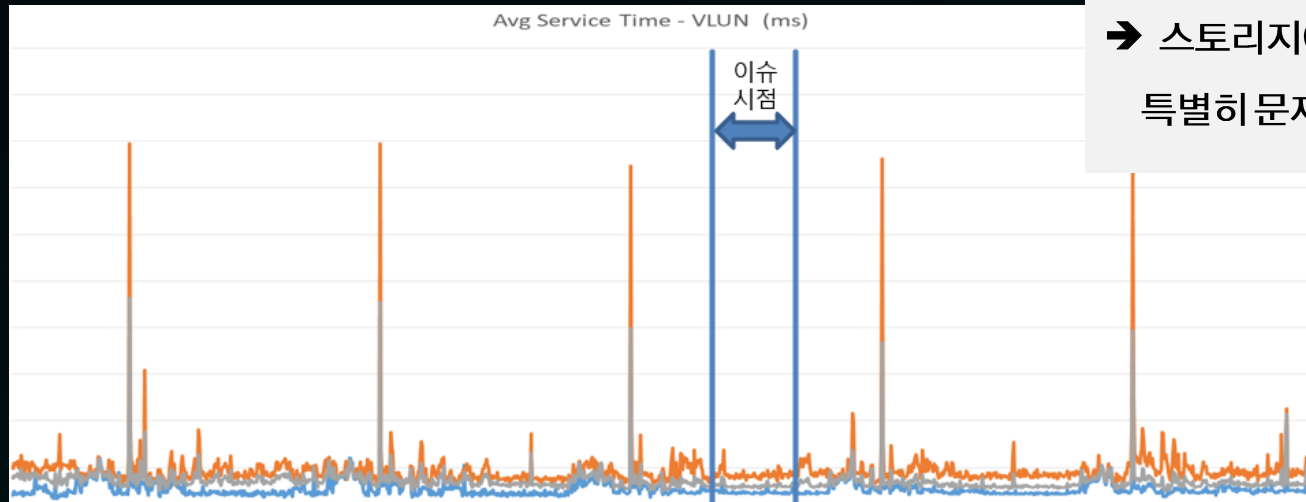


성능 모니터링 Enable
해 주세요

성능 데이터 수집해
주세요

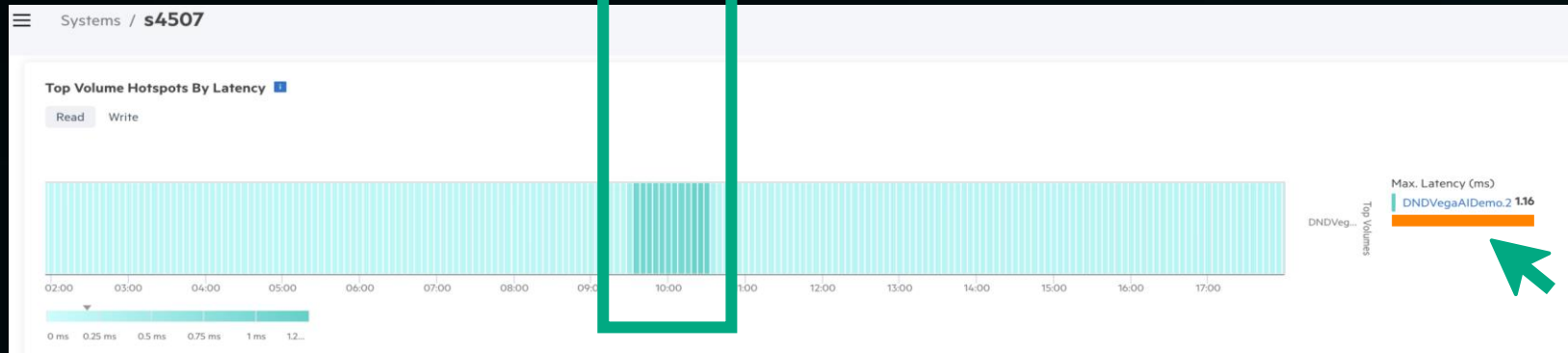
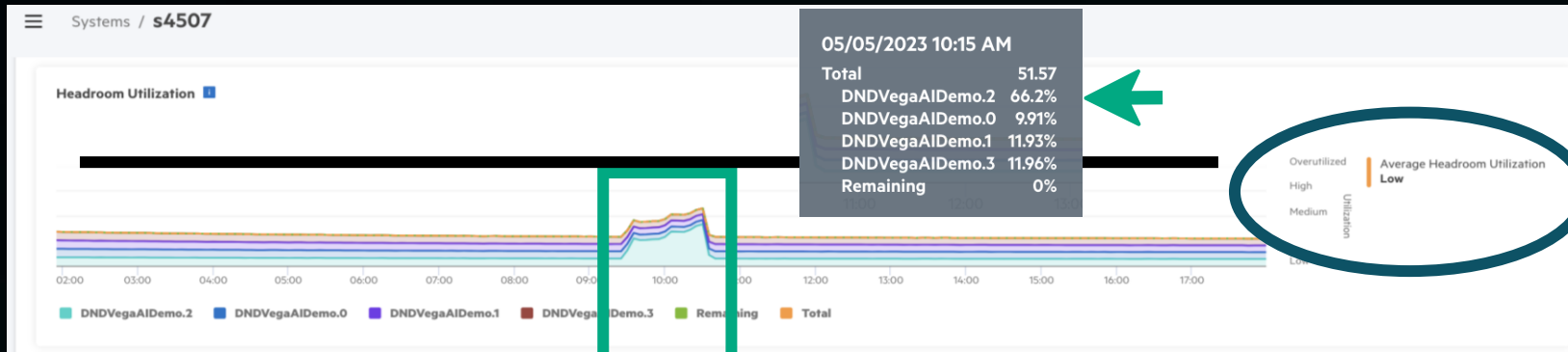
엔지니어 분석

■ 1 Week Later



→ 스토리지에 장애는 없었고, 말씀하신 시점에도 특별히 문제는 없었던 것 같습니다. ?????

Case 1 : Performance Issue with DSCC



1 Week

5분 안에 확인

Workload Drift Insight

Summary

Time: 05/05/2023 09:25 AM - 05/05/2023 10:35 AM

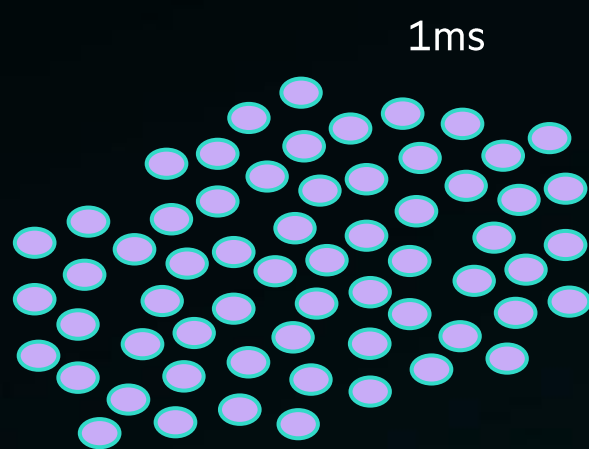
IO Type: Write

Description

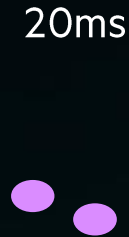
A drift is detected in the write workload on this volume. There was a spike in the I/Os for the workload sizes 128 KiB. In the duration of the drift, 90% of I/Os had a latency within 0.9 ms and occasional spikes with maximum latencies of at least 512 ms were observed.

Performance 이슈 해결을 위한 다양한 Insight – with AI

? → Answer!



Headroom 분석



Average ~ 1.7ms



Standard deviation /
Variance



Latency Insight

Workload Drift Insight

Case 2. 알고 있었다고요?

Known Issue

장애가 발생했을 때

Known Issue 입니다.

X.x.x 버전으로 업그레이드 하시면 됩니다.
(서버, 스토리지, 스위치 등등)



**모르는데,
어떻게 대비합니까?**



Case 2. 이제 알 수 있습니다

HPE는 알려 드립니다. !!!

System

Warning

Call Home ● On

Model **HPE Alletra 6030**
Serial # **AF-301883**

Capacity Utilization

2.39%

Issues Capacity Protection Performance Hardware Software Network

Title	Severity	Category
Software recommendation available		Generic

Warning Software recommendation available

11 days ago

Description
Software version 6.1.2.500-1053701-opt is available for AF-301883

System	ZW-CEC-BLOCK
Severity	Warning
Category	Generic
Component	ZW-CEC-BLOCK
Parent resource	ZW-CEC-BLOCK
Occurred at	May 23 2024, 02:27:07 PM KST



Case 2. 이제 알 수 있습니다.

- New OS 출시
- **Auto Alert** – 업그레이드 필요한 시스템에 자동 Alert 발생
- **Safe Upgrade** – 시스템 영향 평가, 전/중/후 단계별 안정성 Check

Software Version

OS Version 6.1.1.100-1013503-opt
Previous Version 6.0.0.500-1005932-opt

Available Updates

Version	Severity	Type	Readiness Checks	Install Time	Update Path	Actions
6.1.2.500-1053701-opt	Available	Standard Support Release	Not checked	—	Current → 6.1.2.500-1053701-opt	<ul style="list-style-type: none">Run ChecksInstall Update NowSchedule Update

System readiness checks are successful

Results HPE Alletra 9000 OS Release 9.4.0

Check Enclosure Health	Passed
Check Cabling Health	Passed
Check Dual Boot Drive State	Passed
Check Cache Availability	Passed
Check Missing Nodes	Passed
Check for Sluggish CLI	Passed
Check Cage	Passed
Verify Hardware Model	Passed
Verify Update Path	Passed
Baseline System Status	Passed

Re-run checks

또 다른 장애 예방 - 드물지만 무시할 수 없는 Human Fault

모든 작업은 UI 기반의 Guide와 함께

The screenshot shows the HPE iLo Alerts interface. At the top, there are navigation elements: 'Alerts 1 of 15', a search bar, and a 'Filter' button with a '2' notification. Below this, a list of alerts is shown, with the first one highlighted in red: 'Magazine 1:23:0, Physical Disk 15 Failed (Replace Drive, Vacated, Invalid Media, Media Failed)'. A mouse cursor is pointing at the word 'Physical' in the alert title. A modal window is open over the alert, displaying details under the 'Alerts' heading. The 'General' section includes fields for Type (Component state change), ID (6), Message code (0x600fa), and Corrective action (Resolution: Replace the physical drive. For instructions on how to 1) identify the failed component and the replacement part number; 2) order a new part; and 3) perform the replacement, see the following resources: • Search for the HPE Storage Service Guide available from http://www.hpe.com/support...; library: available at http://www.hpe.com/support/sml-csr). The 'Repair action' field is highlighted with a yellow box and contains the text 'Service the physical drive'. The 'Component' section shows 'Detected by node' as 0 and 'Component' as Magazine 1:23:0 Physical Disk 15.

The screenshot shows the 'Service System' repair guide for a physical drive. The title is 'Service System' with a close button. The main text reads: 'The system can be upgraded or repaired by making the appropriate selections below. An upgrade can be either adding an additional node pair, a single adapter card to each of the existing nodes, or additional physical drives. Repair can be the replacement of one of the following components: node, node coin battery, node DIMM, node boot drive, SFP, adapter card, IO module, node power supply, enclosure power supply or physical drive.' Below this, there are four sections, each with a dropdown menu and a teal arrow pointing to it with Korean text: 1. 'Operation' section: 'Select the type of service operation to perform.' with a dropdown menu showing 'Repair'. Arrow text: '작업 내용 : upgrade or repair'. 2. 'Component' section: 'Select the component to repair' with a dropdown menu showing 'Physical drives'. Arrow text: '대상 Part'. 3. 'Enclosure' section: 'Select which enclosure the repair is to take place on' with a dropdown menu showing '1'. Arrow text: 'Part 위치'. 4. 'Drive' section: 'Select which drive the repair is to take place on' with a dropdown menu showing '23'. Below this, there is a 'Details of selected physical drive:' section with a table showing 'Status' as 'Failed' with a red diamond icon. Arrow text: 'Part 상태'.


가장 안전한 Upgrade & Repair – Human Fault 방지

Repair Information

Details on repairing a physical drive can be found here:
Video: [Physical drive repair video](#)
Instructions: [Physical drive repair instructions](#)

Location

Front Panel Locate Drive Enclosure
Capacity 56 TiB | 18% Used



Warning
▲ The selected drive has not failed. Replacing non-failed drives should be performed with caution and only under the advice of Hewlett Packard Enterprise support.
This process may take some time as the data is moved off the drive.
Please ensure you have a replacement part of equal or greater size ready to use.
You will be prompted when the data has been moved and the drive is ready to be removed and replaced with your spare.
 I have read and understand the implications.

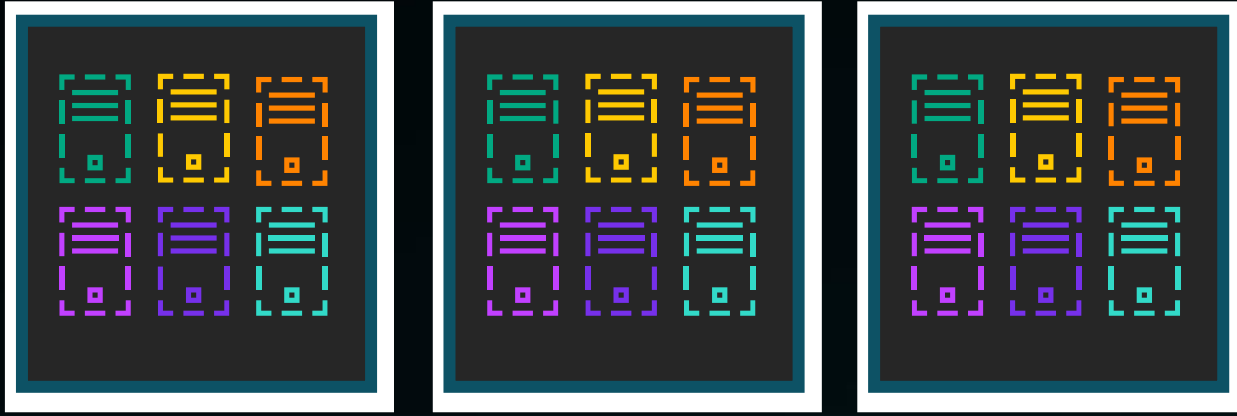
Human Fault 방지

- 장애 Part define
- Step by Step Guide
- 작업의 영향도
- **Part 교체 시 사전 “이해” 확인**

Protect



다른 접근 방식이 필요한 가상화 환경의 DR



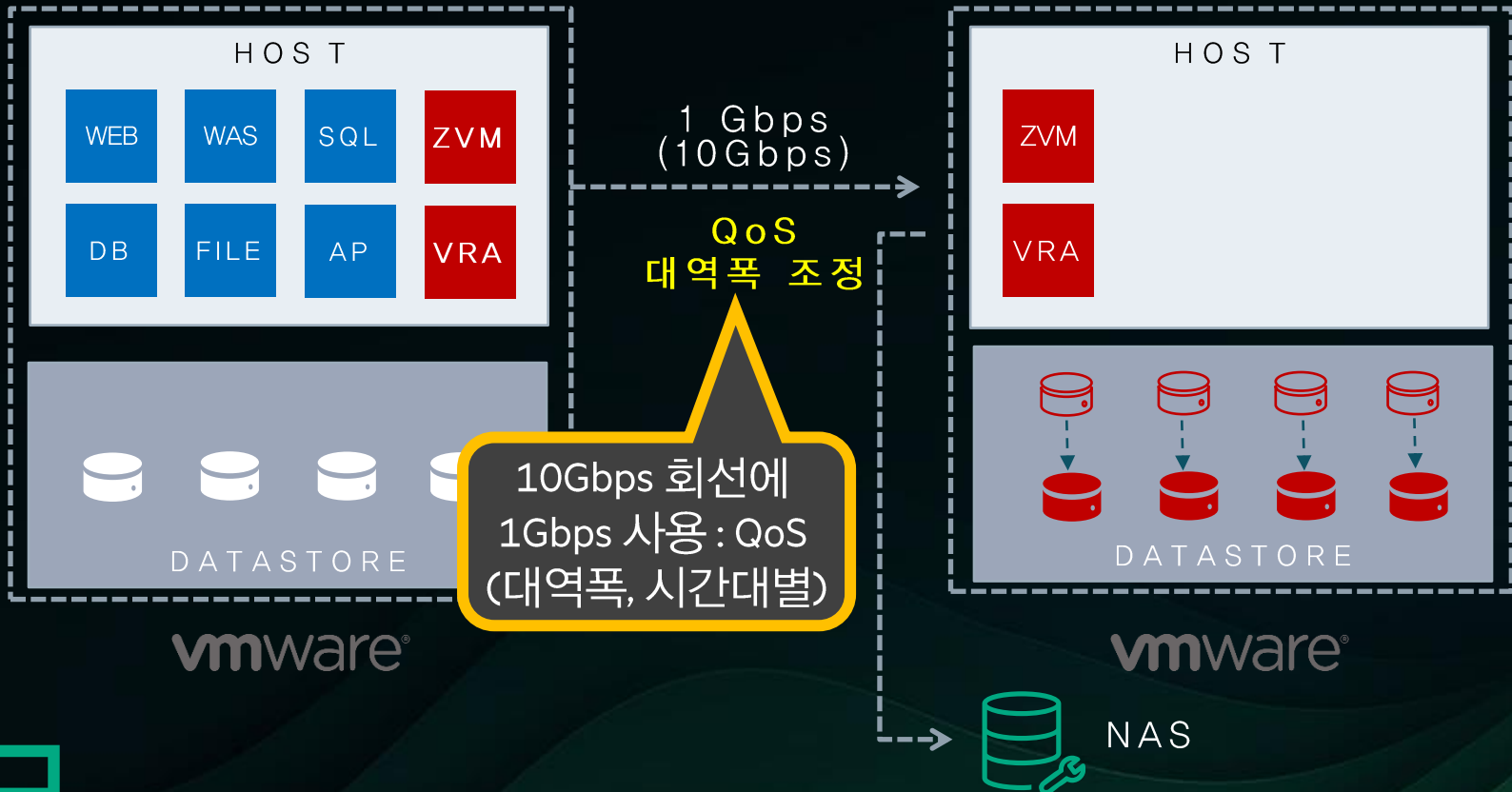
- 중요 업무의 분리 복제 어려움
- 전체 복제시 비용 증가
- 각 **VM**간 데이터 정합성 필요
- 복잡한 모의 훈련

Case 1. DR과 백업을 동시에

Customer Requirement

- 회선 공유로 회선에 대한 QoS 필요
- DR과 백업 모두 필요

Start Time	End Time	Duration
10:07:37	10:07:38	00:00:01
10:07:37	10:07:38	00:00:01
10:07:37	10:07:38	00:00:01
10:07:37	10:07:38	00:00:01
10:07:38	10:07:38	00:00:00
10:07:38	10:07:38	00:00:00
10:07:38	10:07:38	00:00:00
10:07:38	10:07:56	00:00:18
10:07:38	10:07:45	00:00:06
10:07:45	10:07:51	00:00:06
10:07:51	10:07:56	00:00:05
10:07:38	10:07:56	00:00:18
10:07:38	10:07:45	00:00:06
10:07:45	10:07:51	00:00:06
10:07:51	10:07:56	00:00:05



RPO : **7 sec**
 대역폭 : **1 Gbps(QoS)**
 구성 : **DR+장기보관**
 모의훈련 : **필요시**

Case 2. Physical Server에서 가상화 DR까지

Customer Requirement

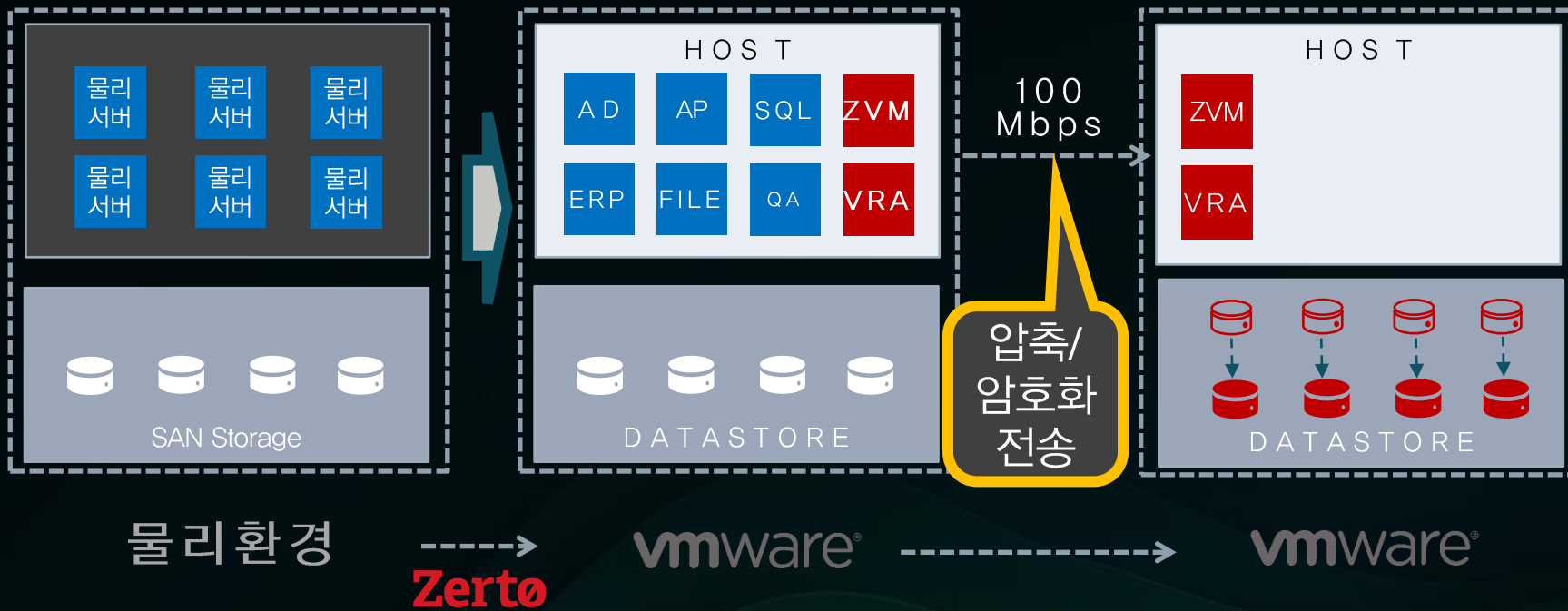
- 업무 그룹별 정합성 보장
- 전송 회선에 대한 최적화 필요 (**100 Mbps**)
- 가상화 전환 및 **DR** (현재 **Physical Server** 환경)

Zerto

Recovery Report for Virtual Protection Group
Site-A-Multiple-VM-VPG
Report was generated on 04/04/2023 12:13:57

Recovery Operation Details	
Initiated by	Administrator
Recovery operation	Fallover Test
Point in time	04/04/2023 12:11:53
Recovery operation start time	04/04/2023 12:12:02
Recovery operation end time	04/04/2023 12:13:35
RTO	21 seconds
Recovery operation result	Passed by user
User notes	Stop Test for VPG Site-A-Multiple-VM-VPG

Virtual Protection Group Recovery Settings	
Protected site	Site-A
Recovery site	Site-B
Default recovery host	7esxi216-02.hpe.local
Default recovery datastore	ESXi02-ZERTO-DS02-BASE
Default test recovery network	ZERTO-TEST-BUBBLE



RPO : **8 Sec**

대역폭 : **100 Mbps**

구성 : **P2V + DR**

모의훈련 : **필요시**

가상화 환경에서 필요한 DR 솔루션은 “Zerto”



백업까지 한 번에



랜섬웨어

실시간 감지

5 초전으로

1 분내 복구

Store Manage Protect



Customer Case

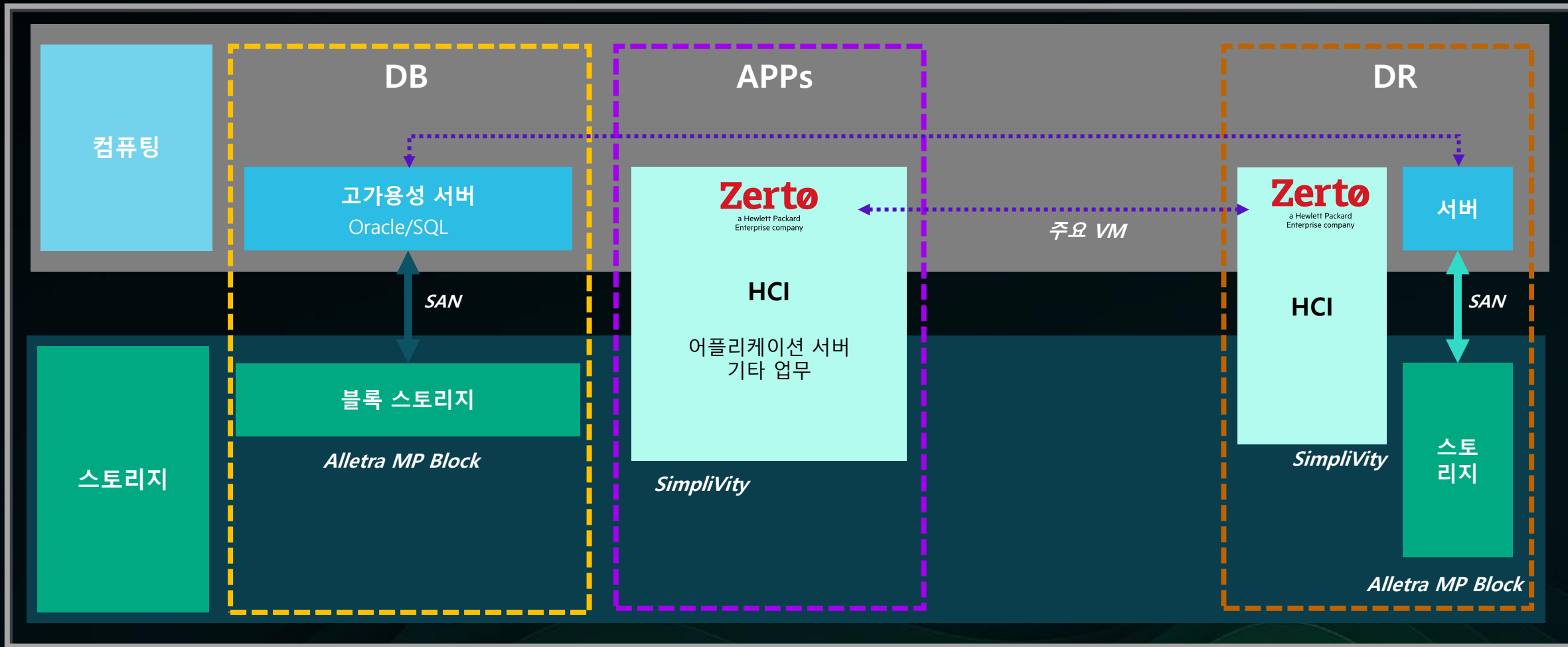
안전하고

빠르게

효율적으로 관리하게

24/365 데이터 보호

단일 관리 콘솔



HPE Storage와 함께

STORE

안전하고, 빠르게

MANAGE

무엇이든 손쉽게

PROTECT

24/365

Askstorage@hpe.com