

WEBINAR

THE NEW NORM: OPTIMIZING ORACLE WORKLOADS TO DO MORE WITH LESS

오라클 워크로드 최적화를 통한 업무 가용성 효율성 극대화 비법

2020년 10월 21일 오후 2시- 3시

TODAY AGENDA

14:00-14:10 PURE STORAGE 키 업데이트 (배성호 이사장)

14:10- 14:50 MAIN SESSION (이규현 상무, 강신우 차장)

오라클 워크로드 최적화를 통한 업무 가용성 효율성 극대화 비법 !

아는 사람만이 해낼 수 있는 오라클 워크로드 최적화! 퓨어스토리지 솔루션을 통하여 비용은 최소화 하고, 효율성은 극대화 하는 솔루션을 알려드립니다.

그리고, 데이터 센터 장애에도 오라클 워크로드는 끊임없이 살리는 퓨어스토리지 액티브 클러스터 데모도 함께 보여 드립니다!

14:50- 15:00 Q&A (ALL)

TODAY SPEAKERS



배성호 이사장
퓨어스토리지 코리아 총괄
sbae@purestorage.com



이규현 상무
퓨어스토리지 코리아 기술총괄
klee@purestorage.com



강신우 차장
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sekang@purestorage.com

THE NEW NORM: OPTIMIZING ORACLE WORKLOADS TO DO MORE WITH LESS

PURE STORAGE KEY UPDATES

배성호 지사장

Delivering the MDE & Milestones

GROWTH



+\$50B

Total Addressable Market

\$1.64B

FY20 Annual Revenue

Subscription Services up **37%** Year-over-year (Q2 FY21)

CUSTOMERS



8,150+

Customers

1,700

New Customers in FY20

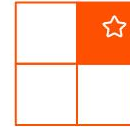
45%

of Fortune 500
Companies

23%

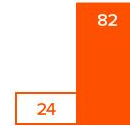
Year-over-year Growth
in Total Customers

LEADERSHIP



Gartner Magic Quadrant

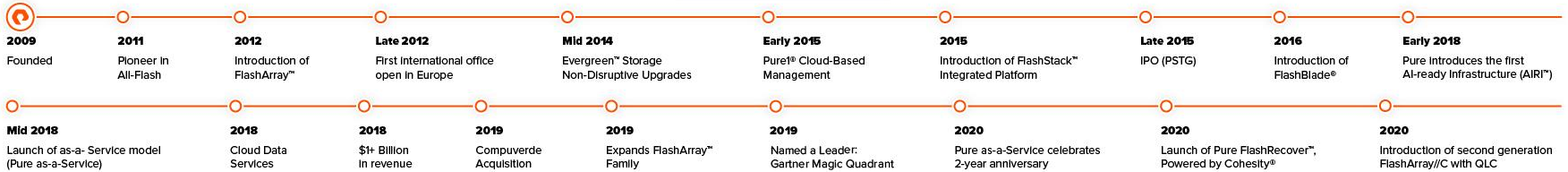
For the sixth year in a row,
Pure Storage is a leader in the
Gartner Magic Quadrant.



Net Promoter Score

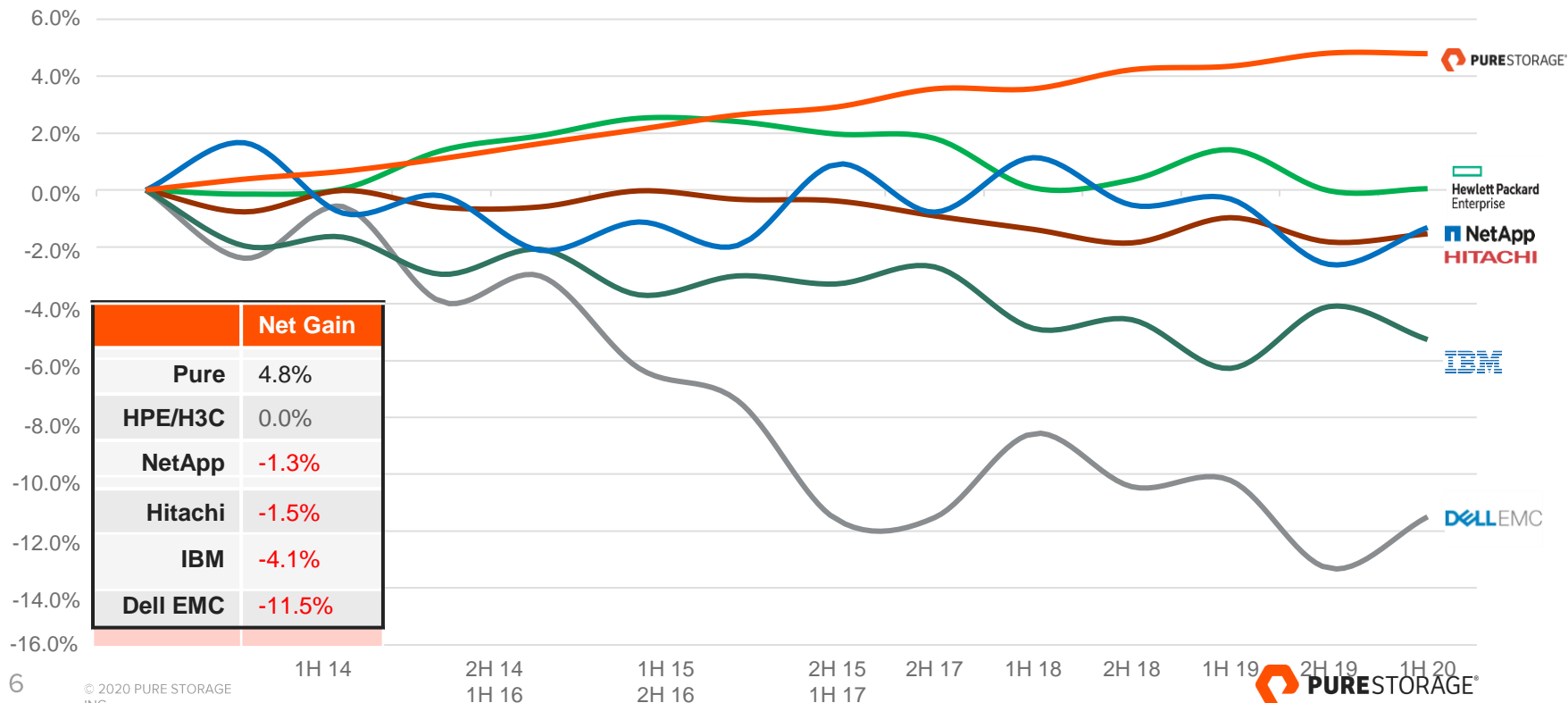
In the top 1% of B2B companies.

COMPANY MILESTONES



6.5 Year Storage Market Share*

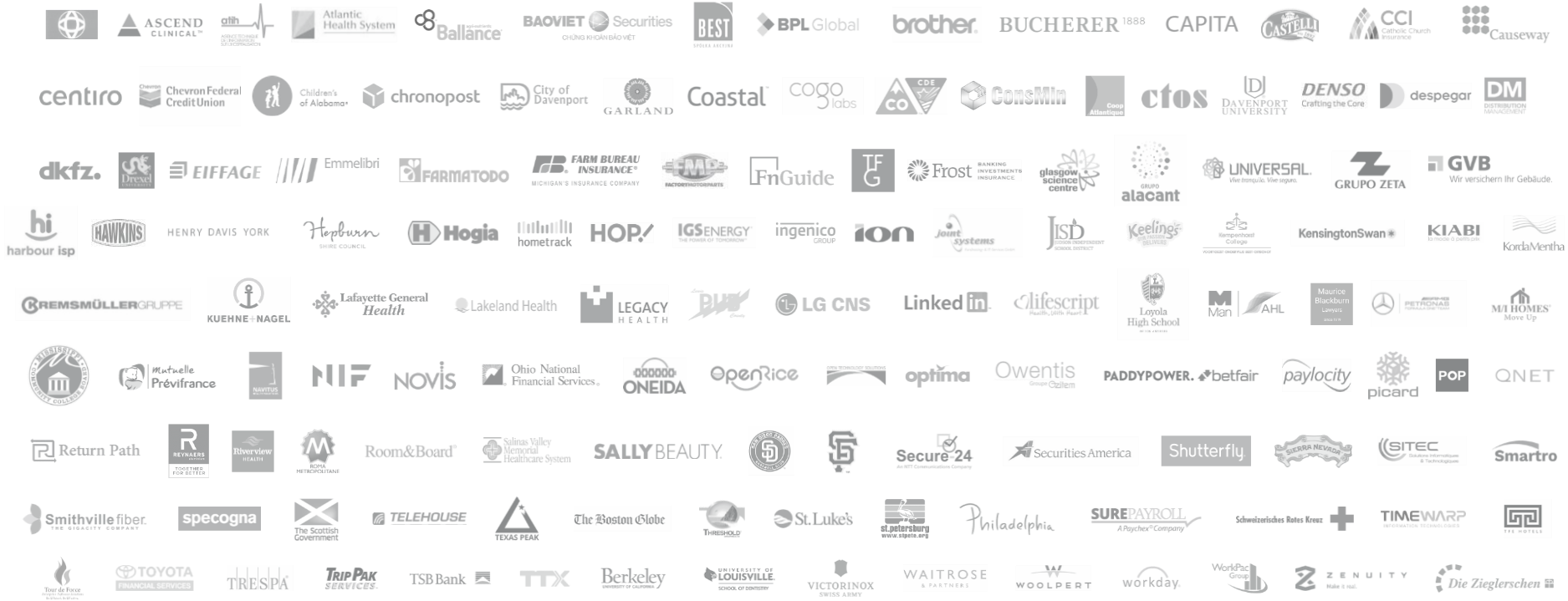
CUMULATIVE MARKET SHARE GAIN/LOSS - HALF YEAR BASIS



*Excludes HCI revenue

Delivering the Modern Data Experience

> 8,150 Customers and Counting



Industry Accolades



Pure Awarded With
UK Cloud Award
Best Data Management
Product Or Service



Pure Wins
**Cyber Security
Excellence Award**
Gold Award



Pure Awarded With
**Flash / SSD
Storage Vendor
Of The Year**
At Storage Awards Xvi



Pure Awarded With
**Storage Performance
Optimization Product
Of The Year**
At Storage Awards Xvi



Recommended Vendor for
**Enterprise
All-Flash Array**
In 2020-21



Pure Ranked As
Top Rated
FlashArray (Enterprise
Storage)
FlashBlade (Object Storage)



Pure Awarded
**Channel
Vendor Program
Of The Year**
At 2019 UK Awards

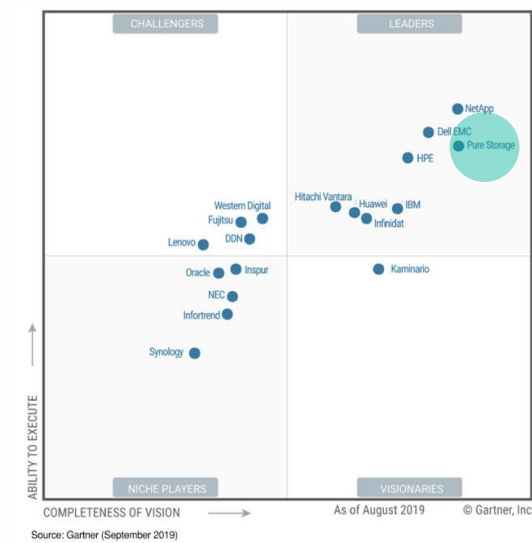


Pure Recognized As
#1 Ranked in Storage

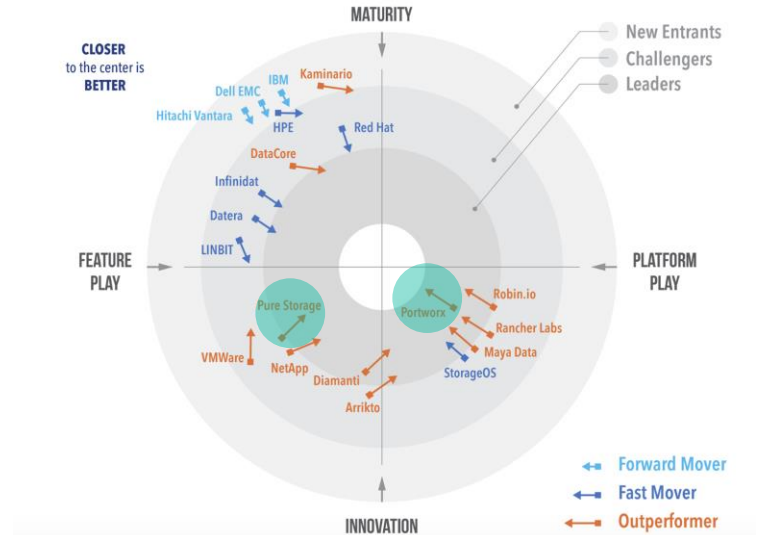
Combining the Strength of Two Market Leaders



+



Gartner
Magic Quadrant for Primary Storage, 2019



GIGAOM
GigaOm Radar for Data Storage for Kubernetes, 2020

THE MODERN DATA EXPERIENCE



FAST MATTERS

Consistent, predictable response times to keep end users productive

Rapid cloning to accelerate software development cycles



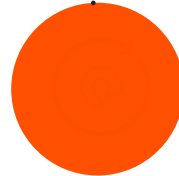
SIMPLE IS SMART

Faster time to value with easy installation

Eliminate unnecessary tuning and maintenance – save time

Easy capacity planning with Pure1® to minimize budget impact

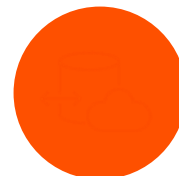
Deeper consolidation without noisy neighbor problems



CLOUD EVERYWHERE

Seamless workload mobility to support changing business models

Ramp new digital initiatives faster with a global data plane and management



SUBSCRIPTION TO INNOVATION

Update software and components without headaches or downtime

Shift to flexible OPEX consumption models that grow as you need

AI-driven predictive support solves problems before they happen



A complete PORTFOLIO OF DEPLOYMENT OPTIONS



On-Premises

Hybrid Cloud

Multi-Cloud

Scalable
Storage



Integrated
Management



Mission-Critical
Options

FlashArray **FX**

Flexibility & High
Performance for Tier 1
Workloads & Consolidation

FlashArray **FC**

Lower cost and high
capacity for Tier 2
Storage & Dev/Test



Pure1[®]

Single Pane, AI-powered
Data Management & Monitoring
From On-Prem to Cloud



Pure as-a-Service

On-Demand Capacity
Whenever, Wherever Needed

FlashStack

Appliance-level
Simplicity & CVDs for
Footproof Deployment

FlashBlade **FB**


Scale-out object and file for
rapid restore & modern
analytics



Evergreen[™] Storage

Upgrade without Service
Disruption or Performance
Degradation





오라클 워크로드 최적화 및
진정한 서비스 무중단 구축 방안

PURESTORAGE KOREA

AGENDA

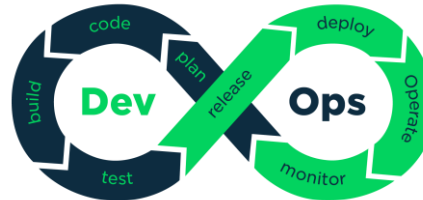
- **INTRO**
- **RETHINK BUSINESS CONTINUITY**
- **RETHINK INFRA AGILITY**
- **RETHINK SERVICE PERFORMANCE**
- **Live Demo 시연**
- **Q&A**

KEY DISCUSSTION

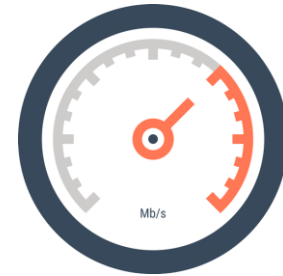
BUSINESS CONTINUITY



INFRASTRUCTURE AGILITY



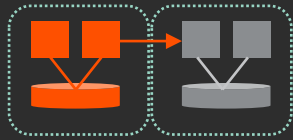
SERVICE PERFORMANCE



RETHINK BUSINESS CONTINUITY



BUSINESS CONTINUITY

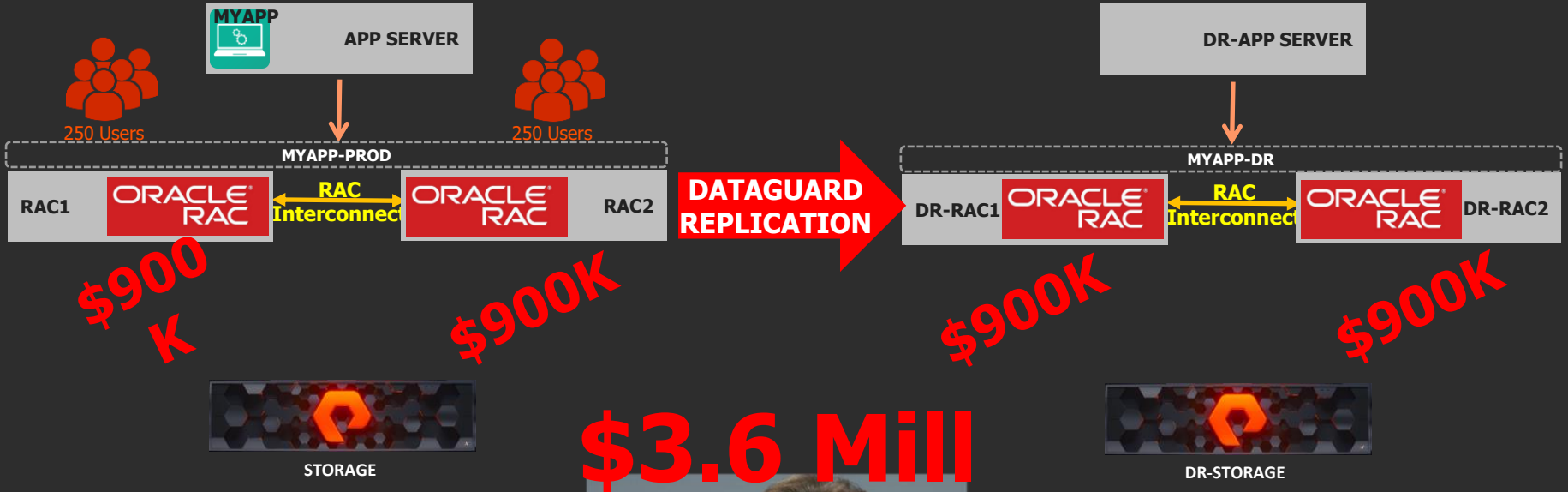


Active/Standby
Complex Failovers



Active/Active
Zero Touch

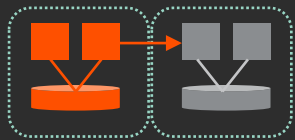
전통적인 HA 및 DR 모델



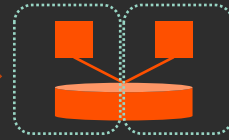
ActiveCluster

BUSINESS CONTINUITY

RE-IMAGINED

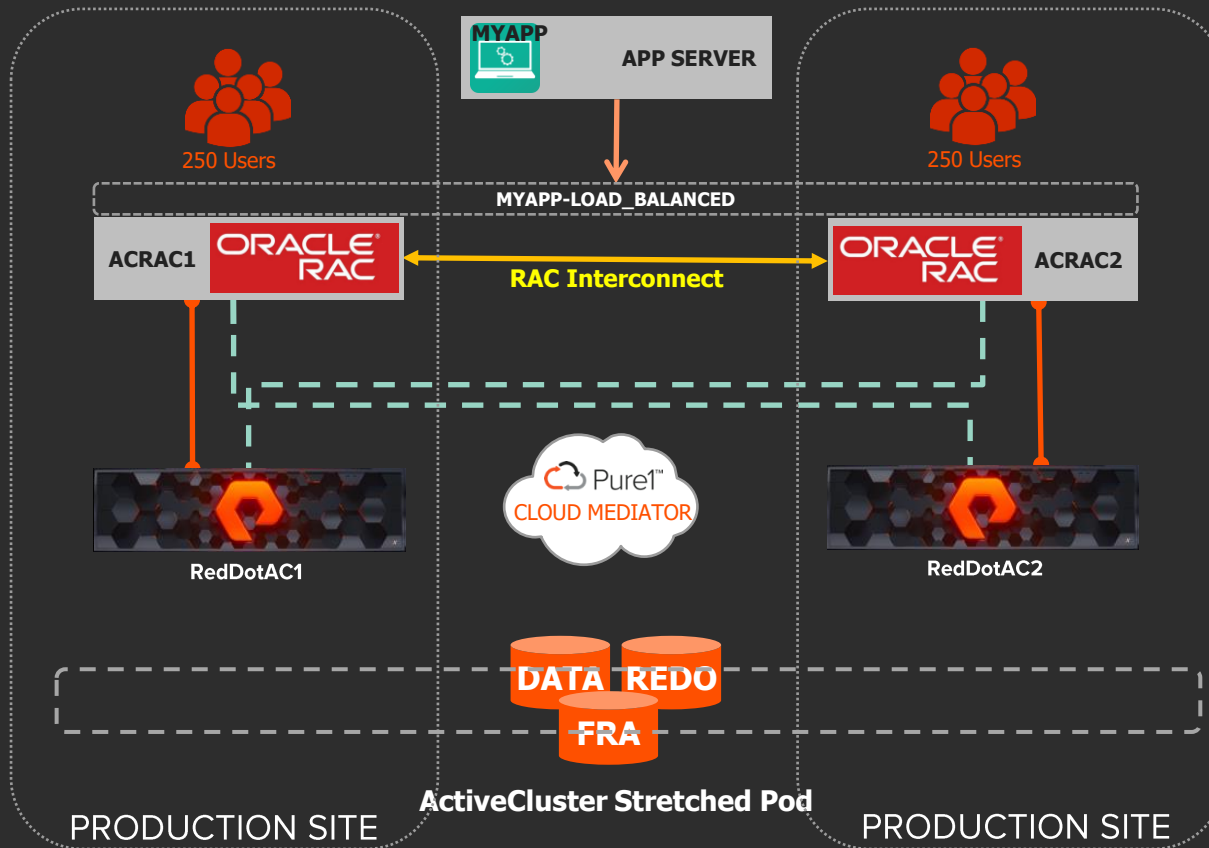


Active/Standby
Complex Failovers

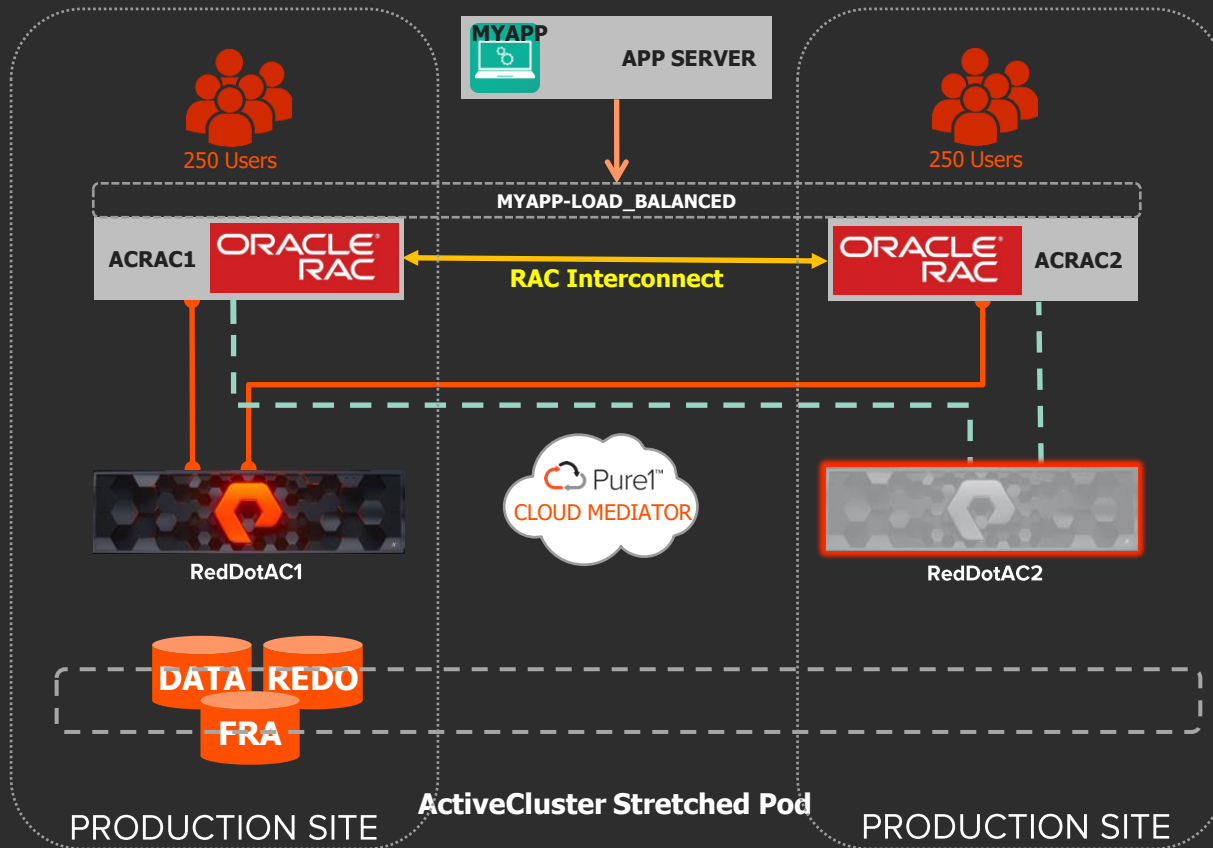


Active/Active
Zero Touch

ActiveCluster를 통한 RAC 구현



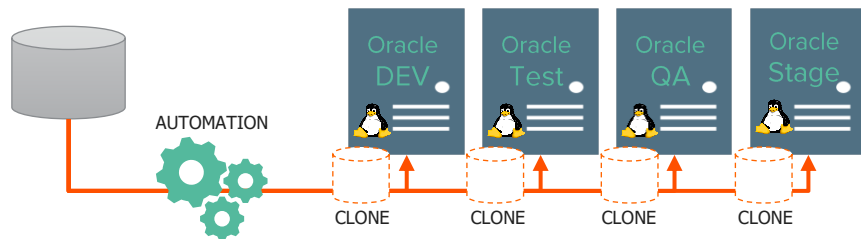
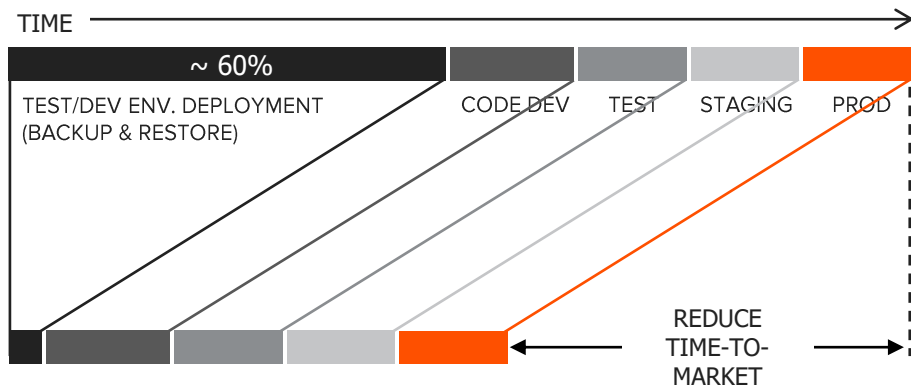
ActiveCluster를 통한 RAC 구현





RETHINK INFRASTRUCTURE AGILITY

RETHINK YOUR AGILE DEVELOPMENT





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고려사항

- 전체 개발 프로세스 간소화
- 대용량 DB 백업/복구 소요시간 단축
- 여러 별의 복제 데이터 관리
- 개발 워크플로우 자동화
- 스토리지 중복 투자 비용 절감

PURESTORAGE 를 통한 백업 효율화

Backup Type	Storage	DB Size	DB Space Used	Backup Space	Total Space Used	Backup Duration	CPU Consumption
RMAN Full Compressed	Traditional Disk	65TB	65TB	32.5TB	98TB	28 hour	High
RMAN Incrementally Updating	Traditional Disk	65TB	65TB	130TB	195TB	About 1+ hour	LOW
RMAN Incrementally Updating	 FlashArray	65TB	21.6TB	16.25TB	37.85TB	~ 20 min	MINIMAL
FlashRecover Snapshot	 FlashArray	65TB	21.6TB	15.1TB	36.7TB	0 min	ZERO

- Zero-time for 65TB DB backup with PURE FlashRecover Snapshot
- 3X better total capacity efficiency than RMAN Full compressed backup

어디서나 백업 및 복구 수행

메타데이터가 함께 저장되는 스냅샷 기술을 통해 이기종 NFS 스토리지 및 클라우드로 데이터 전송

COST-EFFECTIVE

- 모든 라이선스 기본 제공
- 변경 데이터만 압축 후 전송
- 최소 데이터 저장으로 최소 과금

SIMPLICITY

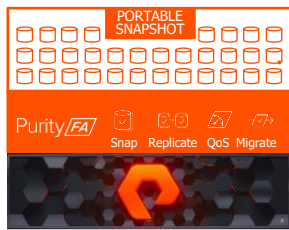
- GUI/CLI/REST API 기반 자동화
- PURE1 기반 카탈로그 통합 관리
- 간편한 클라우드 마이그레이션

COUD-NATIVE

- AWS / AZURE Direct 지원
- CBS로 언제든지 복구 제공
- 클라우드 개발을 위한 데이터 플랫폼 지원

COMPLIANCE

- 온-디멘드 데이터 열람
- 클라우드 기반 장기보관 티어링
- HTTPS 기반 전송 데이터 암호화



SNAP TO FLASHBLADE



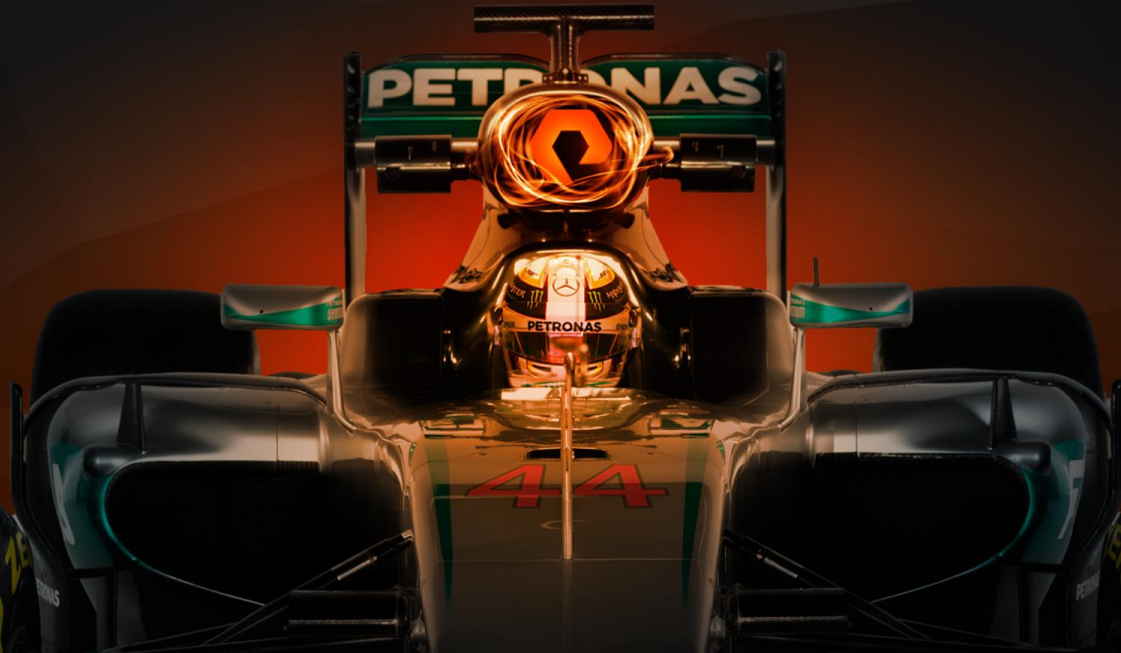
SNAP TO 3rd Party



SNAP TO Linux

- 메타데이터와 실제 시점 데이터를 함께 전송하여 퓨어스토리지의 FlashArray 와 연동 시, 어떤 환경에서도 활용 가능
- 퓨어스토리지의 FlashArray 제품이 제공하는 오픈 API 환경을 통해 자동화 기반의 백업 환경으로도 활용 가능
- 클라우드 기반의 통합 관리 솔루션인 Pure1 을 통해 전체 스냅샷의 카탈로그 관리 제공
- 클라우드로 전송 시, 퓨어스토리지의 Cloud Block Store와의 연동을 통해 비용-효율적인 DRaaS로 활용 가능

RETHINK YOUR SERVICE PERFORMANCE



All-NVMe – 애플리케이션 성능 개선

NVMe 를 통한 더욱 더 빨라진 스토리지 성능



VS SAS Flash

2.9X

ORACLE
DW/DSS
쓰기 대역폭 성능 개선

ORACLE

3.7X

SAP 변경데이터
병합 시 쓰기 성능 개선

SAP HANA

40%

로그 쓰기 작업
지연시간 단축

SAP® Certified
Hardware for SAP HANA®

45%

읽기 성능 개선

Epic

27%

EPIC IOPS
개선

의료용 EMR
애플리케이션

End-to-End NVMe Ready Infra

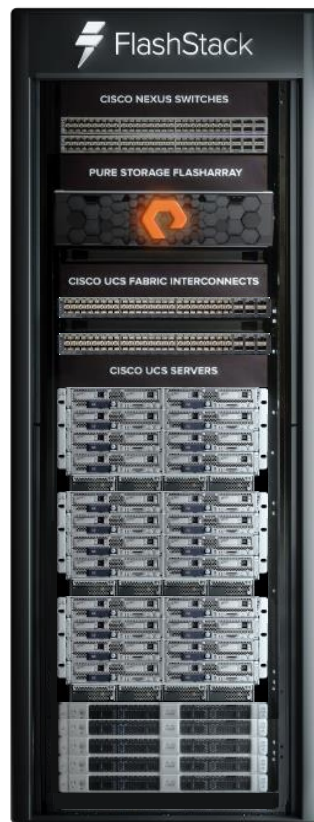


FLASHSTACK NVME-oF ROCEv2
OracleRAC 19c Cisco Validated Design

ORACLE

< 300µs
응답속도

최대 30%
CPU 사용율 절감



Cisco Nexus 9000 Series

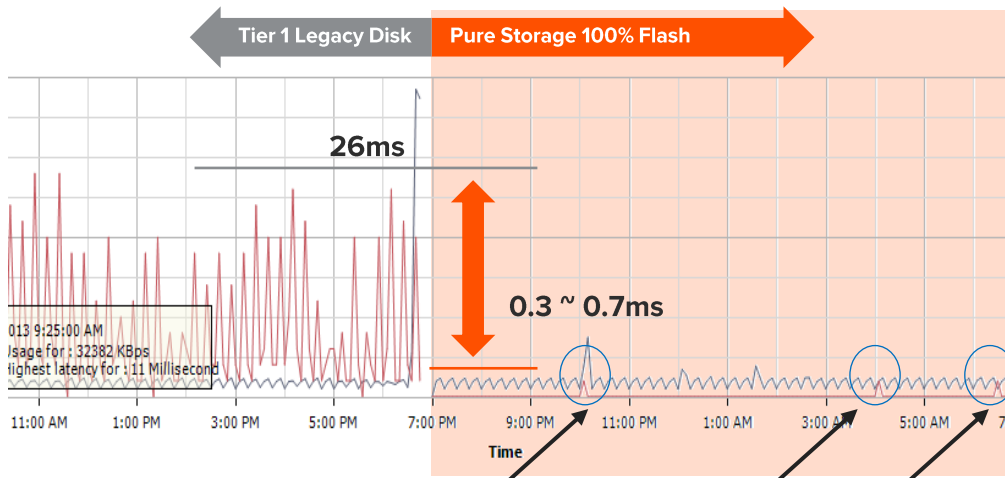
Pure Storage FlashArray//X

Cisco UCS FI 6454

Cisco UCS B & C-Series Servers

해외 도입 및 오라클 성능 개선 사례

All Flash 성능 개선 사항



컨트롤러 장애

업그레이드

케이블 단절

15배 비즈니스 어플리케이션 성능 향상

- ✓ 큰 블록 사이즈 쓰기 최적화(redo log)
- ✓ 일관된 서비스 응답속도 제공
- ✓ 전체 서비스 체감 속도 개선
- ✓ 컨트롤러 장애 시에도 변함없는 성능
- ✓ 모든 장애에 대한 안정성 제공
- ✓ 성능 개선 → 컴퓨팅 절감 → 라이선스 절감

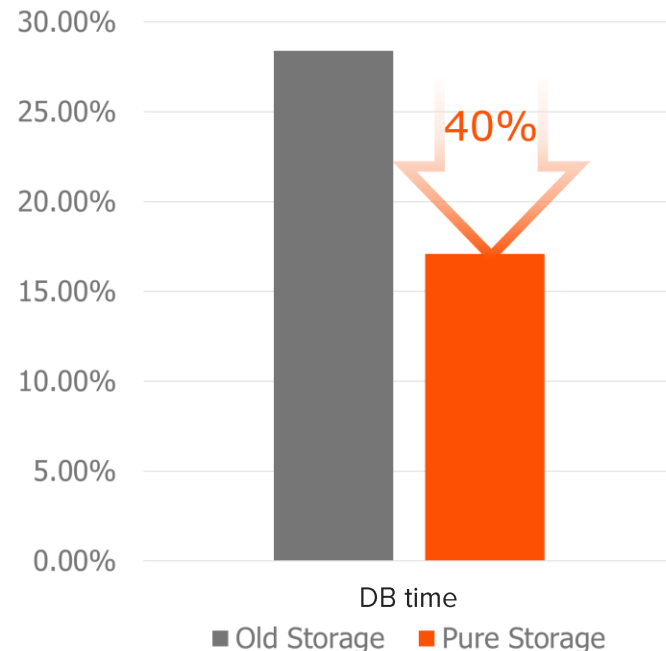
국내 대형 운송사

REDUCED 40% DB LATENCY

Load Profile

	1st per sec	2nd per sec	%Diff	1st per txn	2nd per txn	%Diff
DB time:	28.4	17.1	-39.7	0.0	0.0	-50.0
CPU time:	12.6	11.9	-5.5	0.0	0.0	0.0
Redo size:	6,465,156.7	6,406,289.7	-0.9	5,163.6	4,942.0	-4.3
Logical reads:	925,746.9	904,249.6	-2.3	739.4	697.6	-5.7
Block changes:	32,506.8	31,738.2	-2.4	26.0	24.5	-5.7
Physical reads:	13,159.7	12,942.3	-1.7	10.5	10.0	-5.0
Physical writes:	2,070.9	2,043.1	-1.3	1.7	1.6	-4.2
User calls:	6,231.2	5,212.1	-16.4	5.0	4.0	-19.3
Parses:	1,706.7	1,776.8	4.1	1.4	1.4	0.7
Hard parses:	1.4	1.8	28.7	0.0	0.0	0.0
W/A MB processed:	0.0	0.0	0.0	0.0	0.0	0.0
Logons:	1.2	1.6	32.8	0.0	0.0	0.0
Executes:	17,149.8	17,029.0	-0.7	13.7	13.1	-4.1
Transactions:	1,252.1	1,296.3	3.5			

	1st	2nd	Diff
% Blocks changed per Read:	3.5	3.5	-0.0
Recursive Call %:	82.1	85.2	3.0
Rollback per transaction %:	3.1	5.9	2.8
Rows per Sort:	25.4	43.0	17.6
Avg DB time per Call (sec):	0.0	0.0	-0.0



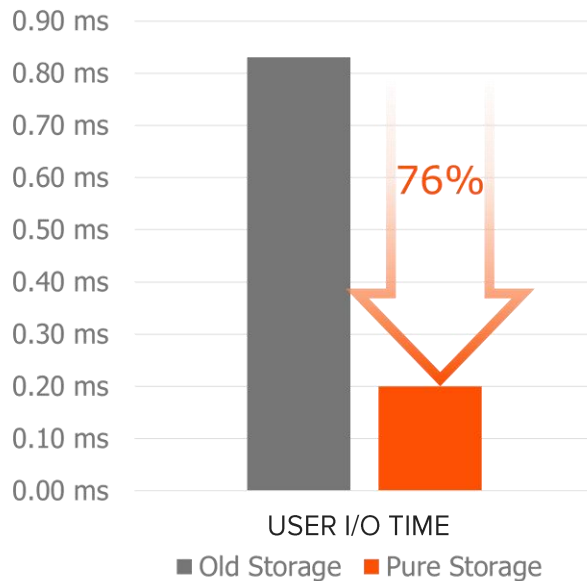
국내 대형 운송사

REDUCED 76% DB USER I/O LATENCY

Wait Classes

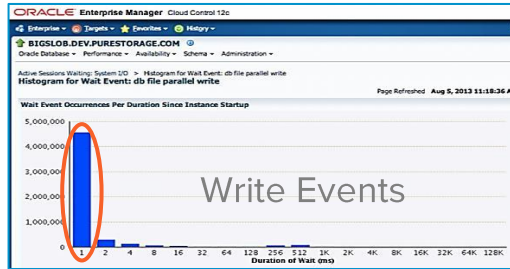
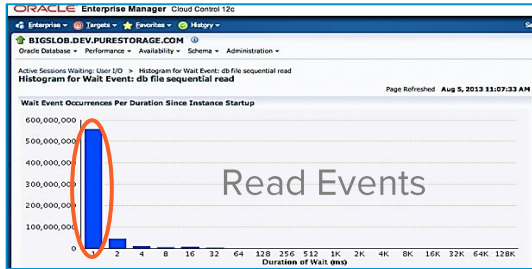
- Ordered by absolute value of 'Diff' column of '% of DB time' descending

Wait Class	% of DB time			# Waits/sec (Elapsed Time)			Total Wait Time (sec)			Avg Wait Time (ms)		
	1st	2nd	Diff	1st	2nd	%Diff	1st	2nd	%Diff	1st	2nd	%Diff
User I/O	30.24	11.47	-18.77	10,289.22	9,973.21	-3.07	61,773.70	14,194.19	-77.02	0.83	0.20	-75.90
Network	8.77	10.55	1.78	6,579.30	5,763.25	-12.40	17,920.36	13,055.18	-27.15	0.38	0.31	-18.42
Commit	2.54	3.17	0.63	290.90	317.30	9.08	5,192.33	3,919.72	-24.51	2.48	1.71	-31.05
System I/O	3.73	4.19	0.46	869.56	817.66	-5.97	7,611.24	5,180.10	-31.94	1.22	0.88	-27.87
Configuration	0.08	0.38	0.30	0.16	0.14	-12.50	163.76	465.83	184.46	143.02	474.37	231.68
Other	0.06	0.02	-0.04	56.55	57.40	1.50	124.39	20.19	-83.77	0.31	0.05	-83.87
Application	0.12	0.09	-0.02	2.01	1.44	-28.36	238.28	113.43	-52.40	16.50	10.88	-34.06
Concurrency	0.08	0.08	0.00	99.04	73.58	-25.71	166.01	104.88	-36.82	0.23	0.20	-13.04



국내 대형 운송사

ORACLE 환경에 퓨어스토리지 사용 시 USER IO에 대한 병목을 줄일 수 있습니다.



Oracle DB의 95% read/write 프로세스가 1ms 이하에 처리됨

Top 5 Timed Foreground Events

Event	Waits	Time(s)	Avg wait (ms)	% DB time	Wait Class
db file sequential read	263,313	700	3	44.94	User I/O
DB CPU		521		33.44	
direct path read	942	10	11	0.64	User I/O
db file scattered read	1,494	7	5	0.45	User I/O
direct path read temp	379	4	9	0.23	User I/O

HDD스토리지 사용

Top5의 대부분이 User I/O → I/O 병목 현상

Top 5 Timed Foreground Events

Event	Waits	Time(s)	Avg wait (ms)	% DB time	Wait Class
DB CPU		4,206		63.48	
latch: cache buffers chains	754,392	1,629	2	24.59	Concurrency
enq: TX - row lock contention	386,885	696	2	10.51	Application
cursor: pin S	30,126	108	4	1.64	Concurrency
buffer busy waits	69,321	42	1	0.64	Concurrency

퓨어스토리지 사용

Top5의 대부분이 CPU, Concurrency → 더 이상 I/O 병목 없음

SUMMARY

BUSINESS CONTINUITY



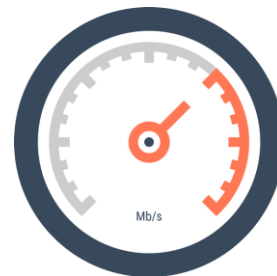
- Zero RPO/RTO
- 자동화된 서비스 Failover
- 라이선스 비용 최적화
- 무중단 서비스 구현

INFRASTRUCTURE AGILITY



- 자동화된 개발 워크플로우
- 복제 데이터 최적화
- 대용량 DB 백업/복구 시간 최적화
- Time-to-Market 시간 최소화

SERVICE PERFORMANCE



- End-to-End NVMe
- 초고속 서비스 응답속도
- DB 컴퓨팅 리소스 최적화
- 라이선스 비용 절감

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