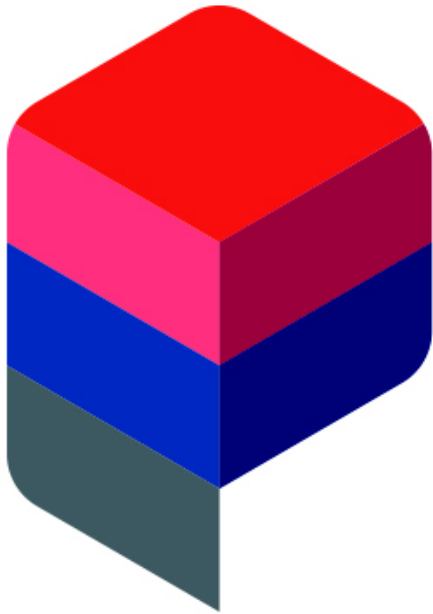




**performing
databases**

The Price We Pay: Performance and HA with Oracle Data Guard

Martin Klier 
Performing Databases GmbH
Mitterteich / Germany

with Axel vom Stein 
BSS Bohnenberg, Solingen

Speaker

- Martin Klier
- Solution Architect and Database Expert
- My focus:
 - Performance + Tuning
 - Highly available systems
 - Cluster and Replication
- Linux since 1997
- Oracle Database since 2003



SYMPOSIUM^{L2}
Proud Member of symposium42

Performing Databases

- Three Experts for Database technology
 - Concepts and Project Competence
 - Architecture- and System planning
 - Licensing
 - Implementation and Troubleshooting
- Get in touch
 - Performing Databases GmbH
Wiesauer Strasse 27
95666 Mitterteich // Germany
 - <http://www.performing-databases.com>
 - Twitter: @PerformingDB



Speaker

About me ...



- **Technical Project Manager, Head of IT (working for BSS since 2001)**

- **Oracle:**

- **since 2001**
- **started out as a developer (PL/SQL, C, C#)**
- **interest moved more towards DBA topics**

- **Focus and soft spots:**

- **teaching trainees and young professionals**
- **HA - concepts**
- **migration projects**
- **standardization**
- **everything you can automate**



BSS Bohnenberg

Company – BSS focuses on...



- **Design and detailed planning of intralogistic systems and facilities**
- **Flowpicker® (patent for special high performance order picking)**
- **Warehouse Management Control System (WMCS)**
- **Material Flow Control (MFC)**
- **Automated highbays and mini-loads**
- **Automated Guided Vehicles (AGV's)**
- **Pick-by-light / pick-by-voice**
- **Forklift Control System (FCS)**
- **Visualization**
- **PLC – technology**
- **etc.**



Promises and Compromises

Promises vs. Compromises



vs.



Nota Bene: A.C.I.D. – a promise!

Data Guard = Stretched ACID

Infrastructure for our Tests

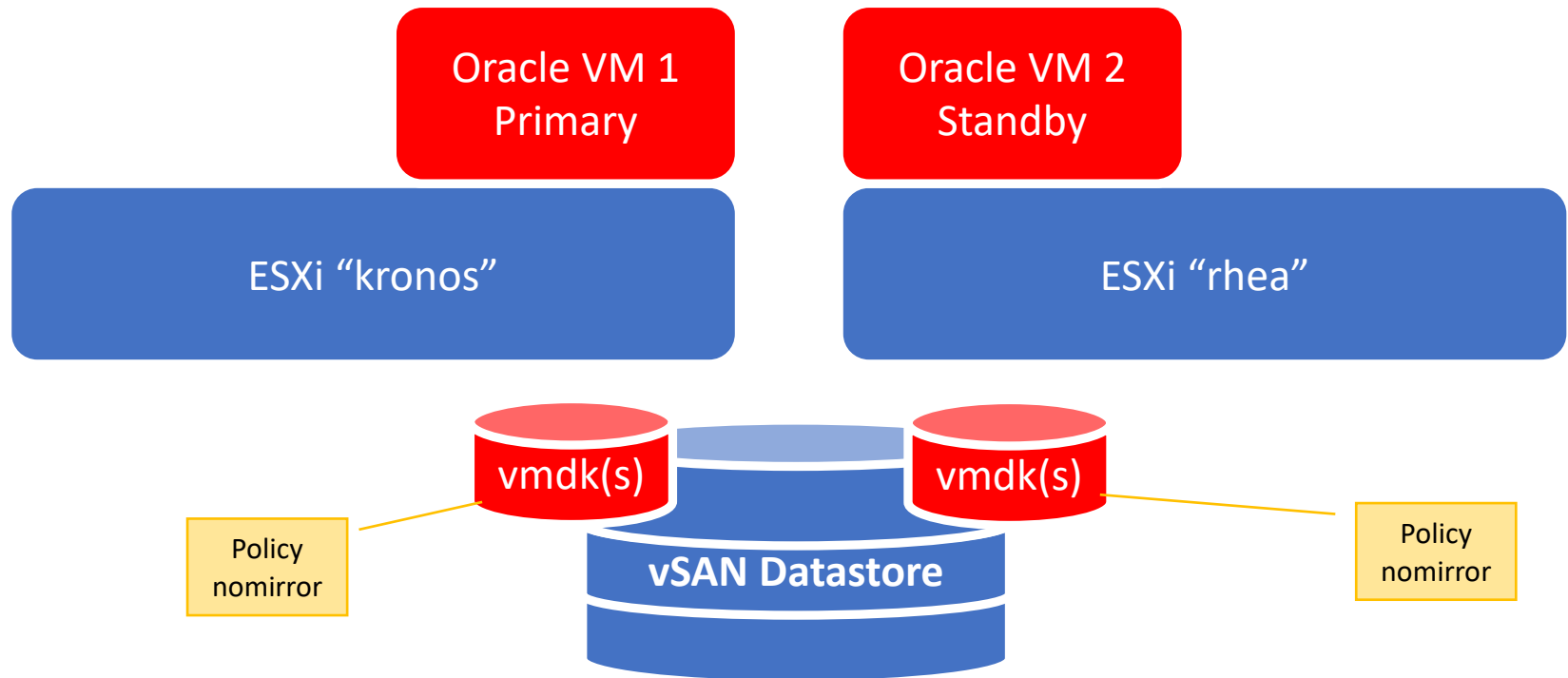
Test Gear, Hyperconverged



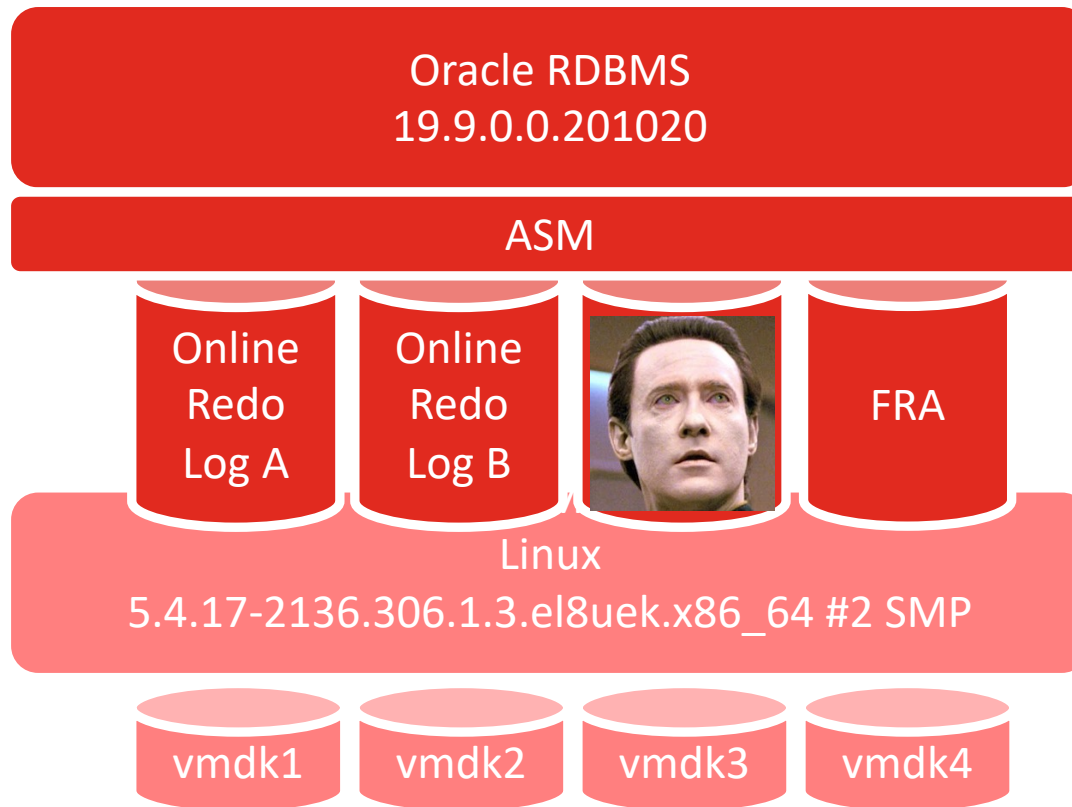
2x HP ProLiant DL385 Gen10 + 1 witness on old HW
each 1x AMD EPYC 7402 24-Core Processor
each 16 physical disks @ 10k rpm
NO flash cache ☹️
4x 1Gbit Trunk Network

VMware vSphere 7.0.1
vSAN 7

Test Gear, Hyperconverged

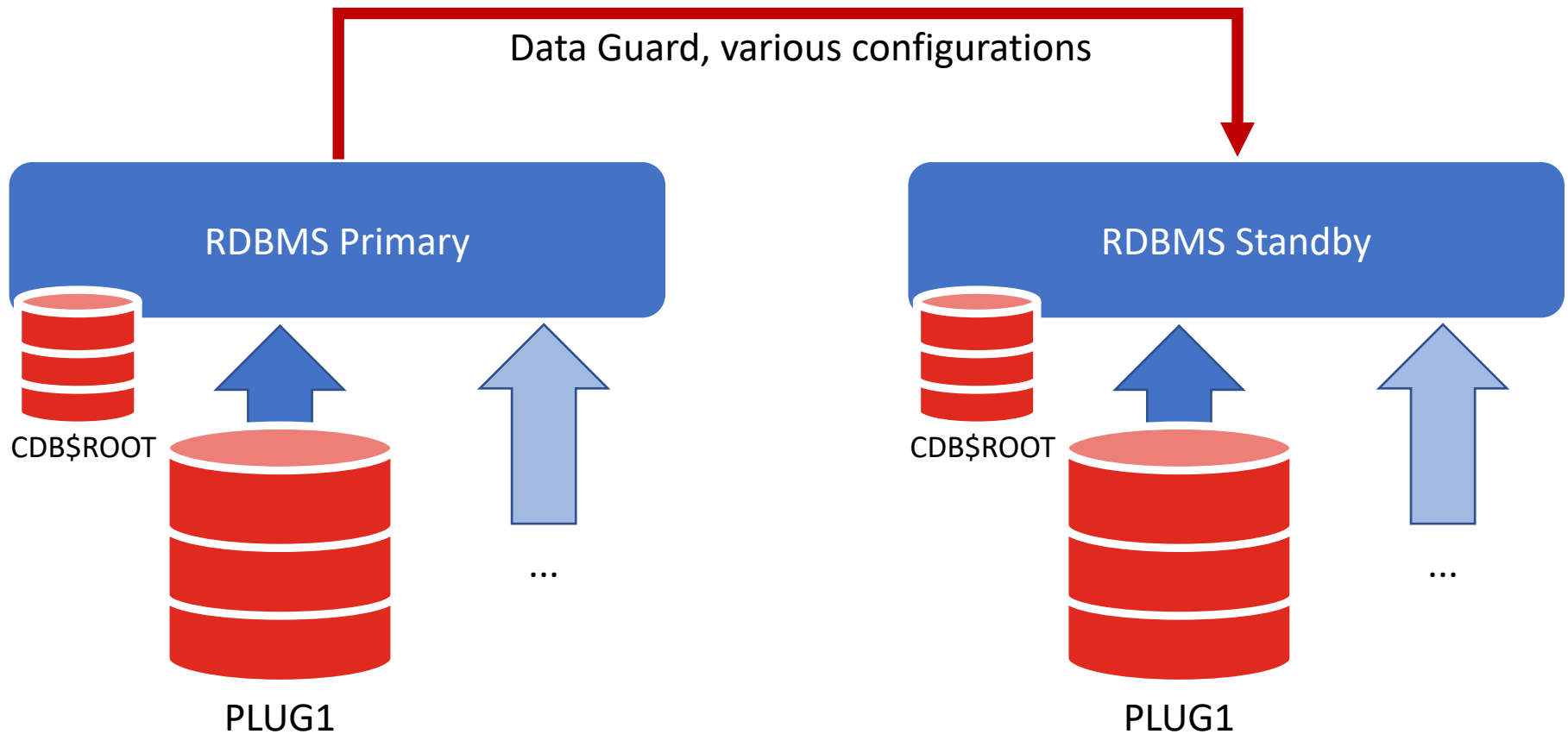


Test Gear, ASM



Test Gear

Pluggable, Data Guard



Performance Baselines

dd IO Baseline

= Multiblock IO

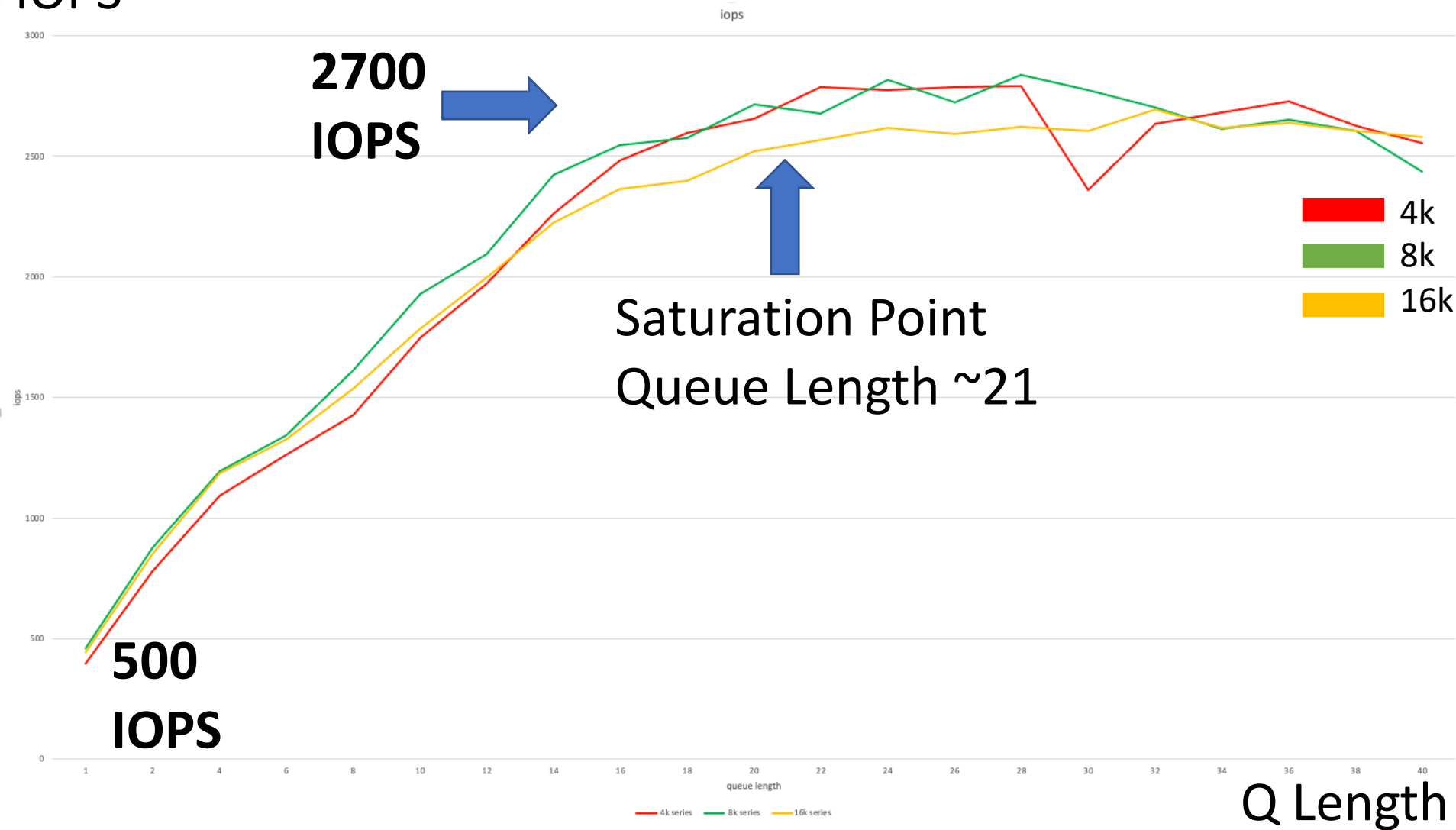
IO Size = DB_FILE_MULTIBLOCK_READ_COUNT * DB_BLOCK_SIZE

IO Size = 128 * 8k = 1024k

Input	Output	IO Size	MB/s
/dev/zero	/dev/BENCHMARK1	1024k	450-500
/dev/urandom	/dev/BENCHMARK1	1024k	~45
/dev/BENCHMARK1	/dev/null	1024k	200-250
/dev/zero	/dev/BENCHMARK1	8k	450-500
/dev/BENCHMARK1	/dev/null	8k	200-250

ORION IOPS Baseline

IOPS



ORION Latency Baseline

Latency

average latency

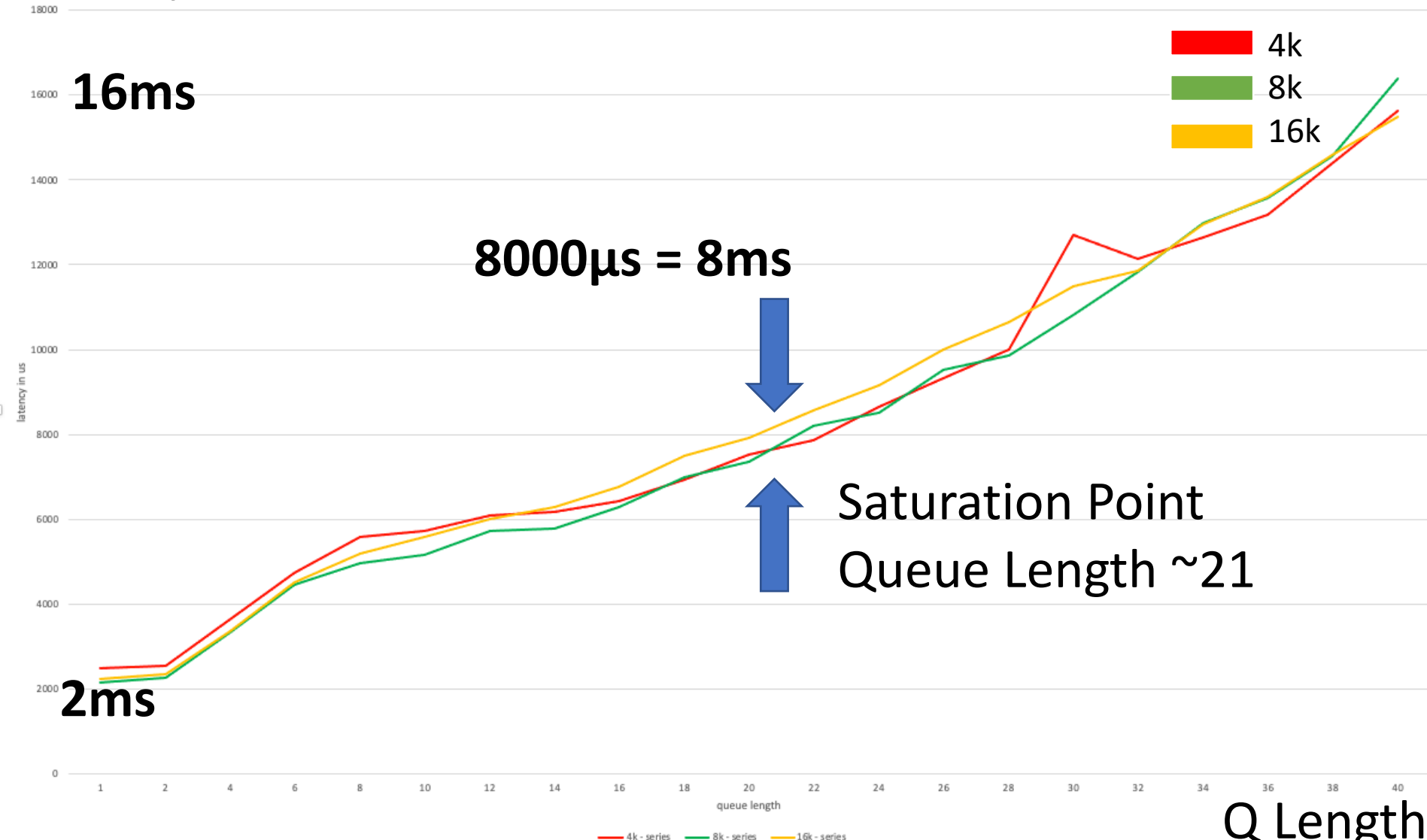
16ms

8000 μ s = 8ms

2ms

4k
8k
16k

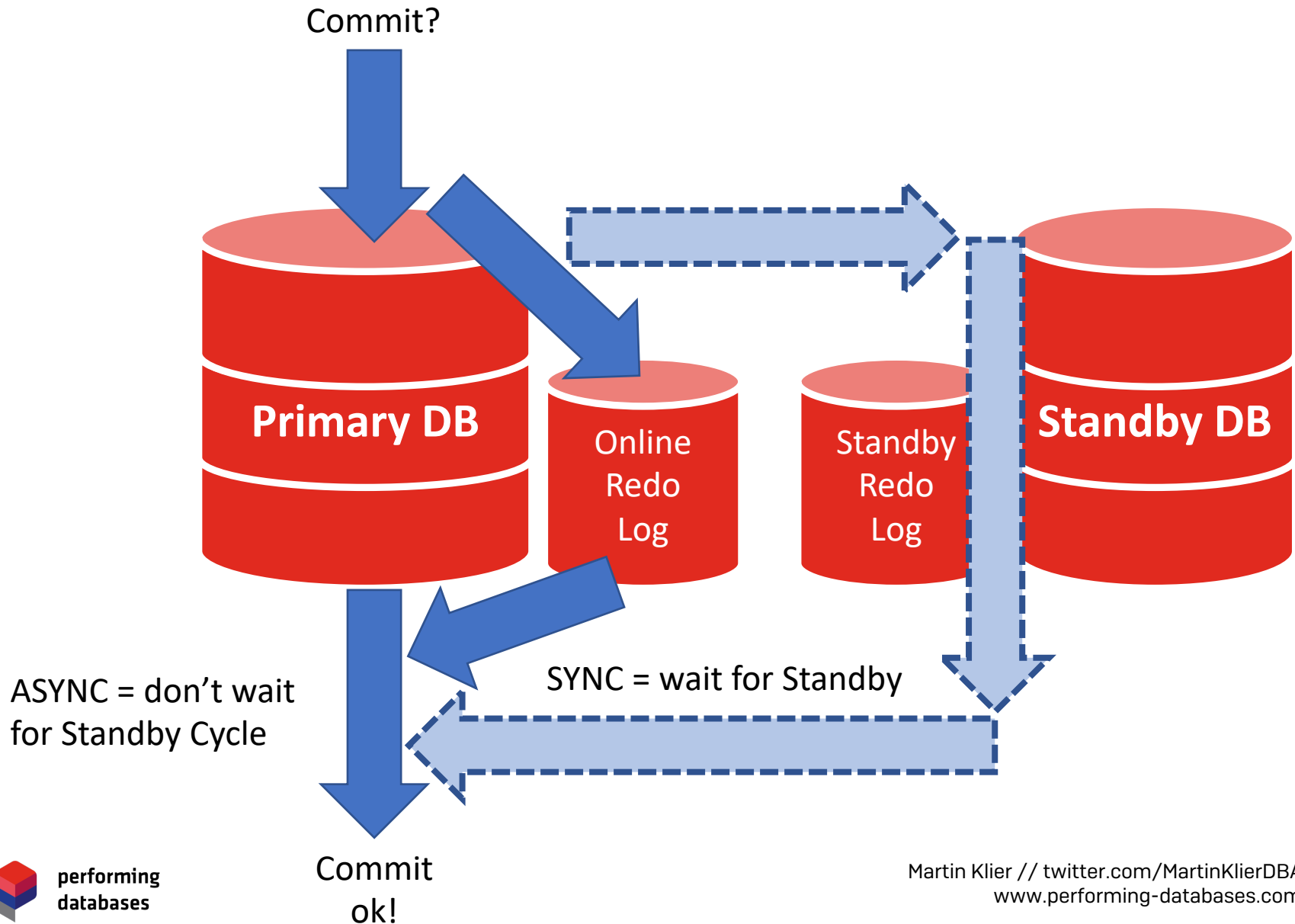
Saturation Point
Queue Length ~21



Data Guard Architecture

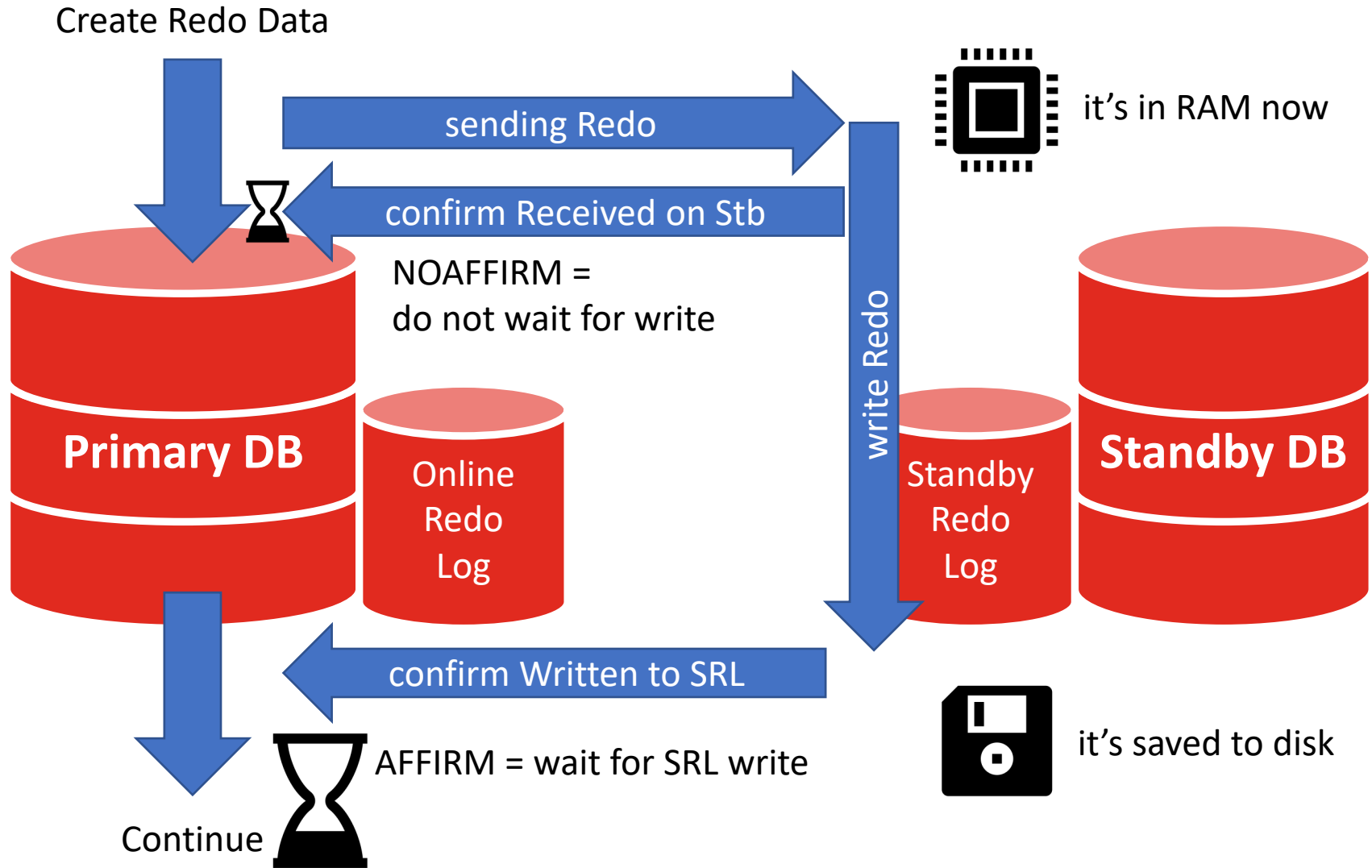
What is ASYNC vs. SYNC?

ASYNC vs. SYNC



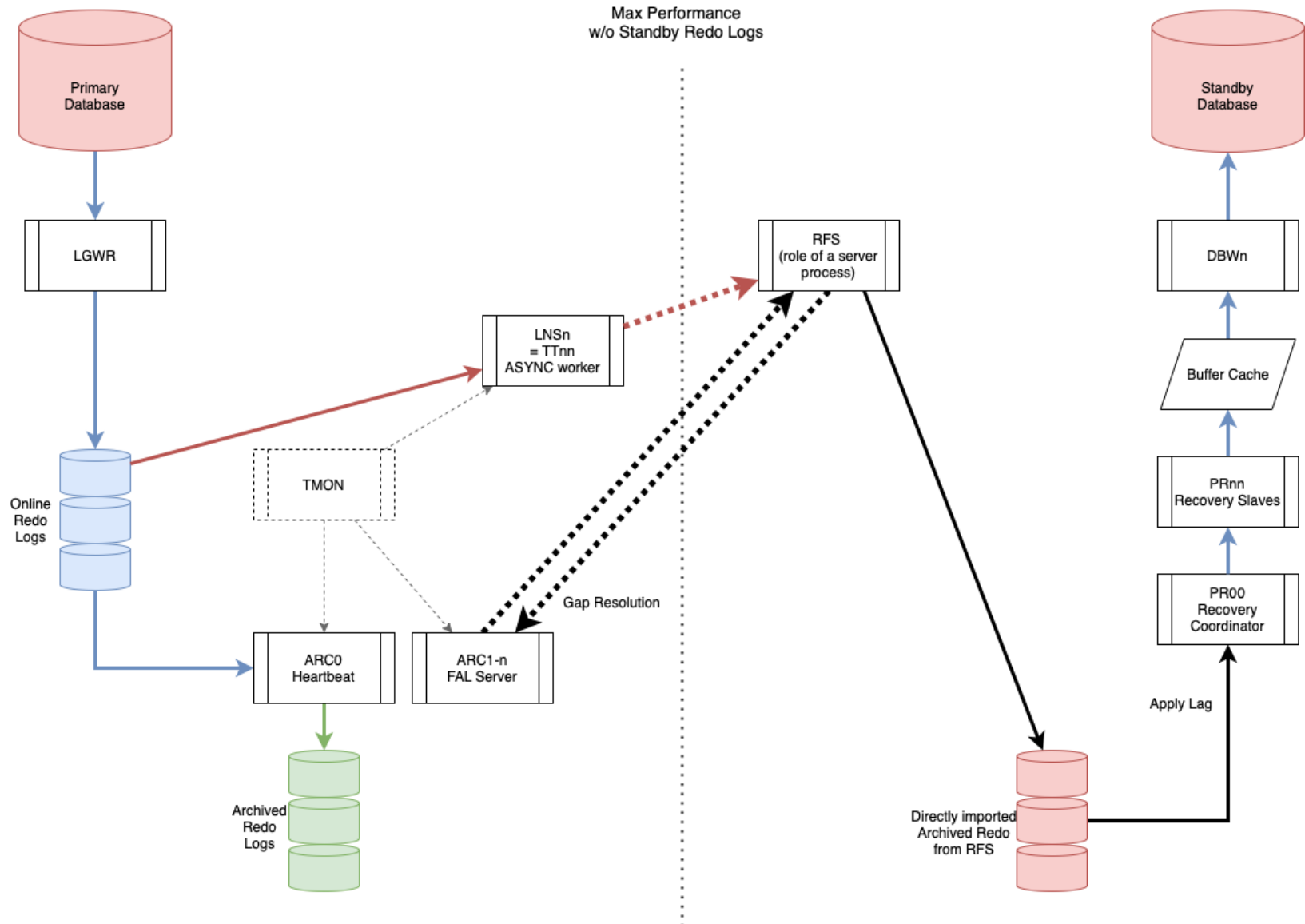
What is NOAFFIRM vs. AFFIRM?

NOAFFIRM vs. AFFIRM

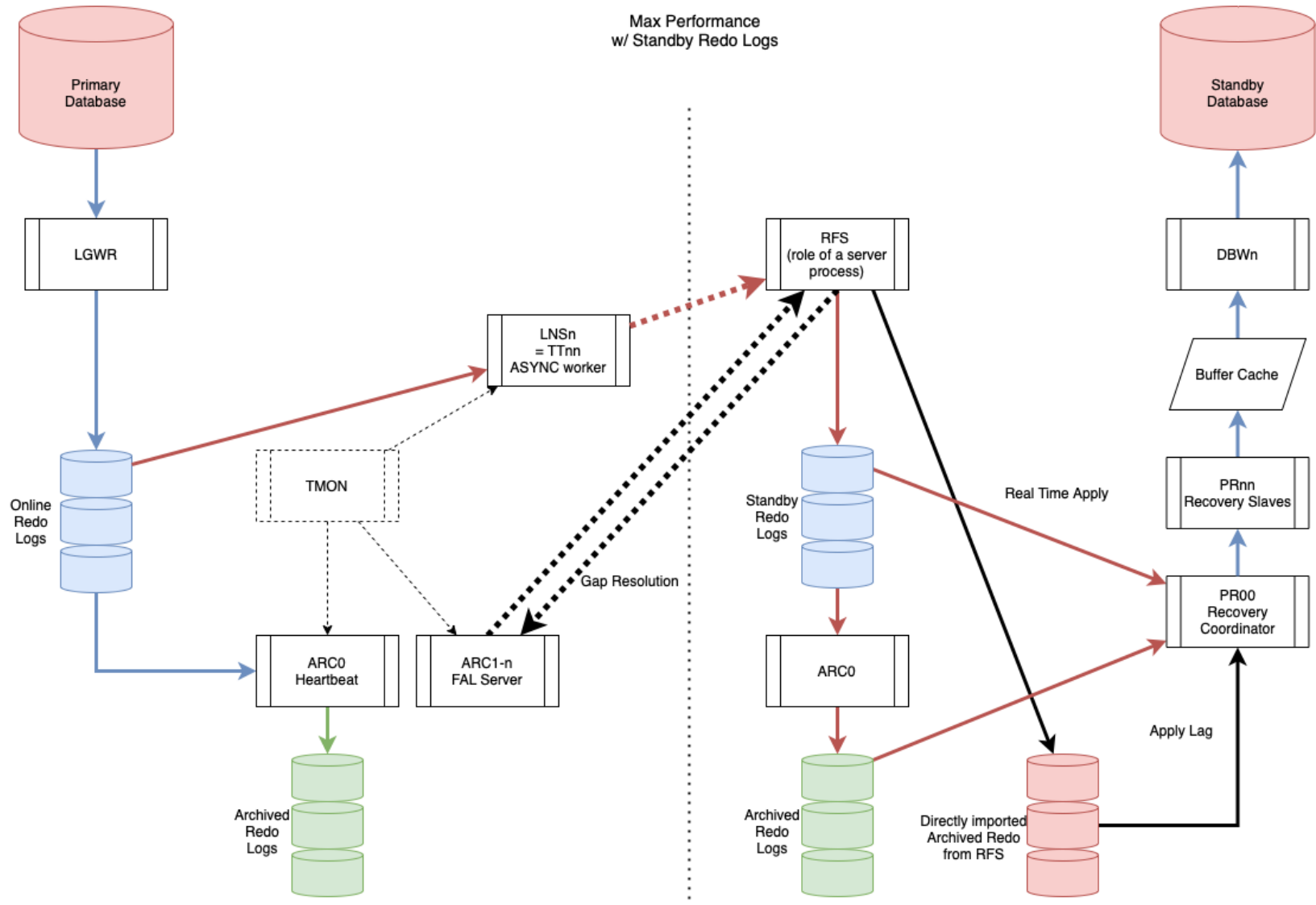


The Who is Who of Data Guard

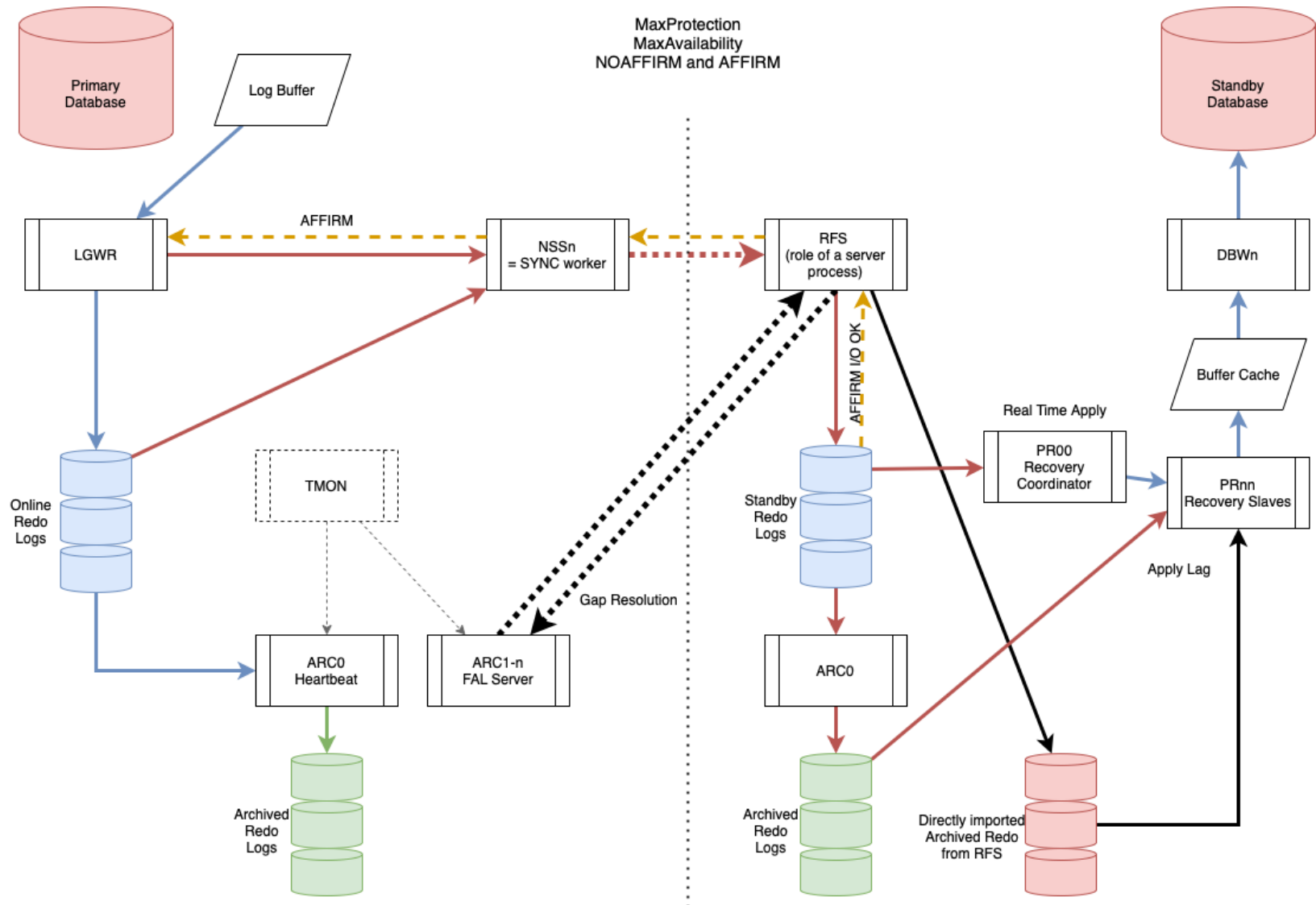
MaxPerformance w/o Standby Redo



MaxPerformance w/ Standby Redo



MaxProtection NOAFFIRM/AFFIRM

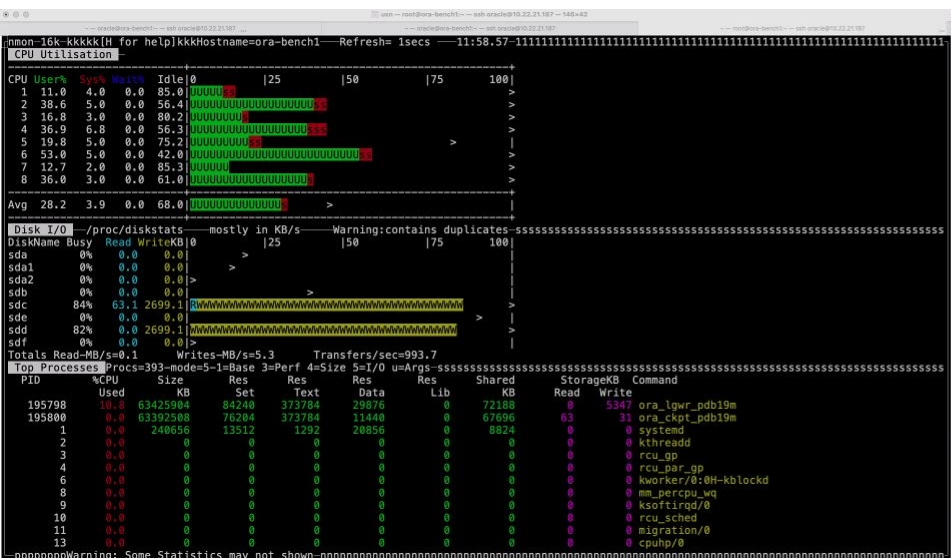


Data Guard Trials

1st Impression

Primary:

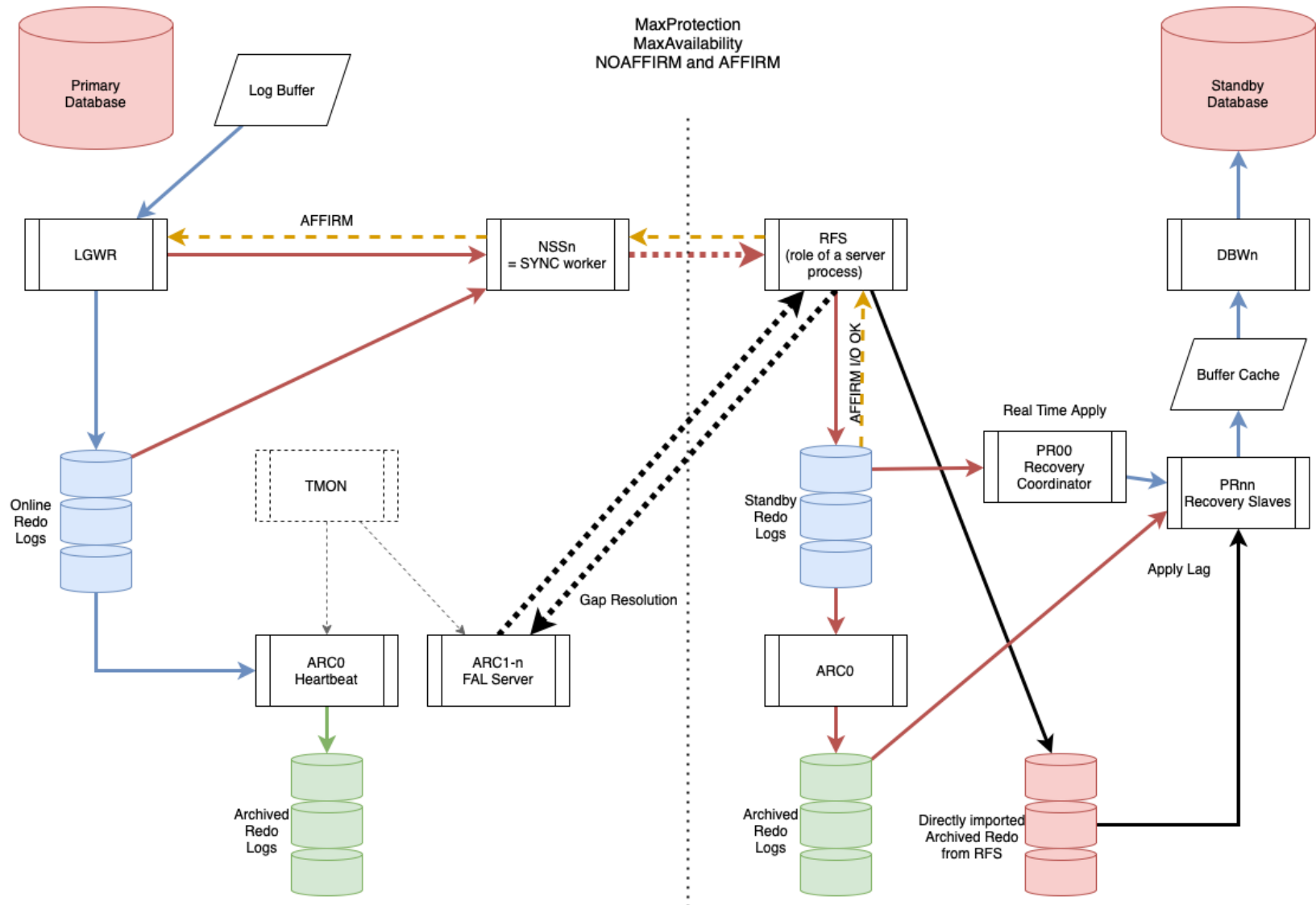
Standby:



Data Guard Trials I

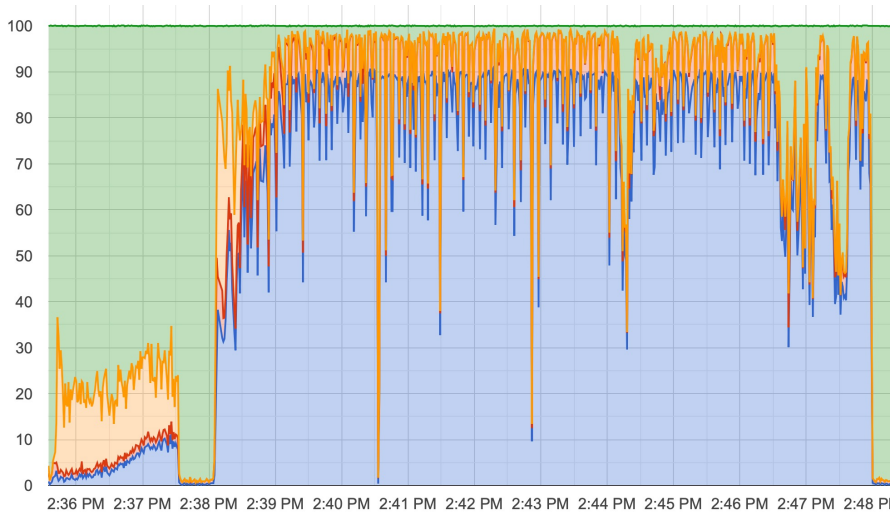
MaxAvailability SYNC AFFIRM

MaxProtection NOAFFIRM/AFFIRM

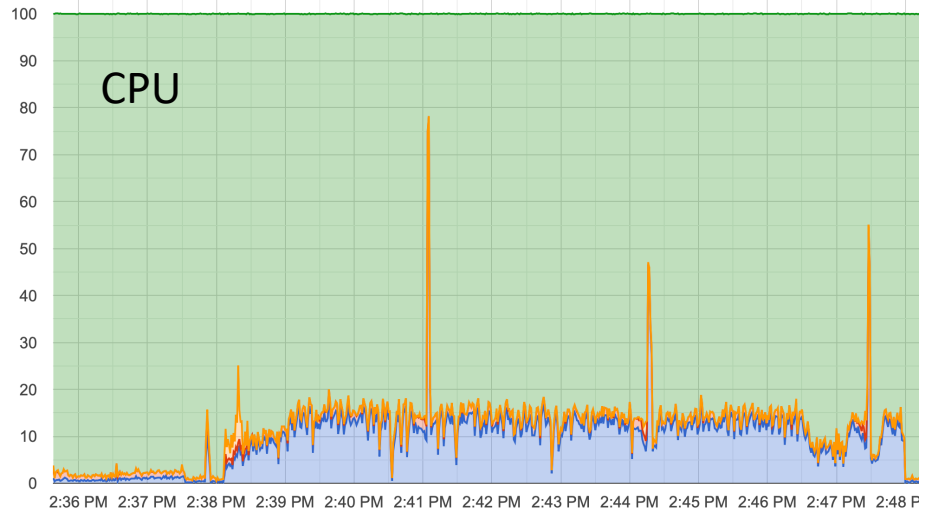


MaxProtection SYNC+AFFIRM

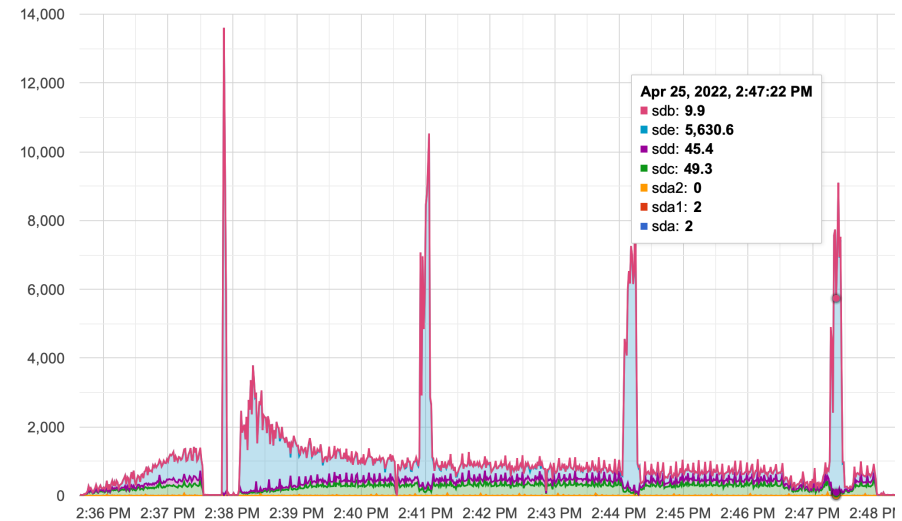
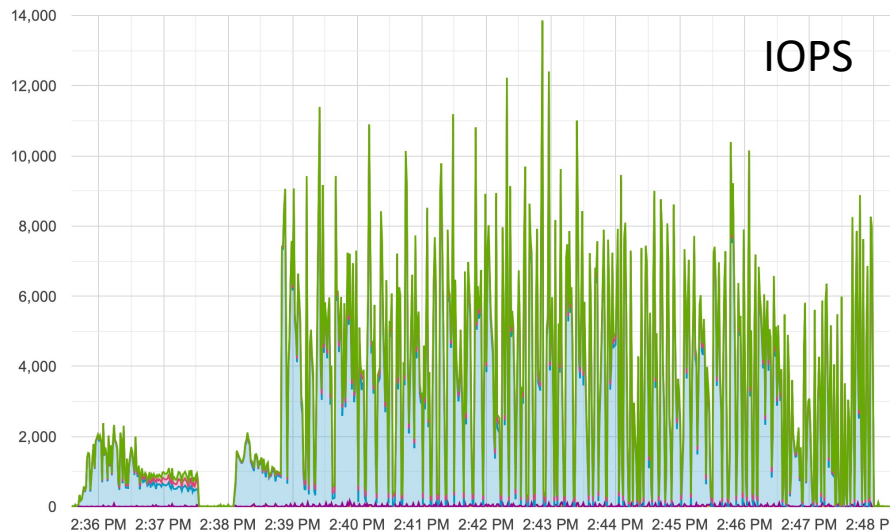
Primary:



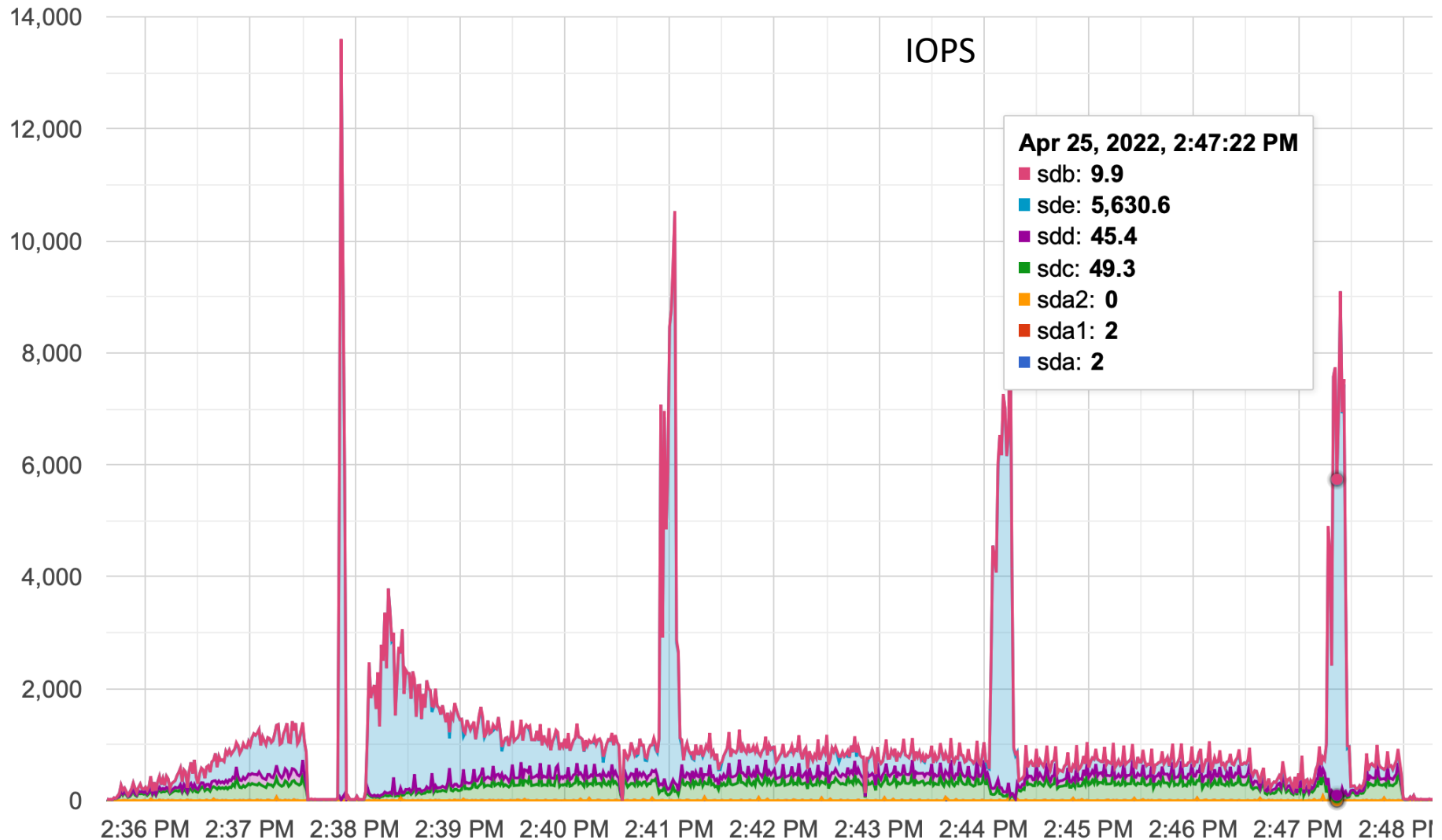
Standby:



IOPS



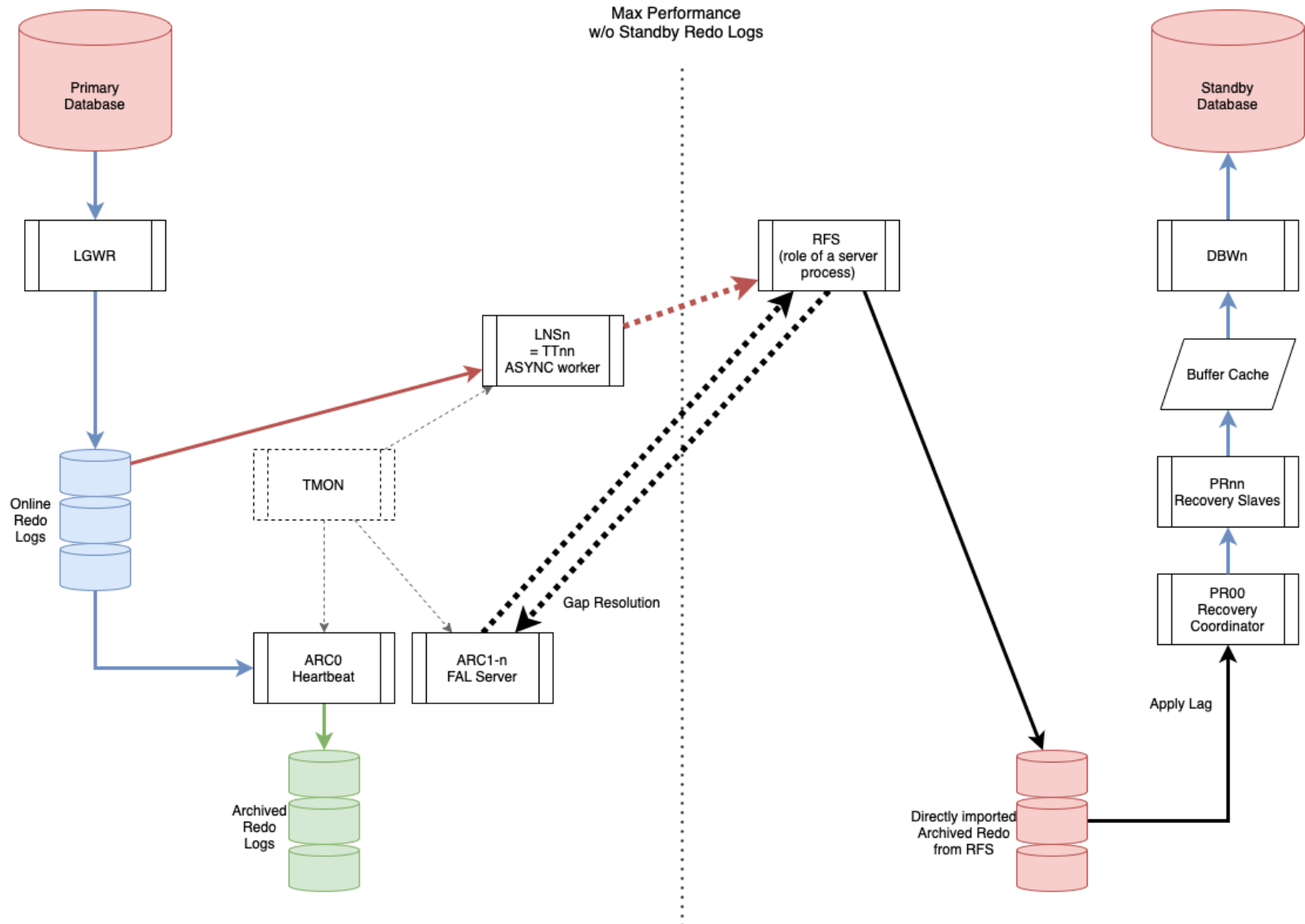
MaxProtection SYNC+AFFIRM



Data Guard Trials II

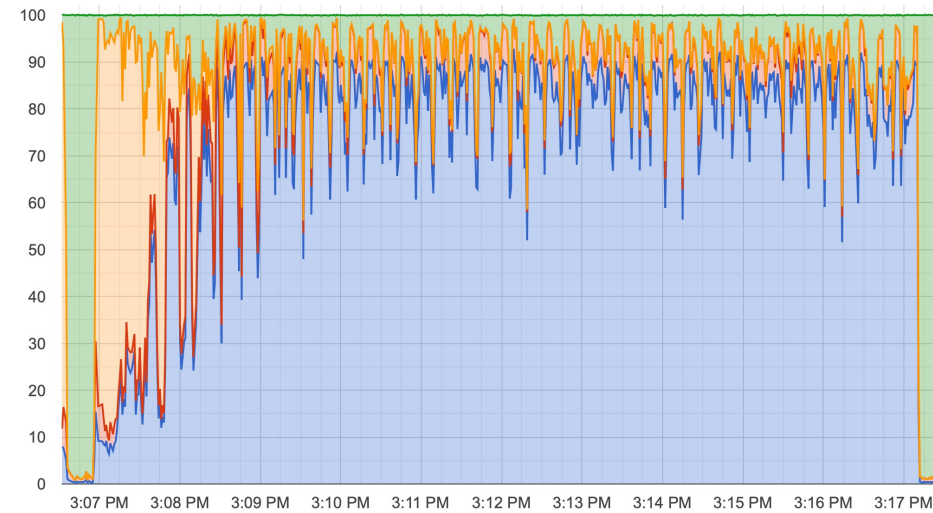
MaxPerformance ASYNC
w/o Standby Redo Logs

MaxPerformance w/o Standby Redo

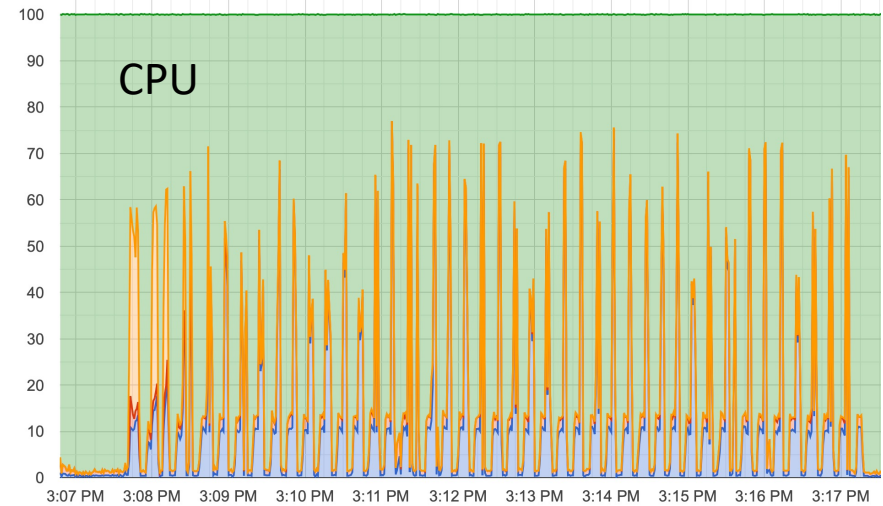


MaxPerf ASYNC w/o SRL

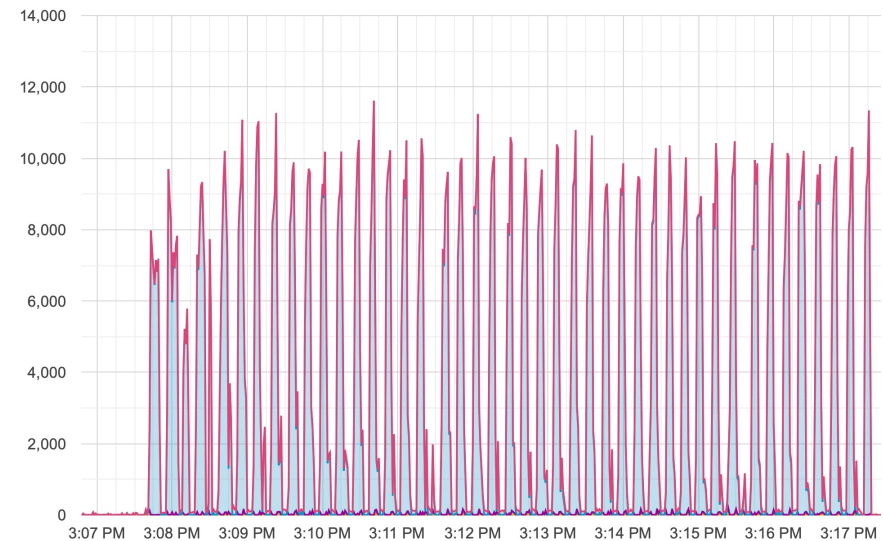
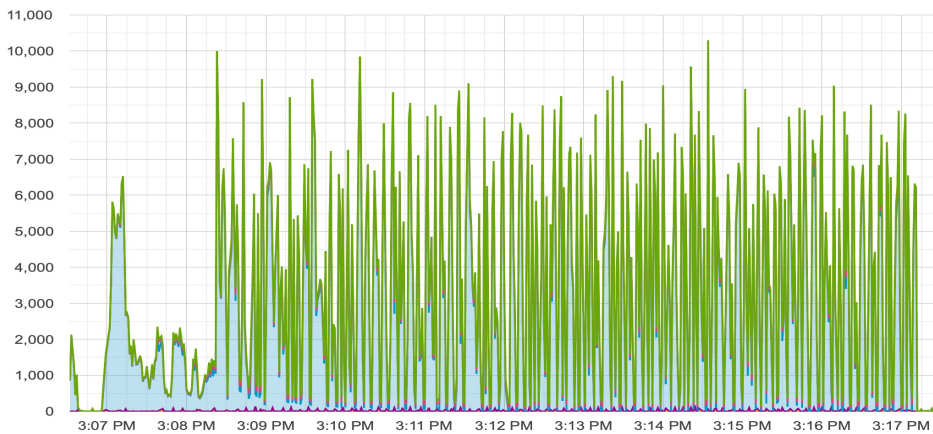
Primary:



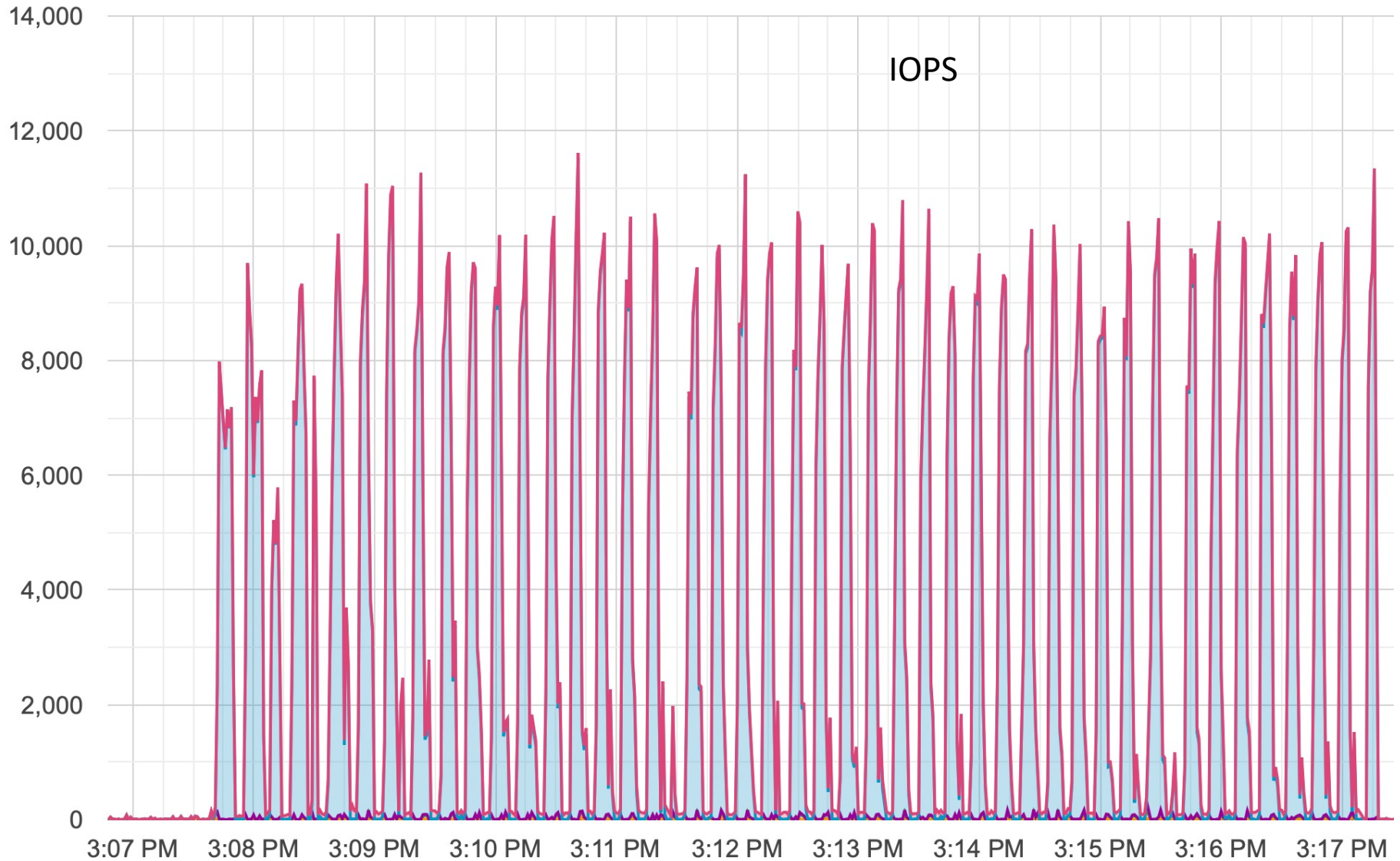
Standby:



IOPS



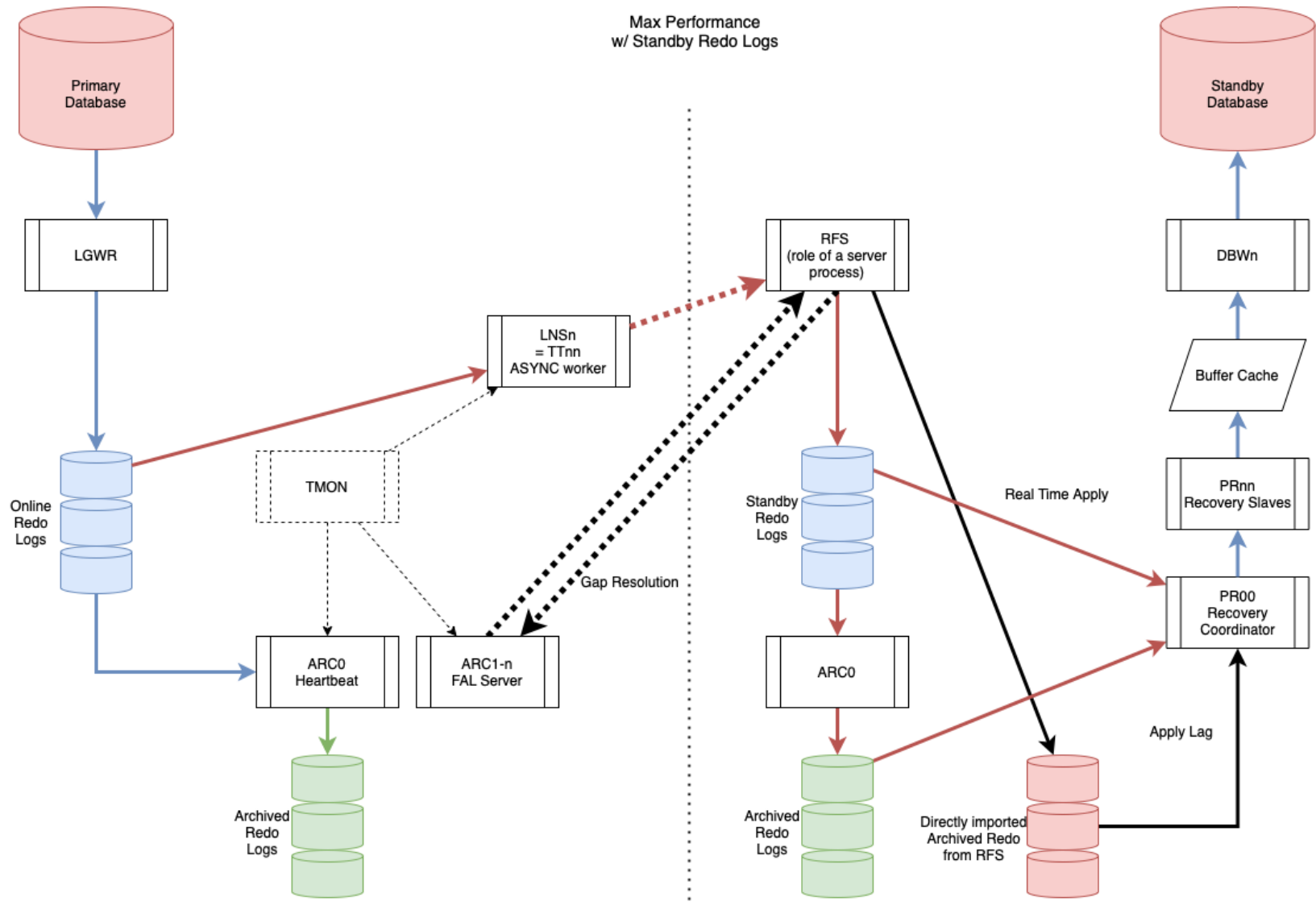
MaxPerf ASYNC w/o SRL



Data Guard Trials III

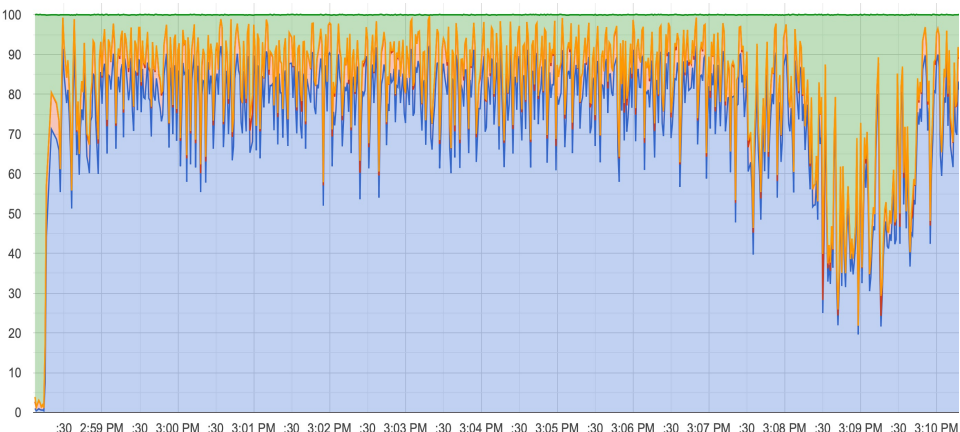
MaxPerformance
SYNC+NOAFFRIM
w/ Standby Redo Logs

MaxPerformance w/ Standby Redo

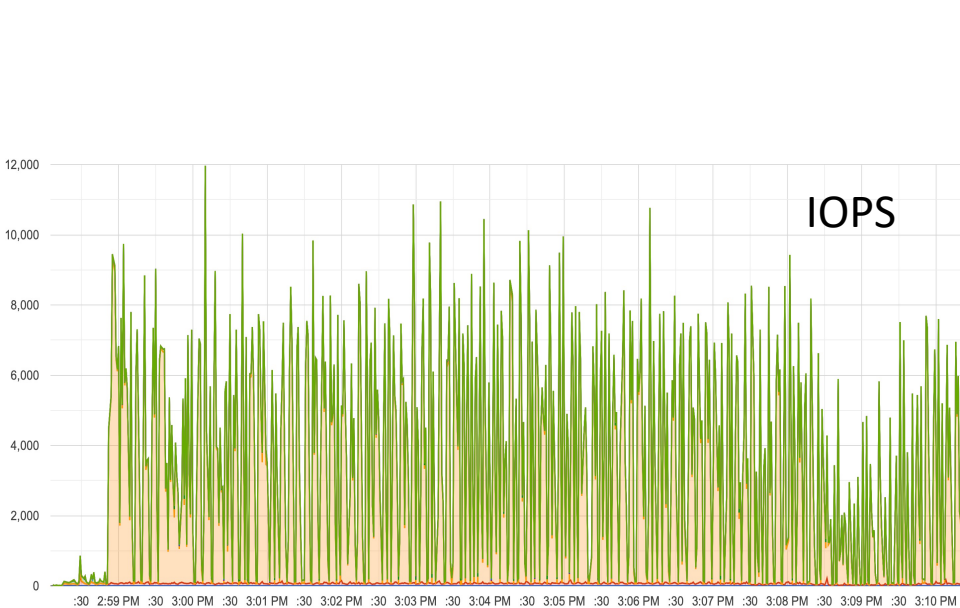
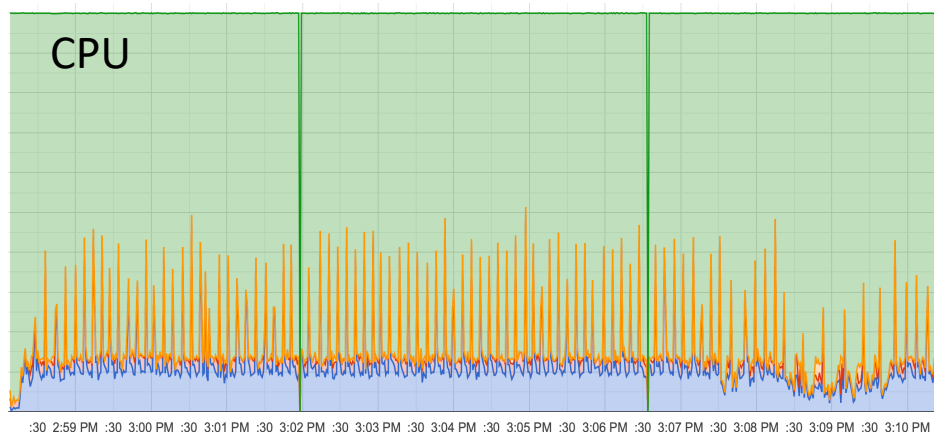


MaxPerf SYNC+NOAFFRIM w/ SRL

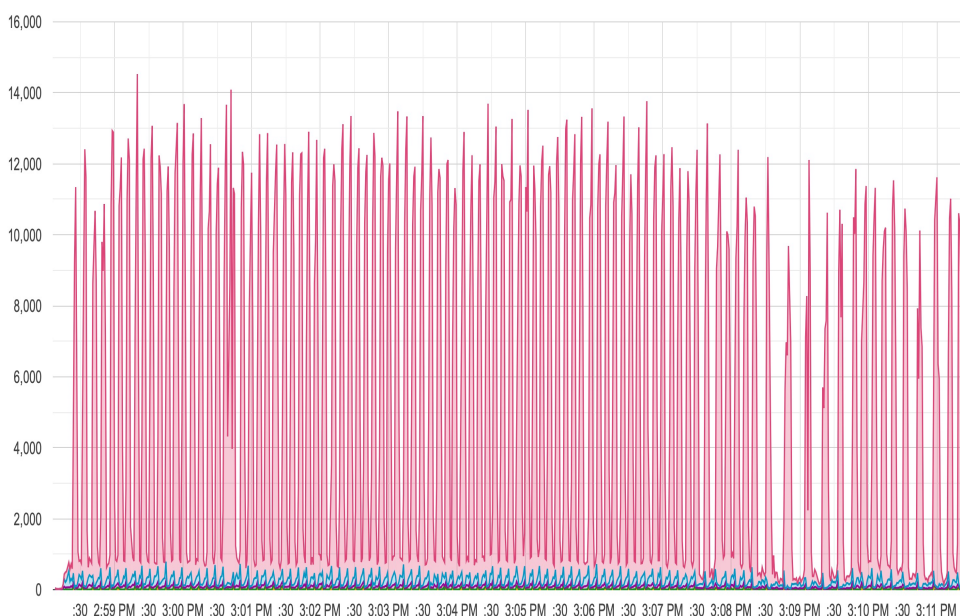
Primary:



Standby:

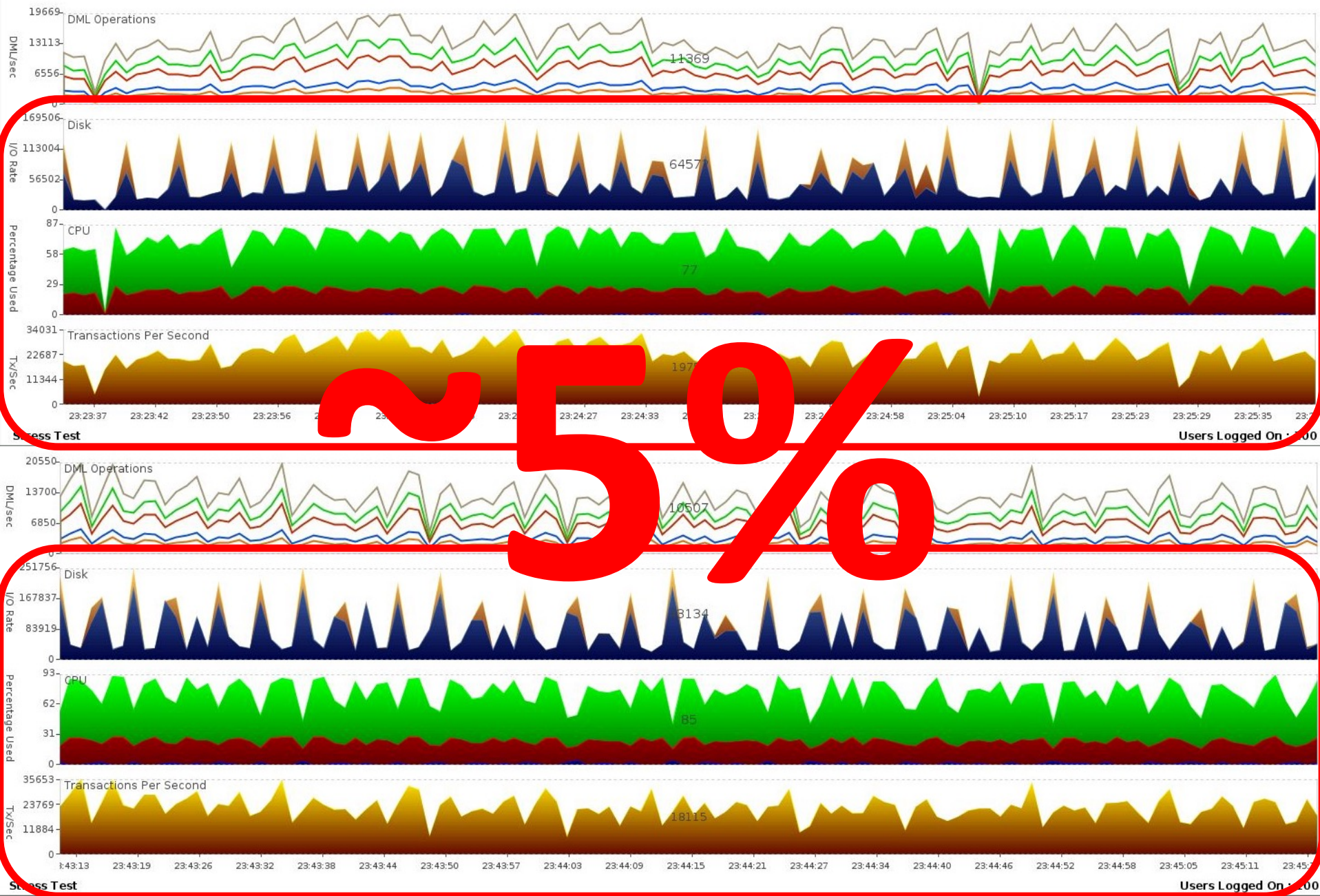


IOPS



Nearly done....

Data Guard: With and Without



The Old Song of Network Latency



Martin Bach - Swingbench for Oracle Research

<https://dokumen.tips/documents/swingbench-for-oracle-research-doagorg-complicated-queries-against.html?page=43>

Lessons to Learn about Data Guard Performance

- Oracle is efficient.
- Less impact than one might expect.
- I.T. depends! Mostly on the infrastructure.
- Right-size your Standby Machine,
never underestimate IOPS there!
- Nature of load is different on P and S

Now in this room - learn how we did it, tools and tricks!

WELCOME

Making of: The Price We Pay – Performance and HA with Data Guard

Axel vom Stein  BSS Bohnenberg GmbH
with Martin Klier  Performing Databases GmbH

Meet & Greet

martin.klier@performing-db.com

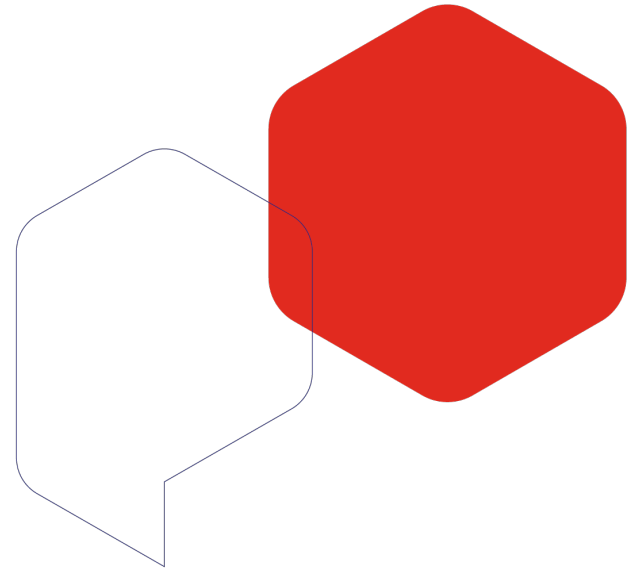
www.performing-databases.com

Many national // international events



Trivadis Performance Days 2022

Efficiency is
to stay in touch!

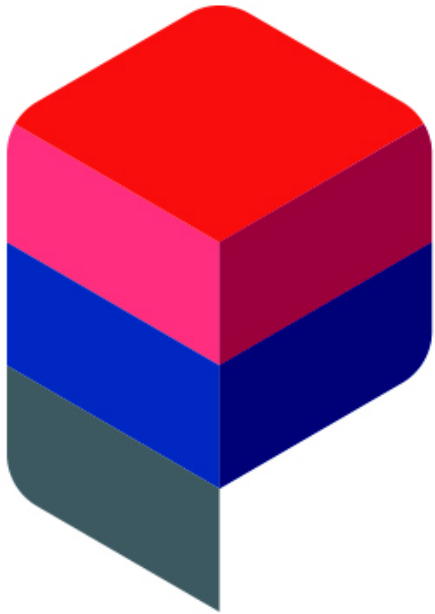


martin.klier@performing-db.com

<http://www.performing-databases.com>



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