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Oracle Global Leaders Program

June 23 - 16.15 CET

Oracle Global Leaders Summer Meeting EMEA 2020

Oracle Exadata for Analytics Panel

Dr. Marcus Prätzas
Enterprise Architect
Deutsche Bank - Germany

Luis Esteban
CDO
CaixaBank - Spain

Stephen Bendall
Oracle Technical Authority
Vodafone - UK

André Giger
Head of Unix Platform Services
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Oracle Exadata for Analytics – Update

Dr. Marcus Praetzas, June 2020,Deutsche Bank AG

Agenda

1. Introduction

- Deutsche Bank
- Exadata Experience & Estate

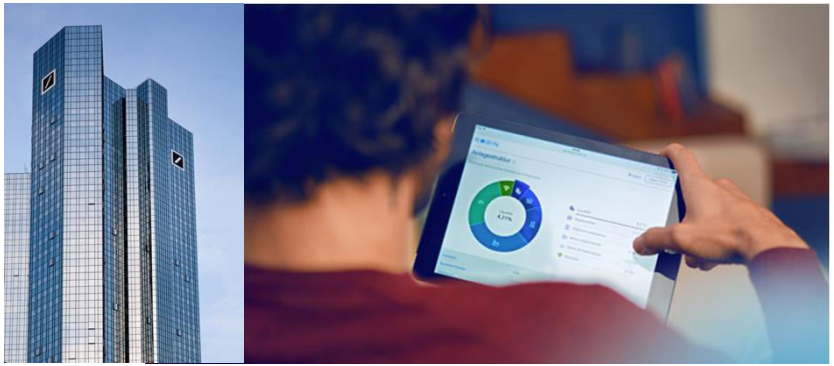
2. Analytics - Example

- dbART Platform - Analytics, Reporting and Trending
- Change Risk Prediction and Quality Assessment
- Production Support Effort – Corona / WfH

3. Exadata Outlook

- PoC Exadata Cloud Service + Autonomous Database

Deutsche Bank AG



- Founded 1870 in Berlin
- Picture: Frankfurt Branch by Roßmarkt 18 around 1930.
- Internationalisation 1955 – 1988
- Global from 1989 – now
- 1989: Acquisition of the British merchant bank Morgan Grenfell
- 1999: acquisition of Bankers Trust
- 2006: acquisition Berliner Bank, Norisbank
- 2010: acquisition Postbank, SalOp.
- 2017: #PositiveImpact
- 2018: Initial Public Offering of DWS
- 2020: 150 years

Oracle Exadata Experience – since 2010

Stable, resilient, performant and cost efficient operation of the Oracle database estate

20+ (critical) Applications

- Risk & Capital Planning, Regulatory Reporting, Compliance, Tax, Payment Processing, Financial Messaging,

Features

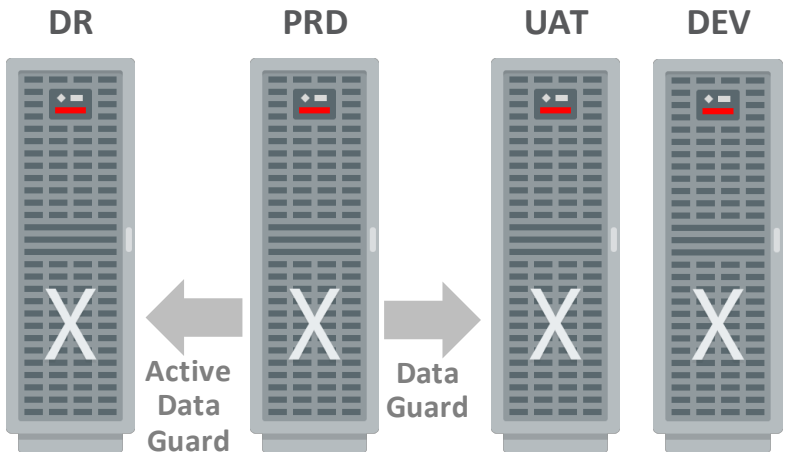
- RAC, In Memory, Multitenant, Active Data Guard

Global Deployment

- 48% Germany, 43% UK, 9% US
- All versions from Exadata X2 to X8

Experience

- Started in 2010
- Initial Focus on performance
- Proven stability ever since



> 65 Exadata Systems and > 37 PB of Data

Build future platform on Exadata … "cloud-ready" … "in cloud"

dbART Platform

Analytics, Reporting and Trends

Objective

— dbART provides analytical and reporting capabilities for compliance, risk and stability metrics for the Bank's IT department: "Technology, Data and Innovation" … and beyond.

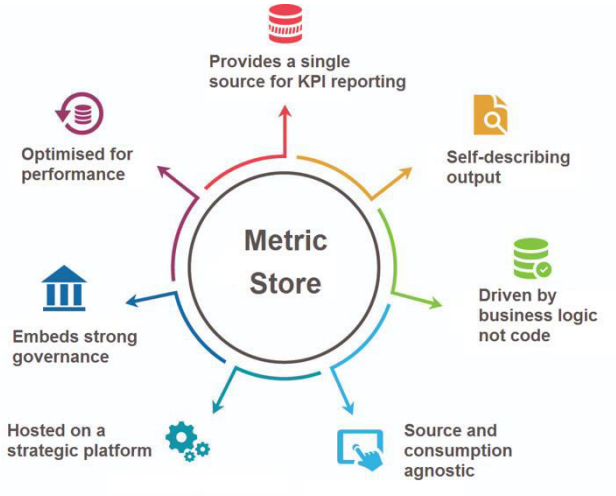
Focus

— Key Performance Indicator reporting for the Bank's Balanced Scorecards, Group Architecture, Product Management and Product Engineering.

— Stability and Risk analytics for IT Service Management information (incident, problem, change), None Financial Risk Management, IT Stability Risk (ITSR)

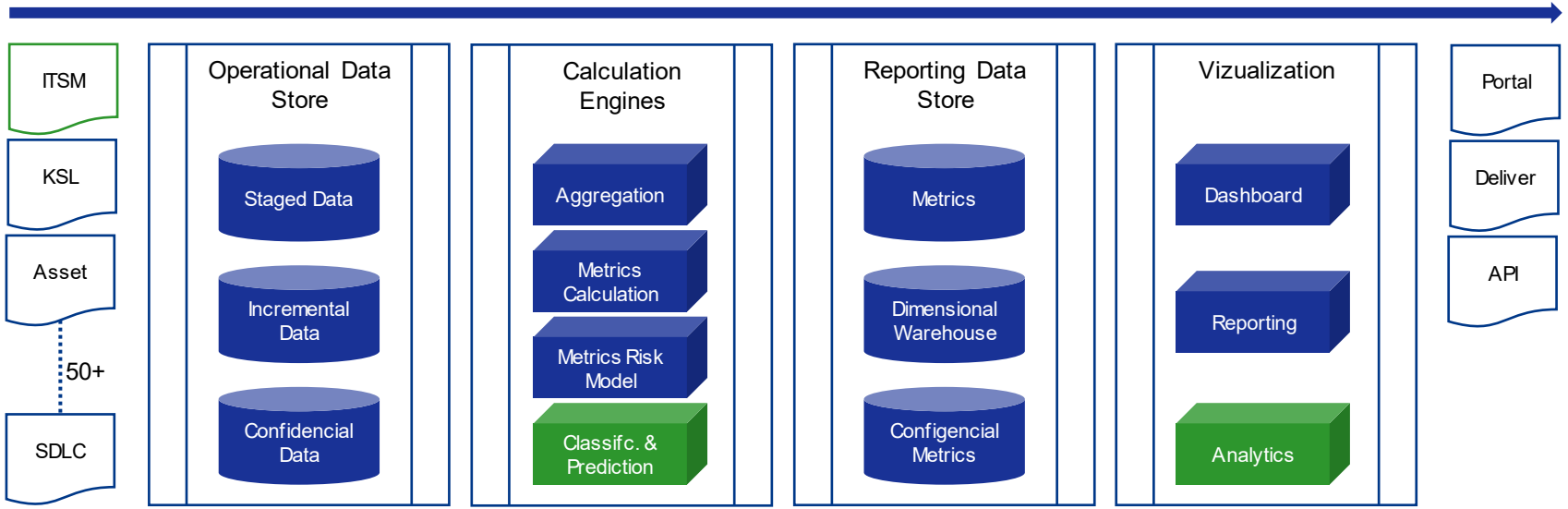
— Compliance status on Vendor Management, Technology Roadmap, Audit, eTrading Governance and Controls

— High degree of Self Service to create and maintain metrics



dbART Platform

Architecture



Use-Case: Change Risk Classification

Automated prioritisation

100 % Change Tickets*

Manual Review
All

+80% OK-Tickets

100 % Change Tickets*

1. Adjustable Filter
Automation vs Error-Rate
e.g. for an automation rate of 20% an an error of 1,8% of not detected risky tickets (w atch=1) is expected.

Priority 1 Manual Review
likely High Risk

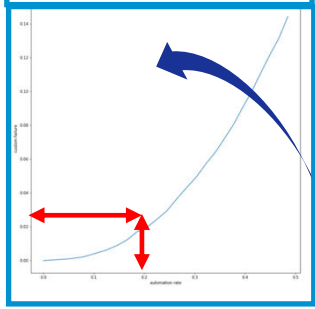
Priority 2 Manual Review
likely Low Risk

Likely High Risk-Tickets

Likely OK-Tickets

XGBoost

Word2Vec



2. AI Learning Engine
Datasets w hich can be predicted by the trained machine learning model w ith a sufficient confidence w ill be filtered out.

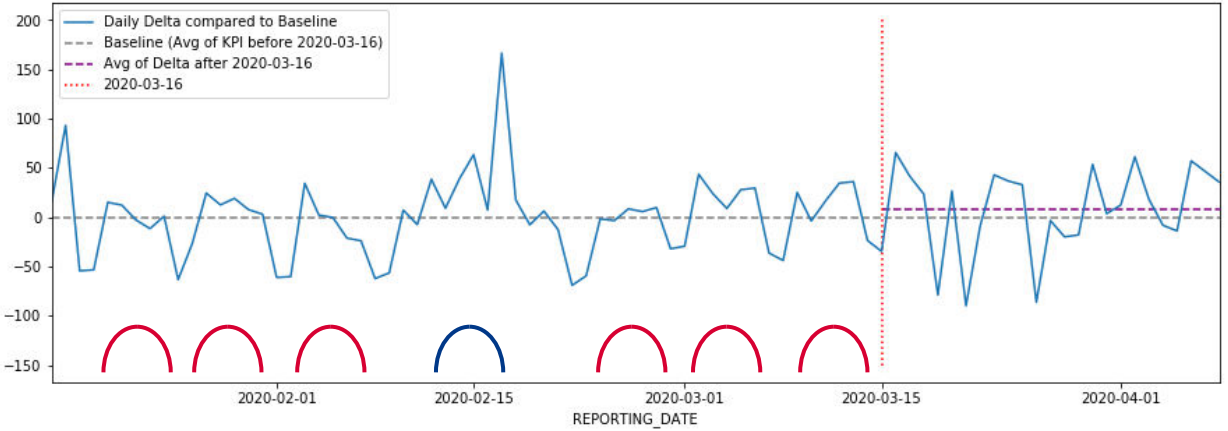
* Relevant change tickets, not already covered by standardized templates

Ad-Hoc Use Case – Production Support Activity

Observations pre- and Post Corona initiate Work from Home (WfH)

- Production support activity is measure by a (normalised) combination of data source such as job scheduling, incident, problem and change tickets, key stroke logs in the production environment or for production support.
- At March 16th Work-from-home was initiate for most production support functions, globally

- The weekly pattern seems broken as it before only happened occasionally
- The average production activity is slightly higher than before



Forecasting

Weekly pattern

PoC Exadata Cloud Service + Autonomous Database

Highlights

— Connected to Oracle Public Cloud Datacenter over a 6 month period (Frankfurt Region – Oct 2019 – Mar 2020)

— Executed 40+ test cases to review functional and none- functional requirements jointly with support from Oracle

Exadata Cloud Services Results

✓ Exadata Cloud Service delivers equivalent level performance, availability and recoverability to Exadata On Premise

Significant additional advantages to Exadata On Premise

✓ Much Easier Setup, Manageability

✓ Much Easier Patching

✓ Dynamic CPU Scaling

✓ Comes with Encryption using TDE and with Standard Audit functionality

Autonomous Database Results

✓ Easier setup than Exadata On Premise: less optionality to customize

✓ Zero configuration required

✓ Operational tasks performed by Oracle: Monitoring, Patching, Backup, Upgrade, Tuning

✓ Usual Oracle Database tools are available

✓ Latest Release Automated features included

✓ Performance equivalent to Exadata Cloud Service

Not tested with Autonomous

• Disaster Recovery with Oracle DataGuard: release planned by end CY20

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Oracle Global Leaders EMEA Summer June 2020

Stephen Bendall


Vodafone
Our journey with Engineered Systems

The Vodafone story so far. .

We're one of the world's leading mobile communications providers, operating in 24 countries and in partnership with networks in 40+ more. Across the world, we have 625+ million customers and 18+ million in the UK. We are also a global leader in IOT solutions with 94+ Million connections

Ours is a story of investment, innovation and award-winning customer service. We're also winning the race on 5G across Europe, with Vodafone 5G live in more than 100 places across the UK and other European countries, which is more than twice as many locations as any other provider!

40 places in UK, 68 across Germany, Spain, Italy & Ireland

COVID-19

Over the last few weeks, we've seen a huge change in behaviour for our voice and data traffic – with a 30% increase in internet traffic, more than 25% increase in landline calls, and 42% increase in mobile voice traffic

vodafone.co.uk/network

Who am I ?

Stephen Bendall
Oracle Technical Authority for Vodafone UK

Leading this large telco's interaction with all of Oracle Technology, (Hardware, Software, Cloud and Services)
Architectural overview of multi-vendor solutions that are created and ensuring that they are delivered to provide real advantage to the company and to our customers.
With over 25 years of experience working with business critical, always-on environments in Healthcare, Finance and for the last 7 years, Telecoms. I am always looking for opportunities to drive the state of the art further forward.
Working as a professional within IT since 1992 with System V Unix , Novell Netware

Working with Oracle products, starting with Database in 1997. Using 7.1

My background always had an Engineering viewpoint, and that is still the attitude I approach things with now.

Worked for local government , then the NHS for 10 years, moved on to FCA regulated insurance for 8 years, then 7 years ago lured to Vodafone.
Vodafone is an exciting and challenging tech-comms company, I have not been bored once in the years I have been there.

Vodafone :
Customer Centric Stack

CSS – Customer Centric Stack

- What is the CCS ?
  - Call Centre Agents
    - Order System
    - CRM System
    - Billing System
    - Provisioning System
    - Payments Interface System
  - Mobile App
    - My Vodafone App
    - VeryMe
  - Vodafone.co.uk
    - Website back-end & Self-service
  - Financial Reporting

CSS – Customer Centric Stack

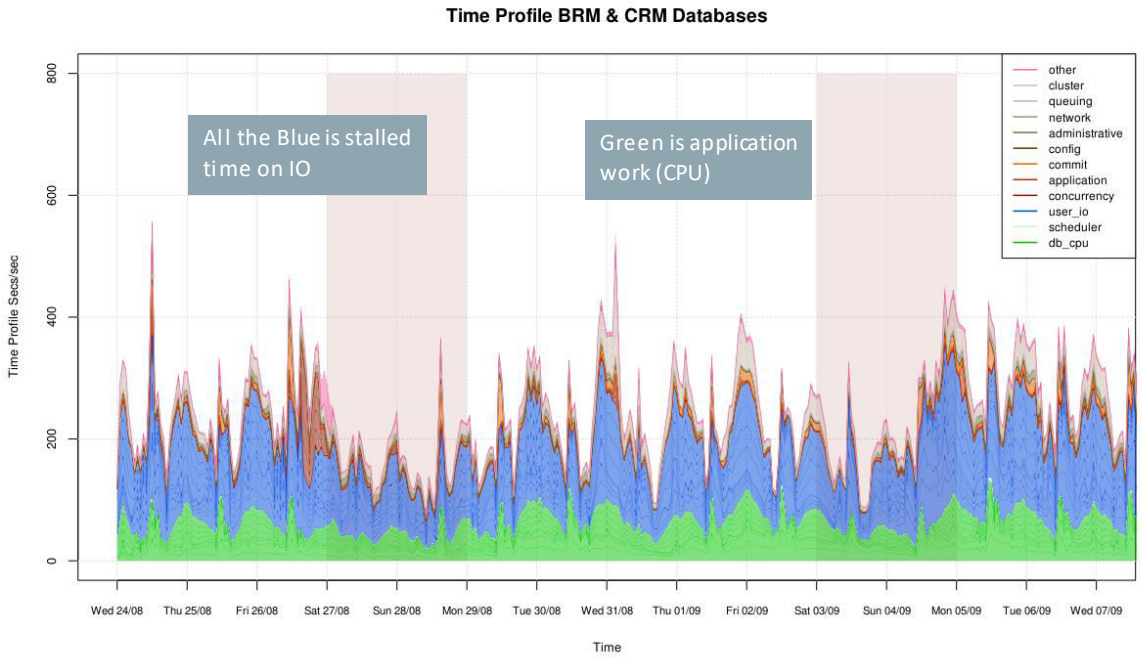
- History “NewCo” approach
  - 18M+ Customers
  - ~3 Billion CDR records / day from cellular network
  - Oracle Software Stack (RODOD)
  - 13 Oracle Applications / Databases ½ PB OLTP
    - Security systems… Identity and Authentication.
    - Billing (BRM) – 200TB
    - CRM (Siebel) – 80TB
    - Documents (WCC) – 60TB
    - Provisioning (OSM) – 25TB
    - Inventory (UIM) – 25TB
    - Fusion Middleware – 10TB
  - 2011 – Deployed/Go Live – Oracle X86 infrastructure
  - 2014 – EMC Storage deployed
  - 2014 – First Exadata’s for OSM only
  - 2017 – All Databases considered for Oracle Exadata
  - 2018 – All Databases in this stack completed transition to Exadata

AWR Analysis of Customer Centric Stack (Databases)

- Was initially built in 2011
- Using more traditional infrastructure & iterations
- Compute and SAN , NAS Storage

- Issues with this:-
- End 2 End Ownership
  - HP & Dell Compute
  - EMC SAN
  - Netapp NAS
  - Interconnect for SAN / NAS / 10GBE
  - Issues / patching / problem resolution.

Improvements Analysis CRM + BRM Combined



Breakdown where time is spent

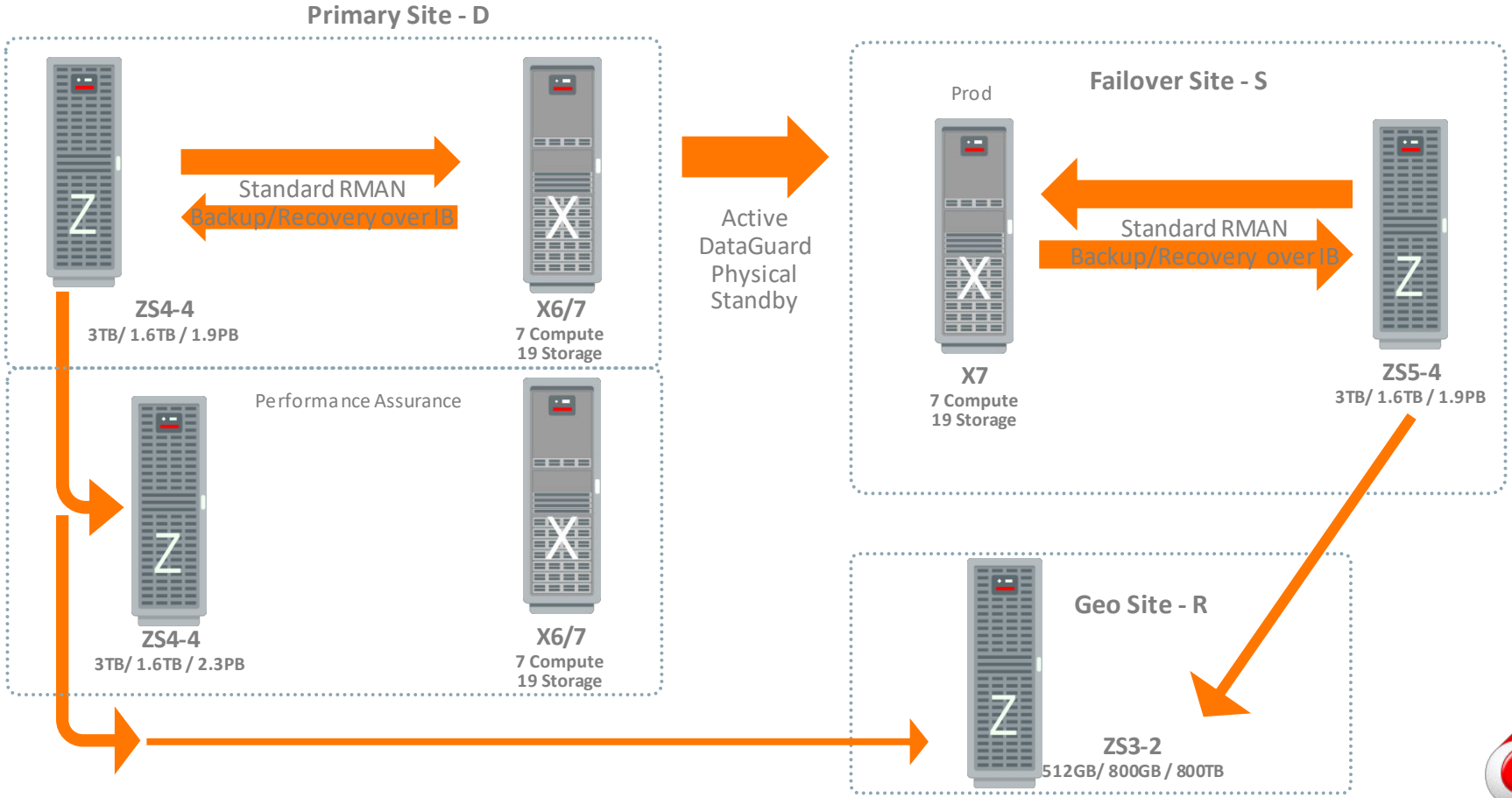
- Green: Useful CPU work
- Blue: stalled waiting for IO
- **Queries spend 50-80% time stalled**
- Exadata will eliminate stalling for IO

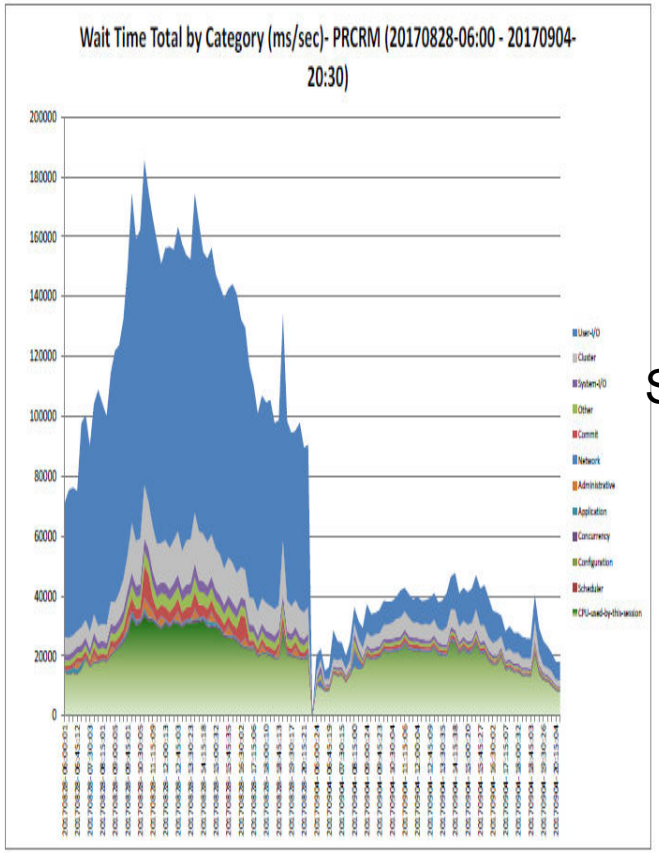
Total SQL Time Reduction Expectation

2-3x

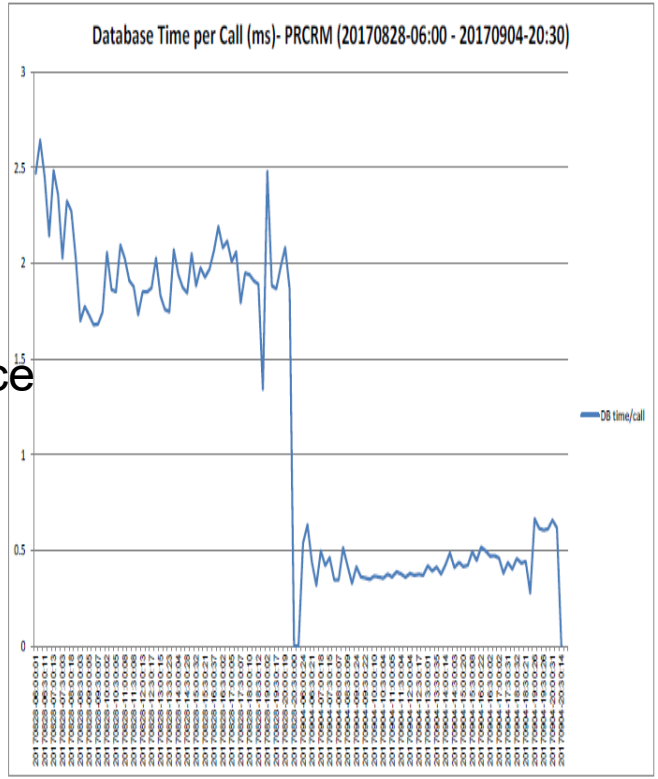
Vodafone : Customer Centric Stack Engineered Systems

Vodafone Customer Centric Stack – Database Infrastructure





Siebel Performance Before and after Exadata



ExaData Consolidation & Migration

DB	11.2.0.4	DataGuard	Migrated	12c upgrade
Siebel	✓ ✓	✓ ✓	✓ ✓	12.1 Candidate ✓
BRM	✓	✓	✓	✓
UIM	✓	✓	✓	✓
OSM	✓	✓	✓	
FMW/FMX	✓	✓	✓	
IDAM (DIR/OAM)	✓	✓ ✓	✓ ✓	✓ ✓
WCC	✓	✓	✓	
ASAP	N/A		(Swindon)	✓
Old IDAM			37	Decom
ORBIB / BIA				

All Exadata environments have been built and migrated in a collaboration between Oracle ACS and Vodafone.

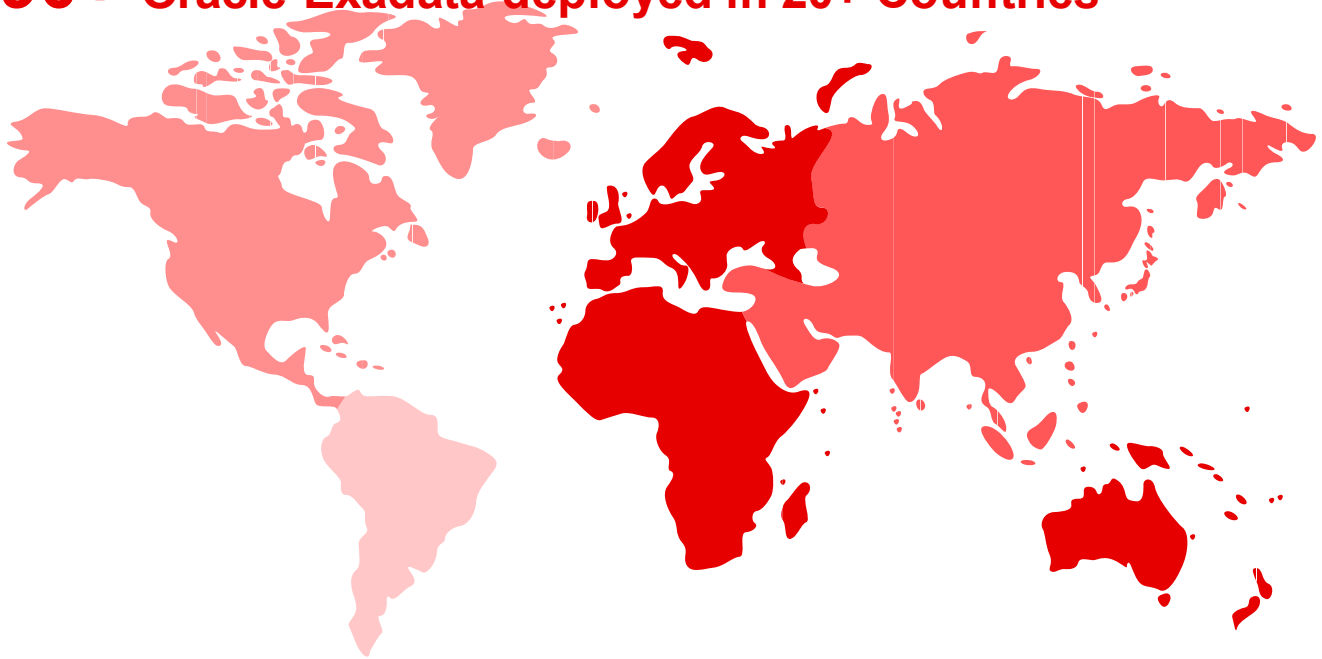
Oracle ACS build the environments and providing ongoing best practice advice.

Vodafone operate and manage the Exadatas, with deep technical Expertise support from ACS

Perfect blend between Oracle expertise and Vodafone's build and operate standards

Vodafone Oracle Estate on Oracle Exadata

90+ Oracle Exadata deployed in 20+ Countries



Oracle Exadata now deployed in +20 Vodafone markets, extending across data warehouse and OLTP workloads

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Avaloq on Oracle Exadata

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Avaloq 1st time on Oracle Exadata

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Avaloq on Oracle Exadata
AGENDA

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- Zürcher Kantonalbank – who are we
- Motivation, potential & decision
- Application landscape and procedure
- Method and challenges
- Migration and performance
- Conclusion

Zürcher Kantonalbank
YOUR SPEAKERS

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André Giger
Head of Unix Platform Service

Christian Marquardt
Oracle Database Specialist Expert

Chris Notz
Avaloq Application Expert

Zürcher Kantonalbank
RELIABLE PARTNER FOR ALMOST 150 YEARS

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- The bank for the **people of Zurich** since 1870
- With over **5’100 employees** one of the biggest employers in the canton of Zurich
- A globally networked **full-service bank** with strong regional and local roots
- Switzerland's **safest bank** and the world's most secure full-service bank:

AAA	S&P
AAA	Fitch
Aaa	Moody’s

Avaloq Banking Suite

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Avaloq on Oracle Exadata
MOTIVATION & POTENTIAL

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- Avaloq database infrastructure platform “end-of-lifecycle”
- Performance requirements have increased over the years
- Increasingly longer reaction and processing times

- Very high performance of the Datamart DB with Oracle Exadata
- High potential for acceleration

➔ Proof of concept (PoC)

Avaloq on Oracle Exadata
DIMENSIONING

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- Sizing based on OEM reports
- Exadata X7-2 database servers:
  - 48 Cores
  - 768GB RAM
- Storage servers:
  - 3x X5-2L
  - 1x X7-2L
- Data recovery (DR) → DataGuard

Avaloq on Oracle Exadata
DECISION GRID

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- Strategic fit
- Feasibility
- Risks
- Finance

Avaloq on Oracle Exadata
DATABASE

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- DB size: ~8TB
- # of tablespaces: 1’818
- database objects:
  - 11’808 tables
  - 357’261 table partitions
  - 25’061 indexes
  - 234’938 index partitions
  - 2’971 Java classes
  - 40’416 PL/SQL packages

Avaloq on Oracle Exadata
CHALLENGES

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- statistics export/import takes too long
- too much partition objects let DDL becomes too long
- multiple patches not existing for Exadata ORACLE_HOME's
- problems with a partitioned table using user def. types → not exportable due to bugs
- Avaloq environment never created/tested @Exadata DB-Server
- role separation «oracle» vs. «grid»
  - some reports will be created as user oracle/some as user grid
  - problems compiling Avaloq software
  - creating FACL's on different directories
- Oracle Bugs on DataPump export/import (ORA-600)

Avaloq on Oracle Exadata
Migration «full import»

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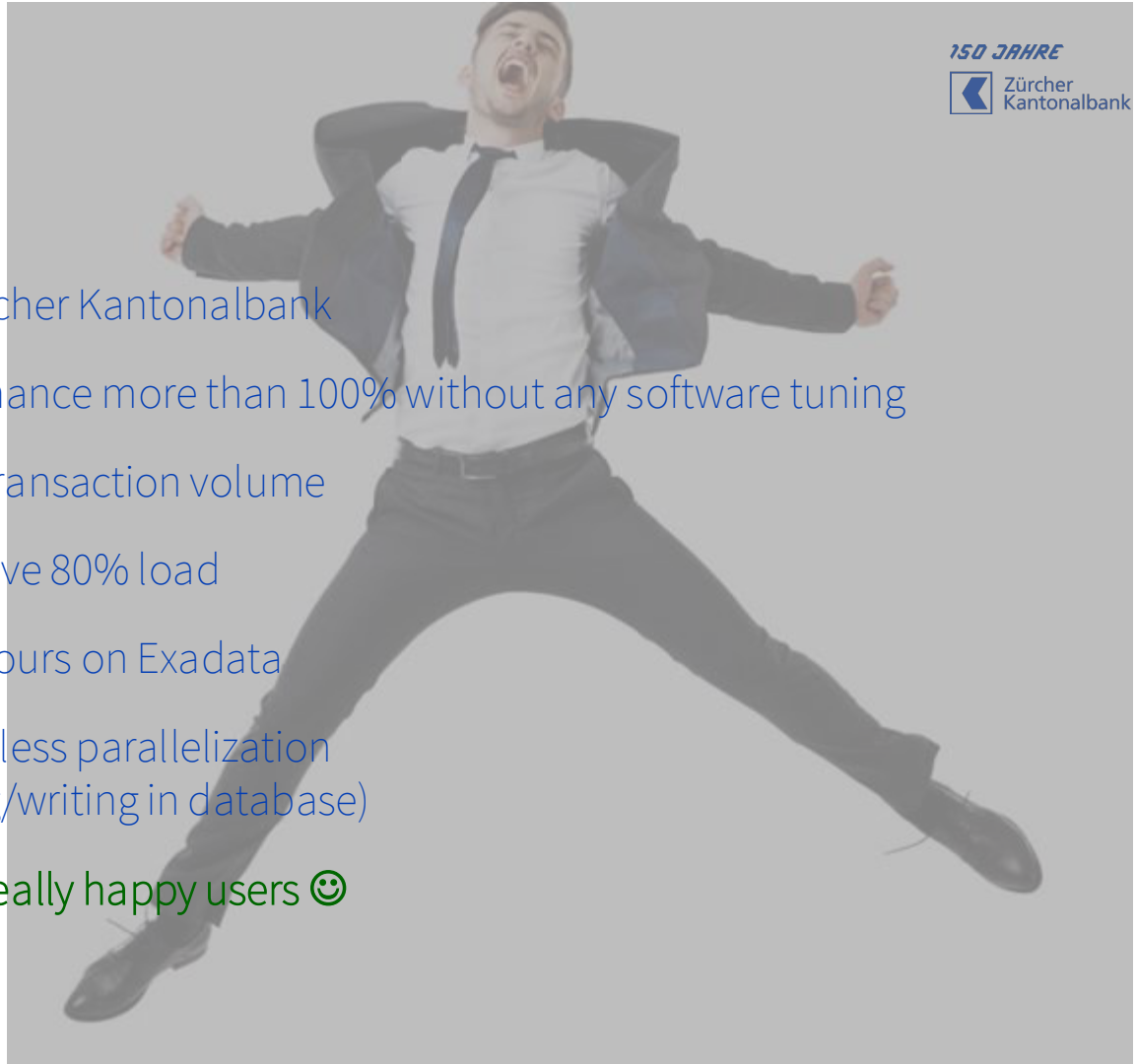
- importing all application-related database objects
- Import takes: 11:35h
  - parallel=96
- transfer «aud_item» (buggy table)
  - individually imported using «ACCESS_METHOD=EXTERNAL_TABLE» during export/import
  - duration export: 1:48h
  - duration import: 1:07h
- result
  - one missing index

Performance highlights



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- ✓ Migration completely done by Zürcher Kantonalbank
- ✓ OLTP and datawarehouse performance more than 100% without any software tuning
- ✓ Same performance regardless of transaction volume
- ✓ No saturation in Exadata even above 80% load
- ✓ Recalc all positions 6 days vs. 14 hours on Exadata
- ✓ Better message performance with less parallelization (application view: MQ incl. reading/writing in database)
- ✓ Less performance incident ➔ really happy users ☺

Datawarehouse performance (average of all jobs in sec)

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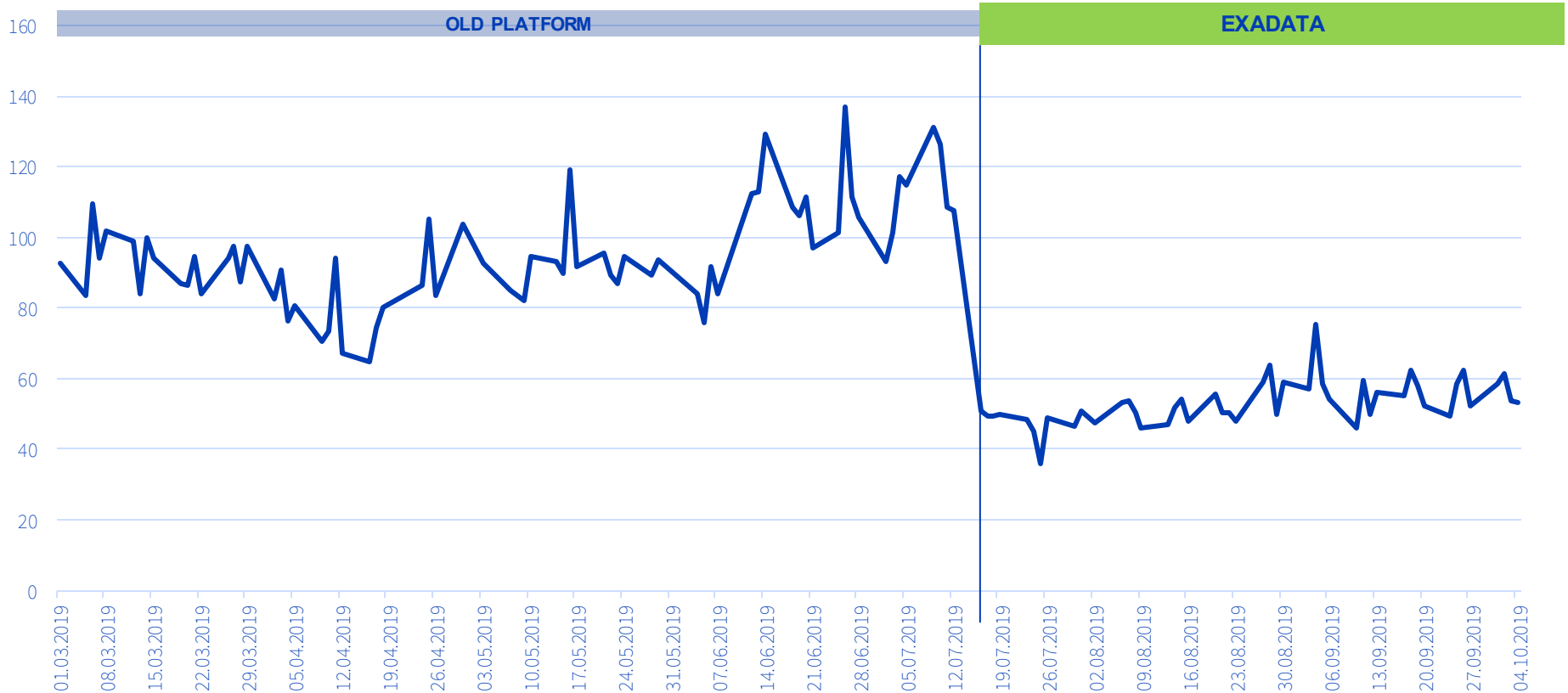
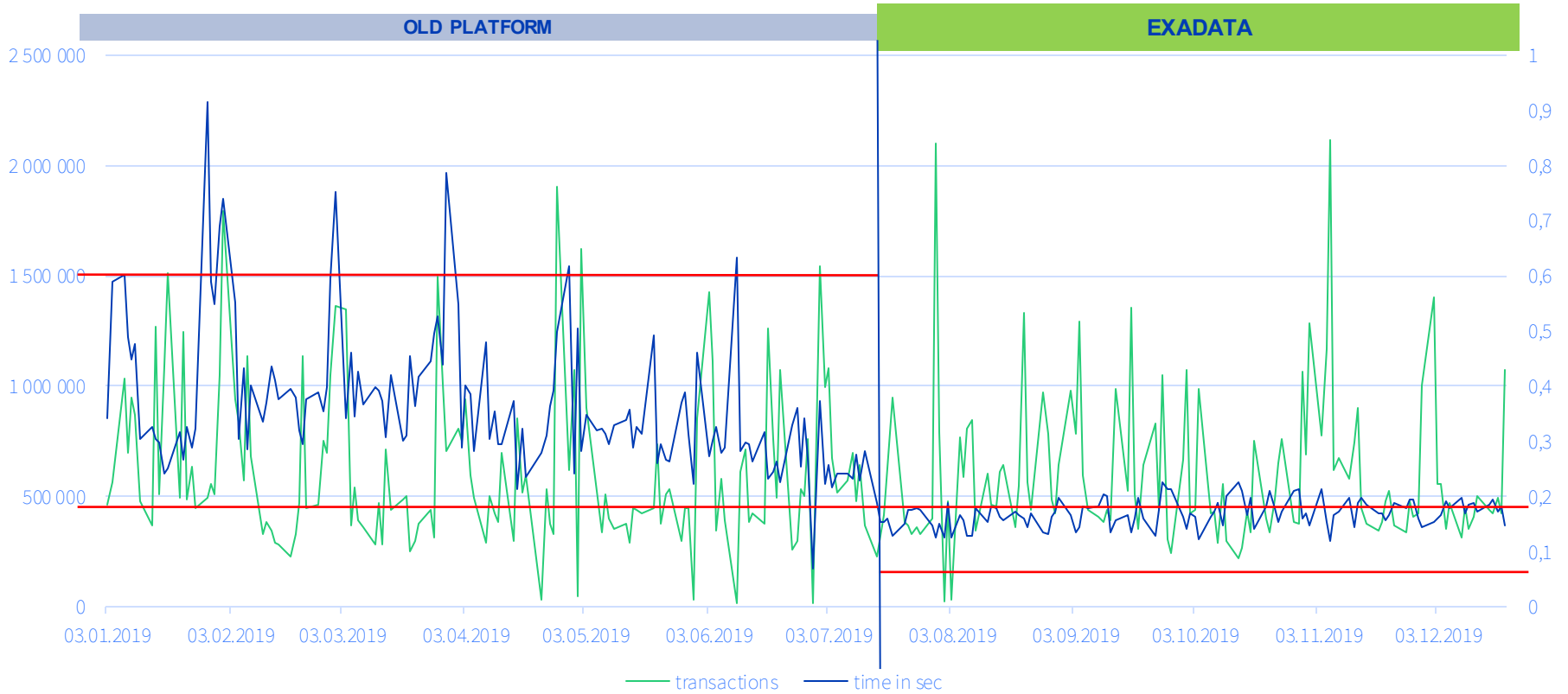
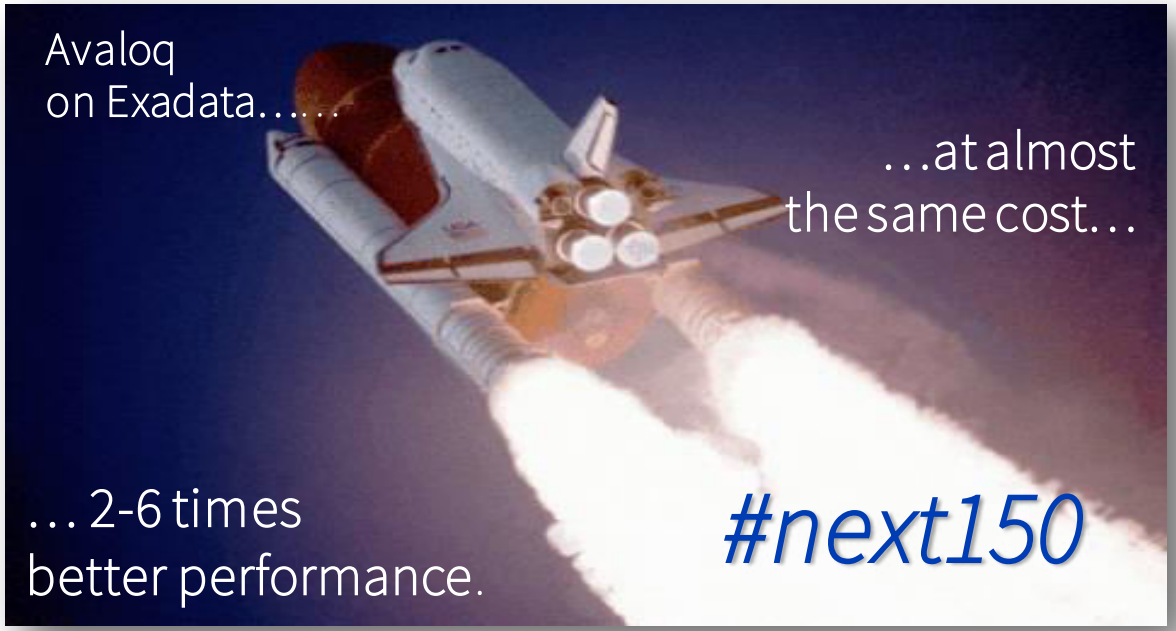


OLTP Stock Exchange transactions



Avaloq on Oracle Exadata
CONCLUSION



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