Oracle for SAP Cloud and Infrastructure Update

ORACLE

July 2023

The relationship of Oracle Corporation and SAP SE has been and is based on a long history, a rich heritage of joint developments and a bright future – for the benefit of our mutual customers. Both companies have had an ongoing commitment to our tens of thousands of joint customers for over 30 years.

Our longstanding reseller and support agreements provide enhanced access to Oracle Database technology, Oracle Cloud Infrastructure and world class customer support. Oracle will support SAP Business Suite and SAP BW as long as SAP will be supporting them. With every new release we will provide latest database technology and let customers make use of more and more SAP application optimizations.

Running SAP applications on **Oracle Cloud Infrastructure** has been certified for Bare Metal and Virtual Machine shapes as well as for **Exadata Cloud Service** and **Oracle Exadata Cloud@Customer**. Oracle Exadata Cloud Service is the most powerful platform to run Oracle Database in the cloud. Oracle Exadata Cloud@Customer is the Cloud version of Exadata which is located on-premise in the datacenter of the customer; both services are only available from Oracle. Both SAP Application Server ABAP/Java as well as SAP Business Objects are deployable on Oracle Cloud Infrastructure. Oracle Cloud Infrastructure combines the elasticity and utility of public cloud with the granular control, security, and predictability of on premises infrastructure to deliver high performance, high availability, and cost effective infrastructure services. Oracle Cloud Infrastructure offers a set of core infrastructure capabilities such as compute and elastic storage to provide customers the ability to run any workload in the cloud. It offers a comprehensive set of integrated, subscription based infrastructure services that enable businesses to run any workload in an enterprise grade cloud-managed, hosted, and supported by Oracle. The Oracle product strategy provides flexibility and choice across the IT infrastructure. There are several Cloud database migration techniques: R3LOAD (SAP), BRSPACE (SAP), RMAN, O2O, Triple O and Data Guard physical standby. For further details regarding cloud migration techniques, please see page 6.

The **Oracle Exadata Database Machine** is engineered to consolidate all of your SAP and non-SAP Databases into a private Database Cloud environment. It delivers the highest performance and most available platform for running the private Oracle Database Cloud for all types of database workloads; including both Online Transaction Processing (e.g. SAP ECC 6.0), and Data Warehousing (e.g. SAP BW 7.0 and higher). The Exadata Database Machine is ready to tackle your largest and most important database workload, often running them up to 10 times faster or more. It has already been deployed by many SAP customers.

Oracle Linux is the best Linux for supporting SAP infrastructure computing needs that is running on Oracle Database. It is fast, brings the latest innovations to customers and delivers best performance for SAP. It is reliable and it provides best security and data integrity. It is optimized for Oracle Database and improves application uptime.

Oracle Linux Virtualization Manager is a server virtualization management platform that can be easily deployed to configure, monitor, and manage an Oracle Linux Kernel-based Virtual Machine (KVM) environment. **Oracle Linux KVM and Oracle Linux Virtualization Manager** provide a modern, open source, high performance alternative to proprietary server virtualization solutions with zero licensing costs.

The **Oracle development teams** on site at SAP SE in Walldorf, Germany continue to work together with SAP developers to ensure that SAP customers will always have access to the latest optimized Oracle technologies, ensuring performance, reliability and innovation.

The **Oracle for SAP Service & Support** team from Customer Success Services (CSS), which subsumed the former Advanced Customer Services, offers services that include health checks, workshops, database migrations, performance tuning, and Oracle Solaris Services for SAP environments, including Assisted Services Engagements (Analysis/Enhancement and SAP Readiness Service for IT Infrastructure).

For more information please visit **www.oracle.com/sap.**

We welcome your comments and questions. Please contact us at: **frontdesk-walldorf_de@oracle.com**

Sincerely,

Gerhard Kuppler

Vice President SAP Alliances
Oracle Corporation

ORACLE CORPORATION: US$42B total GAAP revenue in FY 2022 • 430,000 customers in 175 countries • 20,000 partners across the globe • 170,000 employees, including: – 48,000 developers and engineers – 15,000 customer support and service specialists, speaking 29 languages - 20,000 implementation consultants • Supports thousands of educational institutions and millions of students in more than 130 countries • More than 18,900 patents worldwide • 5 million registered members of Oracle's customer and developer communities • 469 independent user communities in 97 countries representing more than 1 million members.

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Oracle Cloud for SAP Customers
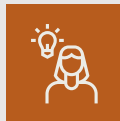
ORACLE CLOUD: A GREAT OPPORTUNITY

Same SAP Application, Same Oracle Database
No business disruption. Retain all your customizations.

Reduce Costs
Transform Capex to Opex. Pay only for what you use.

Improve Agility, Accelerate Innovation
Focus on SAP software deployments, not infrastructure management.

Best Price Performance and Transparent Pricing
Get 34% lower infrastructure costs for your SAP workloads vs leading cloud provider.

ORACLE CLOUD: BENEFITS

Optimized for Oracle Database
Oracle Database runs up to 7.8x faster on Oracle Cloud Infrastructure vs leading cloud provider.

High Predictable Performance
Run SAP applications and Oracle databases on bare metal and virtual machine instances. Leverage high performance resources.

Exadata Cloud Service and Exadata Cloud@Customer
Most powerful platform to run Oracle Database in the cloud, only available from Oracle.

Security and Control
Compute and network isolation help ensure data security. Compartment capabilities allow for control of SAP deployments.

ORACLE CLOUD: USE CASES

Development/Test in the Cloud
Test new customizations or new software versions.
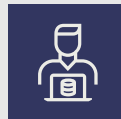
Backup and DR in the Cloud
Independent data centers for high availability, disaster recovery. Duplicated environment in the cloud for application and database.

Extend Data Center to the Cloud
Transient workloads (training, demos). Rapid implementation for acquired subsidiary. Geographic expansion or separate LOB.

Production in the Cloud
Reduce reliance on on-premises data centers. Focus on strategic priorities and differentiation, not managing infrastructure.

Several options available for SAP-Oracle user companies to reap the benefits of the Oracle Cloud Infrastructure

DATABASE MIGRATION TO THE ORACLE CLOUD MADE EASY

Oracle Cloud Infrastructure Services enable companies to enjoy significant benefits. Like all Oracle Cloud Services, the use of Oracle Cloud Infrastructure Services is increasing at a rapid pace.

Oracle's Cloud Infrastructure Services offer comprehensive control and the versatility to run both traditional and cloud-native workloads with predictable savings. Oracle Cloud Infrastructure, which is managed, hosted, and supported by Oracle, provides organizations with the tools needed to migrate, build, and run production, business-critical applications in the cloud.

The use of the SAP NetWeaver Application Server ABAP/Java on Oracle Cloud Infrastructure is the start of a new chapter in the long-standing partnership between Oracle and SAP. The focus here is on operating Oracle SAP databases on the basis of powerful computing, network, and storage infrastructure workload services on a secure, stable, predictable and extendable platform.

Database migration to the Oracle Cloud lies at the heart of this collaboration. Usually, this takes place after planning, preparatory work, and various precursors, such as setting up an Oracle Infrastructure account, determining an appropriate workload sizing, choosing the appropriate bare metal shape, use of Oracle Cloud Infrastructure Object Storage, and much more.

More information about database migration for Oracle-SAP customers can be found in the whitepaper „SAP NetWeaver Application Server ABAP/Java on Oracle Cloud Infrastructure". Please download the whitepaper:
http://www.oracle.com/us/solutions/sap/ sap-netweaver-on-oracle-cloud-wp-3931430.pdf.
More information is available in the appropriate SAP Notes (for example 2474949 „SAP on Oracle Cloud Infrastructure" or 2520061 „SAP on Oracle Cloud Infrastructure: Support Requisites").

RMAN and/or BR*Tools

There are also several options, procedures, and methods available to SAP-Oracle customers for migrating databases or what is also known as "Lift and Shift into the Cloud" combined with the Oracle Cloud Infrastructure when using or operating source and target platforms with Linux (Linux x86_64).

The focus here is on five methods or procedures. The tools used will be very familiar to all Oracle-SAP customers, especially when it comes to backup, restore and recovery (both on the source and target host).
• Firstly, RMAN (Oracle Recovery Manager) Oracle Backup/ Recovery Toolset is used,
• and secondly: BR*Tools (previously sapdba) for administration and management of Oracle databases in the SAP environment.

Procedure 1: With the first option, the database is migrated to the Oracle Cloud using Oracle Recovery Manager via Oracle Cloud Infrastructure Object Storage. Object Storage is configured on the source host and backup/recovery is undertaken. The same procedure is followed on the target host, including recovery and restoration.

Procedure 2: With the second option, the database is migrated using BR*Tools via the brbackup tool. The procedure is the same as above but also includes integration/use of BR*Tools and the corresponding specifications of command functions on the source and target host.

Procedure 3: If the source platform is a Linux X86-64 and/ or if the process involves a permitted combination from MOS Note 1079563.1, the RMAN command „duplicate database from active database" can be used to produce an exact copy of the source database on the target in the cloud. If desired, the database is made available in the cloud as a Data Guard standby database so that Data Guard can be used to apply all further changes to the source database on the target database. Migrations can therefore be almost free of interruptions. The RMAN „duplicate" process can run with an active source database to restrict the migration „downtime" for the database to a Data Guard role switch and/or failover. Release changes, upgrades or other changes to the configuration or database content are not possible with this option. One benefit of this procedure is that there is no need for a temporary buffer for backups, exports or data.

Procedure 4: If the source platform is different from the target platform in the cloud, e.g. as a result of a different endian type, and if the database is able to accept a slightly longer „downtime", migration across all platforms can be undertaken using the RMAN „cross platform transportable tablespaces" command. This procedure requires a new minimal database to be created in the cloud. The application data is then migrated by transferring the application tablespaces. This can be done on the basis of RMAN backups where incremental online backups can also be used to transfer subsequent changes made to the source database. Only the last backup and a meta data export have to be undertaken with the application and/or SAP stopped. With this procedure, the data (backups) have to be buffered to a filesystem that can be accessed from both the source and cloud.

Procedure 5: The most flexible procedure is called Oracle Lifecycle Migration Service (O2O), which is a service provided by Oracle ACS*. All supported platform combinations are possible here. There are two steps to the procedure. First, a set of scripts is generated. Those scripts allow for the creation of the new target database, setup of the environment and to perform the data movement. The second step is the actual execution of those scripts to perform the migration.. Large tables are transferred using database links and smaller ones using export/import. A high degree of parallelism is possible if the hardware (compute and network) involved permit it. A new database is created in the cloud, which means that a

database upgrade can be implemented transparently as part of the migration. Changes to tablespaces and schedule as well as activation or deactivation of features, such as compression, partitioning, encryption, RAC or Database Vault, are all possible as well. The only thing which cannot be done is the SAP-based unicode conversion because this has to be done by the SAP server. A buffer, which can be accessed from both sides, is needed for the scripts and export files. The application, i.e. SAP, has to be stopped for the duration of the migration process.

If using GoldenGate, the O2O procedure becomes the OOO procedure, and the changes made since the start of the O2O migration are recorded by GoldenGate and applied to the new database in the cloud. OOO is the online variant of O2O with which SAP can remain active with the exception of a short „downtime" during the switchover.

More information about database migration for Oracle-SAP customers can be found in the whitepaper „SAP NetWeaver Application Server ABAP/Java on Oracle Cloud Infrastructure". Please download the whitepaper:
http://www.oracle.com/us/solutions/sap/ sap-netweaver-on-oracle-cloud-wp-3931430.pdf.
Further information can also be found" in the appropriate SAP Notes (for example 2474949 „SAP on Oracle Cloud Infrastructure" or 2520061 „SAP on Oracle Cloud Infrastructure: Support Requisites").

*Note: As of July 2023, Oracle ACS (Advanced Customer Services) became part of Oracle CSS (Customer Success Services).

SAP NETWEAVER APPLICATION SERVER ABAP/JAVA ON ORACLE CLOUD INFRASTRUCTURE, ORACLE EXADATA CLOUD SERVICE, ORACLE EXADATA CLOUD@CUSTOMER – IMPLEMENTATION GUIDES

Abstract:

Three technical white papers are provided as reference guides for deploying SAP NetWeaver® Application Server ABAP/Java onto the Oracle Cloud Infrastructure utilizing Bare Metal shapes, Exadata as a Service and Exadata Cloud@ Customer. The guides provide suggested platform best practices as well as details about the individual components of the Oracle Cloud Infrastructure, Oracle Linux, Oracle Database instances, and SAP application instances necessary to run software products based on SAP NetWeaver Application Server ABAP/Java in the Oracle Cloud Infrastructure.

The white papers assume the following knowledge:

- You are familiar with the fundamentals of Oracle Cloud Infrastructure.

- You have a background in SAP NetWeaver Application Server ABAP/Java using Oracle Database and Oracle Linux. For more information, see the following resources:

  - http://go.sap.com/solution.html

  - https://www.sap.com/community/topic/oracle.html

  - http://docs.oracle.com/en/operating-systems/linux.html

- You're familiar with the product documentation for:

  - Oracle Cloud Infrastructure

  - Oracle Database 12c and 19c

  - Oracle Linux 6 and 7 and 8

  - SAP NetWeaver 7.x

Most of the steps described here are the same as in a traditional SAP deployment in a customer data center.
The document also includes details about how to develop a backup and high-availability plan for your SAP installation in Oracle Cloud Infrastructure. With this background and the Implementation Guide it should be no problem to install SAP applications on Oracle Cloud Infrastructure (OCI).

Additional Training available:

For those who are working hands-on implementing SAP NetWeaver Applications on the Oracle Cloud Infrastructure, the SAPCC and Oracle Solution Center team in Walldorf have developed a Technical Training, which will be available on special request.
Additional video tutorials are available with the following topics:

1. Introduction to OCI4SAP

2. Typical reference architecture for OCI4SAP

3. Terraform core setup

4. OCI4SAP Ref Arch based & deployment process

5. OCI4SAP customer prerequisites

6. OCI4SAP OCI Tenant + Virtual Cloud Network (VCN)

7. OCI4SAP Bastion Host

8. OCI4SAP Central Services Installation

9. OCI4SAP DB installation

10. CI4SAP Application server installation

11. OCI4SAP DMZ component installation: Web Dispatcher

12. OCI4SAP DMZ component installation: SAPRouter

13. OCI4SAP Final summary including checklist

14. Additional OCI key features

SAP NetWeaver Application Server ABAP/Java on Oracle Cloud Infrastructure, Oracle Exadata Cloud Service, Oracle Exadata Cloud@Customer

Implementation Guides

SAP NetWeaver® Application Server ABAP/Java on Oracle Cloud Infrastructure

Contents:
- Overview of Oracle Cloud Infrastructure
- Overview and Architecture of SAP NetWeaver Application Server ABAP/Java
- Overview of SAP NetWeaver® Application Server ABAP/Java on Oracle Cloud Infrastructure
- Recommended Instances and Topologies for SAP NetWeaver® Application Server Installation
- Planning Your SAP Implementation
- Planning the SAP Deployment
- Implementing Your Plan
- Oracle Database in the Cloud
- Migrating to the Cloud
- High Availability in the Cloud

Download from:
- https://www.sap.com/documents/2018/06/eab0396a-0c7d-0010-87a3-c30de2ffd8ff.html
- https://www.oracle.com/us/solutions/sap/sap-netweaver-on-oracle-cloud-wp-3931430.pdf

SAP NetWeaver® Application Server ABAP/Java on Oracle Database Exadata Cloud Service

Contents:
- Overview of Oracle Database Exadata Cloud Service
- Planning Your Exadata Cloud Servives for SAP NetWeaver Application Server ABAP/Java
- Planning the SAP Deployment
- Implementing the Deployment
- SAP Bundle Patch for Oracle Database Exadata Cloud Service: Live Cycle Management for SAP Databases
- High Availability with Oracle Data Guard

Download from:
- https://www.sap.com/documents/2020/04/5ca170cf-8f7d-0010-87a3-c30de2ffd8ff.html
- http://www.oracle.com/us/solutions/sap/sap-netweaver-on-exadata-cloud-wp-4428540.pdf

SAP NetWeaver® Application Server ABAP/Java on Oracle Exadata Cloud@Customer X9M

Contents:
- About Oracle Exadata Cloud@Customer X9M
- Planning the SAP Deployment
- Implementing the Deployment
- Patching Exadata Cloud@Customer X9M: Life Cycle Management for SAP Databases
- Using SAP Transaction DB13
- Migrating Databases
- Database Backup Options with Exadata Cloud@Customer
- High Availability with Oracle Data Guard

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- http://www.oracle.com/a/ocom/docs/sap_netweaver_app_server_abap_java_on_exadata_cloud_at_customer.pdf

AMAGGI BOOSTS UPTIME BY MIGRATING KEY WORKLOADS TO ORACLE CLOUD INFRASTRUCTURE

The Brazilian agribusiness saves 20% in costs and reduces monthly close time 2X by moving to Oracle Cloud Infrastructure.

Business challenges

Amaggi is a Brazilian agribusiness company active in large-scale soybean, corn, and cotton production with emphasis on sustainable development. The company currently has 362,000 hectares of agricultural production and sells around 16.9 million tons of grain worldwide. Amaggi is present in Argentina, Paraguay, China, the Netherlands, Switzerland, and Norway.

As a major player in the agribusiness sector, which sustains the Brazilian trade balance through exports, Amaggi invests in the development of precision agriculture-techniques that improve crop management and optimize productive areas. Every year the company wins awards and certifications for sustainable development.

With today's agribusiness driven by technology, Amaggi invests continually in integrating its systems for business efficiency. In 2022, with data center equipment and maintenance at end of life, the company decided to migrate to a more robust structure that would guarantee data security and high availability of its IT infrastructure.

> „ Agribusiness is on the cutting edge in Brazil. If you visit a farm, you will be amazed at the degree of technology. A soybean or cotton harvester is practically a computer on wheels. With OCI connectivity, we control the entire process from cultivation to export."
>
> *Wagner Biasi, CSC and IT Manager, Amaggi*

Why Amaggi chose Oracle

Amaggi ran Oracle Exadata Database Machine and associated technologies in its data center for years. While evaluating other cloud providers, Amaggi selected Oracle as a known

quantity that understood the business challenge and proposed the most responsive solution for the company's move to the cloud.

Results

By migrating to Oracle Cloud Infrastructure (OCI) with Exadata Cloud Service, Amaggi reduced costs 20% by not having to refresh its data center through the arduous cycle of negotiating the purchase and delivery of expensive imported hardware.

OCI now runs the entire Amaggi production environment of 46 terabytes, including the critical grain processing, grain origination, agricultural support, weights and measures, and credit systems. The platform also supports the company's SAP enterprise resource planning (ERP) system, which was migrated over a weekend.

> „ Moving from our data center onto Oracle Cloud Infrastructure has reduced costs, eliminated hardware refresh bottlenecks, and has given our producer and logistics ecosystem a tremendous boost in availability."
>
> *Wagner Biasi, CSC and IT Manager, Amaggi*

Previously hampered by database unavailability due to memory or disk space overflow, Amaggi now has 99.999% uptime through OCI's high availability, monitoring service, and load balancing. Billing disruption caused by downtime has been eliminated with OCI's high availability and lower latency, which ensures greater speed in grain shipment and delivery for Amaggi and its producers.

Efficiency gains also include 3X faster database provisioning, enabling DevOps teams to support the complex demands of crop picking, storage, loading and unloading, interconnec-

tivity of farm machinery, logistics contractors, traceability, compliance, and cash flow.

The agricultural producer has trimmed monthly closing processes from 40 minutes to 5 minutes, positively impacting business operations that span 100 branch offices in Brazil and subsidiaries abroad.

Amaggi uses OCI FastConnect to link with its Cuiabá data center, which still runs some quality assurance, testing, and business continuity modules. Disaster recovery also sits in Cuiabá, managed by Oracle Exadata Cloud@Customer, combining the power of Exadata and Oracle Cloud. Amaggi is considering moving the environment to Oracle's São Paulo cloud region once it realizes the full benefits of OCI for its production workloads.

Oracle Cloud Governance also supports the fiscal complexity and controls Amaggi deals with in the import of farm inputs and export of grain. International Ship and Port Facility Security Codes for receiving and shipping merchandise, bills of lading, shipping manifests, toll payments, freight payments, and more all need maximum available connectivity as well as the checks and balances within OCI governance and security.

Partners

Amaggi went live with OCI in six months, assisted by Oracle Consulting and Oracle Partner Lanlink.

AMAGGI

https://www.amaggi.com.br/

SAP ON ORACLE CLOUD INFRASTRUCTURE IMPROVES PERFORMANCE AND ELIMINATES $2.5M ON-PREMISES TECHNOLOGY

Oracle partner Cintra delivers production SAP system in the Oracle Cloud Infrastructure – and establishes repeatable RapidCloud for SAP migration process to deliver future Oracle Cloud transformations for SAP customers.

Business problem

A B2B retailer's mission-critical SAP system was running on end-of-life technology in a data center. Replacing the technology was going to cost more than $2.5 million. The retailer wanted to avoid this cost and move from a traditional capex cost model to an opex one.

The new platform needed to be capable of delivering high-availability, as well as the same or improved performance as on-premises.

How we won

Customer was familiar already with Oracle Exadata – both for SAP and non-SAP databases. In order to consolidate and standardize underlying infrastructure a move to Oracle Cloud Infrastructure and Exadata as a service (ExaCS) in OCI was a natural next step. The company chose Cintra to deliver this critical transformation project due to the credibility of Cintra's RapidCloud transformation methodology, which looks after every stage of the transition, from an early discovery and assessment, through architecture design, provisioning, migration and optimization, to ongoing cloud managed services. They also recognized the additional benefit of running SAP on Exadata in Oracle Cloud Infrastructure.

With one partner to deliver the entire journey, RapidCloud makes the transformation easy for customers. Moreover, the detail and credibility of the cloud design means we avoid the need for a proof of concept (POC). With Cintra and RapidCloud, customers have the confidence to go immediately to a real project, thereby accelerating their use of Oracle Cloud Infrastructure.

The customer asked Cintra for two technology options, one using a hybrid of Oracle Cloud Infrastructure and AWS, the other using purely Oracle Cloud Infrastructure. Cintra quickly created two fully costed designs using our RapidCloud tooling, then presented them to the customer. They explained why pure Oracle Cloud Infrastructure was the best option to meet the retailer's needs. Reasons included:

- **High-availability:** The best way to achieve high-availability was using Oracle RAC, which is only available in the Oracle Cloud

- **Consolidation:** The Oracle Cloud would enable them to consolidate multiple standalone servers and RAC clusters into a single Exadata

  Exadata PaaS benefits: Oracle Exadata Cloud Service has the added benefits of being a PaaS service, so the customer will not be responsible for monitoring and patching the platform, thereby freeing up valuable resources

- **Enterprise-grade cloud:** The Oracle Cloud is the only true enterprise-grade cloud, capable of running mission-critical production workloads at scale

- **Performance:** The Oracle Exadata Cloud Service would additionally provide a performance improvement, enhancing user experiences and business-critical processing

Lessons learned

We delivered the retailer's complete SAP-to-Oracle-Cloud-Infrastructure transformation in less than 90 days. The project delivered a design and provisioned cloud in 30 days, an SAP test environment in 60 days, and the final production deployment within 90 days.

Cintra created repeatable RapidCloud designs and blueprints that can be used to move other SAP customers to the Oracle Cloud Infrastructure quickly, predictably and with minimal risk. SAP to Oracle Cloud Infrastructure transformation is now a strategic focus for Cintra.

The customer's SAP system went live on-time, and performance has been markedly better in the cloud than on-premises.

By successfully deploying SAP in the Oracle Cloud Infrastructure, we have enabled the B2B retailer to avoid its $2.5 million legacy on-premises technology refresh costs and move to its desired opex cost model. We also paved the way to move further critical applications at this customer to Oracle Cloud

Infrastructure, which we are currently delivering.

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Products

- Oracle Cloud Infrastructure IaaS

- Oracle Exadata Cloud Services

- Oracle RAC on Exadata

- Load Balancer as a Service (LBaaS)

- Oracle Cloud archive storage

- SAP ERP 6.0

- SAP ECP - Easy Cost Planning - EHP7 (Enhancement Pack 7)

- SAP BW - Business Warehouse

- SAP Solution Manager

- SAP EP - Enterprise Portal

CINTRA
Architecting your success

For more information, please contact:
sales@cintra.com

ENECO MOVES APPLICATIONS TO ORACLE FOR FASTER PERFORMANCE

By completing a migration to Oracle Cloud Infrastructure in just four months, the energy provider minimized business impact and cut project costs by 50%.

Business challenges

The leader in the sustainable energy market since 2007, Eneco Group provides 2 million customers in the Netherlands with innovative energy products and services to make it easy for consumers to join in the transition to sustainable energy.

Eneco wanted to invest more in important projects, but spent too much time managing IT infrastructure. The company also faced IT lifecycle management challenges. Instead of just adopting a cloud-first strategy, like so many companies, Eneco not only embraced that strategy, but immediately began working with Capgemini, a trusted partner, to make it happen.

Three of Eneco's Oracle Exadata systems in Capgemini data centers were due for replacement. The company identified 19 mission-critical applications that make use of Oracle Database on Exadata hardware.

The energy company wanted to maintain its custom-developed billing application and associated data warehouse. Despite an established Microsoft Azure-first policy for cloud solutions, Capgemini and Eneco determined that Oracle's Exadata Cloud Service would make the best destination for these workloads.

> **" We wanted to achieve a better digital experience for our customers, and we did that by providing higher availability with better performance with Oracle Cloud Infrastructure."**
>
> *Mark Edelbroek, Head of BTO IT Operations, Eneco*

Why Eneco Chose Oracle

Eneco chose Oracle for its reliable Exadata technology and reduced risk and business impact during the migration. The company selected the Frankfurt Oracle Cloud Infrastructure region to maximize flexibility and disaster recovery

options across the three availability domains there. Eneco is also using Oracle GoldenGate for data replication.

> **" In 2019, we migrated our applications to Oracle Cloud Infrastructure. The benefits are lower costs, higher availability, better performance, and a higher degree of security. We also see increased availability for our business users, especially during patching, due to the introduction of RAC and rolling upgrades."**
>
> *Mario Suijkerbuijk, CIO, Eneco*

Results

The initial project was completed over a nine-month period. Moving from one Exadata platform to another made the migration easy, and the close partnership between Capgemini and Oracle ensured that any issues encountered were quickly overcome. Capgemini was able to help Eneco migrate nine of its critical applications to Oracle Cloud Infrastructure (OCI), as well.
This enabled Eneco to use Exadata Cloud Service and reduce software licensing maintenance and support costs.

The success of the project resulted in expanded scope. Halfway through the migration, the company decided to shut down a data center that contained a small but important SAP on Oracle Database environment. It was deployed on two additional Exadata Cloud Service instances plus Oracle Cloud Infrastructure Compute instances for the SAP application servers. The migration took just four months from idea to completion.

Products

- Oracle Cloud Infrastructure
- Oracle Exadata Cloud Service

Partners

Capgemini, the preferred outsourcing partner of Eneco, led the migration to Oracle Cloud Infrastructure and was vital to the successful go-live. Capgemini helped migrate the most important 32 of 54 Oracle Databases and 100 TB of data to Oracle Exadata Cloud Service.

Eneco

https://www.eneco.com

GOODBYE DATA CENTER, HELLO CLOUD!

Media-Service Schlütersche strengthens performance and sustainability by migrating SAP financial applications into the Oracle Cloud

Small and medium sized businesses (SMB), often described as too hesitant and risk-averse, have put many automation projects on their agenda for the immediate future. An important topic in this context is the migration of applications and data to the cloud. The industry association Bitkom has come to the conclusion that currently around three out of four companies (73 percent) use computing power from the cloud in one form or another. However, the current digitalization report for small and medium-sized businesses has found that about two thirds of SMB in Germany are still delaying the implementation of their digitization projects. Schlütersche Media Group, or Schlütersche for short, a medium-sized media service head-quartered in Hanover, wanted to position itself for the future and demonstrate their innovative strength. This is why the long-established company, founded in 1747, became the first German medium-sized company to consolidate both its Production and Development SAP ERP systems onto the Oracle Cloud Infrastructure (OCI). The project and implementation partner was DXC Technology Deutschland GmbH.

OCI supports future strategy

From printed hymnbooks to digital content: Schlütersche's products and services have undoubtedly changed over the past 270 years. Then as now, the company focuses strongly on the needs and requirements of its customers. The company offers Marketing and Publishing support for small and medium sized businesses in the form of industry and service directories, web publishing and online-media. In addition, Schlütersche develops cross-channel media content for subject matter experts as well as learning platforms for special interest groups, including organizing and holding networking events and meetings for their customers.

The overarching company slogan: Expert knowledge and Marketing all in one-stop. What distinguishes the publish-ing house are its innovative strength and the courage to venture into the digital transformation. The company has now transferred its processes controlled via SAP such as finance (FI/CO) and HR (HCM) to the Oracle Cloud. It covers financial accounting data such as dunning as well as information relating to employees such as payroll accounting and personnel administration. For Schlütersche, the SAP migration to the Oracle cloud is the first step towards departing from their own data center.

Optimize processes, keep costs low

For many years, Schlütersche has been increasingly asking itself how it can make its own IT more highly available, cost-efficient and reliable on its own computers in their own data center. While they were able to do so for a long time, they now felt that they were beginning to be overstretched and faced limitation of growth without major hardware invest-ments. When it came to modernizing the SAP system, a new solution had to be found. (Background: Schlütersche uses direct Full Use Oracle licenses which were restricted to a fixed number of cores, so they could not just add more servers to the SAP systems without changing the licensed core count). The company was looking for a service provider who could provide virtual computers and thus ensure the future viability of the publisher's IT. In order to guarantee clean and transparent processes and keep costs low, the project team ultimately opted for OCI.

Small IT team benefits from Cloud

The DXC consultants have both SAP and Oracle know-how, which was essential for a project of this kind. Schlütersche was no longer able to carry out necessary upgrades and updates in a timely manner with the old system. A database migration to SAP HANA was discussed, but it turned out to be a complex and costly undertaking for the medium-sized publishing house. Since the existing environment ran on Oracle and a modernization was planned, the topic soon came to the Oracle cloud. With only a small IT team, the OCI advantages were convincing.

It was also the first project of this kind for DXC: „We had no previous experience with the Oracle cloud. That's why we had to familiarize ourselves with it," reports Antonio Steinhäuser, SAP Technical Architect for DXC Technology. He praises collaboration, test migration and integration. „Anyone who does such a project for the first time always has a few questions, but"working together with Oracle, they can be quickly resolved," says Antonio Steinhäuser.

Smooth migration

First discussions took place in December 2018. This was fol-lowed by testing of the OCI in a test environment. The project phase and installation proceeded smoothly and in a spirit of partnership. „One challenge, however, was to find a solution

explains Michael Eisner, Head of IT Services Operations.Other cloud transformations were larger and more complex, and the standard timetable had to be adapted accordingly.

What was required was a more modern and significantly more powerful as well as scalable hardware. „All in all, the migration went smoothly," says Eisner. He also praises the cooperation with DXC and Oracle: „The support went really well." Overall the whole project took less than a year to close.

Infrastructure as a Service (IaaS) improves flexibility

Oracle Cloud Infrastructure (OCI) has been certified for SAP NetWeaver-based applications in 2017. This enables SAP users such as Schlütersche to deploy ERP and other Netweaver-based applications such as BI, CRM, and SCM, running on Oracle databases, in the Oracle Cloud Infrastructure (Infrastructure as a Service, IaaS). In this context, the performance of the OCI is considerably higher than the compute services of other providers. Memory processing, block storage and network processing are also significantly better.

Central goal: Optimized performance

And what had to be changed as a result of the move of the financial systems to the cloud? „For our SAP users and the business processes, nothing," Eisner replies. „And that's a good thing. At the same time we improved our ability to cope with future changes and performance in general. The response times got much better". In the long run, OCI offers Schlüterschen the opportunity to reduce operating costs. A few examples: Costs are always incurred in the data center, like power, air conditioning or maintenance. These are all investments that companies can save using the cloud.

Cloud offers secure and strong IT support for SMEs

When German SMEs are asked what is preventing them from cloud transformation, many people say that security concerns are the biggest hurdle. IT manager Eisner would like to rebut these concerns on the basis of his experience: „SMEs are always under massive cost pressure. What small and medium-sized businesses can afford in the area of security and data protection must be set in relation to what reasonable cloud providers offer. In my opinion, we are positioning ourselves well in terms of security by moving servers to the cloud, because a large provider like Oracle can offer much more in this respect than most companies can do with their know-how and their own resources. Therefore, in many cases the cloud offers even more security. The cloud is gradually replacing in-house data centers. However, this development is not negative, but above all offers advantages". Eisner feels it is important to emphasize another aspect: „Virtualization does not cost any jobs, because the work of the IT staff is not tied to a piece of hardware. It lies in the

number and complexity of systems and applications". No matter where this system runs - in their own data center or in the cloud: the support is the same. The primary goal for Schlüter's IT is:
„In the next five years, all systems, not just ERP, BI and CRM, are to be moved onto the cloud."

Schlütersche is a good example of how a medium-sized company can automate and modernize IT and systems. Many other companies are currently in a similar situation: they need to standardize and digitize. IT should be less costly, but at the same time new, innovative leaps are always needed. Schlütersche and companies like them can rely on the ability of Oracle Cloud Infrastructure to automate tasks, scale easily, and allow IT teams to concentrate on higher, value-added activities.

About Schlütersche:

The Schlütersche Verlagsgesellschaft mbH & Co. KG, Schlütersche for short, is a media-service company for small and mid-sized customers. With its holdings and subsidiaries it forms the Schlütersche Media Group, in which about 600 employes support 70.000 customers. Schlütersche develops Advertising and Marketing concepts for those customers – in digital, print or cross-channel, all in one-stop.

Its service offerings consist of, among others, classified directories and associated online services such as website creation, search engine and social media marketing as well as digital reach. Furthermore Schlütersche offers an expert knowledge in a number of industries and branches. The portfolio consists of over 30 technical periodicals, as well as books and online media plus focused industry events and meetings and roundtables for special experts. It is the goal of Schlütersche to create an optimal Market-presence for their customers by using this industry expertise in combination with the media services mentioned. Therefore the company slogan is: Industry expertise and Marketing expertise all in one-stop.

https://schluetersche.de/unternehmen/

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ORACLE-RELATED SAP NOTES (CLOUD)

Note No.	Note Title	DB Version
Cloud Platforms : General Information		
1380654	SAP Support in Public Cloud Environments	n/a
Cloud Platforms : Oracle : Cloud Infrastructure		
2474949	SAP NetWeaver on Oracle Cloud Infrastructure	12c-19c
2520061	SAP on Oracle Cloud Infrastructure – Support Prerequisites	12c-19c
2588124	How to protect against speculative execution vulnerabilities on OCI?	12c-19c
Cloud Platforms : Oracle : Exadata Cloud Solutions		
2614028	SAP NetWeaver on Oracle Database Exadata Cloud Service	12c-19c
2614080	SAP on Linux with Exadata Cloud Service: Enhanced Monitoring	n.a.
2799970	Oracle Exadata Cloud Service: Patches for 19c	19c
2884306	Managing SAPDATA_HOME and ORACLE_BASE on Engineered Systems	19c
2956661	SAP NetWeaver on Oracle Database Exadata Cloud@Customer	12c-19c
2992680	Managing shared and multiple Oracle Homes on Engineered Systems	12c-19c
Cloud Platforms : Oracle : Non-NetWeaver-Applications		
2650732	Support of SAP BusinessObjects BI Platform for Oracle Cloud	12c-19c
Cloud Platforms : Non-Oracle		
1656099	SAP Applications on AWS: Supported DB/OS and AWS EC2 Products	12c-19c
2039619	SAP Applications on Microsoft Azure Using the Oracle Database	12c-19c
2358420	Oracle Database Support for Amazon Web Services EC2	12c-19c
2650732	SAP Applications on Azure: Supported Products and VM Types	12c-19c

For more information on why and how to run SAP applications on Oracle Database download the

Oracle for SAP Database Update

from https://www.oracle.com/a/ocom/docs/ora4sap-dbupdate-5093030.pdf

Oracle Exadata for SAP Customers

ORACLE EXADATA DATABASE SERVICE ON OCI

Leverage the power of Exadata in the cloud with Exadata Cloud Infrastructure.

Full access to the features and operations available with Oracle Database, but with Oracle owning and managing the Exadata infrastructure.

Move existing workloads to the cloud without having to worry about availability, scalability, or performance.

Always-on encryption allows IT teams to protect information from unauthorized access to at-rest, in-motion, or backed-up data.

ORACLE EXADATA CLOUD@CUSTOMER

Oracle Exadata Database Service inside customers' data centers

Secure deployment behind customers' data center firewalls enables enterprises to meet data residency, security, and latency requirements.

Infrastructure owned, managed, and maintained by Oracle allows customers to eliminate capital and management expenses.

Operator Access Control allows customers to address concerns by authorizing, limiting, and monitoring Oracle remote operations.

ORACLE EXADATA DATABASE MACHINE

Fastest database performance for both OLAP and OLTP workloads

Ideal platform for database consolidation

Seamlessly combined industry standard hardware with smart storage software

The foundation building block for Exadata Cloud Infrastructure and Exadata Cloud@Customer

WHY ORACLE DATABASE AND ENGINEERED SYSTEMS FOR SAP?

From SMEs to the largest companies around the world, tens of thousands of customers benefit from using the Oracle Database for SAP. There are many good reasons for this. Have a closer look at the outstanding differentiators which make Oracle Database for SAP the primary choice for the majority of SAP customers.

For more than 30 years Oracle and SAP have collaborated to optimize the Oracle Database for SAP customers. Renewing commitments and agreements underline the long-established relationship and partnership. Above all: SAP customers benefit from Oracle innovation. Oracle innovation provides flexible solutions which allow you to meet your business needs and requirements. On the other side, SAP customers value the great sustainability and protecting investments using Oracle Database for SAP applications.

As we look in more detail, it will be clear why Oracle Database for SAP is the leading and best RDBMS running SAP applications. In this context, let's have a closer look at the key differentiators between the Oracle Database for SAP as compared against other databases which can be used in combination with SAP applications. There are no less than 8 differentiators regarding Oracle Database.

1 Best Performance & Scalability

Oracle has leading SAP SD and BI-D (BI-Data Mart benchmark results, with exceptional scaling and performance across SMP and Cluster environments on Unix and Linux.

Oracle Real Application Clusters (RAC) provide a flexible way to achieve near linear scalability of SAP applications. With RAC, customers have a choice to either scale up or scale out the database server layer. Since all RAC nodes are active, it helps SAP customers to meet the demands of production workload requirements. Widely adopted by customers, Oracle RAC is the only generally available active-active clustered database solution certified for all SAP products. RAC makes SAP resources highly available based on Oracle Clusterware and removes the need for 3rd party clustering software.

Oracle Automatic Storage Management (ASM) is a volume manager and a file system for Oracle Database files that supports single-instance Oracle Database and Oracle Real Application Clusters (Oracle RAC) configurations. ASM is Oracle's recommended storage management solution that provides an alternative to conventional volume managers, file systems, and raw devices.

The Oracle Database In-Memory Option accelerates Analytics, Data Warehousing, Reporting and OLTP performance. The In-Memory Option of Oracle Database is 100 percent compatible with existing applications and leverages all existing Oracle Database functionality. Every Application that runs on Oracle Database can automatically and transparently take advantage of Oracle Database In-Memory Option. Existing applications will retain full functionality while experiencing effortless speedups. New applications can be developed that were previously impractical due to performance limitations.

SAP BW Flat Cubes with Oracle Database In-Memory: The data modeling technique Flat Cubes (also called "HANA-Optimized InfoCubes" by SAP), allows customers to simplify the SAP BW data model. Benefits for SAP on Oracle customers: Cost savings through higher performance and optimized integration of SAP BW with Oracle Database 12*c* and above, no indexes and aggregates required, faster query response times and faster data loads.

With Oracle Exadata Database Machine customers can scale up/out incrementally and on demand. Start with the appropriate Exadata size – eighth, quarter, half, or full rack. Exadata can be easily upgraded to the next larger size whenever more processing power or capacity is needed. No need for a forklift upgrade, simply scale up/out the existing system.

Exadata includes a unique technology to offload data intensive SQL operations into the Oracle Exadata Storage Servers and only the data matching the selection criteria are sent from the storage to the database server for final consolidation before the database server sends the results back to the requester.

2 Best Deployment Flexibility

Widest range of supported platforms; Unix – Linux – Windows – "Oracle is Oracle is Oracle". The same code base across all operating systems means, Oracle has the same features, tools and functionality on all hardware platforms and operating systems, so customers can choose the most cost effective platform for their implementations.

Should customers require a change in operating systems, Oracle offers fast and efficient Oracle Lifecycle Migration Services (previously known as O2O and Triple-O Services). These services provide either offline or online migration of the customers databases depending on the downtime acceptable to the customers' business operation. Oracle Lifecycle Migration Service is a near zero downtime online Oracle to Oracle migration. The outage requirements are then cut from hours to minutes independent of the database size.

A new option for Oracle Database, Oracle Multitenant helps customers reduce IT costs by simplifying consolidation, provisioning, upgrades, and more. It is supported by a new architecture that allows a Multitenant container database to hold many pluggable databases. An existing database can be simply adopted, with no change, as a pluggable database. No changes are needed in the other tiers of the application.

Traditionally, Oracle has provided Oracle Database Server software to be installed on systems made up of third-party hardware and a third-party operating system. This approach is still possible. However, in addition, Oracle provides "Engineered Systems", where Oracle manufactures the machine, the operating system and the database. All the embedded components to run an Oracle Database are pre-configured, pre-tuned and pre-tested by Oracle experts, eliminating weeks or months of effort typically required to deploy a high performance system.

3 Best Availability and Reliability

Real Application Clusters (RAC) for SAP removes the database server as a single point of failure. The database remains online as long as one or more database instance is still up and running. Oracle Data Guard complements Oracle RAC, providing a disaster recovery solution that requires no SAP downtime in case of failure. Data Guard is often used in combination with Flashback (technology to rewind database changes without any restore to dramatically minimize downtime). Online Patching allows customers to install single or bundle patches completely online, without requiring the database instance to be shut down.

SAP customers are able to use Oracle Cloud File System (ACFS), which is part of Oracle Database. It complements Oracle Automatic Storage Management (ASM) in order to store non-Database files on ACFS. This option is also available on Exadata X5 and higher. It allows administrators to store SAP-related files like /sapmnt and /usr/sap/trans and avoid using external NFS file systems.

Oracle Exadata Database Machine for SAP customers is a highly engineered and pre-validated configuration. It provides built in High Availability, 'out of the box'. With Exadata's redundant architecture, all single points of failure are eliminated. Familiar features such as mirroring, fault isolation, and protection against drive and cell failure have been incorporated into Exadata to ensure continual availability and protection of data.

Exadata is prebuilt, reducing time and costs for deployment, installation, and configuration (HW, OS, DB, RAC, Clusterware etc.).

4 Best Support for Very Large Databases

The Oracle Database is well known for providing the most efficient use of disk space. This is extremely important to SAP customers as the size of their databases continue to grow dramatically.

Compression of B Tree indexes, which make up to one third of disk space allocated to databases in SAP environments, reduces I/O and improves overall performance by allowing more index information to be stored in the same amount of memory (cache).

Table compression, implemented in Oracle's Advanced Compression, uses a unique algorithm that eliminates duplicate values within a database block, even across multiple columns. This approach combines disk space reduction, performance benefits and ease of management.

Oracle Database Advanced Index Compression uses an unique algorithm to optimize space for index entries at a block level resulting in less amount of disk space needed, faster access to data and higher throughput of the SAP system.

Out-of-line LOBS (SecureFiles) Compression, Client- Server Network Compression, Data Guard Compression, Expdp Compression and RMAN Backup Compression are further enhancements to the compression features SAP customers can benefit from.

The complete unload and load of data during a Unicode migration (required by all new SAP releases) was optimized by Oracle to achieve the fastest SAP Unicode Migrations, with up to 1 terabyte/hour data transfer rates and it is fully integrated with SAP products. Even the largest multi- terabyte databases have been migrated in one weekend.

SAP customers using Oracle Databases also take advantage of a rich collection of table partitioning types to reduce I/O and improve performance. Oracle Database enriches this list with sub-partitioning and interval partitioning meant to enhance design flexibility and application performance.

In Oracle Database 12c and above, several new features have been added to the Advanced Compression Option (ACO) which enhance the storage management capabilities of Oracle Database. Heat Map automatically tracks modification and query timestamps, providing detailed insights into how data is being accessed.

Hybrid Columnar Compression – available on Oracle Engineered Systems (Exadata platform) – enables the highest levels of data compression and provides enterprises with tremendous cost-savings and performance improvements due to reduced I/O. Average storage savings can range from 10x to 15x depending on which Hybrid Columnar Compression level is implemented.

Many environments are reaching the end of their useful life and are costly to maintain. Exadata and Exalogic provide a simple and easy way to manage an environment – a viable option for a private cloud.

SAP Business Warehouse:
  - Huge and complex infocubes, queries or transactions with large database time
  - Large daily extracts with a limited time window
  - Large extracts can flood the network

5 Best Database Security

Compliance and security are more important now than ever before.

Oracle's Advanced Security Transparent Data Encryption (TDE) makes encryption of sensitive data simple by transparently encrypting data when it is written to disk. Oracle Database provides; Tablespace Encryption (encrypts all data within one tablespace), RMAN Backup encryption, Data Guard Secure Network, Expdp, and SecureFile Encryption.

With Oracle Database Vault, protective realms around SAP application database objects can be established to prevent privileged database users from accessing sensitive data and to enforce separation of duties among privileged database users.

Oracle Database Vault helps customers meet regulatory compliance requirements by enforcing separation of duties. Database Vault privilege analysis minimizes the number of granted roles.

All Oracle Security features are available for all database configurations (single instance, RAC) and all Hardware/OS platforms – including the Exadata Database Machine.

Exadata for SAP satisfies even the most stringent security and high-availability requirements. It is a complete, pre-built, balanced and secure cloud-based machine for mission critical databases with all available high security features of Oracle, like Database Vault.

6 Best Manageability and Self-Management

Oracle Enterprise Manager Grid Control (EM), SAP DBA Cockpit, and SAP BR Tools rely on Oracle Automatic Workload Repository (AWR) that automatically stores workload and performance statistics. So administrators and support engineers can analyze and quickly resolve performance issues, whether the root cause happened hours or days before.

Real Application Testing (RAT) to evaluate and implement changes in the customer data center infrastructure e.g. operating system, hardware migrations, patches and upgrade changes. Database Replay (part of RAT) enables customers to realistically test system changes essentially recreating production workloads on the test system.

A very exciting functionality for SAP customers in Oracle is Information Lifecycle Management (ILM) and Automatic Data Optimization (ADO). These features combined along with the Heat Map can be utilized to build a robust ILM strategy. This strategy incorporates automatic tiering and compression of your data to meet the policies you define.

Bundle Patches are created and certified in conjunction with SAP and bundled for simplicity. Applying the Exadata Bundle Patches and the SAP Database Bundle Patches is all that is required. BR TOOLS have been expanded to support ASM and Exadata.

Exadata for SAP:

– Makes complex integration work and manual tuning (database, storage, network, and server) superfluous

– Optimally supports implementations, migrations, and consolidations for quick, inexpensive project runtimes

– Enables users to implement a highly efficient centralized data pool featuring a multitude of system databases

7 Best Support for DB Consolidation

Oracle supported traditional DB consolidation methods like virtual machines or schema consolidation for a long time. And SAP customers benefitting from saving costs and effective infrastructure optimization.

Oracle Engineered Systems such as Exadata Database Machine gave customers new opportunities for DB consolidation and infrastructure cost savings with reduced complexity. More-and-more SAP customers are using Exadata for this stated purpose: the consolidation of their numerous "SAP databases".

SAP can be included in enterprise-wide database consolidation plans on Oracle Exadata Database Machine. Consolidate all databases on a modernized database platform and lower overall database costs due to consolidation; there are great advantages with the opportunity to consolidate multiple dispersed Oracle Databases into one Exadata environment. Administrators can focus on managing Exadata, not on maintaining multiple unique configurations.

Oracle Database Multitenant gives DB consolidation projects massive additional advantages. The Multitenant Option provides higher productivity and resource/cost savings for customers who realize DB consolidation projects by significant simplification. Oracle Multitenant introduces a new architecture that enables customers to easily consolidate multiple databases, without changing their applications, but allowing the management as one grouped resource with minimized memory resources. SAP customers can manage many databases as one (patching, backup, etc.). More efficient utilization of system resources/resource management can be realizing in an easy and very efficient way.

8 Best Integration of Hardware and Software

For years Oracle Database Server Software checks the ability of relevant hardware components. E.g. for using flash, encryption etc. With Oracle In-Memory, scans use super-fast "Single Instruction Multiple Data Values" (SIMD) vector instructions, when supported by the CPU. So, the get together or the integration of hardware and software will be reached by using Oracle 12*c* and above as a new step to higher quality and effectiveness.

Exadata, being an Oracle Engineered System, is prebuilt, thus reduces the time and costs for deployment, installation, and configuration (HW, OS, DB, RAC, Clusterware etc.). Exadata enables SAP customers to have a consolidated platform for databases, and provides the best integration of hardware and software, while reducing the demand for power and cooling for the SAP system operations.

ENGINEERED FOR INNOVATION, EFFICIENCY AND SIMPLICITY: ORACLE ENGINEERED SYSTEMS FOR SAP

Companies need to optimize their IT infrastructure to achieve best performance at reasonable cost. Oracle innovates at every layer of the stack to design engineered systems that reduce the cost and complexity of IT infrastructures while increasing productivity and performance.

Oracle engineers systems that are integrated across the entire technology stack, – so you don't have to do this. Reduced IT complexity frees up time and money, leaving more to spend on innovation and new opportunities.

Oracle's Engineered Systems combine best-of-breed hardware and software components with game-changing technical innovations that simplify operations and lower total cost of ownership (TCO). With Oracle Engineered Systems for SAP, that extreme performance is optimized for SAP applications.

Engineered for Extreme Performance

Extreme performance means everything you're doing now gets kicked up a notch or two – or more. Oracle

describes its engineered systems with words such as *faster, better, lower* and *fewer.* Put them together and you start to understand the Benefits of extreme performance.

- **Faster processing**
- **Lower costs**
- **Less risk**
- **Faster deployments**
- **Higher throughput**
- **More storage capacity**
- **Smaller footprints**
- **More transactions**
- **Better analytics**
- **Faster data loading**
- **Better data compression**
- **Higher availability**

Where competitors stop with "ultra" or "highly" converged systems, Oracle does not stop there, but moves one step ahead by really engineering all layers and integration of all layers into one solution which is designed, tested, built and delivered based on own IP and industry standards.

Oracle starts with the world's most complete, open, and integrated technology stack – including database technology, management software, operating systems, servers, and storage.

Oracle Engineered Systems

While each of the IT infrastructure layers provide leading-edge technology in itself, Oracle went one step further and designed engineered systems that are pre-integrated to reduce the cost and complexity of IT infrastructures while increasing productivity and performance.

Only Oracle can innovate and optimize at every layer of the stack to simplify data center operations, drive down costs, and accelerate business innovation.

Each system integrates Oracle's applications-to-disk technology stack – servers and storage, operating systems, database software, middleware, networking, and built-in virtualization features – to reduce the time and cost associated with purchasing, provisioning, deploying, and maintaining SAP infrastructure.

Oracle and SAP have jointly tested and certified Oracle's Engineered Systems for SAP, making them available as a family of engineered systems that are pre-integrated, pre-tested, and pre-configured to simplify data center operations, ensure fast and easy SAP infrastructure deployment, and accelerate business innovation.

Optimized for Oracle Database and SAP applications, Oracle's Engineered Systems for SAP reduce the time needed to get SAP landscapes up and running.

Oracle Engineered Systems in the Datacenter

Once deployed, consolidating SAP landscapes on Oracle's Engineered Systems reduces data center management complexity.

Administrators can use SAP's BR*Tools and Oracle Enterprise Manager Ops Center to manage SAP landscapes and SAP infrastructure. Built-in automation features simplify administration tasks and reduce day-to-day management demands.

The Oracle Exadata Database Machine, the Oracle Database Appliance, and the Private Cloud Appliance are designed to achieve enterprise performance levels that are unmatched in the industry.

Designed to deliver extreme performance to data warehousing, online transaction processing (OLTP), and mixed-load database applications, the Oracle Exadata Database Machine is tailor-made to improve SAP performance and manageability.

A "data center in a box", the Exadata Database Machine is an easy-to-deploy system that includes all the hardware needed for running the Oracle Database. From there, it adds Oracle Real Application Clusters (RAC), Oracle Grid Infrastructure, storage management tools, and administration software – and optimizes the entire system for extreme performance, mission-critical availability, and reliability.

Using Exadata in SAP Environments

The Oracle Exadata Database Machine is the perfect choice for SAP environments on several levels.

- It delivers outstanding I/O and SQL processing performance for online transaction processing, (SAP ERP), business warehouse, (SAP BW) and consolidation of mixed workloads

- A massively parallel grid architecture using RAC and Exadata storage delivers extreme performance with linear I/O scalability, dramatically increasing data bandwidth between the database server and storage. Intensive query processing and data mining scoring are offloaded to storage servers, bringing processing closer to SAP data to improve query performance and concurrency

- All servers, storage, and networking components are pre-cabled in racks, and the complete package is pre-integrated and pre-tested, cutting weeks or months from deployment schedules. It cuts management and maintenance chores by simplifying tasks such as patching with single vendor bundled patches.

- SAP customers can easily migrate their database to Exadata, which runs SAP applications unchanged. Depending on the source platform, the migration could be as smooth as an operating system platform upgrade.

A CLEAR PATH TO HIGHER SAP PERFORMANCE

Oracle Exadata X8M-2 demonstrates significant performance improvements in proof of concept

Overview

The Oracle Exadata Brazil team performed a very successful proof of concept (PoC) with a large local textile and retail clothing company running their SAP workloads on Exadata X8M. The company is extremely pleased with the results: an over **50% reduction in execution time** and over **60% improvement in SD (Sales and Distribution) transactions** while running on **30% less infrastructure**.

Follow the Performance Leader

Customers have grown accustomed to performance leaps with every new generation of Oracle Exadata Database Machine due to improved processor speeds, architectural enhancements, and specialized algorithms in system software. With the introduction of the Exadata Database Machine X8M, performance gains are now orders-of-magnitude better than the previous generation largely due to the unique use of Intel® Optane™ Persistent Memory and a 100Gb RDMA over Converged Ethernet (RoCE) internal fabric. The result is, indeed, a leap in performance: 16 million OLTP read IOPS, <19 microseconds OLTP IO latency, and 560GB/sec analytic scan throughput.

The SAP Customer Journey with Exadata

How can this new Exadata generation help SAP customers? SAP ERP Central Component (ECC) systems often run mixed workloads of varying types. These differing workloads are where the Exadata X8M architecture leveraging persistent memory excels. This innovation is essential to keep batch chain jobs executing at consistently high performance, while maintaining user transactions at satisfactory response times for the business.

Let's see how SAP workloads are handled by a typical do-it-yourself (DIY) system and Exadata. In the DIY system, there are application, database servers, and external storage all connected via an Ethernet LAN. None of these components are optimized for Oracle Database and the LAN introduces delays. In contrast, Exadata is a full-stack, engineered system whose technology, including persistent memory and RoCE in the latest generation, are optimized and finely tuned to maximize Oracle Database performance.

How this works to enhance performance of SAP workloads: Exadata Storage servers transparently add persistent memory accelerators in front of flash memory. The Exadata Database servers uses Remote Direct Memory Access (RDMA) instead of I/O to read remote PMEM, which is automatically tiered and shared across databases using a cache for the hottest data.
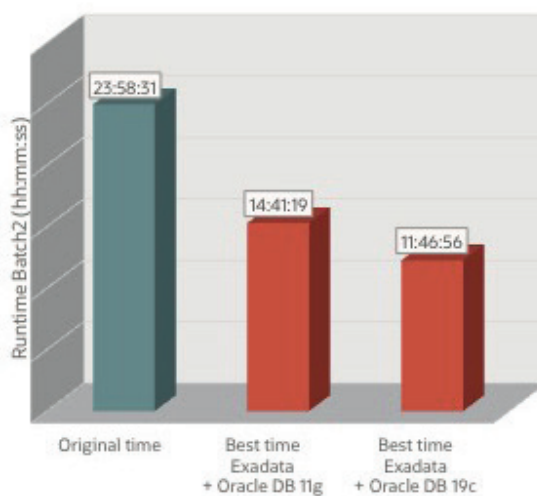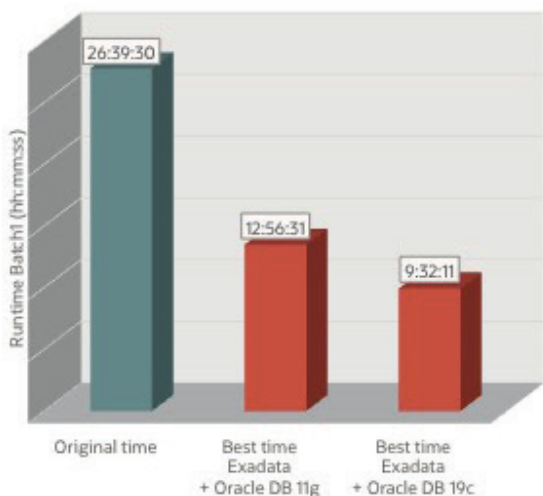
Runtime comparison for two different batch jobs: existing hardware vs. Oracle Exadata Database Machine with Oracle Database 11g or Oracle Database 19c

With the use of Oracle Database 19c on Exadata X8M-2 (used in this PoC) we have the use of a third tier of information storage, in front of flash and behind the Database Nodes' memory. This is based on the new technology of Persistent Memory Data & Commit Accelerator that make use of Intel® Optane™ modules, associated with RDMA over Converged Ethernet (RoCE) 100GbE.

This technology also allows for lower log write latency, which is critical to OLTP performance, such as SAP applications. Faster log writes give way to faster transaction commit times and minimize any log write slowdown that may cause a commit backlog. The Automatic Commit Accelerator allows databases to perform "one-way" RDMA writes to PMEM on multiple Storage Servers, bypassing network and I/O software, interrupts and context switches. The performance benefits of the Exadata X8M are clearly demonstrated in the proof of concept (PoC) results below.

Clear Path with a PoC

Customers upgrading from legacy systems to an Exadata X8M often like to know in advance what performance gain they can expect. To address this need, the Oracle for SAP development team has run a series of benchmarks and published the results, in SAP Application Performance Standards (SAPS) values, in Oracle documentation and in SAPnotes. There are also special cases where a customer may request a PoC to help make the decision on which model and size of an Exadata they should invest in. In these cases, Oracle collaborates with the customer to design a test scenario involving a workload and real data to match the customer's specific requirements.

The complete test scenario and results of the PoC are documented in a White Paper "SAP on Exadata X8M-2 - SAP ECC with Oracle Database on Exadata X8M-2 POC Results." You can download the new white paper here: https://www.oracle.com/a/ocom/docs/sap-on-exadata-x8m-2-white-paper.pdf.

Note: When using Exadata X8M for SAP applications, it is extremely important that all SAP Bundle-Patches (SBP) and upgrade procedures cascading from SAP Note 2799900 for Oracle Database 19c local to the Exadata are also applied accordingly – which was the case for this PoC.

For more information on SAP on Oracle, please visit https://www.oracle.com/solutions/sap/.
For more Exadata-specific information https://www.oracle.com/engineered-systems/exadata/, or simply ask your Oracle Representative.

ORACLE EXADATA MACHINE HELPS AMERISOURCEBERGEN RUN ITS BUSINESS AT PEAK LEVELS WITH SAP

AmerisourceBergen is a global pharmaceutical sourcing and distribution-service company that helps healthcare providers, pharmaceutical companies, and biotech manufacturers to improve patient access to products and enhance patient care. Services range from drug distribution and niche premium logistics to reimbursement and pharmaceutical consulting services. AmerisourceBergen delivers innovative programs and solutions across the pharmaceutical supply channel. The company is ranked no. 12 on the Fortune 500 list.

Challenges/Requirements

- A consistently stable database infrastructure platform capable of supporting an extremely high-volume and mission-critical SAP architecture. The SAP ECC application currently processes 1.7 million line items daily to their existing, incrementally growing, 70TB database

- A reliable and high availability IT environment that can be scaled as needed with near zero downtime. Ideally the environment is easily extendible, flexible, and supports their ambitious future business requirements. Near term growth analysis estimates processing a significant increase in line items by the end of 2017

- Achievement of performance gains taking into account end-to-end processing

- Successful and sustainable total cost of ownership requirements

Solutions

AmerisourceBergen chose to deploy the Oracle Exadata Database Machine Platform as the critical infrastructure foundation for the company's core SAP architecture. The reason for this was for significant scalability & stability improvements in the mission-critical SAP ERP ECC application and other core SAP modules.

Oracle Exadata Database Machine is a highly optimized engineered system capable of handling the most intense I/O workloads. It also serves as a great consolidation platform. AmerisourceBergen has replaced over 50 classical database servers into a small number of Exadata machines.

A much higher density of database per server was achieved. AmerisourceBergen has improved system stability for all mission-critical SAP applications: especially SAP ECC. Their business volume increase from processing 1 million to 1.7 million line items per day was a non-event. The system performed as expected without scalability issues.

Unplanned downtimes were eliminated for their business-critical SAP ECC environment. Both local and remote high availability (near zero downtime) are applied for disaster recovery coverage with faster backup time.

Optimized IT management ensured high performance with proactive monitoring and accelerated issue identification and resolution. This spans the entire Oracle technology solution (e.g. database, RAC, operating system, server, and storage) thanks to Oracle Advanced Customer Service (ACS)* and Oracle Advanced Monitoring and Resolution Services (AM&R).

Why Oracle?

Oracle Exadata Database Machine is a unique and comprehensive database tier solution: engineered and optimized for SAP and non-SAP database workloads. The ability to scale up to meet future needs is outstanding. Oracle AM&R and Oracle ACS* have provided excellent support and great value for the mission-critical IT operation.

Implementation process

AmerisourceBergen first went live with Oracle Exadata Database Machine for SAP in September, 2013. The transition to Oracle Exadata was done in two phases. The first phase focused on the core SAP ECC system. SAP ECC went live in the first 12 weeks of the project. The remainder of the SAP applications including CRM, PI or Portal followed in early 2014.

* Note: As of July 2023, Oracle ACS (Advanced Customer Services) became part of Oracle CSS (Customer Success Services).

The 70TB SAP ECC database environment has been running successfully for three and a half years on a dual-rack X3-8 Oracle Exadata Database Machine. The remaining SAP applications on approximately 20 databases run on a separate X3-2 Exadata machine. Recent expansions of the SAP architecture will introduce Oracle Database In-Memory.

AmerisourceBergen is in the process of consolidating their existing 20 datacenters down to two locations. This process will be finalized in 2018. The company also plans to upgrade the existing X3 Oracle Exadata Database Machine to X6 Oracle Exadata Database Machines this year.

"Oracle proactively assists with infrastructure monitoring to recognize any concerns from a performance perspective. With the North America Oracle SAP team, Oracle Advanced Customer Service (ACS) and Oracle's AM&R we can proactively look at what we need to do specifically to the SAP ECC environment to keep up with the high volumes," says Milt Simonds, Vice President Enterprise Platform Delivery, AmerisourceBergen Corporation.

A word from AmerisourceBergen Corporation

"In three and a half years of productive use, we have benefited from Oracle Exadata Database Machine in numerous ways. The Oracle Exadata Machine ideally supports stability, high availability, and performance in high-volume SAP use and facilitates our ever more ambitious business plans. We have been able to drastically simplify and consolidate our database environment as well as minimizing the TCO – with a greatly optimized support model. The Oracle services ACS and AM&R allow us to effectively focus on core tasks and help us to make optimum use of our own resources."
– MILT SIMONDS,
Vice President Enterprise Platform Delivery, AmerisourceBergen Corporation.

www.amerisourcebergen.com

Oracle Customer: AmerisourceBergen Corporation

Location: Chesterbrook, Pennsylvania, United States

Employees: over 19,000

Annual Revenue: $146.8 billion (FY16)

Oracle Products & Services:
• Oracle 19c Database
• Oracle 19c Database In Memory
• Oracle 19c Database Tuning & Diagnostics
• Oracle 19c Real Application Clusters (RAC)
• Oracle Exadata Database Machine
• Oracle Advanced Compression
• Oracle Data Guard
• Oracle Advanced Customer Support Services (ACS)
• Oracle Advanced Monitoring and Resolution (AM&R)
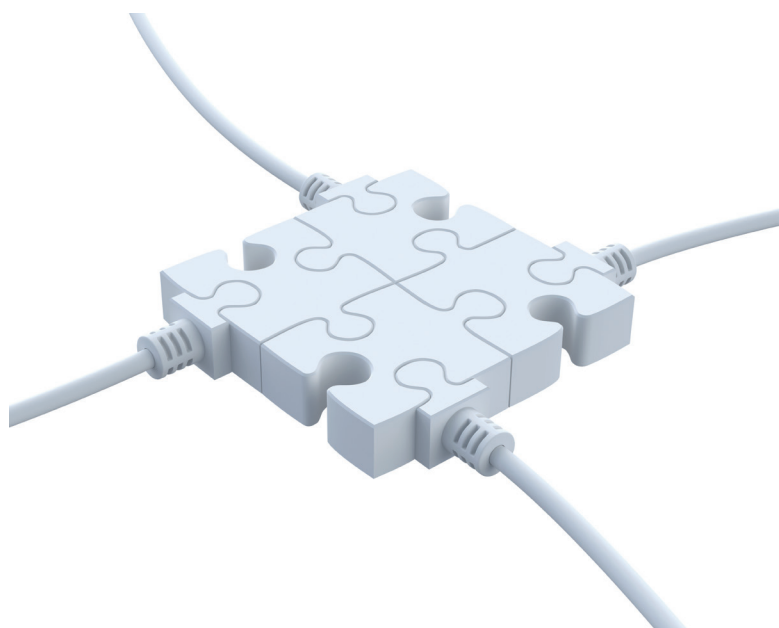
Open up new horizons and boost your business by migrating from MS SQL Server on standard hardware to an Oracle database and Oracle Exadata for SAP

ORACLE DATABASE AND EXADATA – THE PROBLEM SOLVERS FOR BW ISSUES – A SUCCESSFUL MSSQL MIGRATION TO

By replacing the database server of their SAP system running MS SQL Server on standard hardware with Oracle Exadata running Oracle Database, a global provider of infrastructure supply managed to resolve multiple issues on their SAP Netweaver BW/BI that had been affecting their business operations. The move also fixed their previous inability to fulfill business-relevant BW application extension requirements.

The company, an SAP customer for many years, engaged the global Oracle Advanced Customer Services (ACS)* team to migrate and transition to the new Exadata environment. Compared with the previous MS SQL Server and standard hardware setup, the new SAP Oracle 12c database (including RAC) and
the high-performance Oracle Exadata for SAP engineered system have tripled BW reporting performance and doubled the extraction speed of critical data. At the same time, scalability, capacity and high availability (HA) of the system was increased. All without a single change to the existing BW applications.

Rock-solid reasons for Oracle Database and Exadata

It is a well-known fact that, in order to work efficiently, be future-proof and provide flexible scalability, SAP BW/BI Netweaver greatly depends on its infrastructure components, i.e. the underlying database and hardware environment. However, while the use of BW almost continually increases over time, the existing infrastructure environment quickly can outlive it's ability to support the increase in utilization as required. Emerging BW application requirements, such as the use of new BW reports driven by business needs, sometimes cannot be implemented at reasonable cost – or at all. Performance limitations of the existing SAP infrastructure may even prevent the addition of smaller new reports of high business value.

*Note: As of July 2023, Oracle ACS (Advanced Customer Services) became part of Oracle CSS (Customer Success Services).

This was also the case with the above mentioned company that encountered several performance issues preventing them from using BW for normal system operation. At the same time, the existing SAP BW environment was unable to keep up with the increasing BW application requirements and provide the business with new BW functionality. Therefore, it was concluded that „optimizing BW was inevitable".

Various options were developed and evaluated in detail. Eventually, two options for implementing the planned BW optimization emerged from the evaluation process: either switch to SAP HANA or migrate the existing BW landscape based on SAP Netweaver from the MS SQL Server database and its standard hardware environment to Oracle Database and Oracle Exadata. According to a company spokesperson, the scales eventually turned away from the SAP HANA option due to the impact of the expected amount and diversity of changes that would have been required to make their existing applications work in the new environment. The SAP Netweaver BW/BI with Oracle Database and Exadata optimization option was the simpler path and had been thoroughly checked and verified multiple times before the final decision was made.

Qualified support by the Oracle ACS team
The migration project was backed by a dedicated Oracle Advanced Customer Services* team, giving advice as well as providing hands-on assistance. The team was not only involved in the design and planning but also in all relevant project steps such as system sizing, installation of the Oracle database including RAC implementation, Exadata installation, database migration and transition, fine tuning, testing, training and go-live. According to the customer, „Oracle ACS supported us with its vast experience and in-depth know-how at all times and played a crucial part in the timely realization and successful outcome of the project."

Migrating from the MS SQL Server database and a standard hardware environment to Oracle 12c database and an engineered system based on an integrated hardware / software / storage / network system was a huge success for the customer. „The manifold performance issues we had with SAP Netweaver BW/BI have simply vanished into thin air – without a single change to the SAP BW application logic. The use of BW with the new environment enables us to further enhance our business and focus on our goals," the customer explained.

The combination of Oracle 12c and Exadata for SAP has tripled reporting performance and the speed of data extractions has doubled. The new environment is also future-proof as it provides sufficient scalability and capacity resources to implement future change requests or new BW application features (such as the use of big data features) – something that would not have been possible before the introduction of Oracle 12c and Exadata. What's more, the use of Oracle Real Application Clusters has led to significant high availability improvements.

Future expansion of the current Exadata system for extended uses of SAP Netweaver BW/BI is now possible at any time without problems.

Results / improvements achieved through Oracle 12c and Exadata for SAP
Reporting performance 3x
Extract criticals 2x
Scalability / capacity 2x

ORACLE-RELATED SAP NOTES (ENGINEERED SYSTEMS)

Note No.	Note Title	DB Version
Engineered Systems : Exadata		
1590515	SAP Software and Oracle Exadata	19c
1619343	SAPinst for Oracle Exadata on Oracle Linux and Solaris X86	12c-19c
1677978	Mixed GI/RDBMS Versions or Mixed SAP/Non-SAP Environments	12c-19c
1996481	Using Correct Hostnames for Oracle Exadata Database Nodes	12c-19c
2007980	SAP Installation with Oracle Single Instance on Exadata and ODA	12c-19c
2799940	Exadata / Supercluster: Patches for 19c	19c
2846518	Exadata X8M - Virtualization DBs for SAP NetWeaver Products with KVM	12c-19c
2847437	Older Versions: SAP Software and Oracle Exadata	12c-19c
2848997	Additional Patches Required for Using Exadata Software 19.3.0	12c-19c
2884306	Managing SAPDATA_HOME and ORACLE_BASE on Engineered Systems	19c
2992680	Managing shared and multiple Oracle Homes on Engineered Systems	12c-19c
Engineered Systems : Database Appliance (ODA)		
2007980	SAP Installation with Oracle Single Instance on Exadata and ODA	12c-19c
2345633	Oracle Database Appliance: Mixed SAP and Non-SAP ORACLE_HOMEs	12c-19c
Engineered Systems : Private Cloud Appliance (PCA)		
2052912	SAP Software and Oracle Private Cloud Appliance (PCA)	n/a
Engineered Systems : Services		
1983678	Platinum Services for Exadata and SuperCluster running SAP	12c-19c

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