



SAP Infrastructure Platforms

SAP on Oracle

Development Update

MAY 2020 | PUBLIC

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SAP on Oracle Database 12c



SAP on Oracle Database 12c Release 2 Certification

Oracle Database 12c Release 2 (12.2.0.1)

Certified for SAP Business Suite based on
SAP NetWeaver

- from 18 December 2017
- All platforms:
 - Oracle Cloud Infrastructure
 - On-Premise platforms¹
 - Oracle Engineered Systems²
- Single Instance and RAC²
- First Oracle release to support Microsoft Windows Server 2016

Minimum Requirements

- Oracle Database 12c Release 2 with initial SAP Bundle Patch³
- Oracle Client versions 12.1 or 12.2
- Supported SAP Kernels 7.21_EXT|7.22_EXT or 7.45 and higher

For details see

- SAP Notes 2133079 and 2470660

¹ AIX, HP-UX, Linux, Solaris, Windows ² GI 12.2 with RDBMS 11.2.0.4, 12.1.0.2, 12.2.0.1 ³ November 2017 SBP

SAP on Oracle Database 12c Release 2

Supported Releases | Timeline

Supported Releases

Support for Oracle Database 12.2.0.1

- Base release is final release for Oracle 12.2
- May 2020 SBP is most recent
 - contains April PSU for 12.2.0.1

For details see

- SAP Note 1915313

Timeline

SUPPORT TIMELINE ORACLE DATABASE 12.2.0.1¹

Premier Support

Start	1 March 2017
End NEW!	30 November 2020

Limited Error Correction **NEW!**

Start	1 December 2020
End	31 March 2022

No Extended Support offered for Oracle 12.2

¹ Status as of April 2020

SAP on Oracle Database 12c Release 2

Limited Error Correction

Limited Error Correction

New support model for Oracle Database 12.2

- 16 months of add' support after end of premier
- from 1 December 2020
through 31 March 2022
- No additional support fees
- Automatic participation, no request necessary

For details see

- SAP Note 2855812

Includes:

- Severity 1 code fixes¹
- Security fixes via quarterly Release Update process

Limitations and Exclusions²

- No P2 or P3 patches
- No functional upgrades
- Issues related with 3rd party software excluded
- No certifications for new OS versions
- ...

¹ including backports and/or workarounds for newly discovered Severity 1 production incidents ² for the full list of limitations and exclusions see SAP note 2855812

SAP on Oracle Database 12c Release 2

Features

DATA GUARD

- Fast Start Failover Max Protection
- DG Database Compare `dbms_dbcomp.dbcomp`
- DG `DATA_GUARD_SYNC_LATENCY` parameter

SECURITY/ENCRYPTION

- Fully Encrypted Database
 - incl. system, aux, undo tablespaces
- TDE Tablespace Live/Offline Conversion

MISCELLANEOUS

- Online Table Move
- Online Conversion Non-Partitioned Tables
- Restart Online Definition
- ILM/ADO Support with Multitenant
- Advanced Index Compression High
- RAC Multi Instance Redo Apply

and much more...

SAP on Oracle Database 12c

Supported Products

The following SAP NetWeaver-based products are certified with Oracle Database 12c:¹
See the SAP Product Availability Matrix (PAM) for product versions released with Oracle 12c

SAP NetWeaver 7.0, 7.1, 7.3, 7.4, 7.5

SAP BW 7.0/7.0X, 7.1X, 7.20, 7.3X, 7.4, 7.5

SAP ERP 6.0

SAP CRM 7.0

SAP SCM 7.0

SAP SRM 7.0

Banking Services from SAP 6.0, 7.0, 8.0, 9.0

SAP Solution Manager 7.1, 7.2

SAP NW CE 7.1, 7.20

SAP NW PI 7.1

SAP LVM 2.1 and higher

¹ including all corresponding EhPs

SAP on Oracle Database 12c

Notes & Documentation

Entry Notes

- 2133079 Oracle Database 12c: Integration in SAP Environment
- 1914631 Central Technical Note for Oracle Database 12c Release 1 (12.1)
- 2470660 Central Technical Note for Oracle Database 12c Release 2 (12.2)
- 1915313 Current Patch Set for Oracle Database 12c

Quarterly Updated

Check out regularly

- 1915316 Database Patches for Oracle 12.1.0.2
- 1888485 Database Parameter for Oracle 12.1.0.2
- 2507228 Database Patches for Oracle 12.2.0.1
- 2470718 Oracle Database Parameter (12.2)

¹ Introducing Oracle In-Memory support

Features

- 2138262 Oracle Database 12c Advanced Compression for SAP Systems
- 2178980 Using Oracle Database In-Memory with SAP NetWeaver based Products
- 2254866 Using Oracle Database 12c Advanced Data Optimization with SAP NetWeaver
- 2336881 Using Oracle Multitenant with SAP NetWeaver based Products

Tools

- 2087004 BR*Tools Support for Oracle 12c
- 2213142 Corrections in BR*Tools 7.40 Patch 17¹
- 2254836 BR*Tools Support for Oracle ADO/ILM
- 2333995 BR*Tools Support for Oracle Multitenant Database

SAP on Oracle Database 12c

Notes & Documentation

Installation and Upgrade

- 1915302 Database Software 12c Installation on Windows
- 1915301 Database Software 12c Installation on Unix
- 1915299 Troubleshooting Oracle Software Installation (12.1 / 12.2)

Upgrade Guides

Oracle 12c Database Upgrade:

service.sap.com/instguides

- Database Upgrades
 - Oracle

White Papers

- Real Application Clusters (RAC)
 - Upgrade of SAP NetWeaver Installation to Oracle Grid Infrastructure 12.1.0.2 with Oracle Real Application Clusters 12c Release 1
 - Providing High Availability for SAP Resources with Oracle Clusterware 11g Release 2 and Clusterware 12c Release 1
- Exadata
 - Using SAP NetWeaver with Oracle Database 12c on Oracle Exadata
- In-Memory
 - Using SAP NetWeaver with Oracle Database In-Memory
- Advanced Data Optimization
 - Using SAP NetWeaver with Oracle Database 12c Automatic Data Optimization and Information Lifecycle Management

SAP on Oracle Database 18c



SAP on Oracle Database 18c Certification

Oracle Database 18c (18.5.0)

Certified for SAP Business Suite based on
SAP NetWeaver

- Released on

1 March 2019

- February 2020 SBP is most recent
 - contains January PSU 18.9.0

For details see

- SAP Note 2705272

Including:

- Oracle Database 18c
- Oracle Grid Infrastructure (GI) 18c
- Oracle Real Application Clusters (RAC) 18c
- Support for
 - all On-Prem platforms
 - Oracle Cloud
 - Oracle Exadata/Supercluster
- Oracle Failsafe for Windows^{1,2}

¹ released for SAP mid-June 2019 ² Includes Failsafe support for Microsoft Windows 2016

SAP on Oracle Database 18c

Minimum Requirements | Timeline

Minimum Requirements

- Oracle Database 18c
 - Release Update (RU) 18.5.0¹
- Oracle Instant Clients 12.1 and 12.2
 - No support for client 18c
- Supported SAP Kernels:
7.21_EXT|7.22_EXT or 7.49|7.53

Timeline

SUPPORT TIMELINE ORACLE DATABASE 18c

Premier Support

Start	February 2018
End	08 June 2021

No Extended Support offered for Oracle 18c

¹ with February 2019 SAP Bundle Patch based on 18.5.0

SAP on Oracle Database 18c Features

DATABASE IN-MEMORY

2x–5x faster, extremely benefits SAP BW

- Dynamic thread-based scans
- Optimized arithmetic and native binary numbers using SIMD vectoring

RECOVERY MANAGER (RMAN)

Easy and fast cloud migration

- DUPLICATE DATABASE [...] AS ENCRYPTED

¹ planned for SAP

PERFORMANCE

Polymorphic Table Functions¹

- “Fast Data Access” option in SAP’s FOR ALL ENTRIES
- Profile parameter:
rsdb/prefer_join_with_fda = 0|1

EXADATA

Increased Performance

- Undo Block RDMA Read
- Commit Cache

MISCELLANEOUS

- ACFS resize and info storage
 - Online merge (sub-)partition
- and much more...

SAP on Oracle Database 18c

Notes & Documentation

Entry Notes

- 2705272 Oracle Database 18c: Integration in SAP Environment
- 2660020 Central Technical Note for Oracle Database 18c

Quarterly Updated

Check out regularly

- 2660044 Patches for 18c: Database
- 2470718 Oracle Database Parameter 12.2 / 18c

Miscellaneous

- 2763733 BR*Tools Support for Oracle 18c

Installation and Upgrade

- 2660017 Oracle Database 18c Installation on Unix
- 2660018 Oracle Database 18c Installation on Windows
- 2660027 Upgrading to Oracle Database 18c

Upgrade Guides

Oracle 18c Database Upgrade:

service.sap.com/instguides

- Database Upgrades
 - Oracle

SAP on Oracle Database 19c



SAP on Oracle Database 19c Certification

Oracle Database 19c (19.5.0)

Certified for SAP Business Suite based on
SAP NetWeaver

- Released on:

20 December 2019

- SWPM based installation since March 2020
- February 2020 SBP is most recent
 - contains January PSU 19.6.0

For details see

- SAP Note 2817074

Including:

- Oracle Database 19c
- Oracle Grid Infrastructure (GI) 19c
- Oracle Real Application Clusters (RAC) 19c
- Support for
 - all On-Prem platforms²
 - Oracle Cloud
 - Oracle Exadata/Supercluster

Planned:

- Support for Oracle Linux 8 and RHEL 8

¹ Direct upgrade possible from all Oracle database releases 11.2.0.4 through 18 ² First release to support Microsoft Windows Server 2019

SAP on Oracle Database 19c

Minimum Requirements | Timeline

Minimum Requirements

- Oracle Database 19c
 - Release Update (RU) 19.5.0¹
 - SWPM support with 19.6.0
- Oracle Instant Clients 12.1, 12.2 and 19c
 - No support for client 18c
- Supported SAP Kernels:
7.21_EXT|7.22_EXT or 7.49|7.53

Timeline²

SUPPORT TIMELINE ORACLE DATABASE 19c

Premier Support

Start	March 2019
End	31 March 2023

Extended Support³

Start	1 April 2023
End	31 March 2026

¹ with November 2019 SAP Bundle Patch based on 19.5.0 ² Oracle 19c is a *Long Term Support Release* ³ at additional costs

SAP on Oracle Database 19c

Features

EXADATA, EXA-CS & EXA-CC

Automatic Indexing^{1,2}

- In addition to SAP standard index design
 - SAP standard indexes not supported to be dropped
- Ideal for customization of SAP system
 - Improves query performance and throughput for e.g. Z reports

PERFORMANCE

SQL Macros³

- Used for SAP ABAP Core Data Services (CDS)
- Major performance improvement
- To replace specific performance-critical table functions in SAP CDS
 - allows for push-down of query filters

¹ Under evaluation by SAP ² This feature is exclusively available with Exadata, Exadata Cloud Service and Exadata Cloud at Customer ³ as of Oracle 19.7.0

SAP on Oracle Database 19c

Notes & Documentation

Preparatory Notes

Available already before certification

- 2799958 Preliminary Information about Oracle Database 19c
- 2478541 Operating System Requirements for Oracle Database

Entry Notes

- 2817074 Oracle Database 19c: Integration in SAP Environment
- 2799900 Central Technical Note for Oracle Database 19c

Quarterly Updated

Check out regularly

- 2799920 Patches for 19c: Database
- 2470718 Oracle Database Parameter 12.2 / 18c / 19c

Miscellaneous

- 2763733 BR*Tools Support for Oracle 18c and 19c

SAP Certification Roadmap for Oracle Databases 19c and later

SAP certification of a new Oracle database release...

- ...starts with availability on all on-premise OS platforms supported by SAP¹
- ...is planned within 6 months after the on-premise platform availability
- ...will cover all platforms²

For details see

- SAP Note 2606828

ORACLE DATABASE AVAILABILITY TIMELINE

Oracle Database Release	Availability by Oracle for On-Premise Platforms	SAP Certification
Oracle Database 19c	June 2019 Release Update (19.3)	December 2019 (19.5)
Oracle Database 20c/21c	TBD	TBD

¹ Linux, Windows, Solaris, AIX, HP-UX ² Oracle Cloud Infrastructure, Engineered Systems, all on-premise platforms

Oracle Database **In-Memory**



Oracle Database In-Memory Certification

Oracle Database In-Memory

Certified for SAP since 30 June 2015

Minimum Requirements

- Oracle Database 12c Release 12.1.0.2¹
 - including RAC 12c and Engineered Systems
- SAP NW 7.X with kernel 7.21_EXT
 - DDIC < 7.40 SP12 has limited IM support

For details see

- SAP Note 2178980
- Oracle In-Memory whitepaper in SAP Community

SAP Products Support

- Business Suite based on SAP NetWeaver
 - ERP, CRM, SRM, SCM, BW, PI, ...
 - Industry solutions
- Check SAP Product Availability Matrix (PAM) for full list

¹ with June 2015 SAP Bundle Patch (Unix) or Database Bundle Patch 12.1.0.2.6 (Windows)

Oracle Database In-Memory

Two Approaches

APPROACH 1

Using the Database In-Memory Advisor

Situation

- Tables/partitions recommended/suitable for In-Memory are yet unknown

Action¹

- Run IM Advisor for recommendations
 - Adjusted to SAP specifications
- Relies on 2–3 days of Automatic Workload Repository (AWR) data

APPROACH 2

Object candidates for In-Memory are known

Situation

- Reports with long running queries processing large amounts of data have already been identified

Action¹

- Put these tables/partitions in IM column store
- Use SAP_IM_ADV package² for proper column store sizing

¹ See Oracle In-Memory white paper in SAP Community for detailed procedure ² included in SAP Bundle Patch

Oracle Database In-Memory Conventions

Index Design

Changes to SAP standard¹ index design are not allowed:

- No dropping
- No setting invisible or unusable

Individual Columns

All columns of SAP standard tables must be loaded into In-Memory column store

- No loading of individual columns
- No exclusion of individual columns

Database Buffer Cache

Reducing buffer cache size in favor of IM column store is not allowed

- Always use additional memory for IM

SAP BW Aggregates

Dropping all aggregates from an existing BW system is not recommended

- Aggregates are designed for providing good throughput in concurrent user environments

¹ Custom indices in customer namespace are not affected, changes are allowed

Oracle Database In-Memory Licenses

Oracle Database In-Memory
requires the following licenses:

- Oracle Full Use customers:
 - Oracle Database In-Memory Option

 - SAP ASFU customers:
 - SAP “Oracle In-Memory License Package”
- See SAP price list for details

Oracle Database In-Memory Advisor
requires the following licenses:

- Oracle Full Use customers:
 - Oracle Tuning Pack
 - Oracle Diagnostics Pack

- These packs are included in SAP ASFU license

Oracle **Multitenant**



Oracle Multitenant Certification

Oracle Multitenant

Certified for SAP since February 2017

Minimum Requirements:

- Oracle Database 12c Release 12.1.0.2¹
- SAP NetWeaver 7.40 with kernel 7.45² patch 210
- SWPM 1.0 SP19, SUM 1.0 SP19³
- BR*Tools 7.40 Patch 30
- SAP notes to apply

For details see

- SAP Note 2336881

Required licenses:

- Oracle Multitenant comes at a cost for both Oracle direct and SAP ASFU customers
 - No license required when using up to 3 PDBs per CDB
- Oracle Full Use customers need to purchase:
 - Oracle Multitenant Option
- SAP ASFU customers need to purchase:
 - SAP “Oracle Multitenant License Package”

¹ plus specific SAP Database Bundle Patch ² Unicode only ³ Contained in Software Logistics (SL) Tool Set 1.0 SP19

Oracle Multitenant Restrictions

Oracle Multitenant with SAP

is subject to the following restrictions:

- Unix: User concept “Oracle Standard” only
- No mix of OLTP and OLAP PDBs in same CDB

For details see

- SAP Note 2336881

Restrictions planned to be lifted:

- No RAC support. SI/FS and SI/ASM only
- Limited support for Engineered Systems:
 - SI/ASM only
- No support for
 - Windows Cluster
 - Transparent Data Encryption (TDE)
- Limitations regarding SAP Host Agent

Oracle **Advanced Data Optimization**



Oracle Advanced Data Optimization Certification

Oracle Advanced Data Optimization

Certified for SAP since 31 December 2015

Minimum Requirements and Limitations:

- Oracle Database 12c Release 12.1.0.2¹
- SAP NetWeaver 7.40 SP12, 7.50 SP2
- Oracle Hybrid Columnar Compression (HCC):
 - only in combination with ADO
 - limited to row level locking

For details see

- SAP Note 2254866
- Oracle ILM/ADO white paper in SAP Community

Required licenses:

- Oracle Full Use customers need to purchase:
 - Oracle Advanced Compression Option (ACO)
- This option is included in SAP ASFU license

¹ with May 2016 SBP for Unix/Windows Patch Bundle 1608

Engineered **Systems**



Engineered Systems

Exadata & Exalogic

CLUSTERED DATABASE AND STORAGE SERVER

Oracle Exadata Database Machine X2–X8

Support for X2-2|8 through X8-2|8

- **NEW!** X8M certified for SAP in October 2019

For details see

- SAP Note 1590515
- Oracle Exadata white paper in SAP Community

CLUSTERED APPLICATION SERVER

Oracle Exalogic X2–X5

Support for X2-2 through X5-2

- Only in combination with Exadata

For details see

- SAP Note 1617188

Engineered Systems

SPARC Clusters

GENERAL PURPOSE ENGINEERED SYSTEM

Oracle SPARC SuperCluster

Support for T4-4, T5-8, M6-32, M7 and M8

For details see

- SAP Notes 1693680

SMALL-SCALE, GENERAL PURPOSE ENGINEERED SYSTEM

Oracle SPARC MiniCluster

Support for S7-2

For details see

- SAP Note 2384855

Engineered Systems

Database Appliance (ODA) & Private Cloud Appliance (OPCA)

TWO-NODE CLUSTERED DATABASE SERVER

Oracle Database Appliance V1–X7

Support for V1, X3-2 through X7-2

- **NEW!** ODA X8 certification planned with 19c

For details see

- SAP Notes 1760737, 2290084, 2388511 and 2664704
- Oracle ODA white papers in SAP Community

ENGINEERED SYSTEM DESIGNED FOR VIRTUALIZATION

Oracle Private Cloud Appliance X3–X7

Support for X3-2 through X7-2

- **NEW!** OPCA X8 certification coming soon

For details see

- SAP Note 2052912

Virtualization



Virtualization

Oracle Virtual Machine (VM)

Oracle VM

is supported with SAP as follows¹:

- Oracle VM 3.2.1 or higher
- x86-64 platforms²

Guest Operating Systems Support:

- Oracle Linux 5, 6 and 7
- Oracle Solaris 10 and 11
- Microsoft Windows currently not supported
- SuSE Linux Enterprise Server currently not supported
- No RedHat Enterprise Linux Support

SAP Products Support

- All SAP products certified for supported guest OS
- Check PAM for OS availability for SAP product

Oracle Database Support

- Single Instance
 - Oracle 10.2.0.5, 11.2.0.4, 12 through 19
- Real Application Clusters (RAC)
 - Oracle 11.2.0.4, 12 through 19
 - Oracle Linux guests only

¹ see SAP Note 1808268 ² not with ODA

Virtualization

Microsoft Hyper-V

Microsoft Hyper-V

Certified with SAP since June 2013¹

- Windows Server 2012/R2 and 2016
- Virtual and private cloud environments

Guest Operating Systems Support includes

- Windows Server 2019
- Windows Server 2016²
- Windows Server 2012, and R2
- Windows Server 2008 R2 Service Pack 1

SAP Products Support

- All SAP products certified for supported guest OS
- Check PAM for OS availability for SAP product

Oracle Products Support

- All Oracle products certified for Windows Server, including
 - Oracle Database 11.2 through 19
 - Oracle Instant Client 11.2, 12.1 and 19

¹ see SAP Note 1329848 ² Oracle Database 12.2 only

Infrastructure **as a Service**



Infrastructure as a Service

Oracle Cloud Infrastructure Compute

Oracle Cloud Infrastructure Compute

is supported with SAP as follows:

- Oracle Database 11.2.0.4, 12.1.0.2¹ and 12.2.0.1, 18 and 19
- All features/options² supported for SAP on premise are available with Oracle Cloud Infrastructure
- Oracle Linux 6 or 7³

For details see

- SAP Notes 2474949 and 2520061
- Knowledge Base Article 2650732
- Oracle white paper in SAP community

Supported SAP products:

- SAP NetWeaver 7.X^{4,5} and products based hereupon
- SAP BusinessObjects BI platform
- SAP SCM APO-liveCache

¹ Minimum SAP Bundle Patch August 2017 ² except RAC, except ASM ³ both UEKR3 and UEKR4 ⁴ Unicode only

⁵ Minimum SAP Host Agent 7.21 patch level 30 for Bare Metal and patch level 35 for Virtual Machine Shapes

Infrastructure as a Service

Oracle Cloud Infrastructure Compute

CERTIFIED VIRTUAL MACHINE SHAPES

Shape	OCPU	Memory	Database Storage	SAPS
VM.Standard.E2.1 NEW!	1	8 GB	1 PB Block Storage	1,567
VM.Standard.E2.2 NEW!	2	16 GB	1 PB Block Storage	3,133
VM.Standard.E2.4 NEW!	4	32 GB	1 PB Block Storage	6,265
VM.Standard.E2.8 NEW!	8	64 GB	1 PB Block Storage	12,530
<hr/>				
VM.Standard2.1	1	15 GB	1 PB Block Storage	1,359
VM.Standard2.2	2	30 GB	1 PB Block Storage	2,717
VM.Standard2.4	4	60 GB	1 PB Block Storage	5,433
VM.Standard2.8	8	120 GB	1 PB Block Storage	10,865
VM.Standard2.16	16	240 GB	1 PB Block Storage	21,730
VM.DenseIO2.8	8	120 GB	6.4 TB NVMe	10,865
VM.DenseIO2.16	16	240 GB	12.8 TB NVMe	21,730

Infrastructure as a Service

Oracle Cloud Infrastructure Compute

CERTIFIED BARE METAL MACHINE SHAPES ¹

Shape	OCPU	Memory	Database Storage	SAPS
BM.Standard1.36	36	256 GB	1 PB Block Storage	59,370
BM.DenseIO1.36	36	512 GB	28.8 TB NVMe ²	59,520
BM.Standard2.52	52	768 GB	1 PB Block Storage	72,230
BM.DenseIO2.52	52	768 GB	51.2 TB NVMe ²	72,230

For details see

- SAP Notes 2474949 and 2520061

¹ No support for any virtualization technology on Oracle Cloud Infrastructure Bare Metal Compute instances ² Block Volume Storage (up to 1 PB) can also be used

Infrastructure as a Service

Oracle Database Exadata Cloud Service (ExaCS)

Oracle Database Exadata Cloud Service

is supported with SAP as follows:

- Oracle Database 12.1.0.2 and 12.2.0.1, 18 and 19
- All features/options supported for SAP on premise are available with Oracle ExaCS¹
 - including RAC
- Oracle Linux 6 and 7

For details see

- SAP Note 2614028
- Oracle white paper in SAP Community

Supported SAP products (Database only):

- SAP NetWeaver 7.X^{2,3} and products based hereupon
- SAP BusinessObjects BI platform 4.2 and above

¹ Minimum ExaCS release 17.4.2.2 ² Unicode only ³ Minimum SAP Host Agent 7.21 Patch Level 35

Infrastructure as a Service

Oracle Database Exadata Cloud Service (ExaCS)

SUPPORTED ORACLE EXA-CS SHAPES AND MACHINE TYPES

Shape	# Cores per Node	Memory	Database Storage	SAPS
Exadata Half3.200/Half Rack X8-2 NEW!	$20 \leq N \leq 200$	2,880 GB	299 TB on Storage Servers	$274,700 * N / 200$
Exadata Base.48/Eighth Rack X7-2	$8 \leq N \leq 48$	720 GB	74.6 TB on Storage Servers	$60,164 * N / 48$
Exadata Quarter2.92/Quarter Rack X7-2	$8 \leq N \leq 92$	1,440 GB	106 TB on Storage Servers	$115,315 * N / 92$
Exadata Half2.184/Half Rack X7-2	$16 \leq N \leq 184$	2,880 GB	212 TB on Storage Servers	$209,080 * N / 184$
Exadata Quarter1.84/Quarter Rack X6-2	$22 \leq N \leq 84$	720 GB	84 TB on Storage Servers	$119,700 * N / 84$

Infrastructure as a Service

Microsoft Azure

Microsoft Azure

is supported with SAP as follows:

- Oracle Database 11.2.0.4, 12 through 19
- Single Instance only (no RAC)

Supported operating system versions:

- Microsoft Windows Server 2019¹
- Microsoft Windows Server 2016²
- Microsoft Windows Server 2012³, R2
- Microsoft Windows Server 2008 R2 SP1
- Oracle Linux 7
 - Including Oracle ASM support

For details see

- SAP Notes 1928533 and 2039619

¹ Oracle Database 19.5.0 and higher ² Oracle Database 12.2 and higher ³ No support for Oracle Database 19 ⁴ No support for Oracle Database 12.2

Infrastructure as a Service

Amazon Web Services (AWS)

Amazon Web Services

are supported with SAP as follows:

- Oracle Database 11.2.0.4, 12 through 19
- Oracle Linux 6.4 or higher¹
- Amazon Web Services EC2 only
 - No support for AWS RDS
- Single Instance only (no RAC)

For details see

- SAP Notes 2358420 and 1656099

Supported SAP products (Database only):

- SAP NetWeaver 7.X² and products based hereupon

¹ Amazon Machine Image (AMI) must be based on Oracle Linux 6.4 or later ² Unicode only

SAP NW Business Intelligence

Flat InfoCubes



SAP NW Business Intelligence

Recent Optimizations

Overview

Recent optimizations in SAP NetWeaver Business Intelligence:

- Flat InfoCubes

- Standard InfoCubes

- SAP Note 2335159, 7.40 SP15, 7.50 SP04

- Semantically Partitioned Objects (SPOs)

- SAP Note 2711358, 7.40 SP22, 7.50 SP15

- MassConversion

- SAP Note 2523154, 7.40 SP18, 7.50 SP10

- **NEW!** FEMS PushDown

- SAP Note 2816467, 7.50 SP15

- Flat Cubes

- DataStore Objects (DSOs)

- **NEW!** In-Memory Dynamic Scans (18c)

- SAP Note 2335159, 7.40 SP15, 7.50 SP04

— ALL THESE OPTIMIZATIONS ARE BASED ON ORACLE DATABASE IN-MEMORY —

SAP NW Business Intelligence

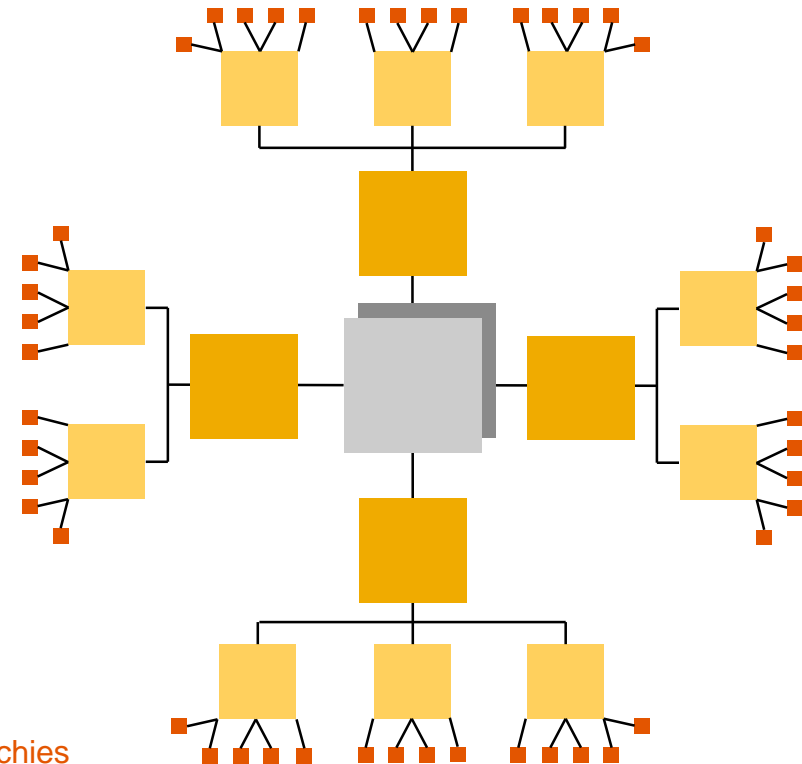
Classic InfoCubes

Classic InfoCubes follow SAP proprietary, extended Star schema

Optimized for row-based, classic RDBMS

- 2 fact tables
 - E fact table: Read-optimized partitioning
 - F fact table: Write/Delete-optimized partitioning
- Dimension tables
 - as grouping sets of characteristics
- Shared master tables

facts
dimensions
characteristics
attributes + hierarchies



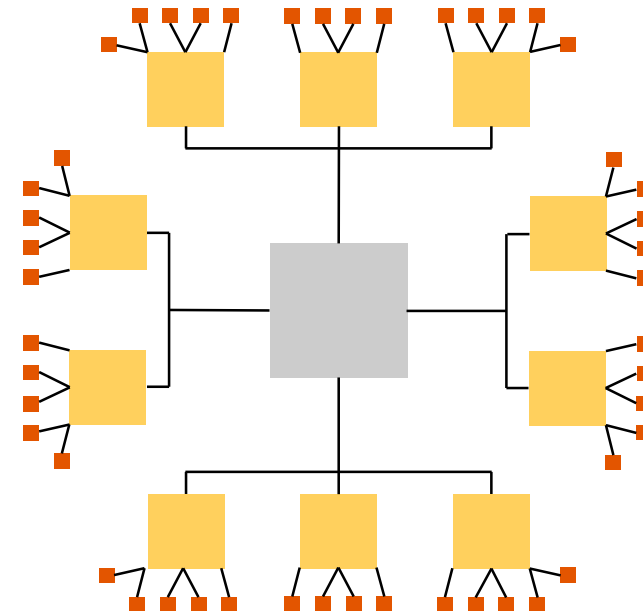
SAP NW Business Intelligence

Flat InfoCubes

Flat InfoCubes are simplification of classic schema

Optimized for columnar and hybrid RDBMS

- 1 fact table
 - Write/Delete no longer harms read performance
 - No separation into E and F fact tables
 - Two-dimensionally partitioned using sub-partitioning
- No dimension tables¹
 - Dimensions become pure meta data
 - Obsolete need to look-up/create DIMIDs strongly boosts update performance
- Much higher query and load performance
 - Due to In-Memory technology
 - Less joins; no indices on fact table



facts
characteristics
attributes + hierarchies

¹ SAP package dimension remains

SAP NW Business Intelligence

Flat InfoCubes with SAP on Oracle

Available from SAP NW Business Intelligence 7.40

Relies on Oracle Database In-Memory technology

- Supported from:
 - SAP NW BI 7.40 SP15
 - SAP NW BI 7.50 SP04
- Oracle Database 12c Release 1 (12.1.0.2)¹ and higher
- Oracle Database In-Memory mandatory
- Automatic mass conversion available
- Support for Semantically Partitioned Objects (SPOs)

For details see

- SAP Notes 2335159, 2523154 and 2711358

¹ requires May 2016 SAP Bundle Patch for Oracle Database, or higher

SAP NW Business Intelligence

Flat InfoCubes: Real Customer Scenario

Data Volume: **9,000,000** Rows

STAR SCHEMA

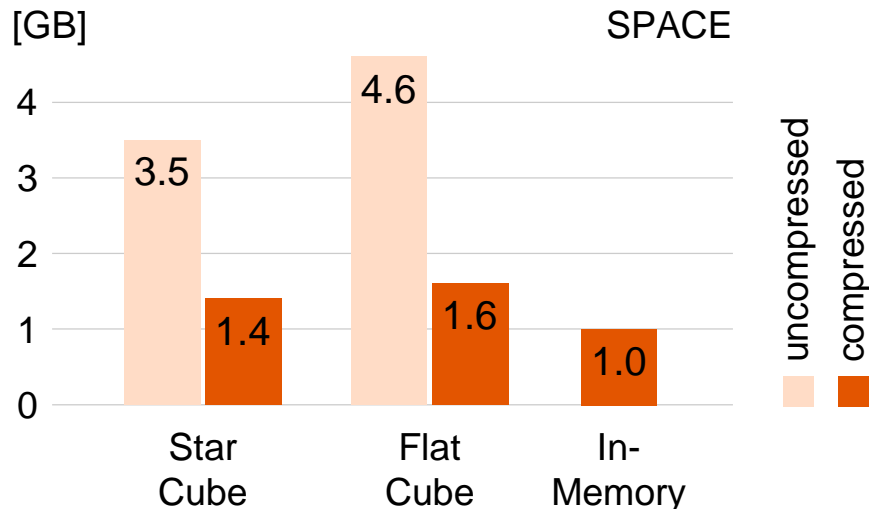
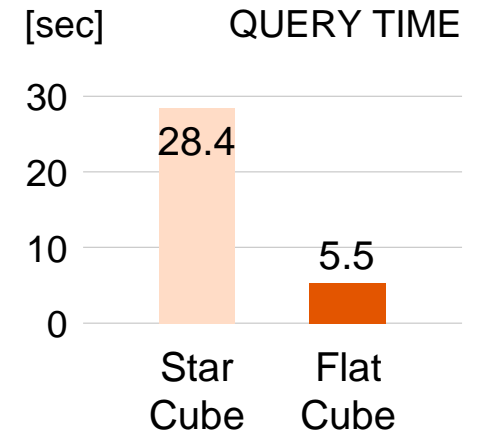
- 12** Dimensions
- 129** Measurements
- 11** Join Dimensions

FLAT SCHEMA

- 46** Key Values
- 129** Measurements
- 1** Join Dimension

Query:

- Many result columns
- 3 attribute tables



In-Memory Flat Cube

Query Characteristics:

- The more data,...
- The less number of result columns,...
- The more joins,...
- The more complex the predicates,...

...the higher the improvement!

SAP NW Business Intelligence

FEMS PushDown

What is FEMS (Form Element Selection)?

Converts a row-based database result into a cell-formatted (“spread sheet-like”) BI client result

- Existing Problem:
 - Time and I/O consuming processing on standard InfoCubes and DSOs in database
 - Large amount of data transferred between database and BW application servers
 - Complex and time consuming processing of large dataset within BW application server
- New Solution with PushDown:
 - Perform all required processing and formatting on Flat InfoCubes and DSOs within Database In-Memory

Performance Improvement: **10x** for BW FEMS queries

Oracle Database 18c In-Memory Dynamic Scans

In-Memory Dynamic Scans

Parallelization of in-memory scan using light-weight threads

- Number of active threads controlled by resource manager
- Efficient utilization of CPU resources to maximize in-memory scan performance

Performance Improvement: **2x–3x** for BW queries using In-Memory

Performance

ABAP Core Data Services



Performance

Paradigm Change

Application server's purpose is to relieve the database server, but:
Today the database server is no longer the critical resource!

NEW PARADIGM:

Data-Centric Approach

Push calculations/business logic from the application server
down to the database server

- Eliminates data traffic...
- ...and allows for local data access optimization

„Bring the Algorithm
to the Data“

Performance

ABAP Core Data Services (CDS)

ABAP Core Data Services

Dynamic, database-side objects, comprising...

- Views
- Views with parameters
 - eq. database table functions
- Scalar functions

and implementing simple to most complex business logic

AVAILABLE FROM SAP NETWEAVER 7.40 SP8
EXTENDED IN SAP NETWEAVER 7.50 | AS ABAP 7.51

Examples:

- Functions:
 - CONCAT, REPLACE, SUBSTRING, LPAD
 - UNIT_CONVERSION
 - CURRENCY_CONVERSION
- Global Temporary Tables¹
- Session Variables¹
- Time¹ and Timezone² Functions
- ...

SEE THE ABAP DOCUMENTATION FOR A FULL LIST OF
CDS FUNCTIONALITY

¹ as of SAP NetWeaver 7.50 ² as of AS ABAP 7.51

Miscellaneous Topics



SAP on Oracle Database 11g Extended Support

Oracle Database 11.2.0.4 Extended Support

EXTENDED SUPPORT TIMELINE ORACLE DATABASE 11.2.0.4

Extra-Charged Extended Support

Start	1 January 2019
End	31 December 2020

- Official request necessary
- SAP online order form
 - see SAP Note 2699935

CONTRACT REQUIRED FOR SBP DOWNLOAD
FROM SAP MARKETPLACE!

SAP on Oracle Database 12c Release 1 Extended Support

Oracle Database 12.1.0.2 Extended Support

EXTENDED SUPPORT TIMELINE ORACLE DATABASE 12.1.0.2

Extra-Charged Extended Support

Start	1 August 2019
End ^{NEW!}	31 July 2022 ¹

- Official request necessary
- SAP online order form
 - see SAP Note 2775143

CONTRACT REQUIRED FOR SBP DOWNLOAD
FROM SAP MARKETPLACE!

¹ Microsoft Windows 2008 platform ends on 31 July 2021

Software Provisioning Manager

Encrypted Tablespaces

Encrypted Tablespaces in Software Provisioning Manager

Creation of encrypted tablespaces during database installation is now integrated in SWPM

ENCRYPTED TABLESPACES SWPM INTEGRATION

Version	Supported Tablespaces	Release to Customer (RTC)
SL Tool Set 1.0 SPS 27	SAP User Tablespaces	16 September 2019
SL Tool Set 1.0 SPS 28	SAP User Tablespaces + SYSTEM, SYSAUX, UNDO, PSAPTEMP	20 January 2020

- Mandatory for SAP deployments in Oracle Cloud
- Oracle 18c and higher

For details see

- SAP Note 2485122

Social Media

SAP on Oracle Community

SAP on Oracle Community Page

Find news, discussions and resources related to SAP on Oracle at

go.sap.com/community/topic/oracle.html¹

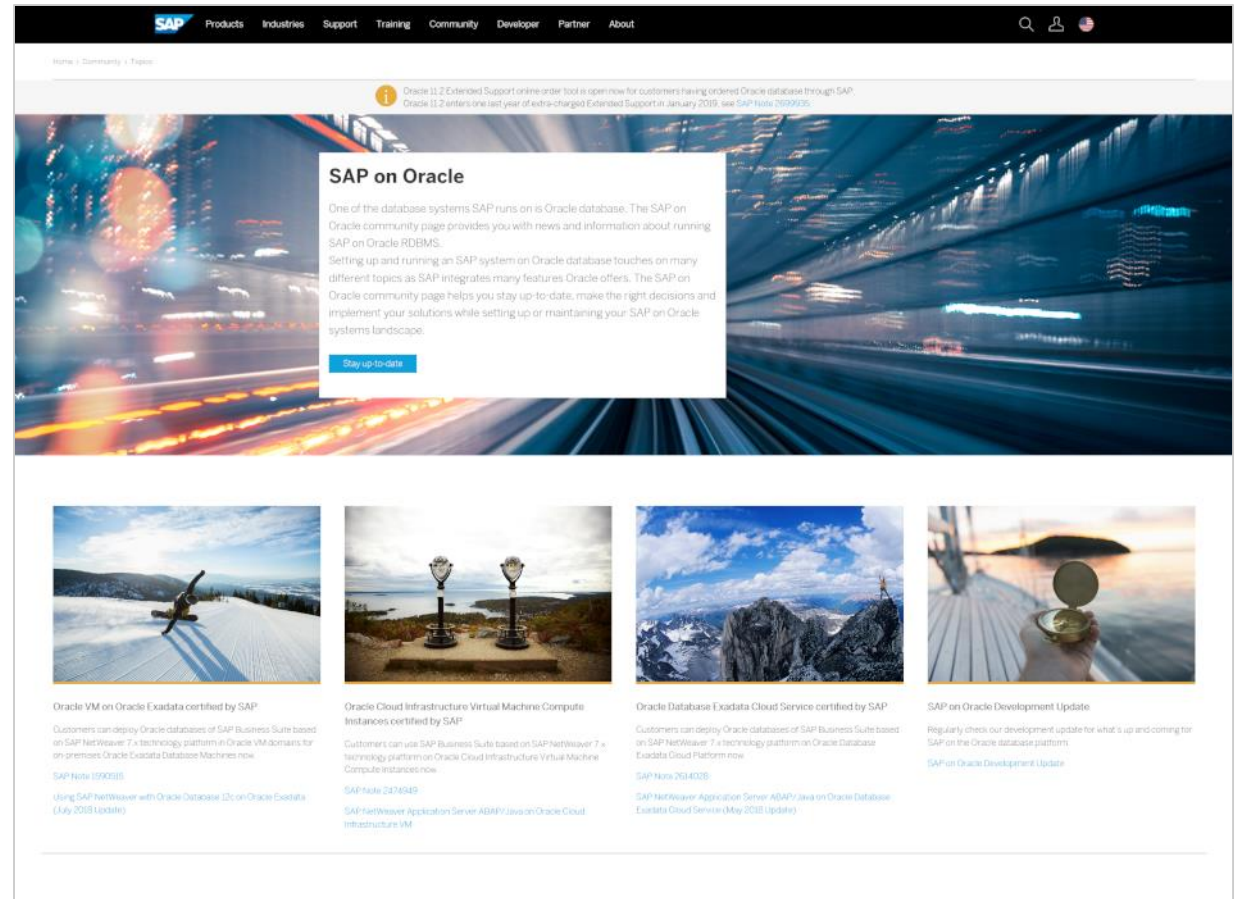
NAVIGATION FROM SAP CORPORATE HOME PAGE

go.sap.com

→ Community

→ Browse the community

→ Search for *SAP on Oracle*



¹ Former *SAP Community Network (SCN)* was discontinued in fall 2016

Social Media

SAP on Oracle – Twitter

Follow us on Twitter

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- SAP Hot News
- Product certifications
- Best Practices/Whitepapers

and much more at:

twitter.com/SAPonOracle

The screenshot shows the Twitter profile for @SAPonOracle. The profile picture is a server room aisle with a SAP logo overlay. The bio reads: "SAP on Oracle @SAPonOracle News and info for SAP customers running the Oracle database". There are 85 tweets and 469 followers. Two tweets are visible: one from August 26th about a development update and one from July 19th about BR*Tools patches. A "Neu bei Twitter?" prompt is also present.