



Oracle versus SAP HANA

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Agenda

- **Erklärung In-Memory Datenbank**

- **Details SAP HANA**

- **Vergleich mit**
 - Oracle Exalytics (TimesTen)
 - Oracle Exadata
 - Oracle 12.1.0.2.0 In-Memory Option

- **Lizenzen SAP HANA**

- **Fazit**

Market share

■ Oracle #1 RDBMS

■ SAP #1 ERP

Worldwide ERP Software Market Share, 2012
Market Size: \$24.5B; 2.2% Growth Over 2011

Relational Database Management Systems (RDBMS) Vendors					
Total Software Revenue, Worldwide, 2010-2011 (Millions of U.S. Dollars)					
Vendor	2010	2011	Share of 2010	Share of 2011	Growth 2011
Oracle	9,990.5	11,787.0	48.2%	48.8%	18.0%
IBM	4,300.4	4,870.4	20.7%	20.2%	13.3%
Microsoft	3,641.2	4,098.9	17.6%	17.0%	12.6%
SAP/Sybase	744.4	1,101.1	3.6%	4.6%	47.9%
Teradata	754.7	882.3	3.6%	3.7%	16.9%
Other Vendors	1,315.3	1,389.7	6.3%	5.8%	5.7%
Grand Total	20,746.6	24,129.5	100.0%	100.0%	16.3%

Source: Gartner (March 2012)

Foto: Gartner

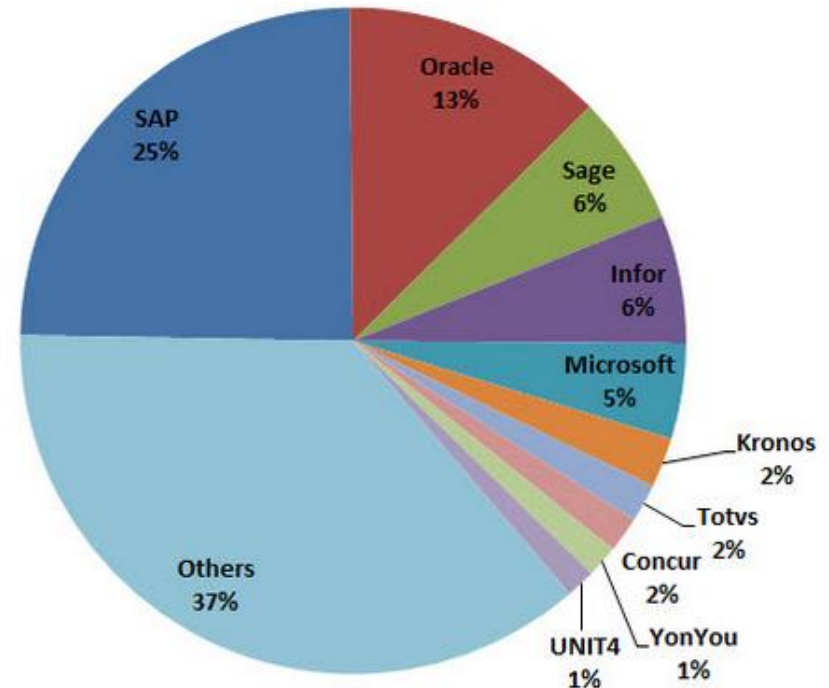


Foto: Gartner

SAP ist auf Oracle zertifiziert

- **SAP ERP (ECC) 6.0**
- **SAP BW 7.x**
- **SAP CRM 2005 / 2007 / 7.x**
- **SAP PLM 6.0 / 7.0x**
- **SAP SRM 2005 / 2007 / 7.x**
- **SAP SCM 2005 /**
- **SAP Oil&Gas 2005 / 6.x**
- **SAP Banking Services 5.0 / 6.0 / 7.0 / 8.0 2007 / 7.x**

→ SAP HANA und Oracle in direkter Konkurrenz!

In-memory Datenbank

- **Echtzeit**
- **Möglichkeiten**
- **Ist nicht jede DB**
 - in memory?
 - >95% cache hit?
- **nur In-Memory?**



Foto: Elica

Row Store erklärt

■ Oracle In-Memory

- Row Store immer
- Column Store

■ SAP HANA

- Entweder row store
- Oder column store
- Row Store nur Master

	A	B	C	D	E	F	G	H	I	J	K	L	M
	ID	Brand	Colour	First release	Version	MPG		other	silly	data	added	here	to
1													
2	1	CSX	red	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
3	2	MDX	green	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
4	3	NSX	yellow	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
5	4	RDX	white	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
6	5	RSX	pink	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
7	6		145 red	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
8	7		146 green	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
9	8		147 yellow	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
10	9		156 white	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
11	10		159 pink	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
12	11		166 black	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
13	12	Brera	grey	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
14	13	GTV	orange	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
15	14	Spider	red	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
16	15	DB7	green	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
17	16	DB9	yellow	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
18	17	DBS	white	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
19	18	Vanquish	pink	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
20	19	Vantage	red	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
21	20	A3	green	1991	4,3	100		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX

Column Store erklärt

- Analytics Schneller
- Komprimierung
- Weniger I/O

- **SAP HANA**
 - Row Store oder
 - Column Store
 - Beide auf Platte

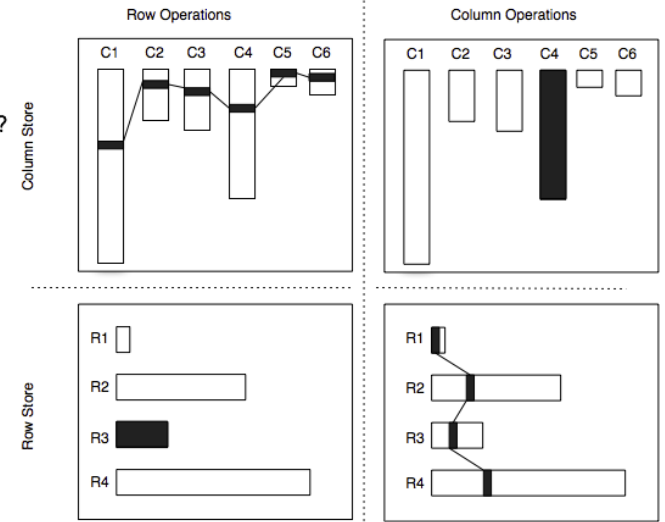
- **Oracle in-memory**

- Row Store und
- Column Store (not on disk) → RAC: Shared nothing!

Column Store Example

SELECT c1,c4, c6 FROM table WHERE c4 < ?

	c1	c2	c3	c4	c5	c6
r1				█		
r2				█		
r3	█			█		█
r4				█		
r5				█		
r6				█		
r7				█		



In-Memory DB Klassifizierung

- 1. Column basierte Komprimierung (10x)**
- 2. Columnar Projection (weniger Spalten lesen)**
- 3. Column-basierte DB Engine (dadurch 100x schneller)**

Rob Klopp (SAP)

■ Welche Datenbanken sind auf Level 3?

- SAP HANA
- IBM DB2 Blu
- Hekaton (MSSQL 2014) [Release Date: 1.April.2014]
- Oracle 12.1.0.2.0 (gibt's noch nicht)
- Others (HP Vertica, SAP Sybase IQ, Actian Paracel)

Es geht um Nanosekunden...

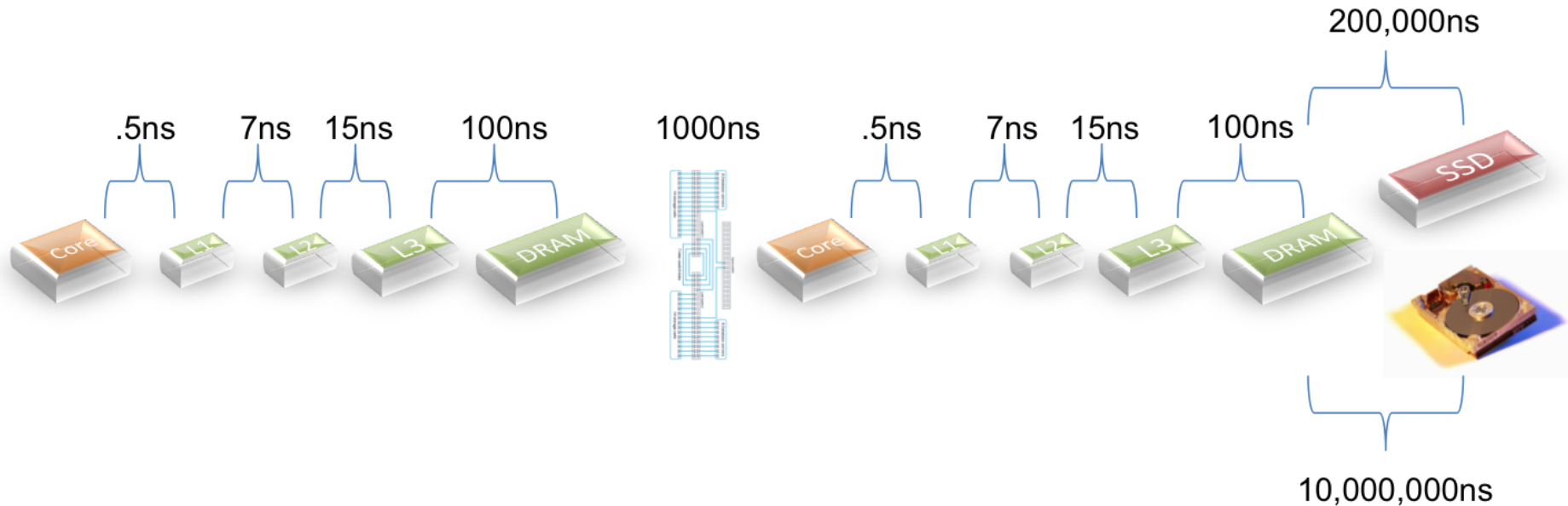
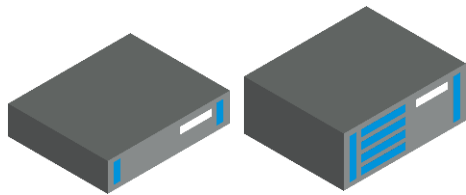


Foto: Rob Klopp (SAP)

SAP hat in 12 Petabyte Daten auf AWS 8 Millionen Datensätze pro Sekunde unter Einsatz von 1776 Kernen in 111 SAP-HANA-Instanzen laden können.

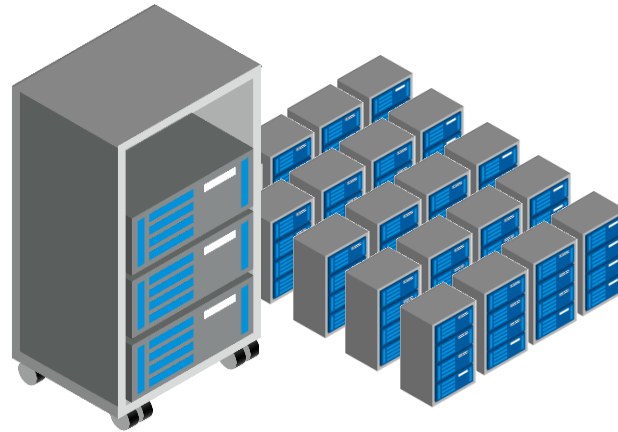
SAP HANA scalability

Scales from very small servers to very large clusters



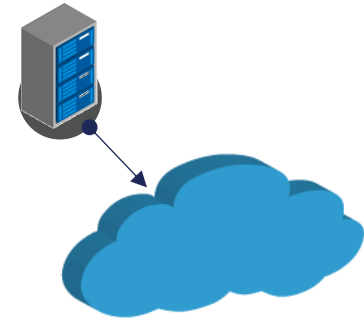
Single Server

- 2 CPU 128GB to 8 CPU 1TB
- Single SAP HANA deployments for data marts or accelerators



Scale Out Cluster

- 2 to n servers per cluster
- Each server is either 4 CPU/512GB or 8 CPU/1TB
- Largest certified configuration: 16 servers
- Largest tested configuration: 100+ servers
- Support for high availability and disaster tolerance



Cloud Deployment

- SAP HANA instances can be deployed to AWS
- (also for Production)

Foto: SAP

Improve ABAP Coding

“Old” ABAP Code

```
OPEN CURSOR ld_cursor FOR
  SELECT *
  FROM (ls_tablenames-tot_table)
  CONNECTION (i_dbcon_name)
  WHERE rldnr = ld_ledger
  AND   rrcty IN i_range_rrcty
  AND   rvers IN i_range_rvers
  AND   rbukrs IN i_range_bukrs
  AND   ryear IN i_range_ryear
  AND   racct IN i_range_racct
  AND   rcur IN i_range_rcur
  AND   drcrk IN i_range_drckr
  AND   rpmax IN i_range_rpmax
  AND   (it_where_clause)
  ORDER BY (it_orderlist).
```

Optimize ABAP code using open SQL

"Old" ABAP Code

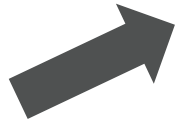
"New" ABAP Code

Leverage the column store by selecting only required columns!



```
SELECT (lt_fieldlist)
FROM zviewsdi?
CONNECTION (i_dbcon_name)
WHERE rldnr = g_leading_rldnr
AND rrcty EQ '0'
AND bukrs IN gt_ranges_bukrs
AND rbusa IN gt_ranges_gsber
AND racct IN gt_ranges_racct
AND ryear IN gt_ranges_ryear
AND (lt_where_clause)
GROUP BY (lt_grouplist)
ORDER BY (lt_orderlist).
```

Leverage SAP HANA capabilities by selecting from HANA views



Delegate aggregations to the SAP HANA database!



98% ABAP Code funktioniert
SAP ERP 1/3 schneller

Vergleich Mit Oracle Exalytics

SAP HANA

- Nov 2011
- 2TB Grenze (1, 4, 10, 12)
- P*Time, TRESX, MaxDB, Client (SAP BO, usw.)
- Hardware IBM, Dell, HP... (Vmware?)
- Keine extra Optionen
- Datamart, DWH (Zukunft), Datenbank (Ja)
- OLAP & OLTP (5000 t/s)

Oracle Exalytics

- Feb 2012
- 2TB Grenze (2, 4)
- Essbase, TimesTen, Oracle BI Foundation Suite, Smart Cache
- Hardware Oracle
- TimesTen DB / Exalytics in-memory software
- Datamart, DWH (Zukunft), Datenbank (Nein)

Vergleich Mit Oracle Exadata

SAP HANA

- IMC Level 3
- 2TB Grenze (1, 4, 5, 12)
- P*Time, TRESX, MaxDB, Client (SAP BO, usw.)
- Hardware IBM, Dell, HP... (Vmware?)
- Keine extra Optionen
- Datamart, 12.1 PB DWH, Datamart, Datenbank (Ja)
- OLAP & OLTP (5000 t/s)

Oracle Exadata

- IMC Level 1 (3 mit 12.1.0.2.0)
- 4TB Grenze (X4-8?) (44TB)
- Oracle RDBMS, Exadata Storage
- Hardware Oracle
- bekannte Optionen möglich
- Datamart, DWH (X4-8), Datenbank (JA!)
- OLTP (2,6 Million t/s)

Vapourware 12.1.0.2.0

- **Oracle RDBMS 12.1.0.2.0**

- SAP wird SAP@Oracle 12.1 zertifizieren

- **Enterprise Edition + In-Memory Option**

- **Release erst in Q4 2014?**

- Beta Phase 1 läuft gerade
- 742060.1 2HCY2014

- **Erst auf Exadata verfügbar?**

- X4-2 seit Jan 2014 verfügbar
- X4-8 (mit viel mehr RAM) noch nicht verfügbar



Was sagt Oracle? (Grafik für eine Oracle DB)

Requirements of a Database Not Everything is about Performance !

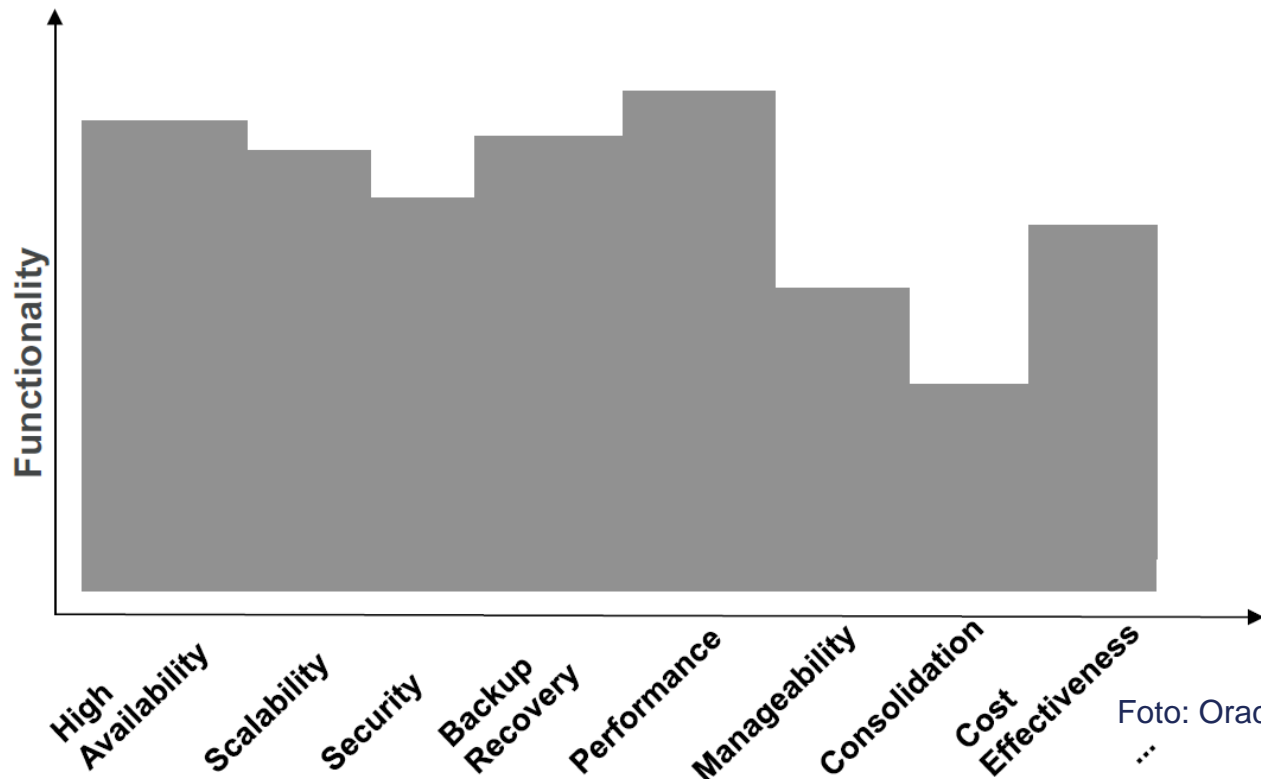


Foto: Oracle
...

Was sagt Oracle? (Gelb = SAP HANA)

SAP HANA

Specialized Database for Analytics

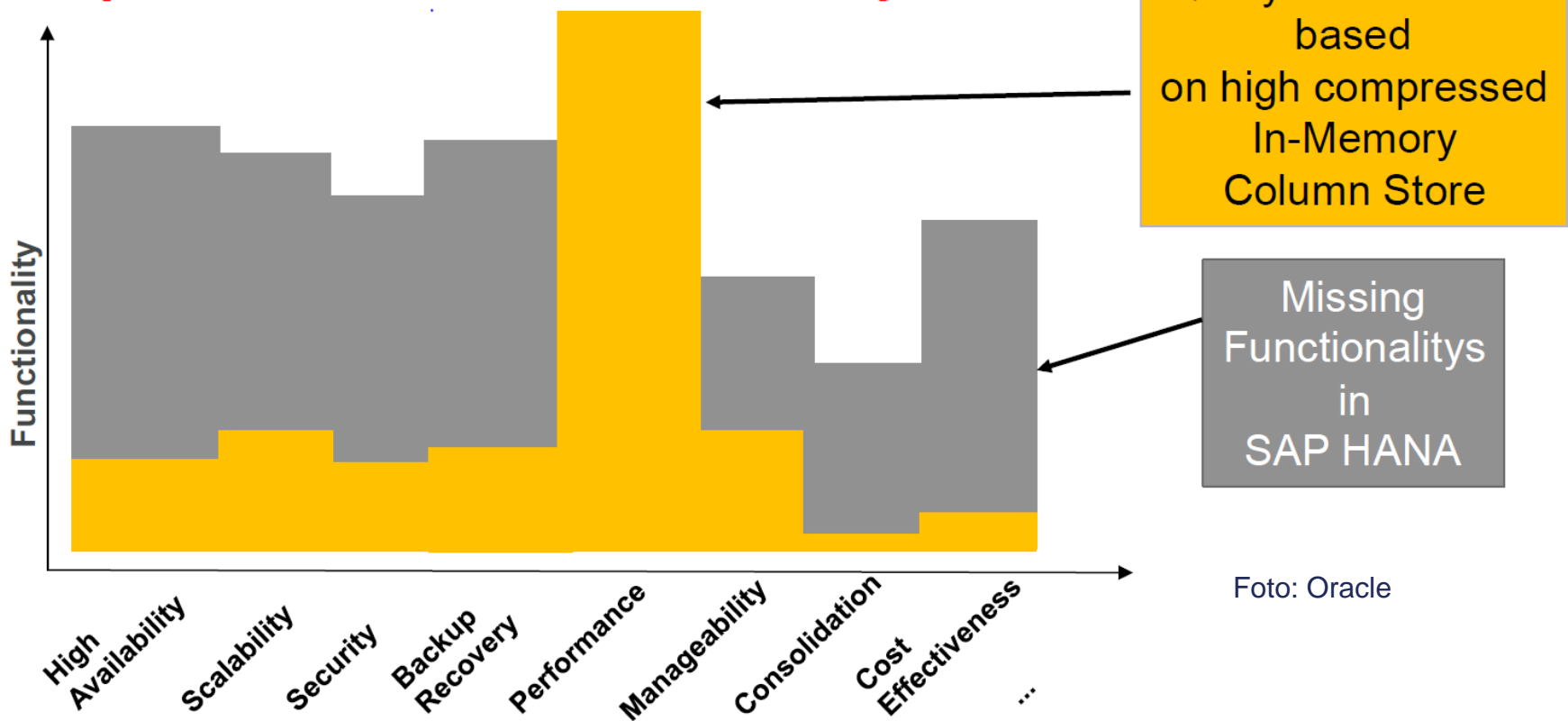


Foto: Oracle

ORACLE

SAP HANA v. Oracle DB12c + in-memory option

■ Hochverfügbarkeit

- Standby (warm, cold, ADG)
- „Scale-Out“ und „shared nothing“
- Add Host → Downtime
- Scale-Out andere Hardware

■ Skalierbarkeit

- Lastverteilung
- 2TB Grenze, (scale out)

■ Sicherheit

- Encryption für Daten, nicht für Logs
- Kein Database Vault, Data masking

SAP HANA v. Oracle DB12c + in-memory option

■ Backup & Recovery

- Nur voll Backup/ Restore, kein Incremental / Restore Objekt

■ Performanz

- Lastverteilung

■ Manageability

- Oracle Betrieb ist schwieriger

■ Konsolidierung

- Nur ein DB in Produktion für SAP HANA

Lizenzierung Exalytics (nur Software, Listenpreise)

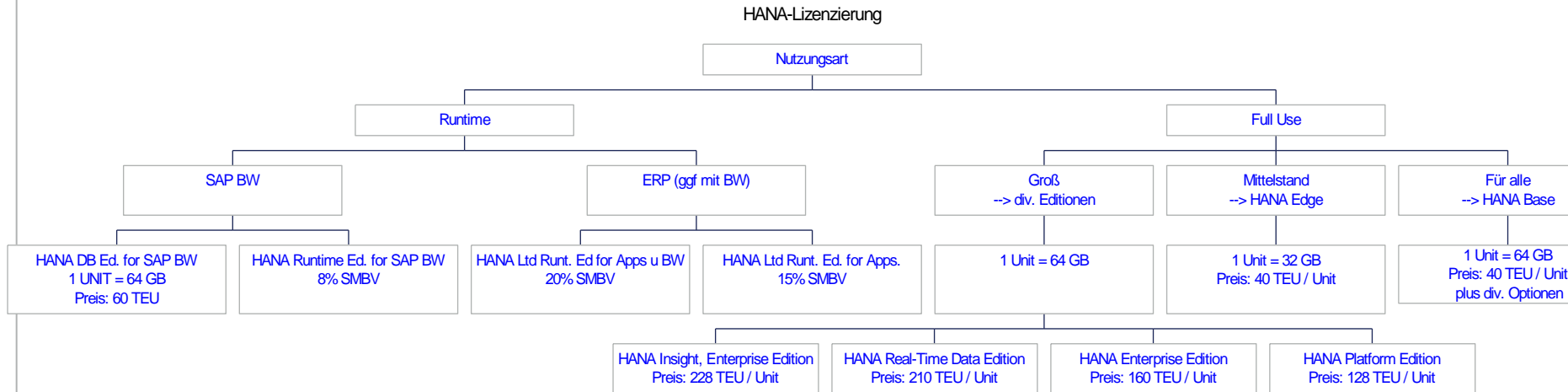
Exalytics Maschine: je nach Größe:

X3-4 (40 Cores - Intel),
T5-8 (128 Cores - SPARC),

- **Oracle Business Intelligence Foundation Suite, including Oracle Essbase**
- **Oracle TimesTen In-Memory Database for Exalytics**
- **Oracle Endeca Information Discovery**
- **Oracle Exalytics In-Memory Software**

Lizenzierung pro
Prozessor (=2 Cores)

Lizenzierung HANA (nur Software, Listenpreise)



■ Keine Optionen, alles drin, ausser bei HANA Base:

sentiment analysis, Textanalyse, Statistics durch "R", datamining & predictive analysis, Graph DB, Rules Engine, Spatial, Planning

■ SMBV = SAP Maintenance Base Value

(gesamter SAP-Lizenzwert: is defined as the total license fees for all SAP Software and/or Third Party Software licensed by Licensee from SAP or an authorized SAP distributor)

■ Prod. muss lizenziert werden, Test und Entwicklung frei

■ Unit Price

Fazit

- **SAP HANA ist nicht Plug and Play,**
 - ABAP Code anpassen
 - Applikationslogik in der Datenbank
 - Aber, Performanzgewinn!

- **SAP HANA v. Oracle Exalytics**
 - Exalytics nicht für OLTP geeignet

- **Oracle hat echter Konkurrenz**
 - Und verspricht die Lösung durch 12.1.0.2.0
 - (keine Code-Änderung nötig)

Fragen



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