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Oracle Database 12c

Thomas Kyte

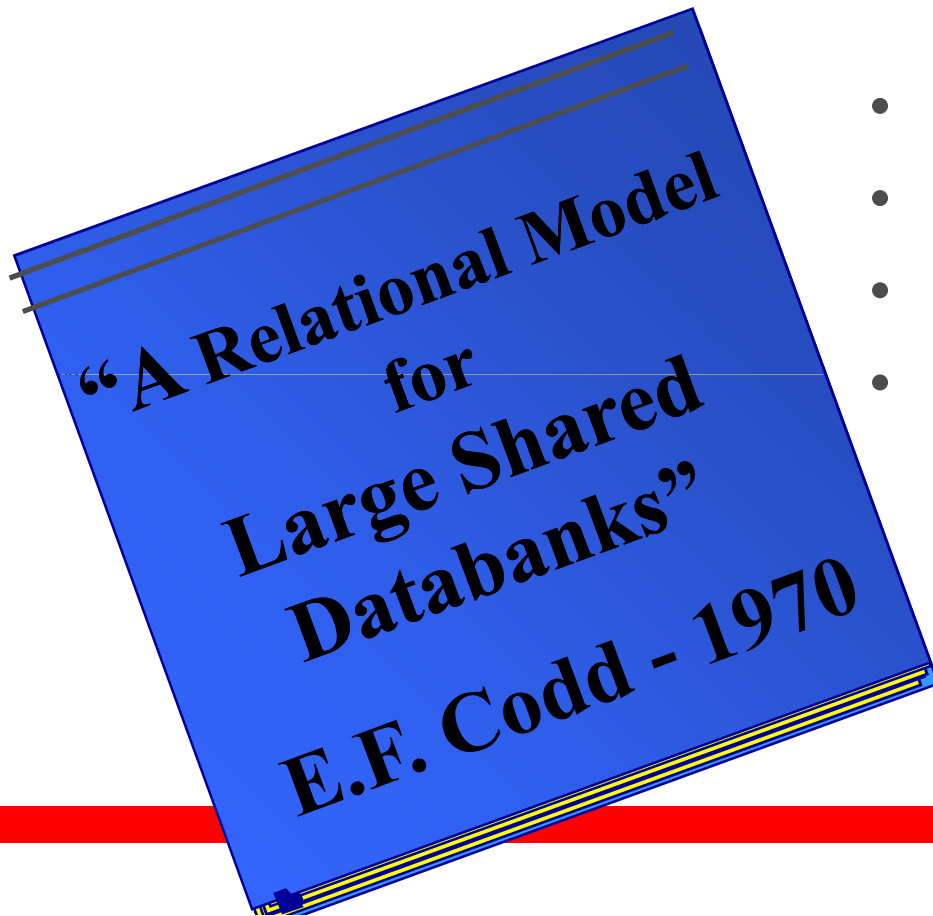
<http://asktom.oracle.com>



Plug into the **Cloud**.



The Beginning...



- Data Model with Structure
- Data Independent of Code
- Set-oriented
- 1977 the work begins



GPS

1978





First RDBMS: Version 2

June 1979

- FIRST Commercial SQL RDBMS
- Impressive First SQL
 - Joins, Subqueries
 - Outer Joins, Connect By
- A Simple Server
 - No transactions, 'Limited' Reliability
- Portability from the Start
 - Written in Fortran
 - But multi-platform – PDP11, Dec VAX



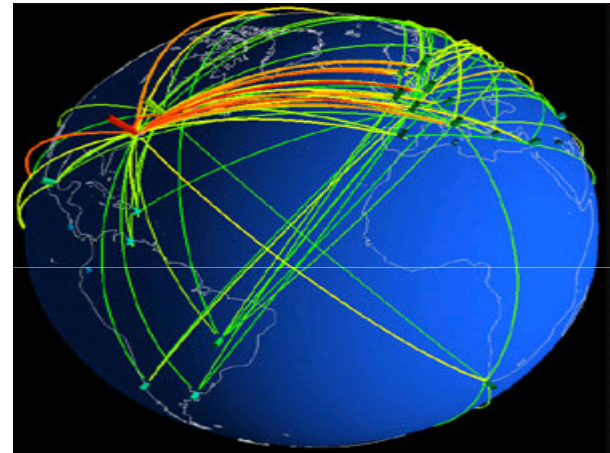
IBM PC – 1981

**IBM model
number
5150,
introduced
on August
12, 1981.**



Internet (as we know it) – 1983

The first TCP/IP-based wide-area network was operational by January 1, 1983 when all hosts on the ARPANET were switched over from the older NCP protocols.





Portability: Version 3

March 1983

- New Implementation Designed for Portability
 - Written in 'C'
 - Single Source
- Architectural Changes
 - Transactions, multi-versioning, no read consistency
 - AI/BI files
- Oracle Corporation – name established

25 years of cell phone service

GOING WIRELESS | First cell phone call at Soldier Field in October '83

October 13, 2008

BY BRAD SPIRRISON AND SANDRA GUY
brad@midwestbusiness.com sguy@suntimes.com

Who would have thought 25 years ago that Americans would walk around like the Borg from "Star Trek," seemingly wired in to their cell phones around the clock?

The inventors of the cell phone certainly didn't.

» [Click to enlarge image](#)

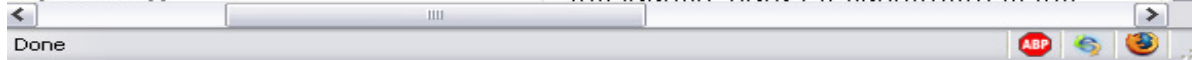


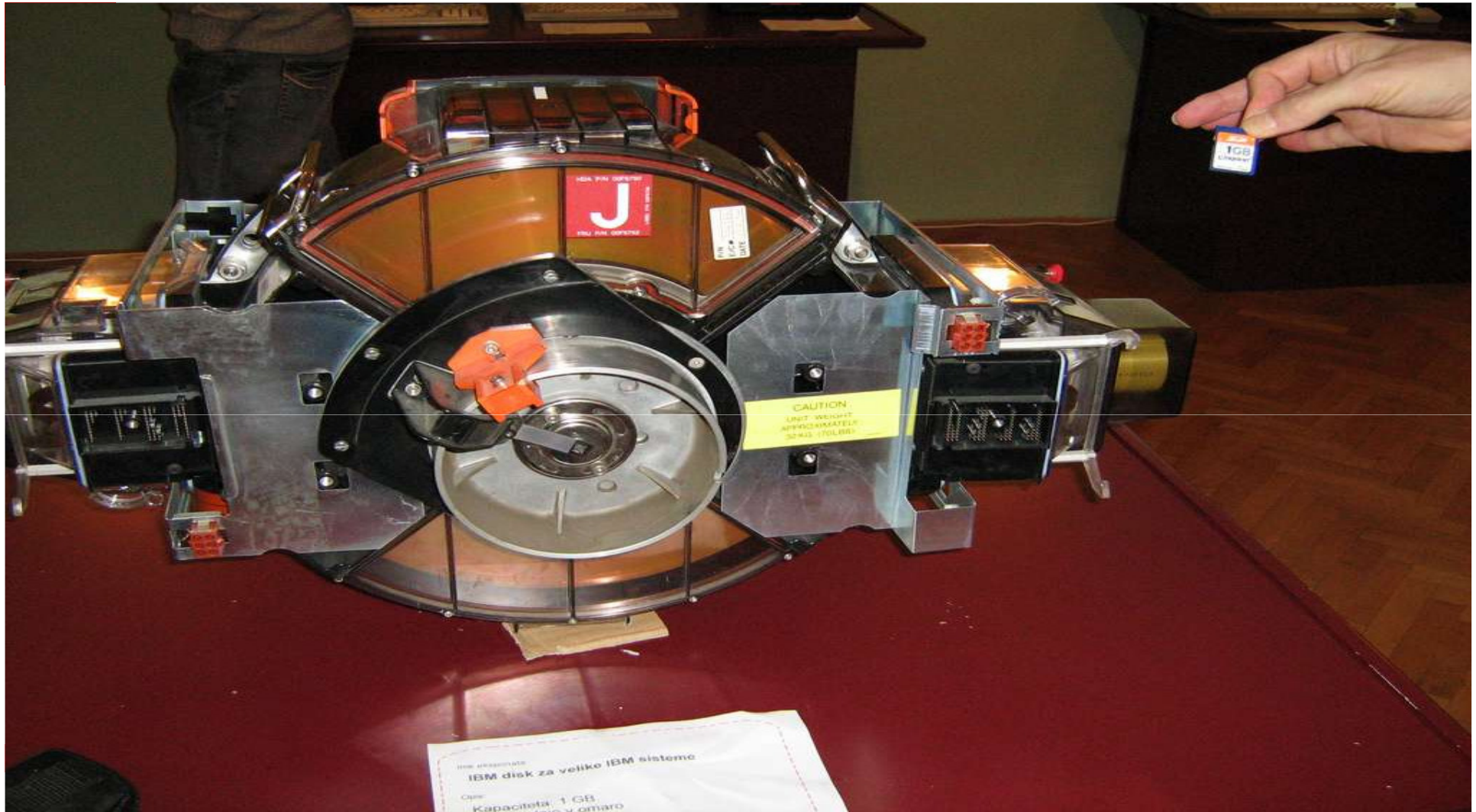
The Motorola DynaTAC 8000X cost \$3,995, was 13 inches long, and weighed 1.75 pounds.

(Courtesy)


Today marks the 25th anniversary of the first commercial wireless call. It happened Oct. 13, 1983, at Soldier Field, where Ameritech Mobile, now part of Verizon Wireless, made the call from a Motorola DynaTAC 8000X known as the "brick" phone. The phone cost \$3,995, was 13 inches long, and weighed 1.75 pounds.

Paul Gudonis, who was vice president of marketing for Ameritech Mobile Communications and who organized the launch, said 20 customers of the





IBM disk za veliko IBM sistemo
Kapaciteta: 1 GB



Cooperative Server: Version 5

April 1985

- *My* First Oracle Experience
 - 1st Client/Server
 - Cooperative Server
 - Distributed Processing
 - Parallel Server
 - Portability
 - V5 was first to go beyond 640K memory on PCs
 - Single-user for Macintosh o/s
 - **SQL_TRACE**
 - `select trace('sql',1),1 from dual;`



Transaction Processing: Version 6

July 1988

- New Architecture
 - *Performance (first SMP)*
 - Availability
 - TPO
 - PL/SQL
- V6 Lays *Architectural* Groundwork for the Future
 - This was a rewrite of the entire database fundamentally

World Wide Web – 1990'ish

The World Wide Web was created in 1989 by British scientist Tim Berners-Lee, working at the European Organization for Nuclear Research (CERN) in Geneva, Switzerland, and released in 1992.





Oracle7.3

February 1996

- Partitioned Views
- Bitmapped Indexes
- Asynchronous read ahead for table scans
- Standby Database
- Deferred transaction recovery on instance startup
- Updatable Join View
- SQLDBA no longer shipped.
- Index rebuilds
- DBV introduced
- Context Option
- PL/SQL - UTL_FILE
- Spatial Data Option
- Tablespaces changes - Coalesce, Temporary Permanent,
- Trigger compilation, debug
- Unlimited extents on STORAGE clause.
- Some init.ora parameters modifiable - TIMED_STATISTICS
- HASH Joins, Antijoins
- Histograms
- Oracle Trace
- Advanced Replication Object Groups

EMC and HP first to complete Oracle's Terabyte Test-to-Scale II Program Business Wire - Find Articles - Mozilla Firefox

File Edit View History Bookmarks Tools Help

FA http://findarticles.com/p/articles/mi_m0EIN/is_1997_Feb_27/ai_19175288 "terabyte test to scale"

Main Asktom WIV Z+ Anc Track Alan Megs mc kc stks

FA EMC and HP first to complete Ora...

EMC and HP first to complete Oracle's Terabyte Test-to-Scale II Program

Business Wire, Feb 27, 1997

ORLANDO, Fla.--(BUSINESS WIRE) **Feb. 27, 1997--**

1.2 Terabyte System Created and Tested Using EMC Enterprise Storage, HP Enterprise Parallel Servers and Oracle's Oracle8 Server

EMC Corporation and Hewlett-Packard Company today announced their successful completion of Oracle's Test-to-Scale II program after creating, testing and demonstrating a 1.2 terabyte data warehouse running Oracle's next generation database software, Oracle8. The three companies made the announcement here at the DCI Data Warehouse Conference at the Orange County Convention Center.

Content provided in partnership with THOMSON GALE

Find: Next Previous Highlight all Match case

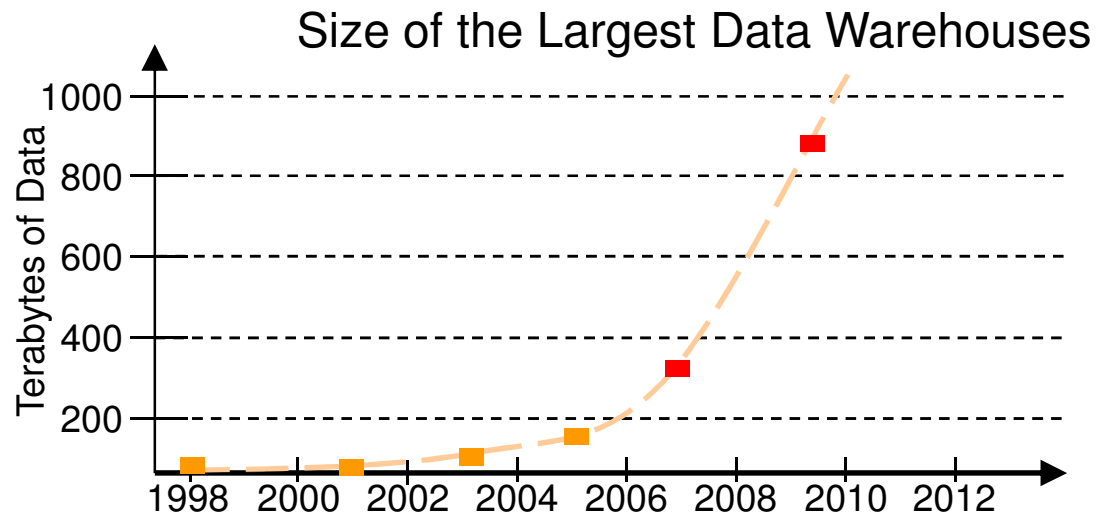
Done

Annual Decline	Cost For 1 GigaByte	Cost For 1 TeraByte = 1,000 GigaBytes (US Dollars)				
		(Storage for 2,000 Scanned File Cabinets) (Holding 20 Million Scanned Letter Size Pages)				
45%	1,000 MBytes (US Dollars) (Storage for 2 Scanned File Cabinets)	Non-FC/SCSI PC Disk No Online Redundancy	Non-FC/SCSI PC Disk Software RAID Redundancy	SAN FC Disk FC Fabric Hardware RAID	SCSI/FC SAN/PC Name Brand Fault Awareness Hardware RAID	Mainframe
Year		1 X	2 X	4 X	8 X	12 X
1992	1,000.00	1,000,000.00	2,000,000.00	4,000,000.00	8,000,000.00	12,000,000.00
1993	550.00	550,000.00	1,100,000.00	2,200,000.00	4,400,000.00	6,600,000.00
1994	302.50	302,500.00	605,000.00	1,210,000.00	2,420,000.00	3,630,000.00
1995	166.38	166,375.00	332,750.00	665,500.00	1,331,000.00	1,996,500.00
1996	91.51	91,506.25	183,012.50	366,025.00	732,050.00	1,098,075.00
1997	50.33	50,328.44	100,656.88	201,313.75	402,627.50	603,941.25
1998	27.68	27,680.64	55,361.28	110,722.56	221,445.13	332,167.69
1999	15.22	15,224.35	30,448.70	60,897.41	121,794.82	182,692.23
2000	8.37	8,373.39	16,746.79	33,493.58	66,987.15	100,480.73
2001	4.61	4,605.37	9,210.73	18,421.47	36,842.93	55,264.40
2002	2.53	2,532.95	5,065.90	10,131.81	20,263.61	30,395.42
2003	1.39	1,393.12	2,786.25	5,572.49	11,144.99	16,717.48
2004	0.77	766.22	1,532.44	3,064.87	6,129.74	9,194.61
2005	0.42	421.42	842.84	1,685.68	3,371.36	5,057.04
2006	0.23	231.78	463.56	927.12	1,854.25	2,781.37
2007	0.13	127.48	254.96	509.92	1,019.84	1,529.75
2008	0.07	70.11	140.23	280.45	560.91	841.36
2009	0.04	38.56	77.13	154.25	308.50	462.75
2010	0.02	21.21	42.42	84.84	169.68	254.51



Data Warehouses Growing Rapidly

Tripling In Size Every Two Years



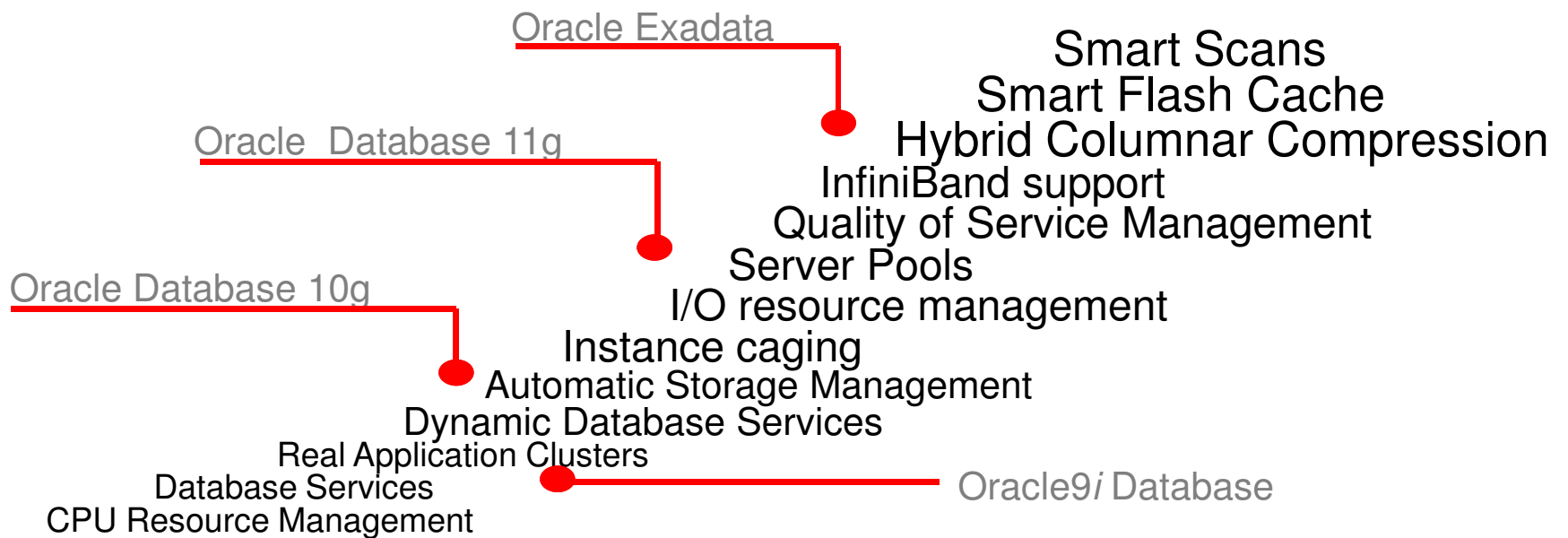
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Source: Winter TopTen Survey, Winter Corporation, Waltham MA, 2008.

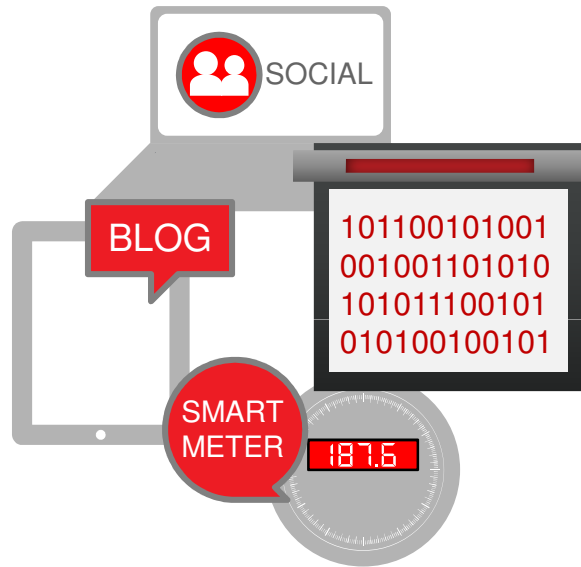


Enabling the Private Database Cloud

Years of continuous Oracle innovation



Major Database Focus Areas



BIG
DATA



ENGINEERED
SYSTEMS



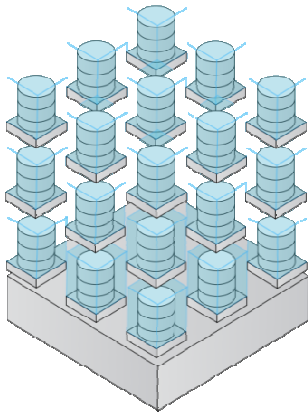
CLOUD
COMPUTING

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Private Database Cloud Architectures

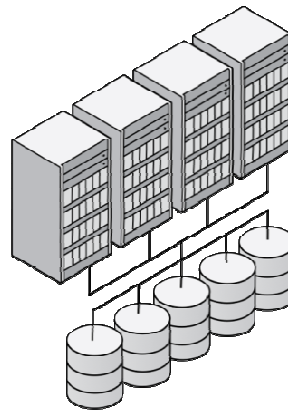
Using Oracle Database 11g

Virtual Machines



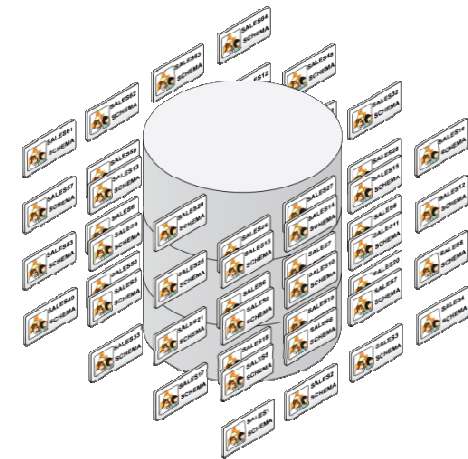
share servers

Dedicated Databases



share servers and OS

Schema Consolidation



share servers, OS and database

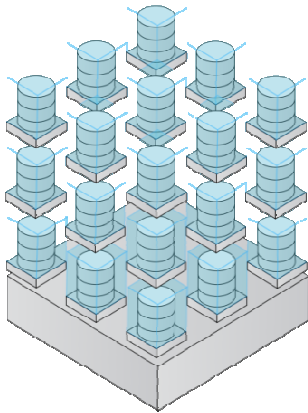
Increasing Consolidation

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Private Database Cloud Architectures

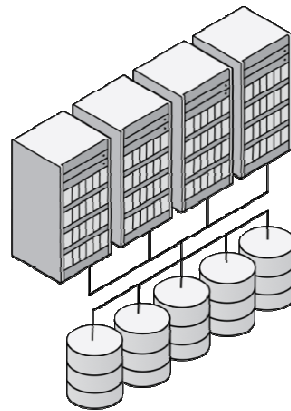
Using Oracle Database 12c

Virtual Machines



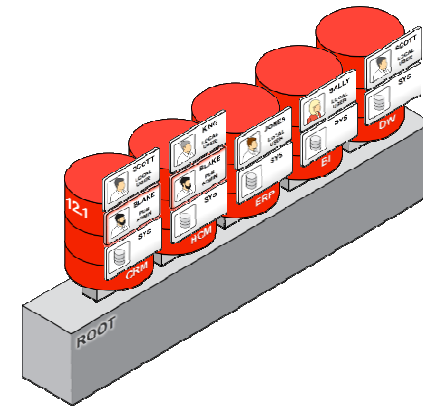
share servers

Dedicated Databases



share servers and OS

Pluggable Databases



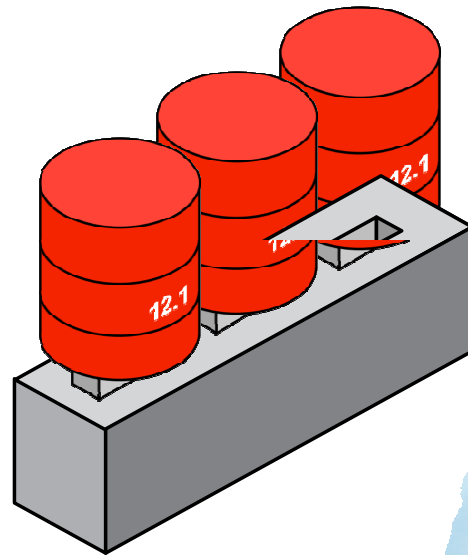
share servers, OS and database

Increasing Consolidation

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Consolidating Databases on Clouds

Key requirements...



No application changes

Isolation and multitenancy

Fast provisioning and cloning

Secure and highly available

Lower IT costs

Manage many as one

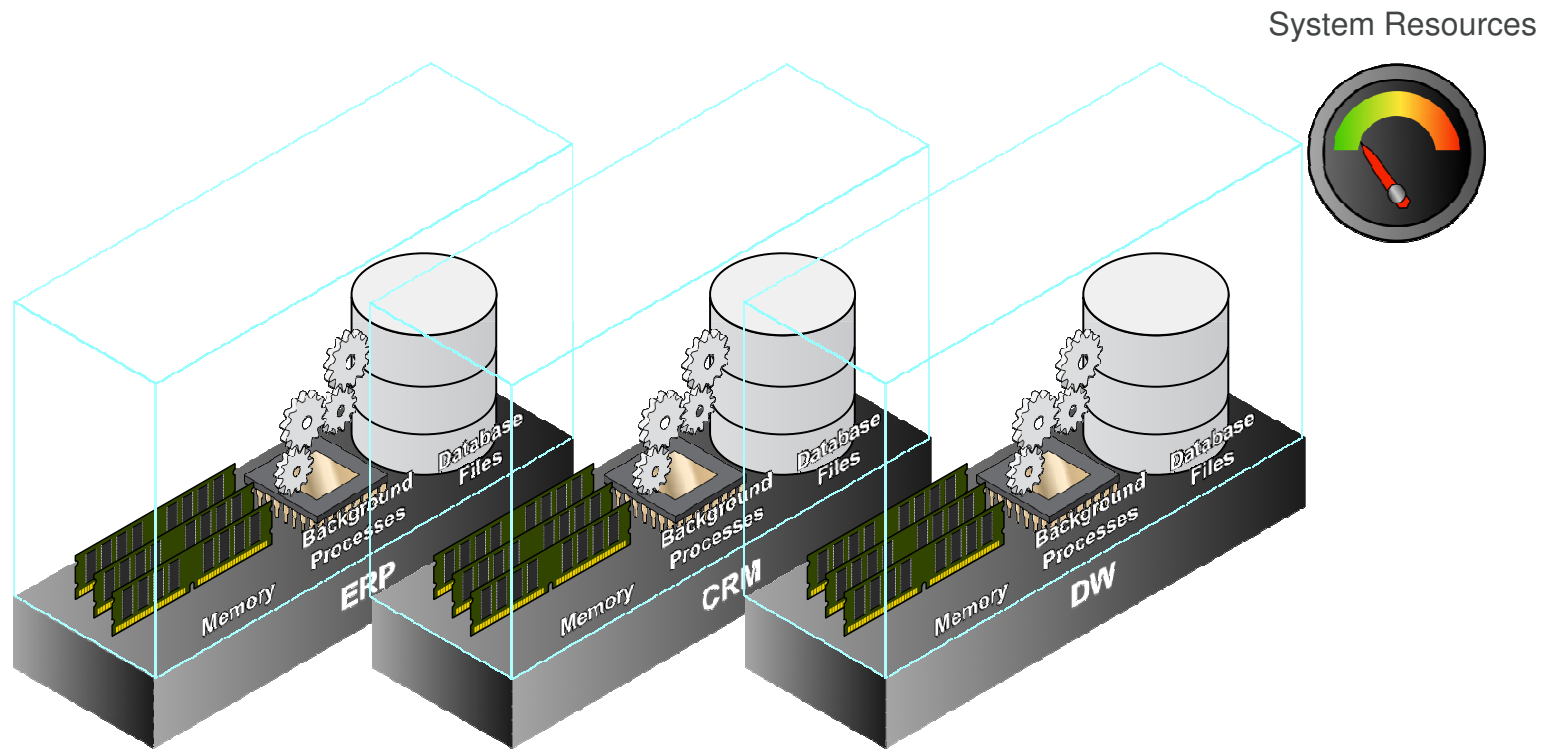
Greater resource utilization

Performant and scalable

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Oracle Database Architecture

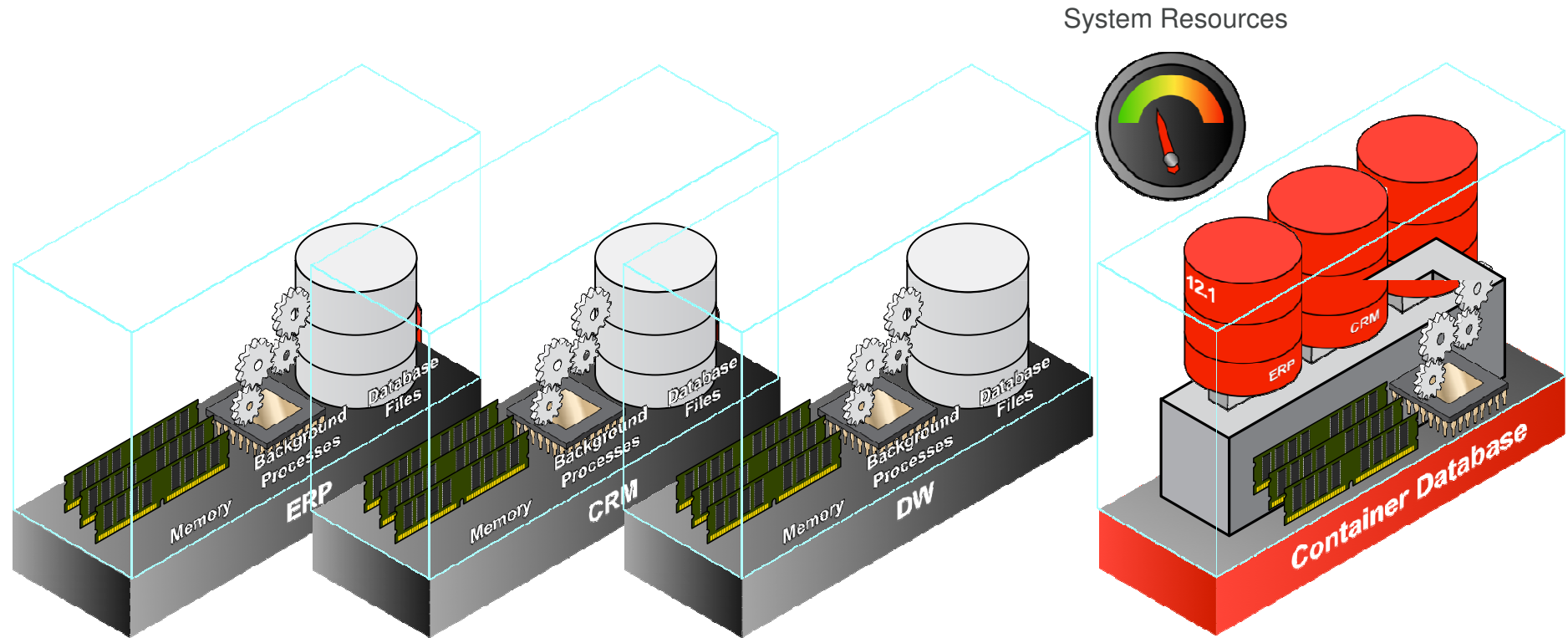
Requires memory, processes and database files



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New Multitenant Architecture

Memory and processes required at container level only

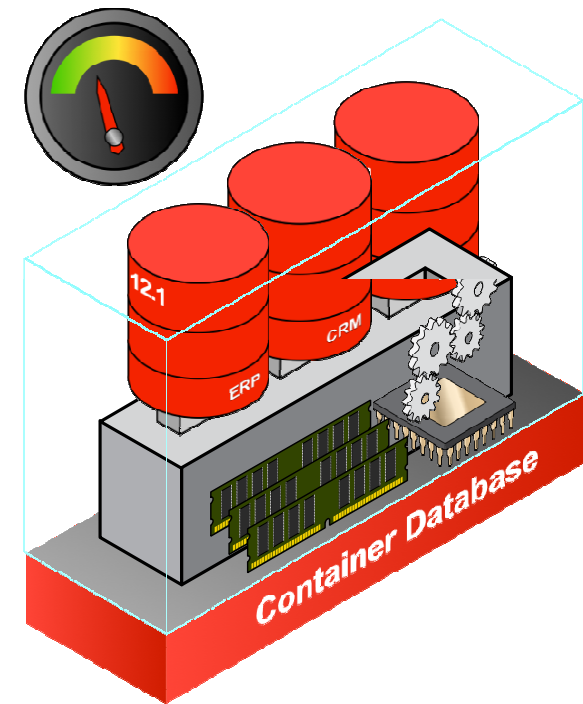


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New Multitenant Architecture

Memory and processes required at container level only

System Resources

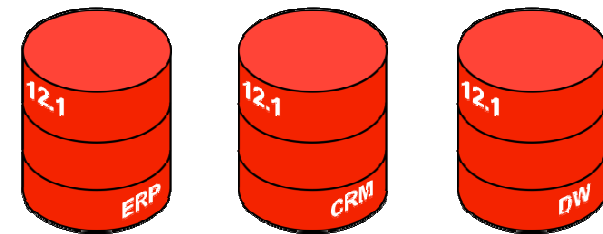
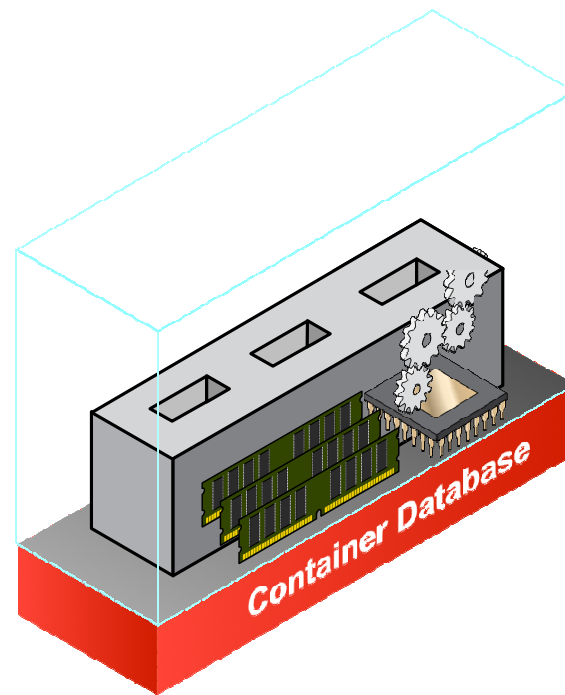


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Consolidating Databases

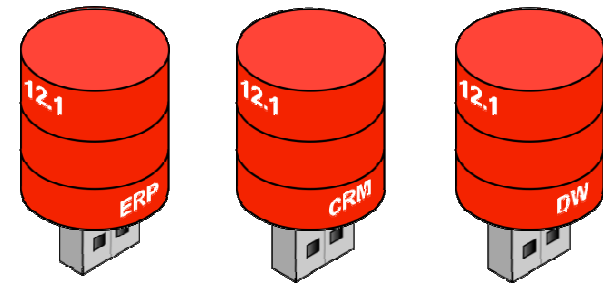
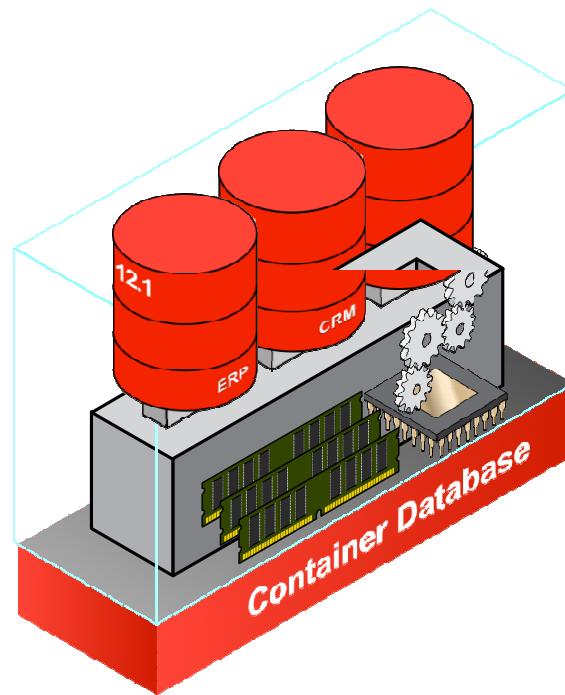
Step1: Upgrade databases in-place



Upgrade in Place

Consolidating Databases

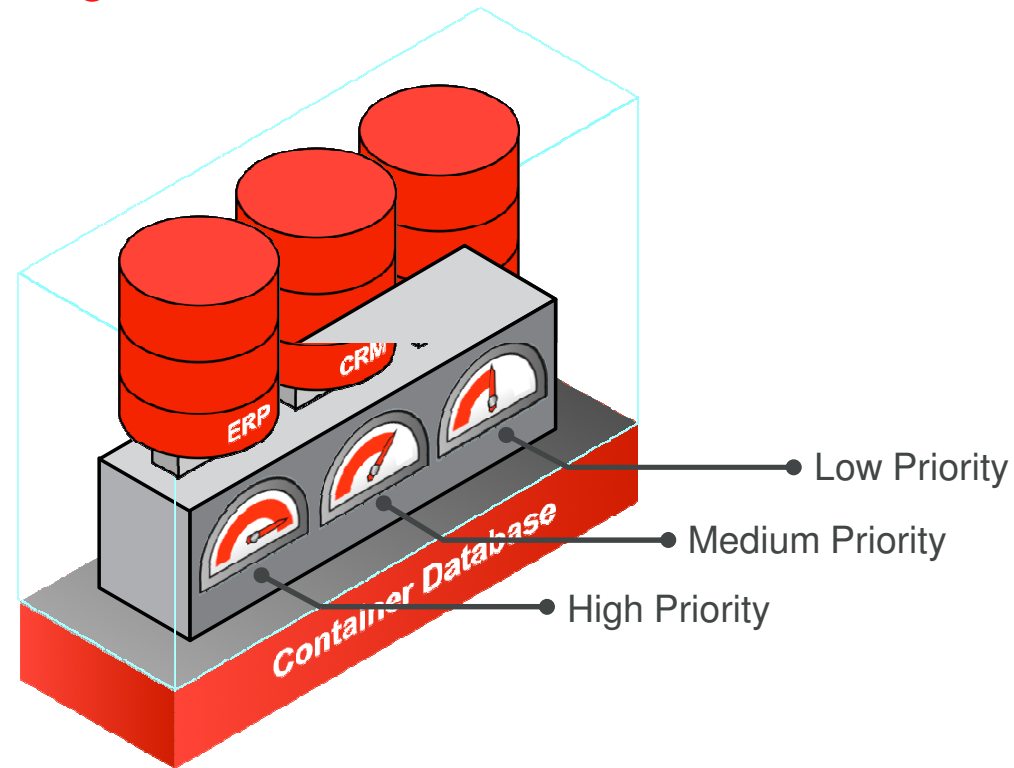
Step2: Plug-in upgraded databases



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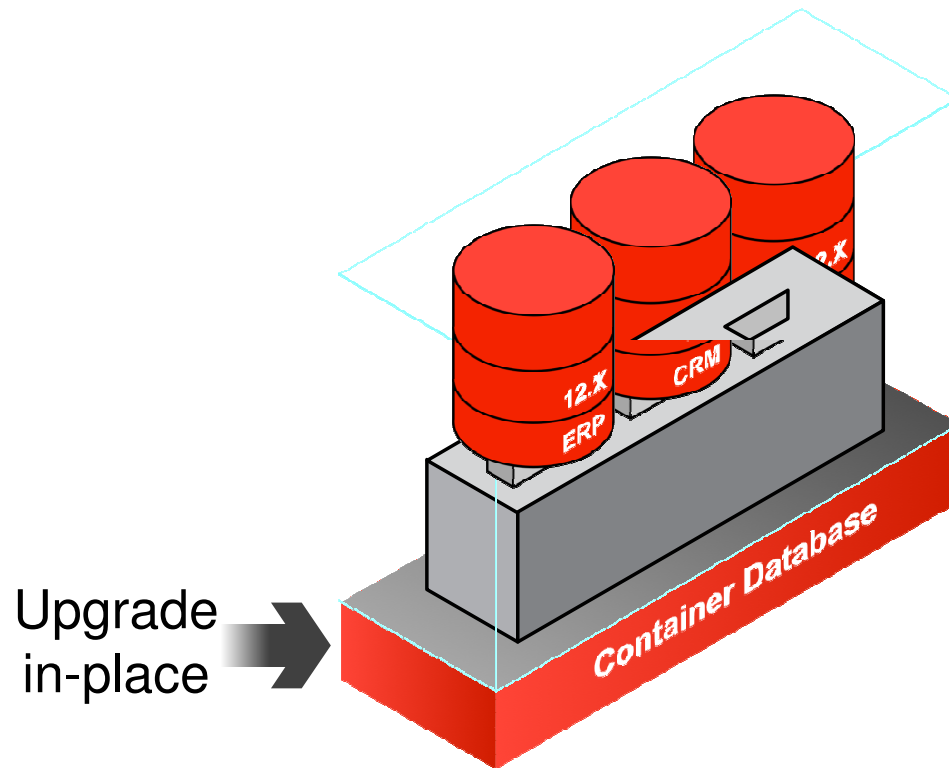
Managing Shared Resources

Resource management for consolidated databases



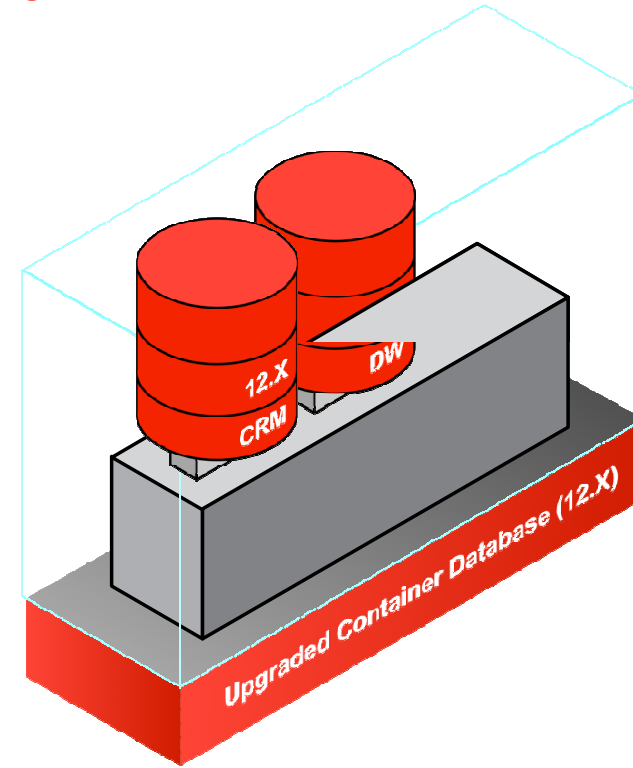
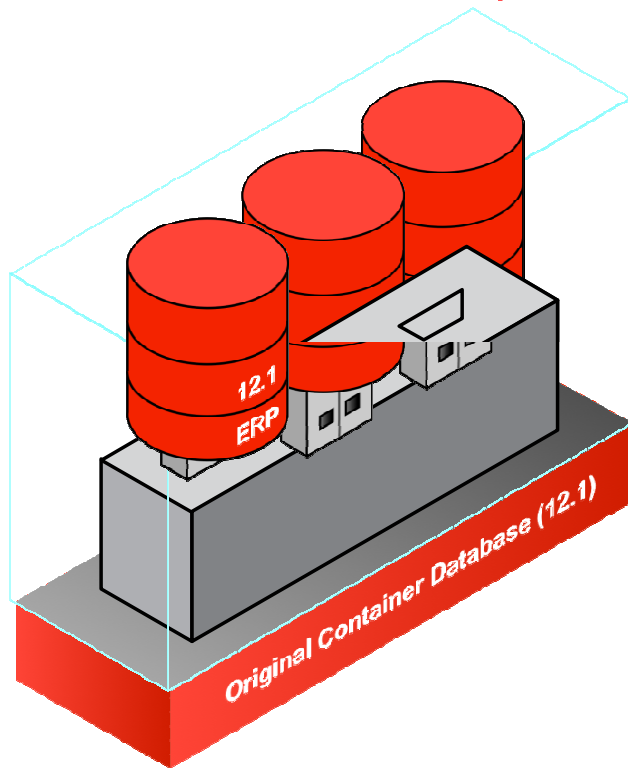
Simplified Patching

Apply changes once, all pluggable databases updated



Simplified Upgrades

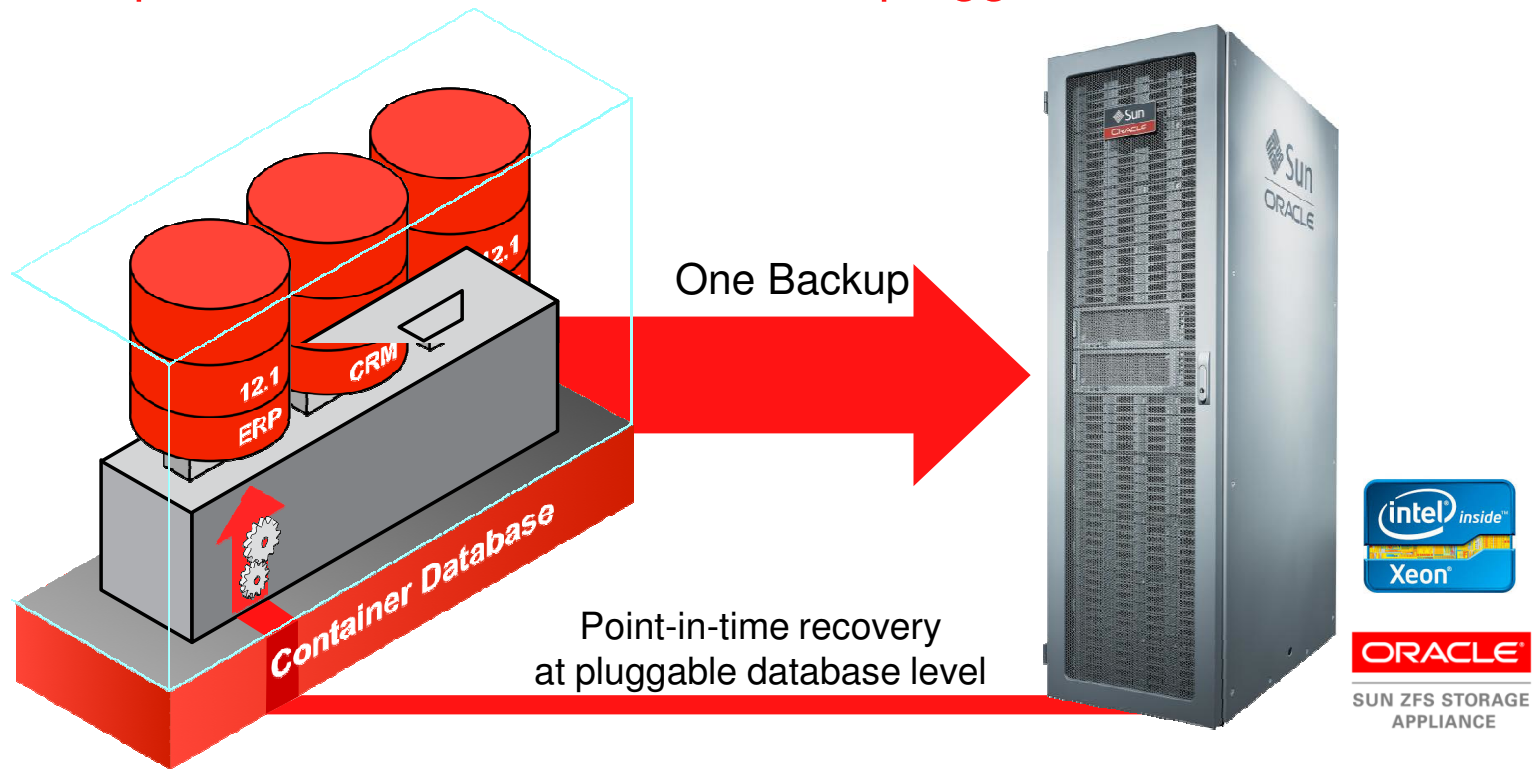
Flexible choice when patching & upgrading databases



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Manage Many Databases as One

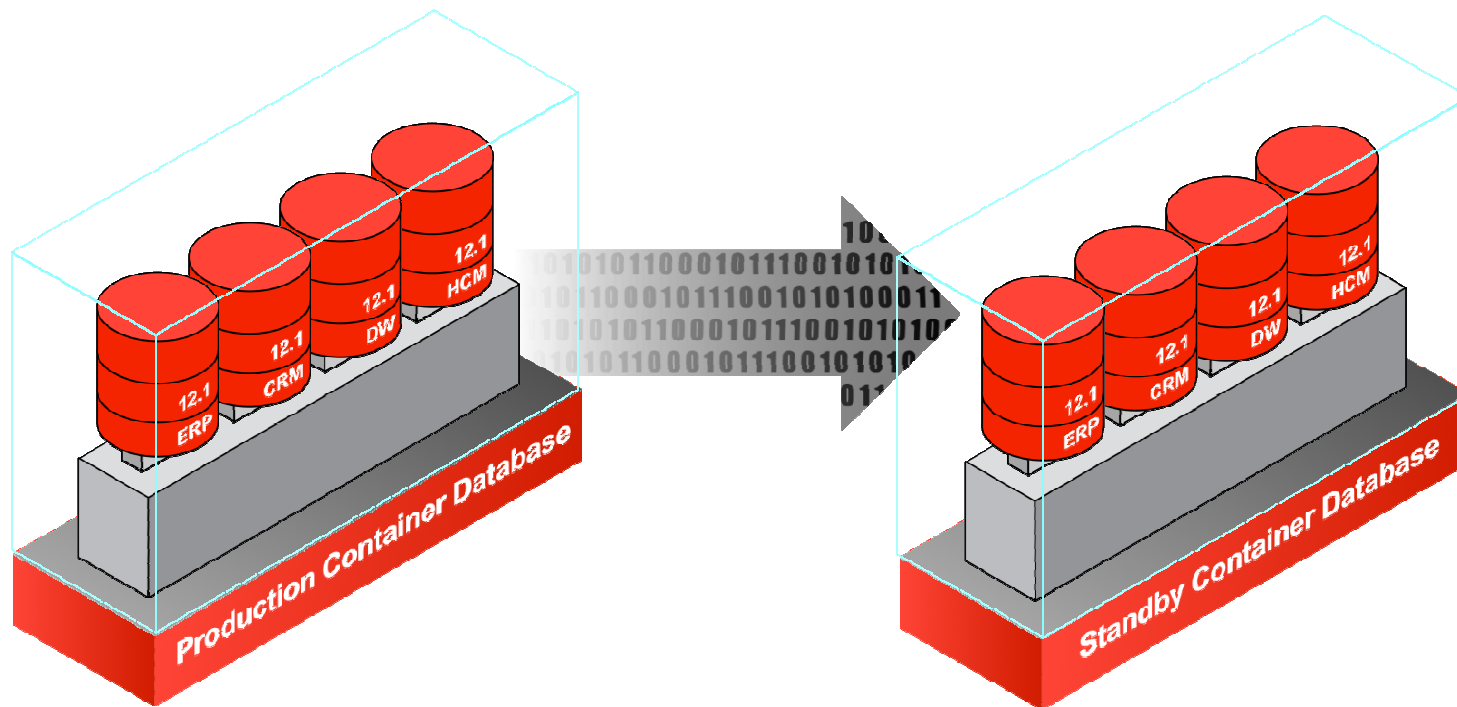
Backup databases as one, recover at pluggable database Level



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Manage Many Databases as One

One standby database covers all pluggable databases



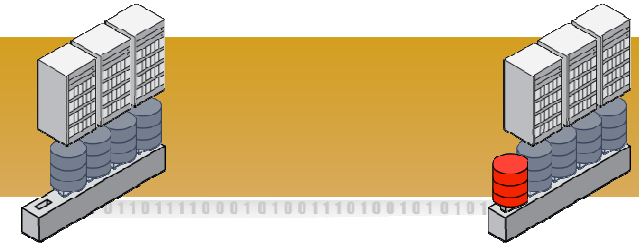
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Managing Database Service Level Tiers

Change tiers as databases become more mission critical

GOLD

RAC, Data Guard, Daily Incrementals



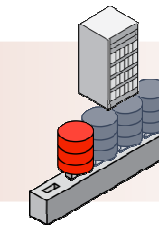
SILVER

Data Guard, Daily Incrementals



BRONZE

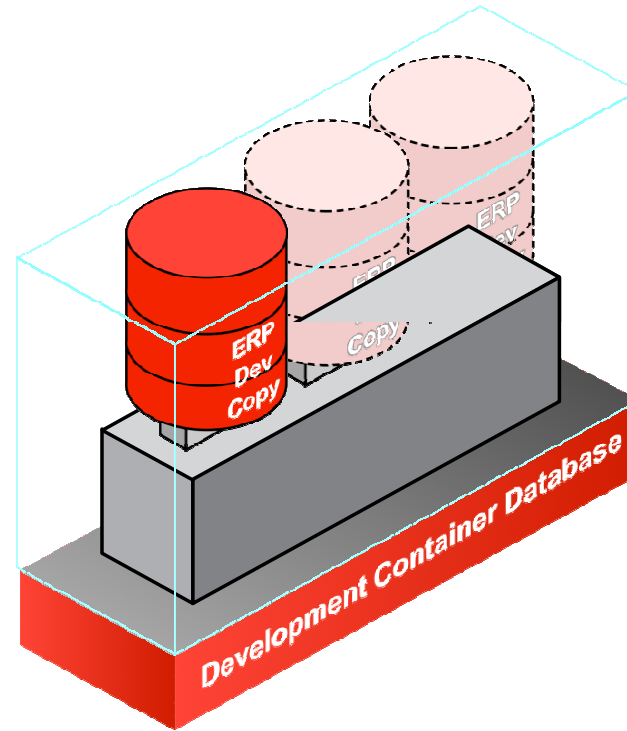
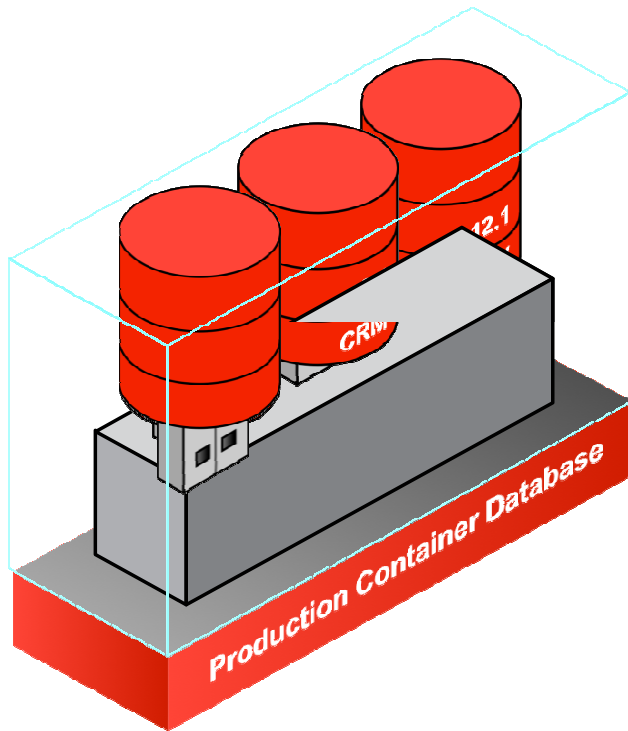
Weekly Full Backups



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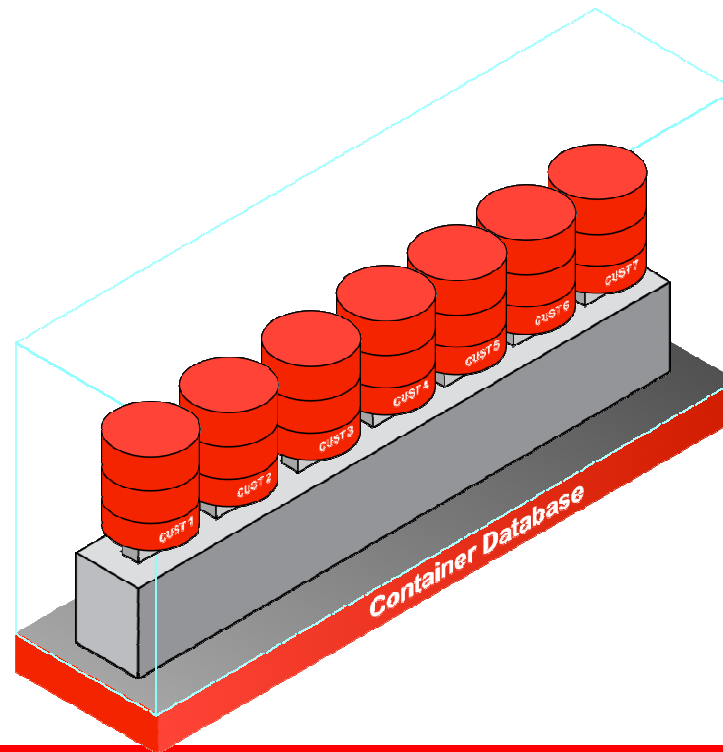
Creating Databases for Test and Development

Fast, flexible copy and snapshot of pluggable databases



Multitenant Architecture for SaaS

Each customer's data in private pluggable database



Foundation of Private and Public Clouds

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DATABASE **12^c**



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