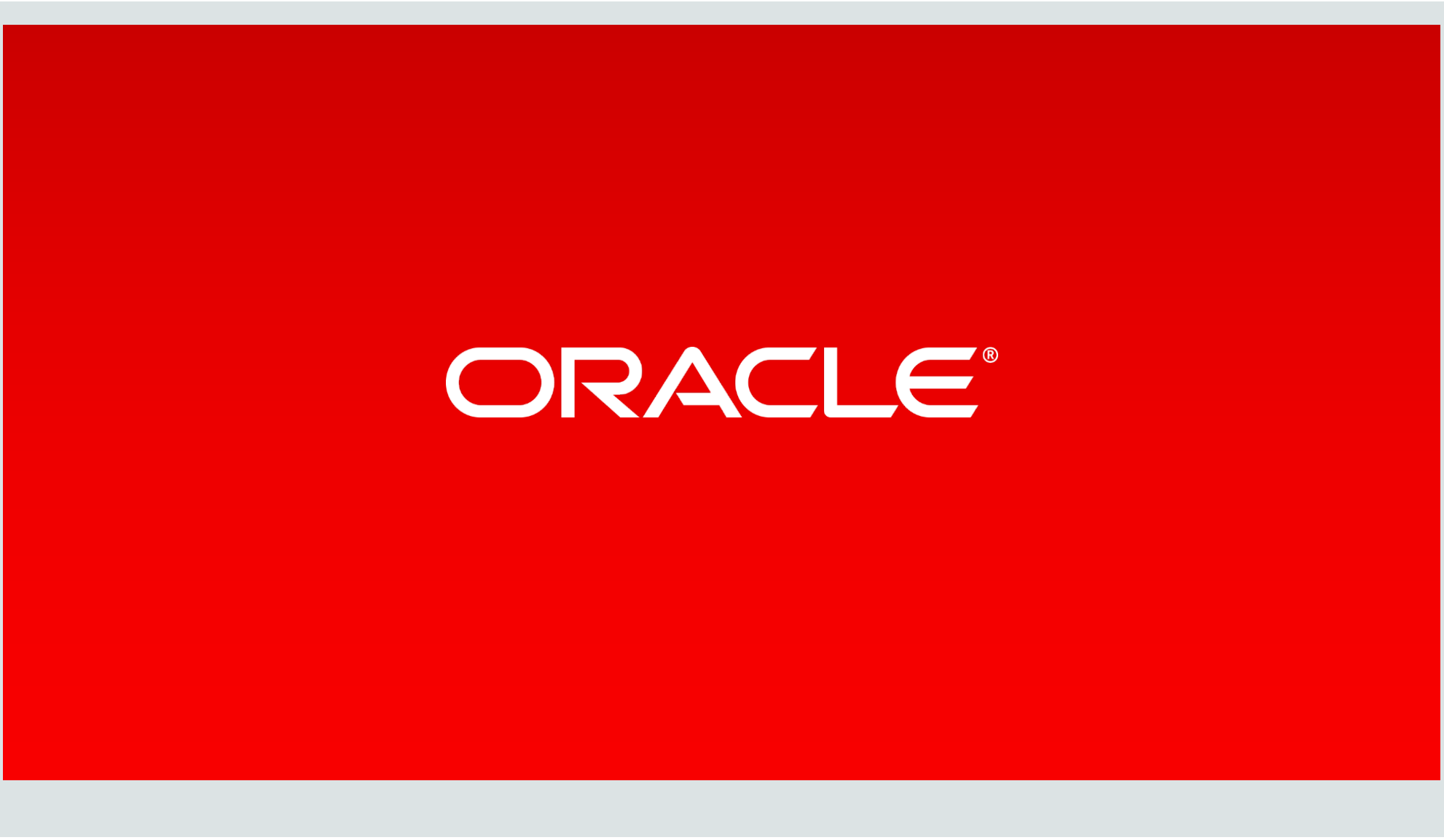
ORACLE®

Oracle12c: The Best Database For Cloud

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New York Oracle Users Group
Spring 2016 General Meeting

ORACLE

Safe Harbor Statement

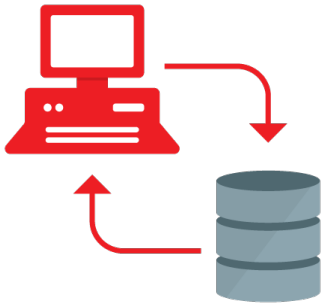
The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Today's presentation

- Oracle Database 12c
  - Designed for Cloud use
  - On or off premises, saves time and money
- Oracle Public Cloud
  - delivered via general purpose and engineered infrastructure
  - with choice of management models
- Private and Hybrid Cloud
  - with ability to migrate workloads and data to the cloud
  - with hybrid services planned for Dev/Test, Disaster Recovery, Security, and Analytics

Continuous Oracle Database Innovations

Preserving customer's investment though each new Computing Era



Client-Server

Stored Procedures
Partitioning
Parallel Query
Unstructured Data

Internet

Resource Management
Real Application Clusters
Data Guard
XML

Big Data & Cloud

Big Data SQL
Multitenant
In-Memory
JSON

Journey to Database as a Service

Silos

Complex

Standardized

Simple

Consolidated

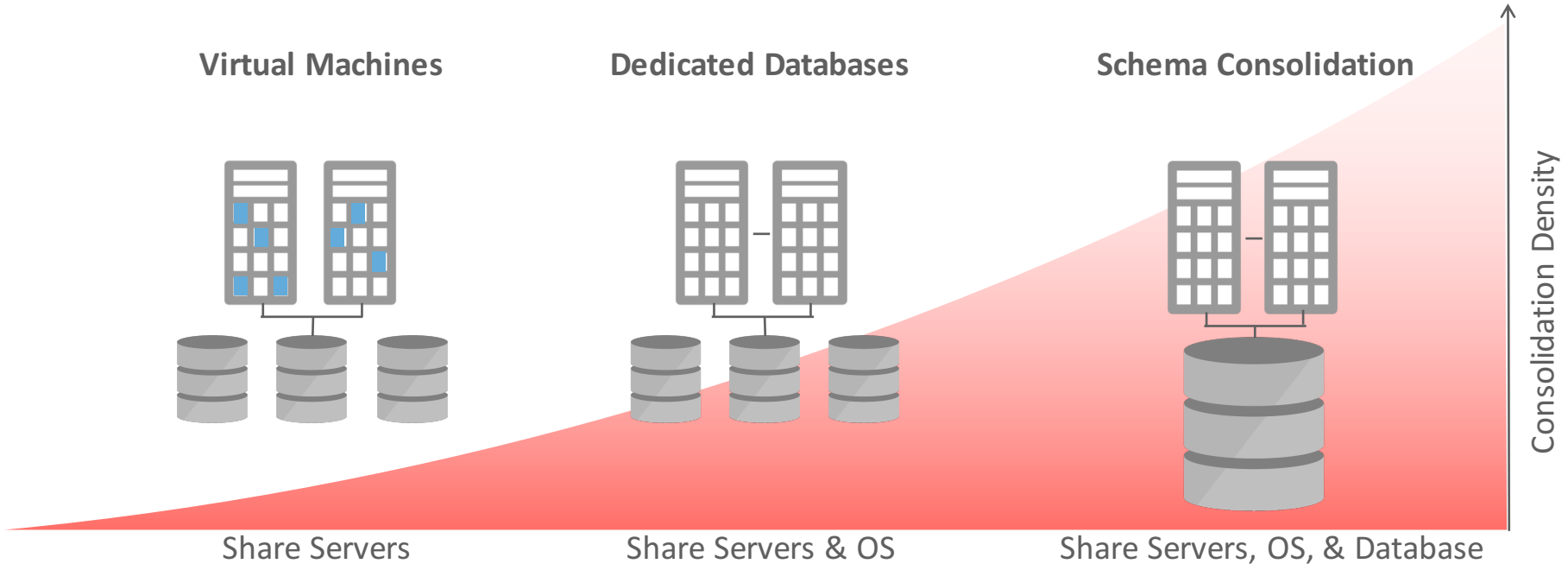
Efficient

Cloud

Agile

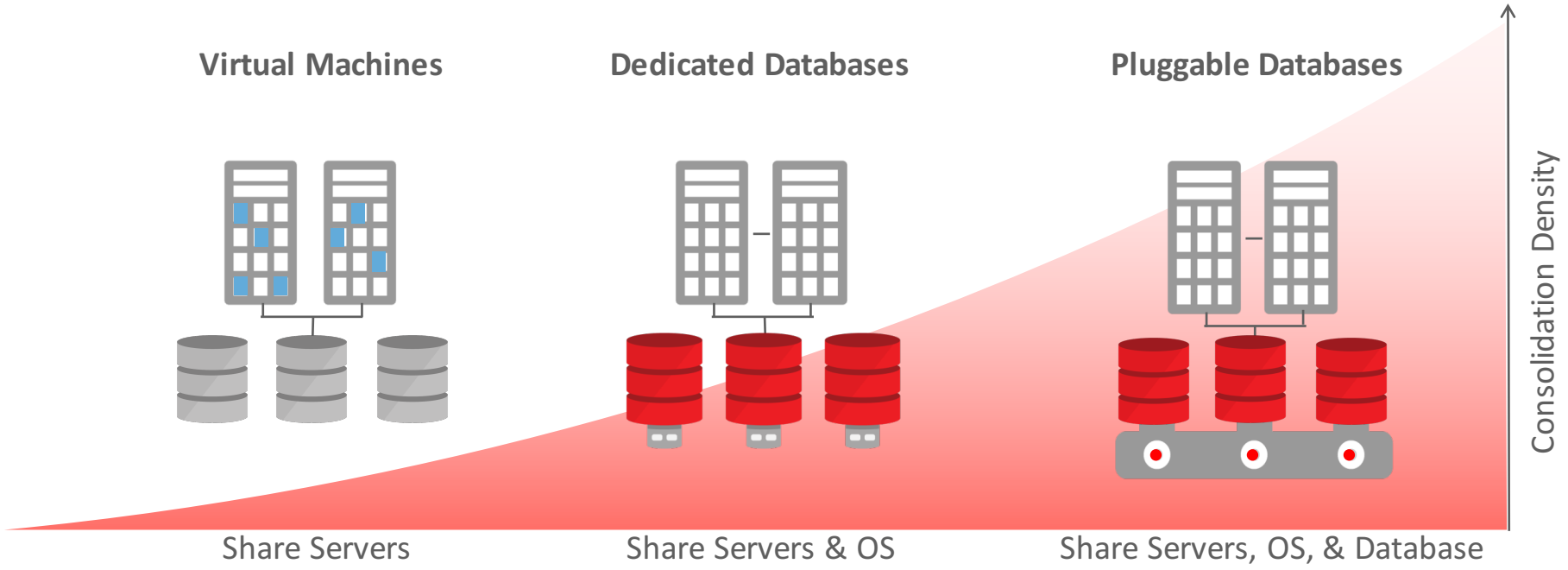
Database Consolidation on Clouds

Traditional consolidation methods



Oracle Multitenant

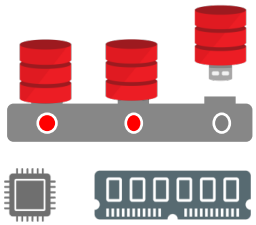
High consolidation density, transparent to existing applications



Multitenant

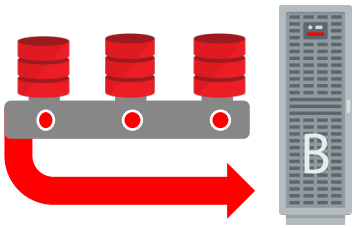
Helping customers reduce capital and operational expenditures

Consolidation



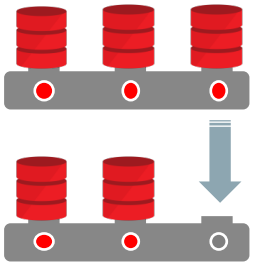
252 PDBs per CDB

Administration



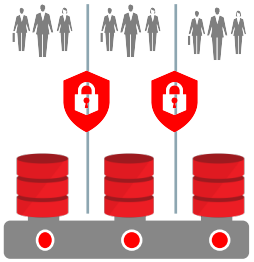
Manage many-as-one

Provisioning



Fast cloning
Unplug/Plug

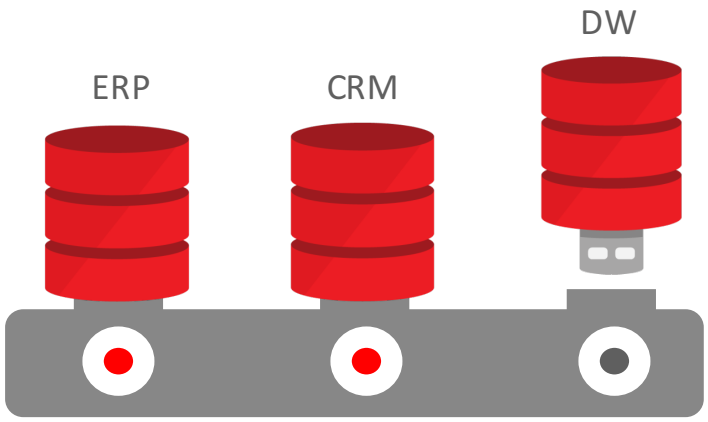
Cloud-enabler



Instant SaaS architecture

Oracle Multitenant

New Oracle Database architecture for the Cloud

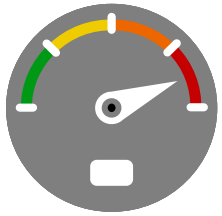


Complementary to VMs

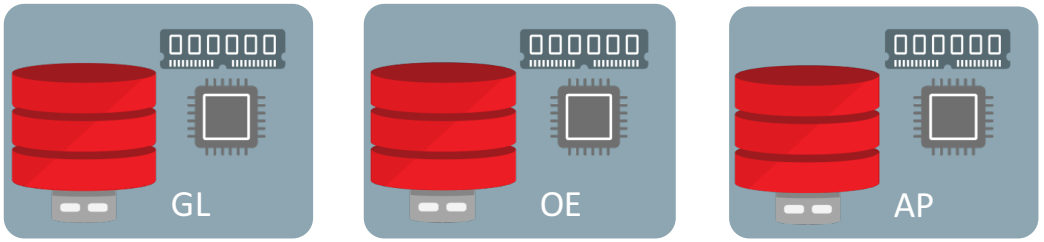
- Virtualize the database into PDBs
  - Applications run unchanged
- Lower OPEX
  - Manage many as one
    - Patch, upgrade, backup, standby
  - Granular control when appropriate
  - Easy to provision, move, clone
- Lower CAPEX
  - More databases per server
  - Shared memory and background processes

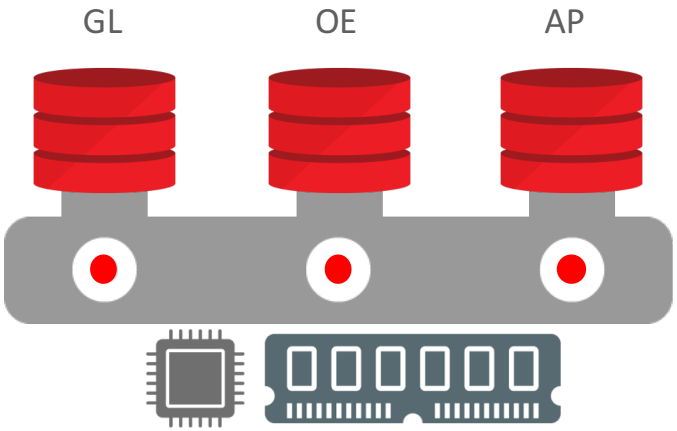
New Multitenant Architecture

Memory and processes required at container level only



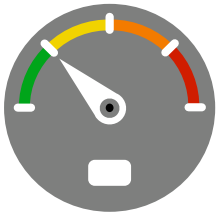
System Resources



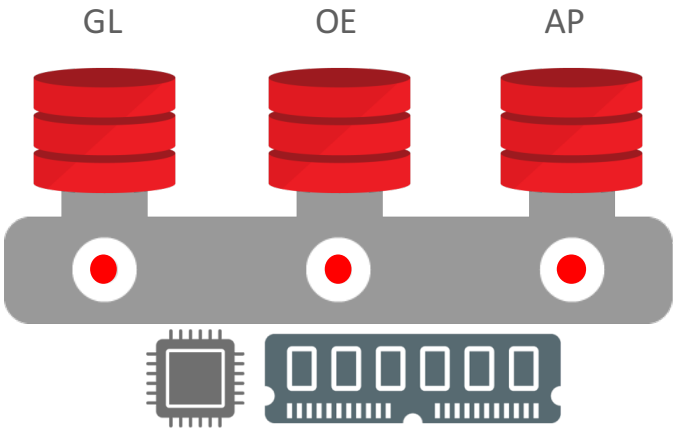


Oracle Database Architecture

More efficient utilization of system resources



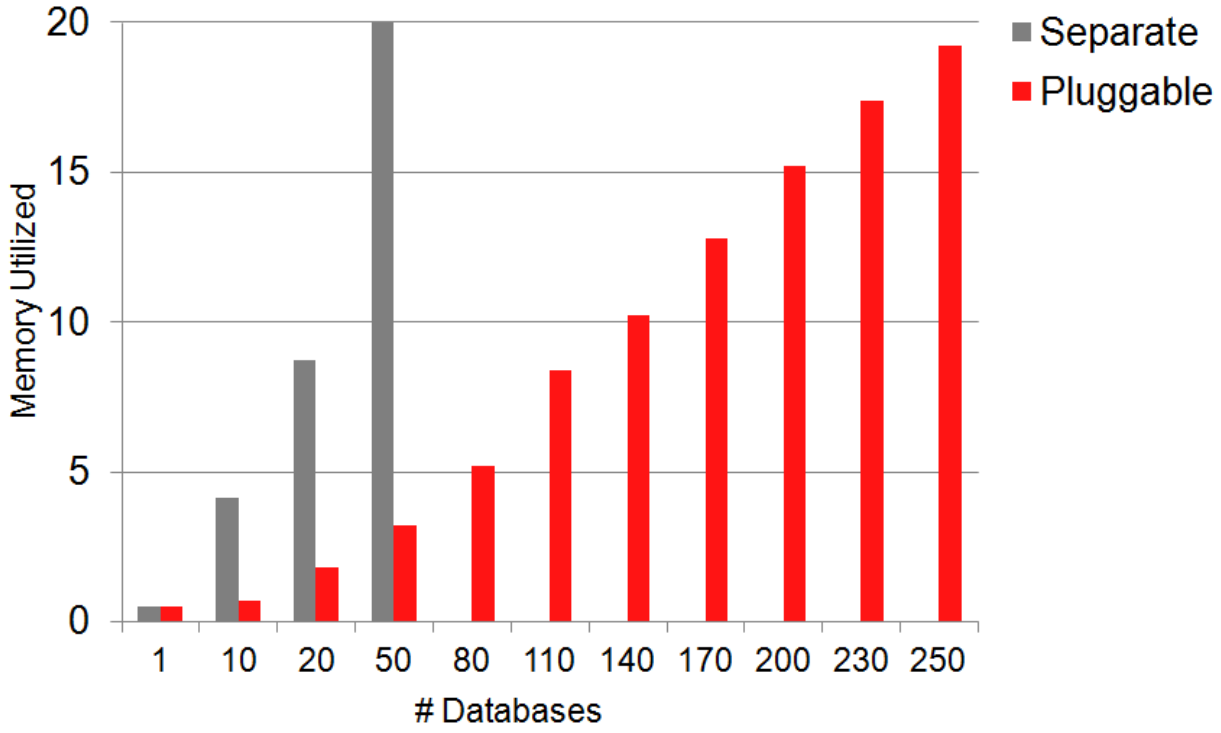
System Resources



Pluggable versus Separate Databases

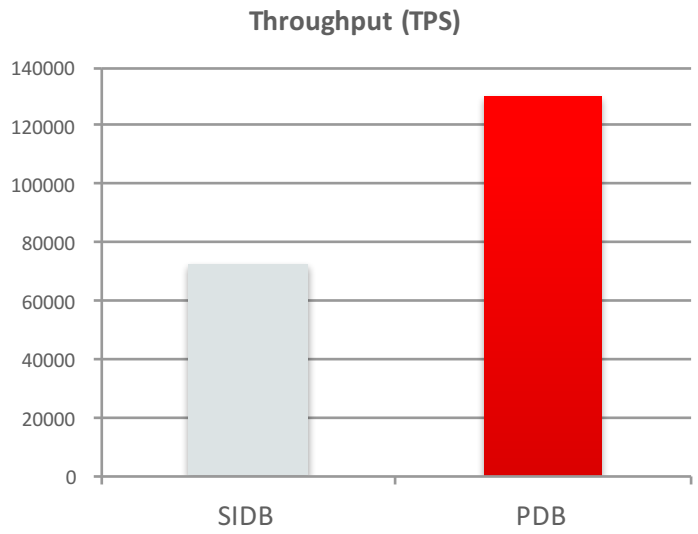
Highly Efficient: 6x Less H/W Resource, 5x more Scalable

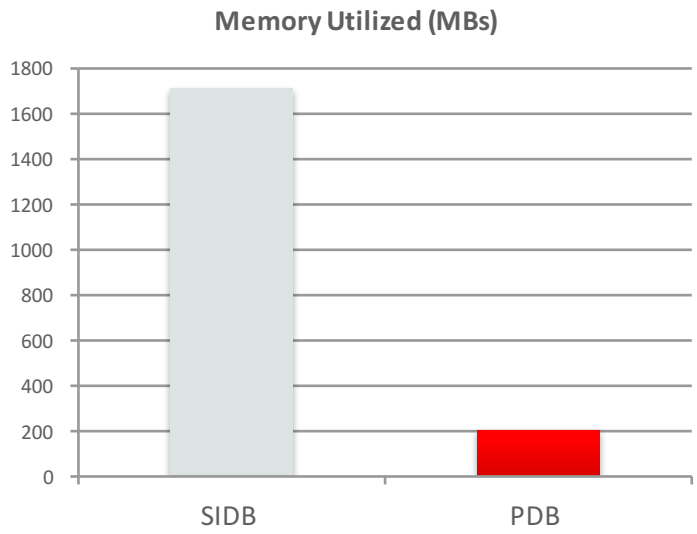
- OLTP benchmark comparison
- Only 3GB of memory vs. 20GB memory used for 50 databases
- Pluggable databases scaled to over 250 while separate database instances maxed at 50



Multitenant Improves Consolidation Density

Tests comparing 252 single instance and pluggable databases

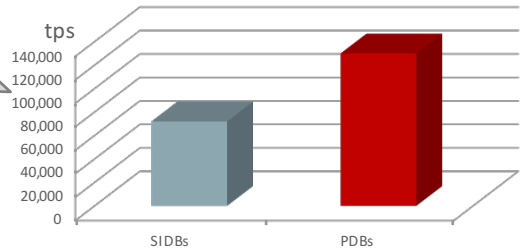




Oracle Multitenant on SuperCluster T5-8

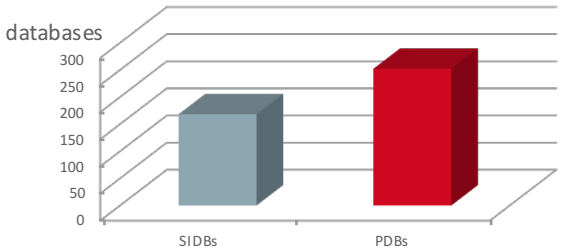
Consolidation Tests of PDBs vs. non-CDBs

Performance (Total Throughput)
252 PDBs vs. non-CDBs



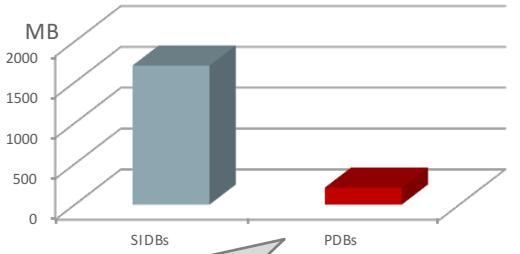
80% higher aggregate throughput

Number of supported Databases
(same Throughput per Database)



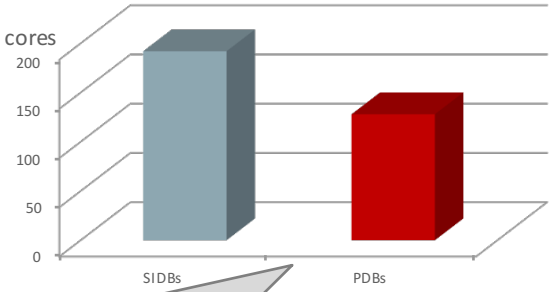
50% more databases consolidated

Memory Footprint per Database
(not including Buffer Cache)



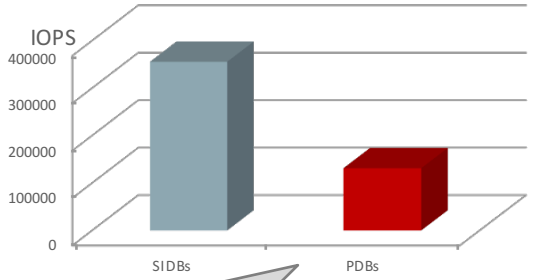
8x reduction in memory footprint

Number of Cores required to support 252 Databases



64 fewer cores needed

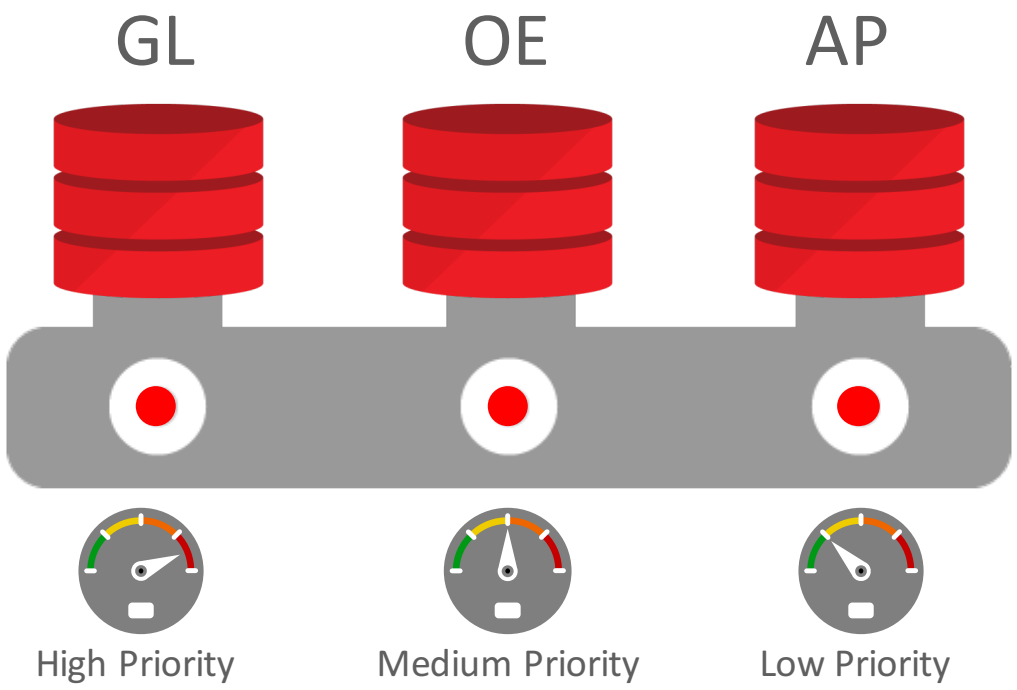
Storage IOPS required to support 252 Databases



3x reduction in storage IOPS

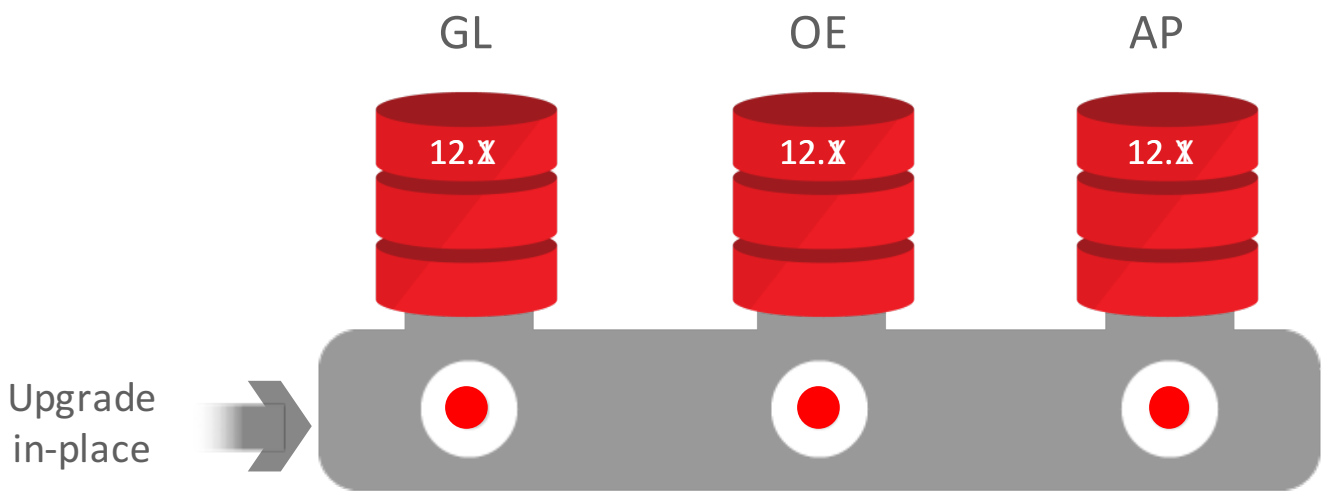
Managing Shared Resources

Resource management in a multitenant environment



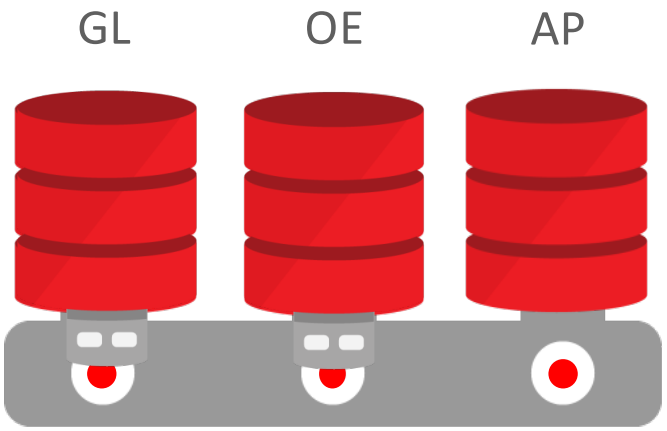
Database as a Service Patching & Upgrades

Apply changes once, all pluggable databases updated

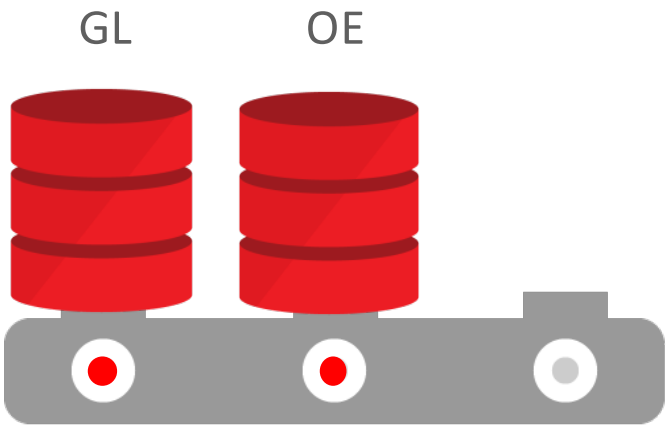


Database as a Service Patching & Upgrades

Flexible choice when patching & upgrading databases



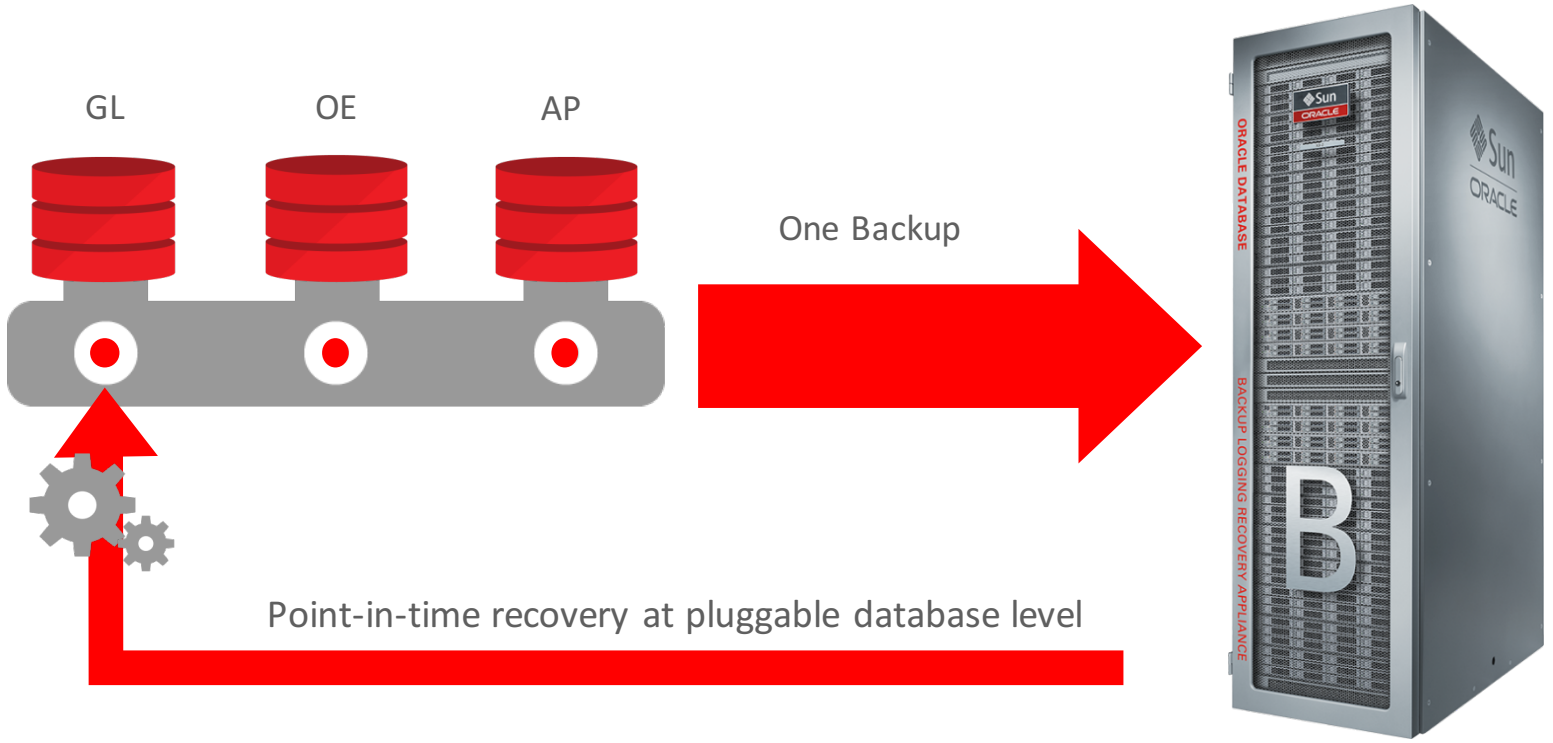
Original Container Database 12.1



Upgraded Container Database 12.x

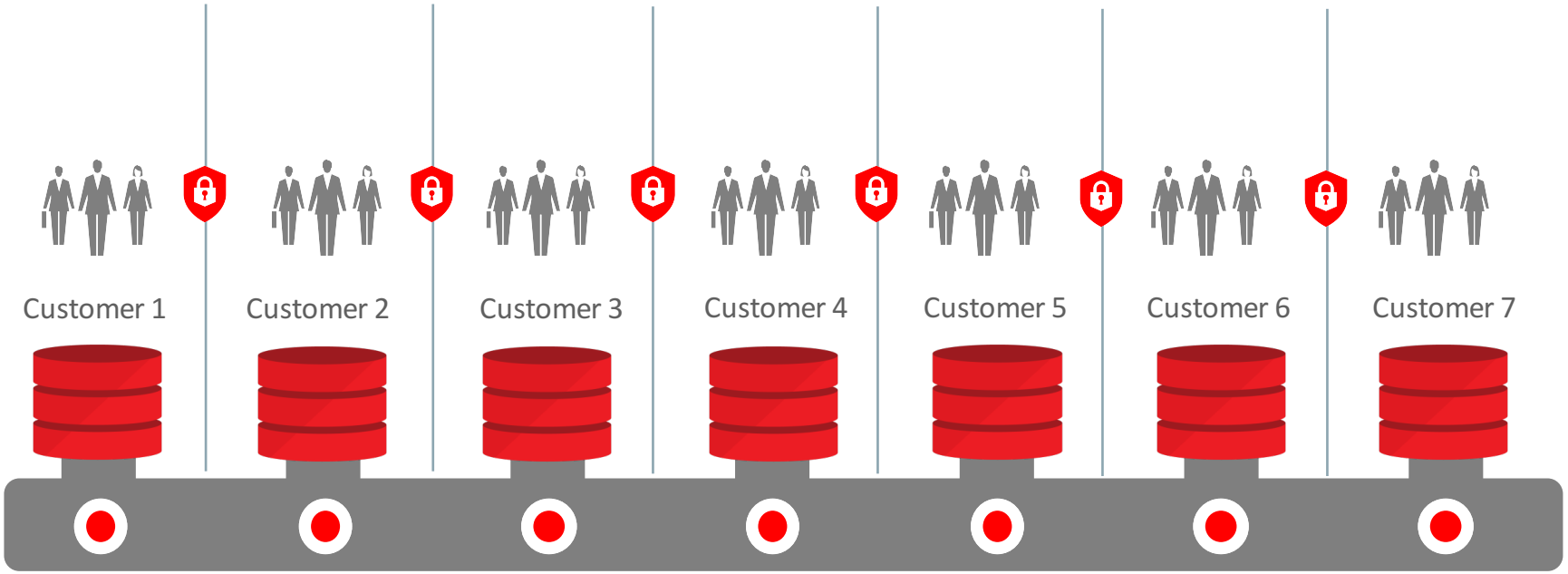
Manage Many Databases as One

Backup databases as one; recover at pluggable database Level



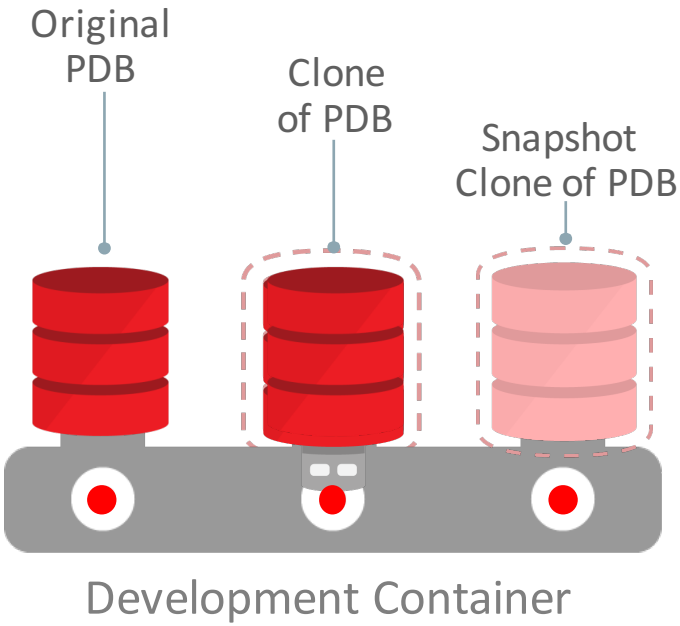
Multitenant for Software as a Service

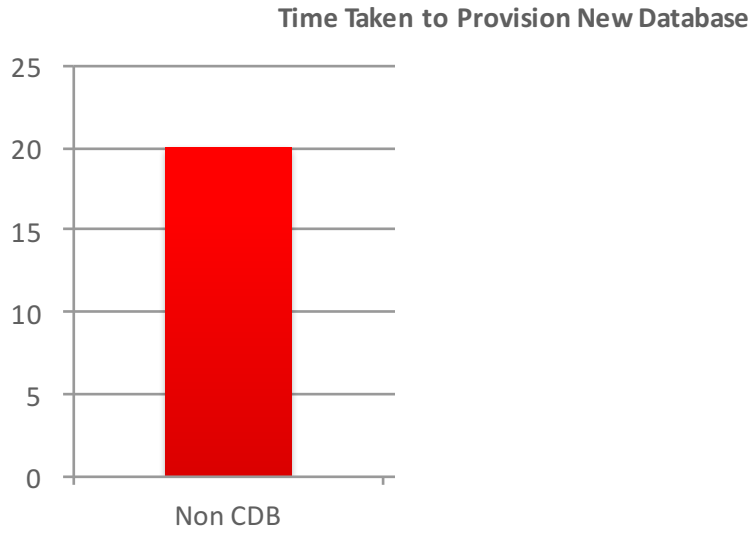
Multitenancy implemented by the Database, not the Application



Database as a Service for Development

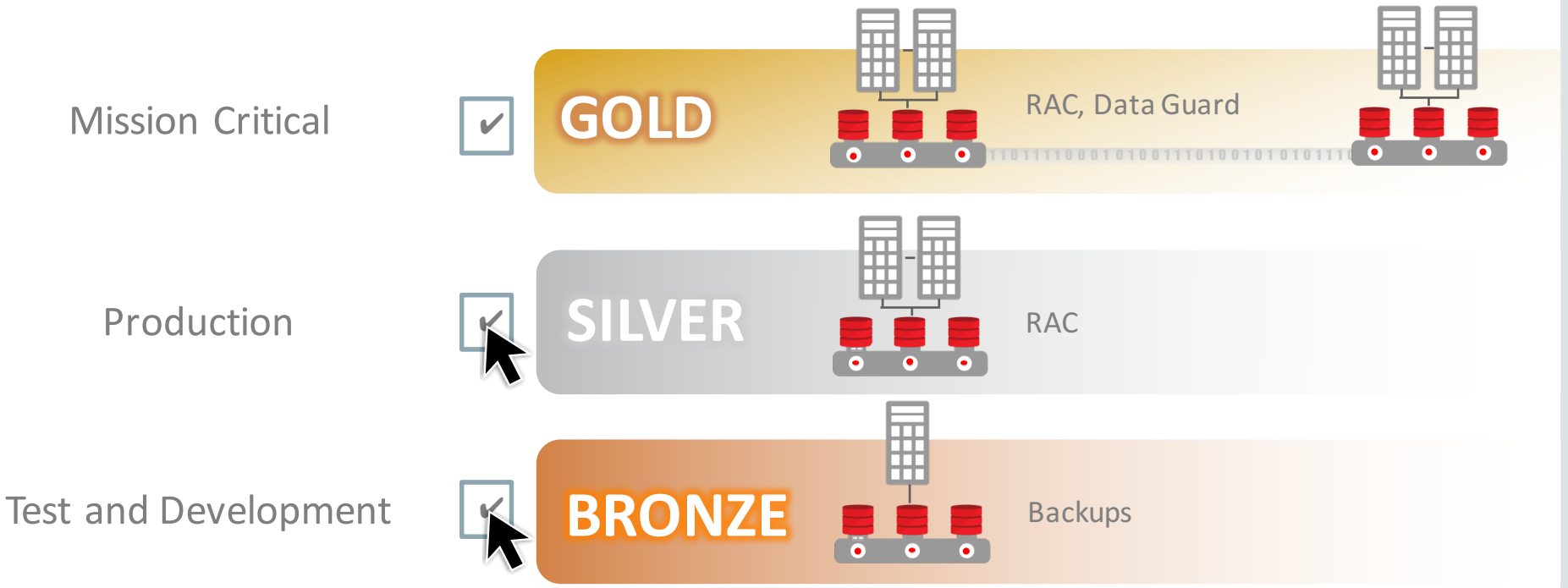
Fast Provisioning, Snapshot Clones





Oracle Multitenant for Database as a Service

Different service levels for different requirements



What is Oracle Database Cloud?

Oracle Cloud

Extend the enterprise data center to the cloud

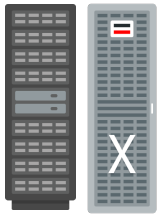
On Premises

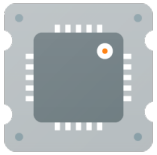
Instantly gain access to infrastructure

Elastic CPU and memory

Elastic block and object storage

Backup database to the cloud

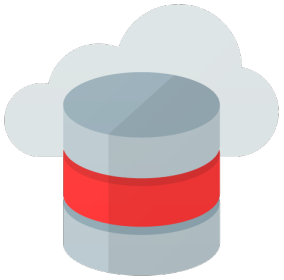




Oracle Cloud

Oracle Database Cloud Service Types

Multitenant



- Database Schema or PDB available as a monthly Subscription by Size (5, 20, 50 GB)
- Oracle Managed Database
- Engineered Systems infrastructure
- Underpins the BI, Document, Mobile, Java and other Oracle SaaS offerings

Dedicated

- Full Database available as a metered service (Hourly or Monthly)
- Choice of Customer or Oracle Managed* Database
- Choice of General Purpose and Engineered Systems
- Choice of editions to meet different customer requirements

*Planned for later this year

Oracle Database Cloud Services

3 Levels of Management

On Premises

Managed*

24-7 active monitoring and management. Backup, recovery and patching are fully managed with opt-in time windows.

Automated

Automated install, patch, upsize / downsize, backup / restore / recovery, configuration & monitoring.

Virtual Image

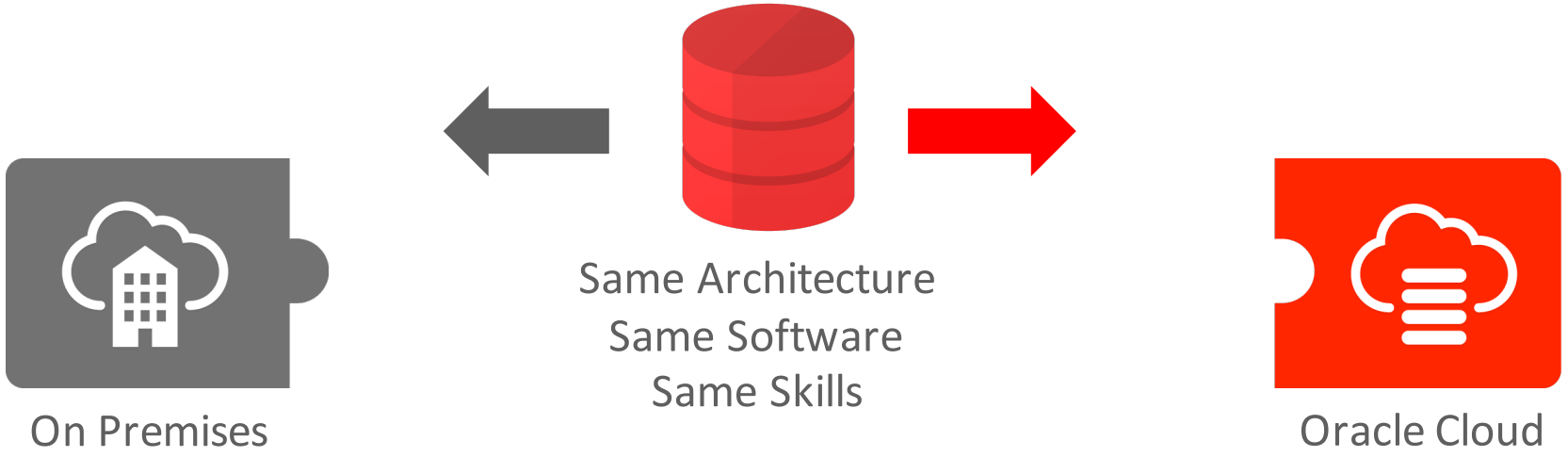
Database software ready to install. Same software as distributed for on premise use.

Oracle Cloud

* Planned for 2016

Oracle Platform-as-a-Service Strategy

Full portability across the hybrid cloud



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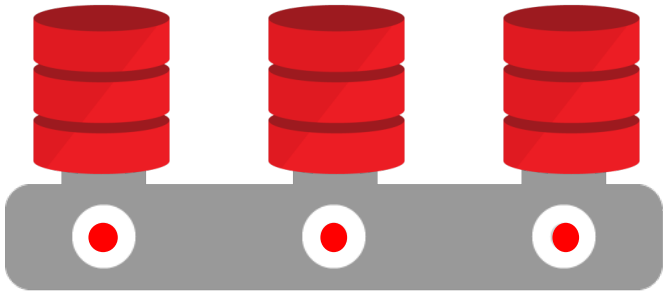
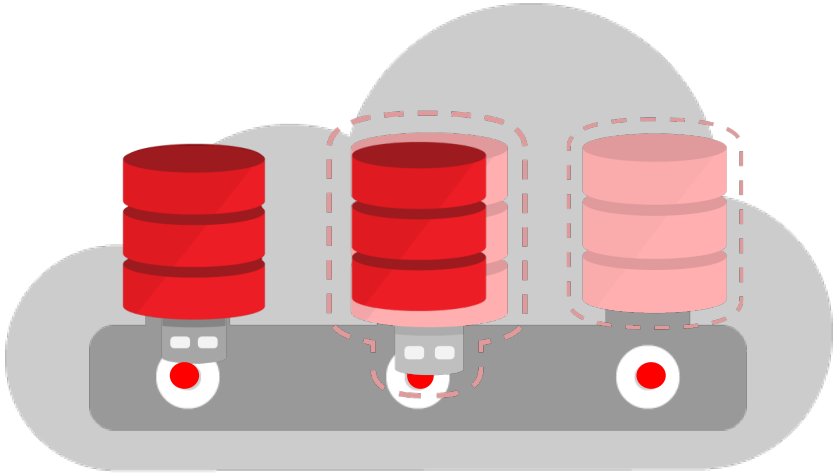
Enterprise Manager manages both On Premises and Cloud

Database as a Service on the Cloud

Development and deployment agility using Oracle Database 12c



Deployment On Premises



Development in the Cloud

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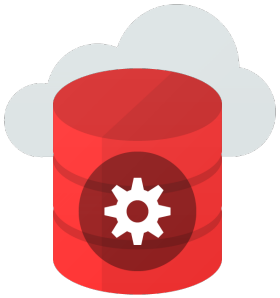
Oracle Database Cloud Service Management Levels

Customer Managed Database



Oracle Managed Database*

Oracle Managed Infrastructure

- Customer has privileged access
- Customer monitors and is responsible for keeping the database available
- Automated install, patch, upgrade, upsize/downsize, backup/restore, recovery, standby…

- Oracle has privileged access
- Oracle monitors and is responsible for keeping the database available
- Oracle manages install, patch, upgrade, upsize/downsize, backup/restore, recovery, standby…

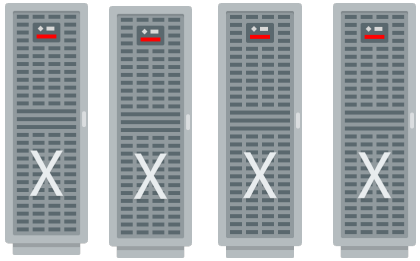
*Planned for later this year

Oracle Database Cloud Service Infrastructure

General Purpose

- Test, Development, Departmental Applications
- Compute Shapes - by OCPU, Standard or High RAM
- Block Storage – by the GB
- Up to 2TB database

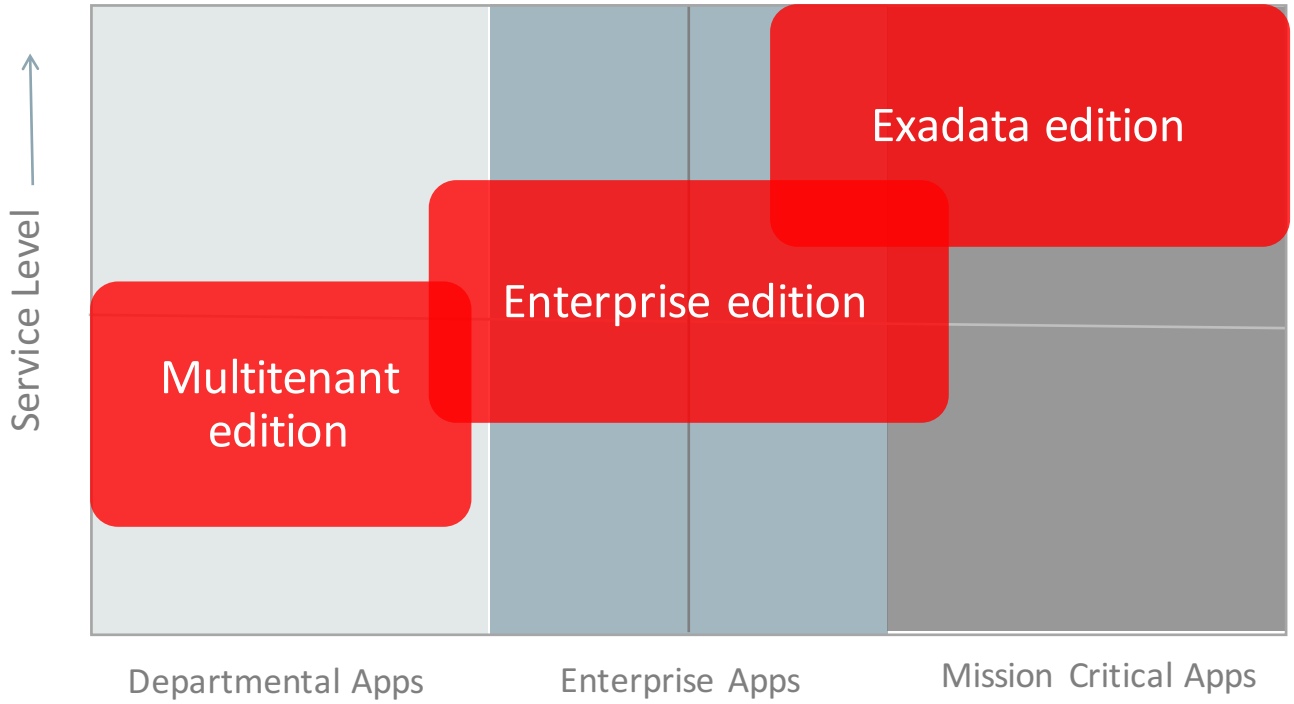
Engineered Systems



- Mission Critical, Intensive OLTP and Decision Support
- Available in uniform Exadata allocation units
- Allocation units: 28 OCPUs, 42TB, ½ TB memory
- Up to 168TB database

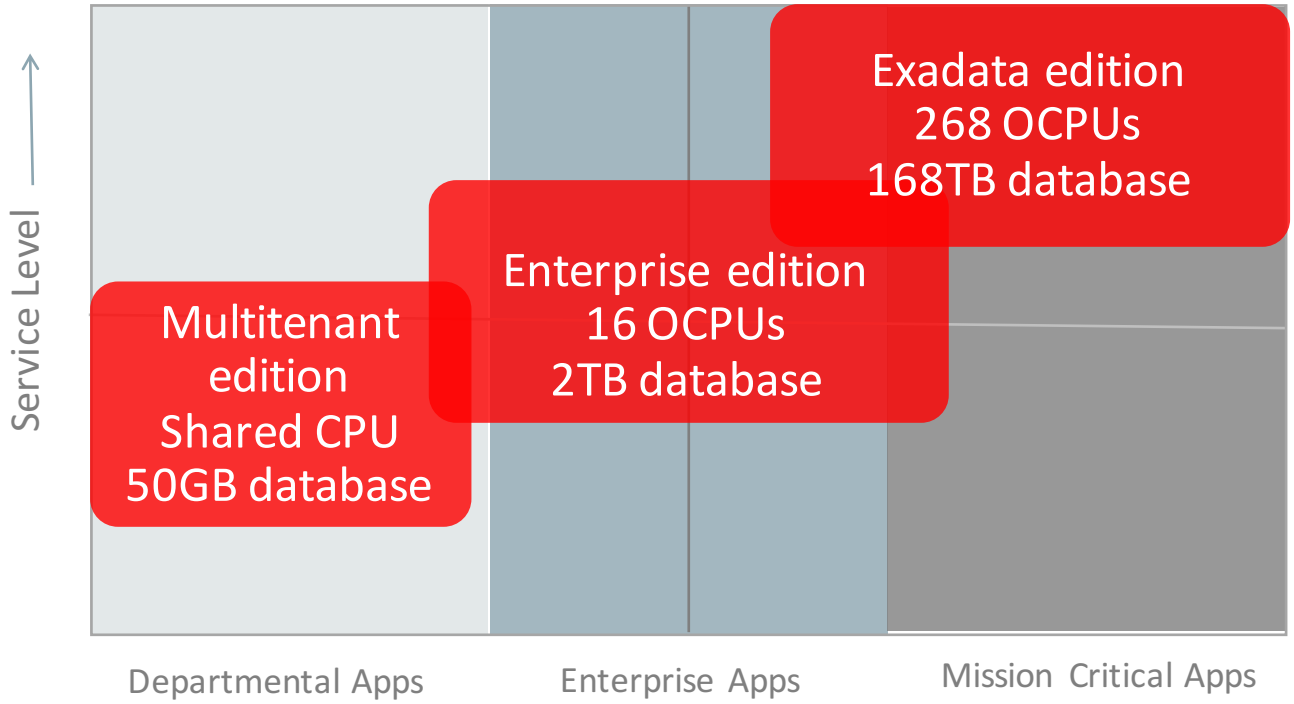
Oracle Database Cloud Service

Offering enterprise capabilities scaling from small startups to global organizations



Oracle Database Cloud Service

Upper Limits for CPU, database size

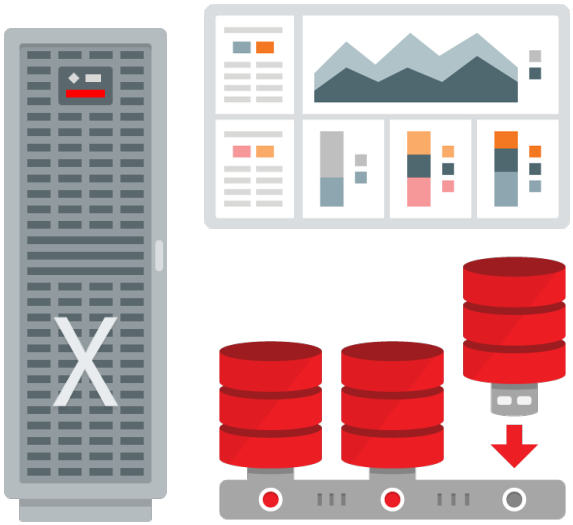


Oracle Database Cloud Summary

- One Oracle Cloud
  - seamlessly integrates multiple cloud deployments
  - offering application transparency for all enterprise workloads
- Database Cloud Services
  - delivered via general purpose and engineered infrastructure
  - with choice of management models
- Extend Enterprise Data Center to the Cloud
  - with ability to migrate workloads and data to the cloud
  - with hybrid services planned for Dev/Test, Disaster Recovery, Security, and Analytics

Database as a Service on Premise

Agile, Efficient, Flexible Deployments



- Foundation Products
  - Oracle Exadata / SuperCluster
    - Accelerates all database workloads
    - Improves consolidation density up to 4x
  - Oracle Multitenant
    - Fast provisioning, Lowers OPEX and CAPEX
  - Oracle Cloud Management Pack
    - Delivers Database as a Service
- Operational Guidance
  - Reference architectures
  - Service catalog best practice papers

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Deliver Database as a Service via a Lifecycle Approach

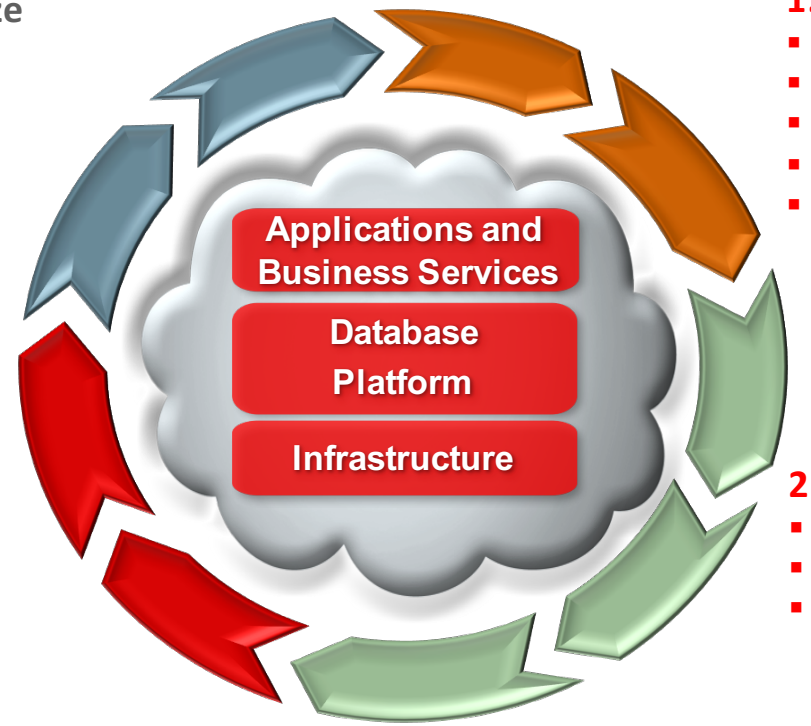
Enterprise Manager Cloud and Lifecycle Management Packs

1. Plan & Setup the DB Cloud
- Design Service Catalog
- Capacity & consolidation planning
- Asset discovery
- Setup Resource Pools
- Setup Policies

2. Enable Self-Service
- Implement Service Catalog
- Enable Service Governance
- Enable integration via APIs

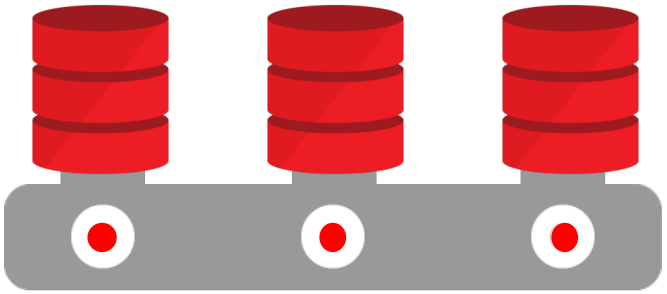
3. Manage & Monitor
- Database monitoring
- Configuration management
- Full stack management

4. Meter, Charge, Optimize
- Meter resource utilization
- Chargeback/Showback

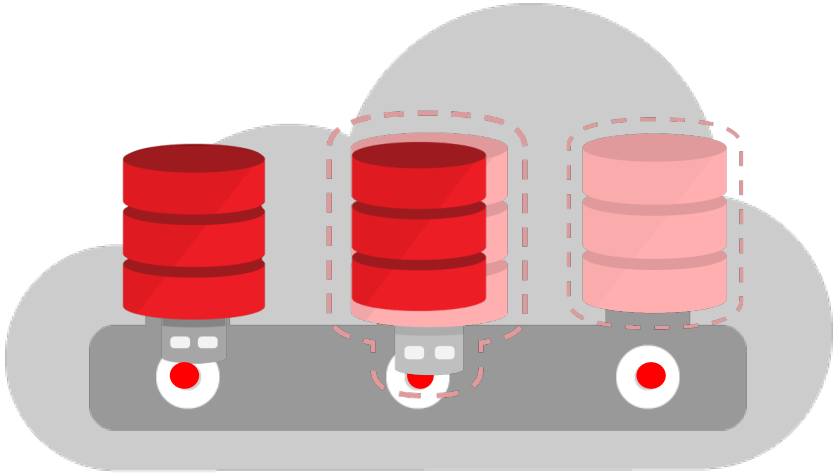


Move to the cloud or back at the push of a button

Development and deployment agility

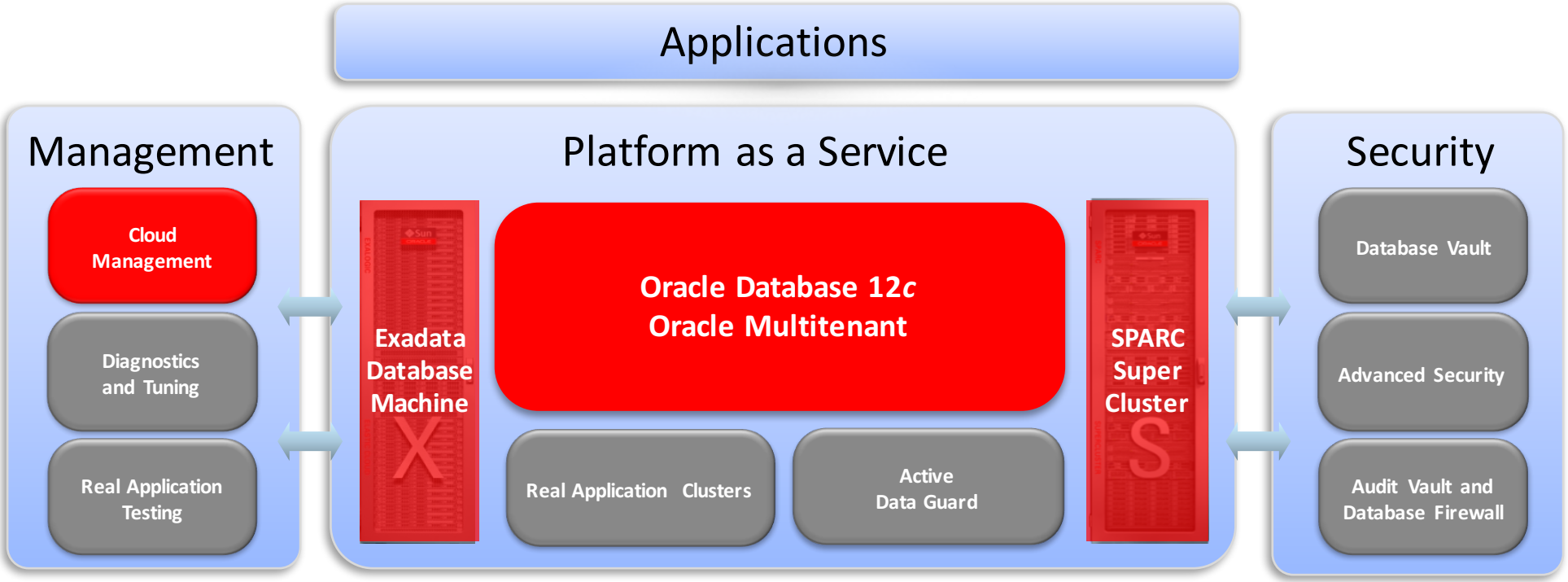


Deployment On Premises



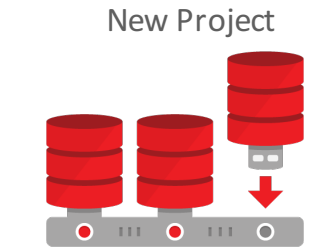
Development in the Cloud

Oracle Database as a Service

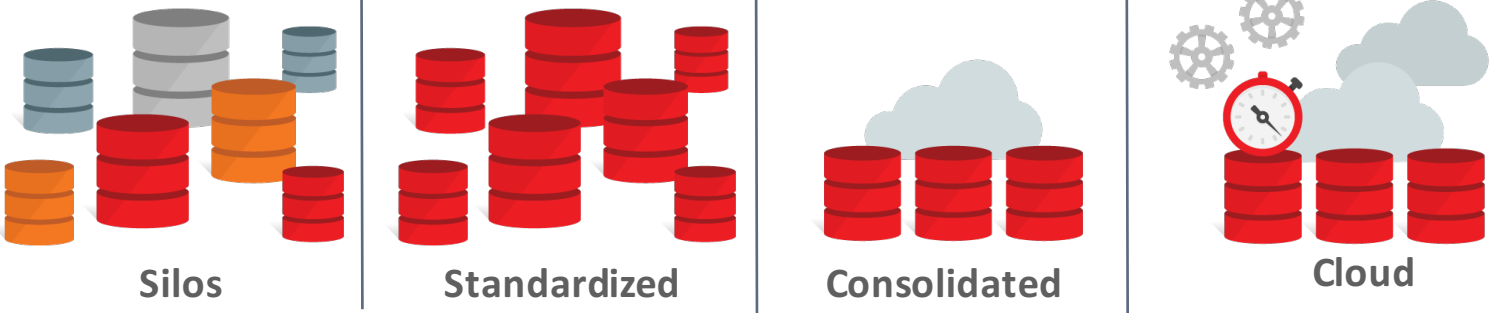


Achieve Database as a Service Today

With a Two-Pronged approach



1. Stand up DBaaS platform today to show immediate value for **new projects**
2. In parallel, **consolidate/optimize** with long term goal to move to strategic DBaaS



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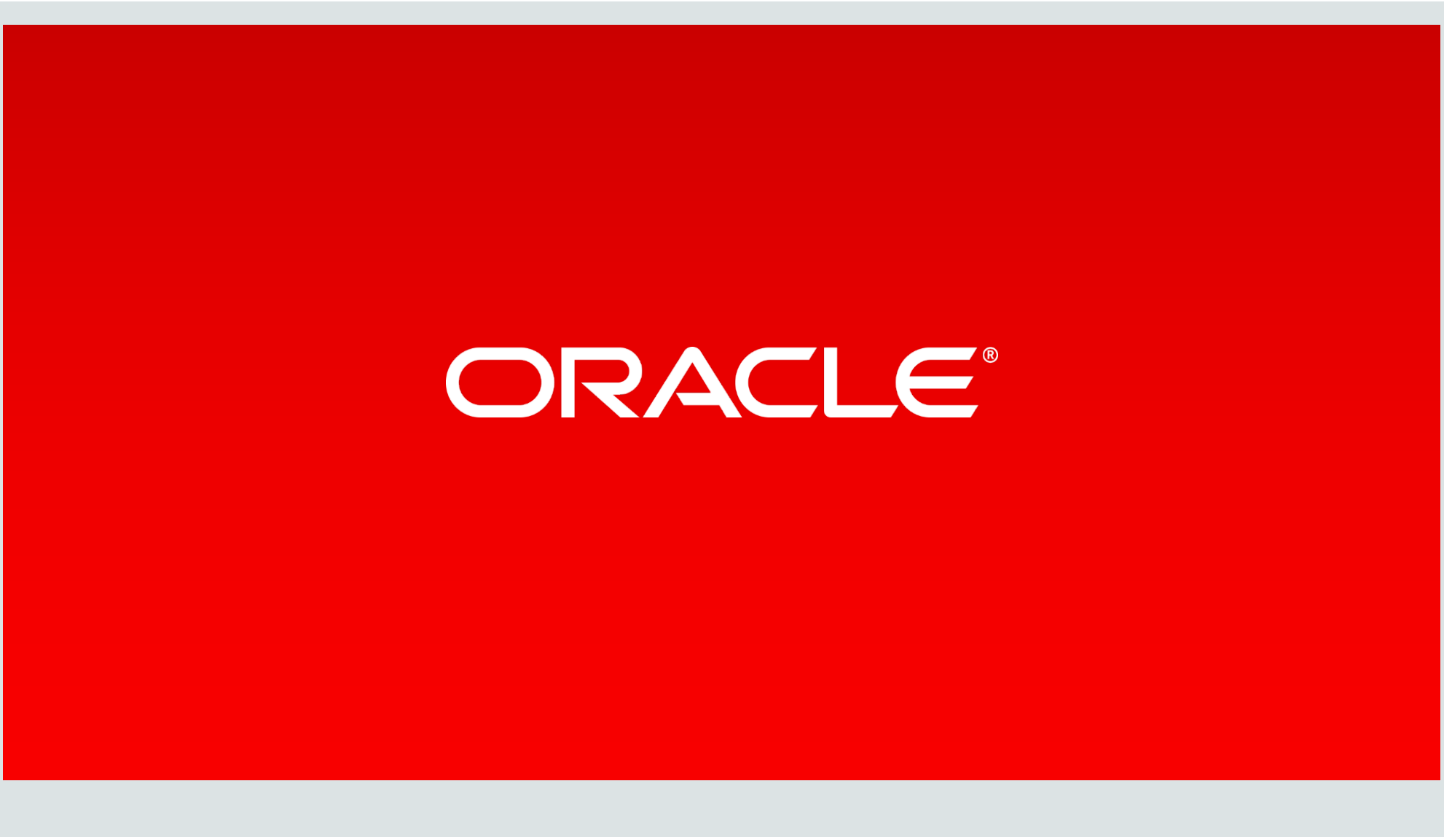
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