# Introduction to Oracle Database Multitenant Architecture

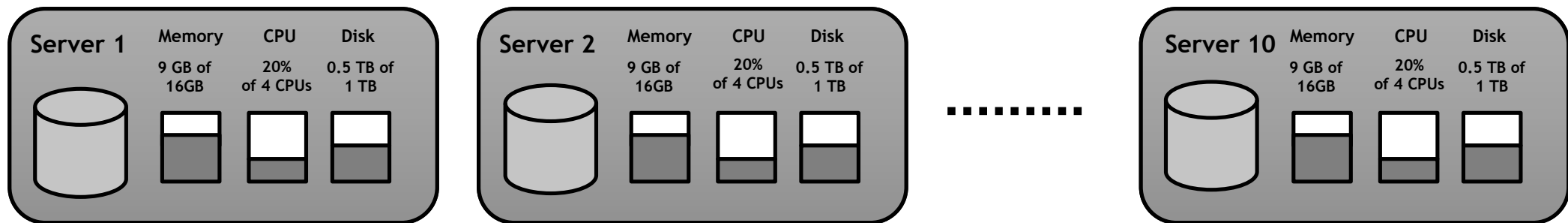By Ahmed Baraka

# Objectives

By the end of this lecture, you should be able to:

- Understand the business challenges that the Multitenant option is addressing

- Understand in high level how the Oracle Multitenant works

- Describe the benefits of using Oracle Multitenant option

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# Multiple databases on different machines challenges: total resource utilization

| Server 1 | Memory | CPU | Disk | | Server 2 | Memory | CPU | Disk | | | Server 10 | Memory | CPU | Disk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9 GB of 16GB | 20% of 4 CPUs | 0.5 TB of 1 TB | | | 9 GB of 16GB | 20% of 4 CPUs | 0.5 TB of 1 TB | .......... | | | 9 GB of 16GB | 20% of 4 CPUs | 0.5 TB of 1 TB |

**Resources Utilization**

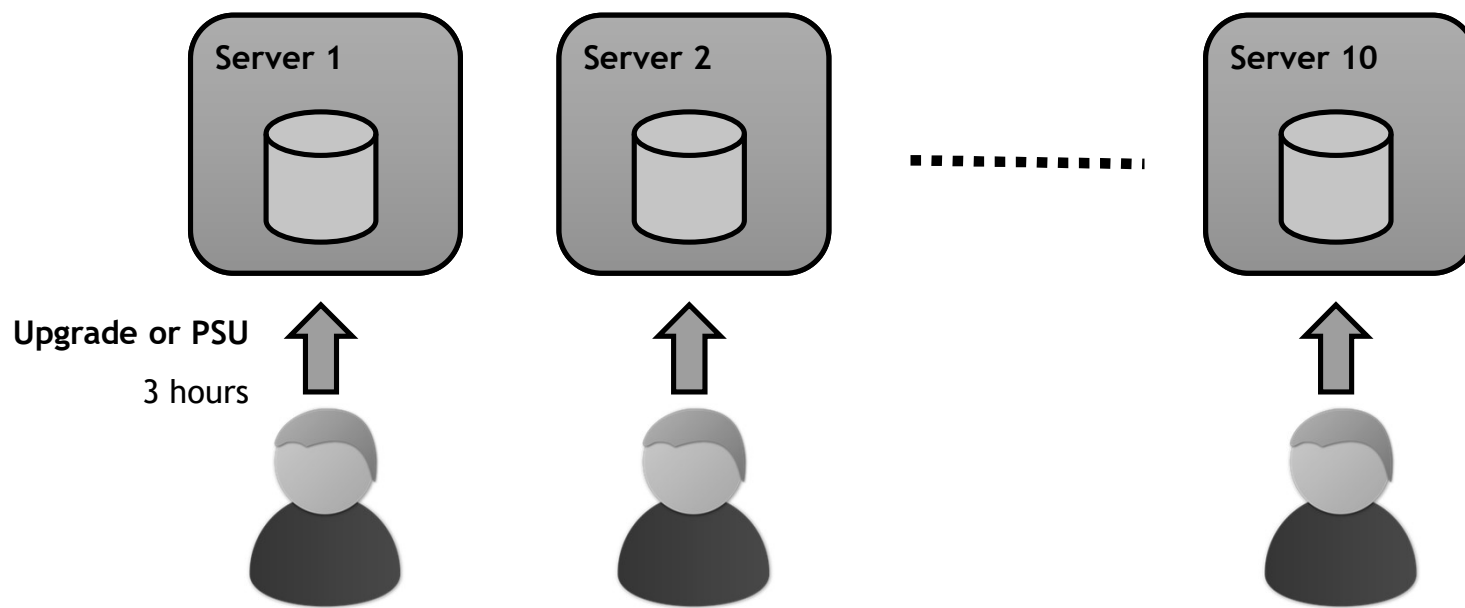**Memory:** 90 GB of 160 GB ( 70 GB free )

**CPU :** 20% of 40 CPUs ( 80% of 40 CPUs is not utilized )

**Disk:** 5 TB is used out of 10 TB ( 5 TB free )

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# Multiple databases on different machines challenges: total upgrade and PSU time

Server 1

Server 2

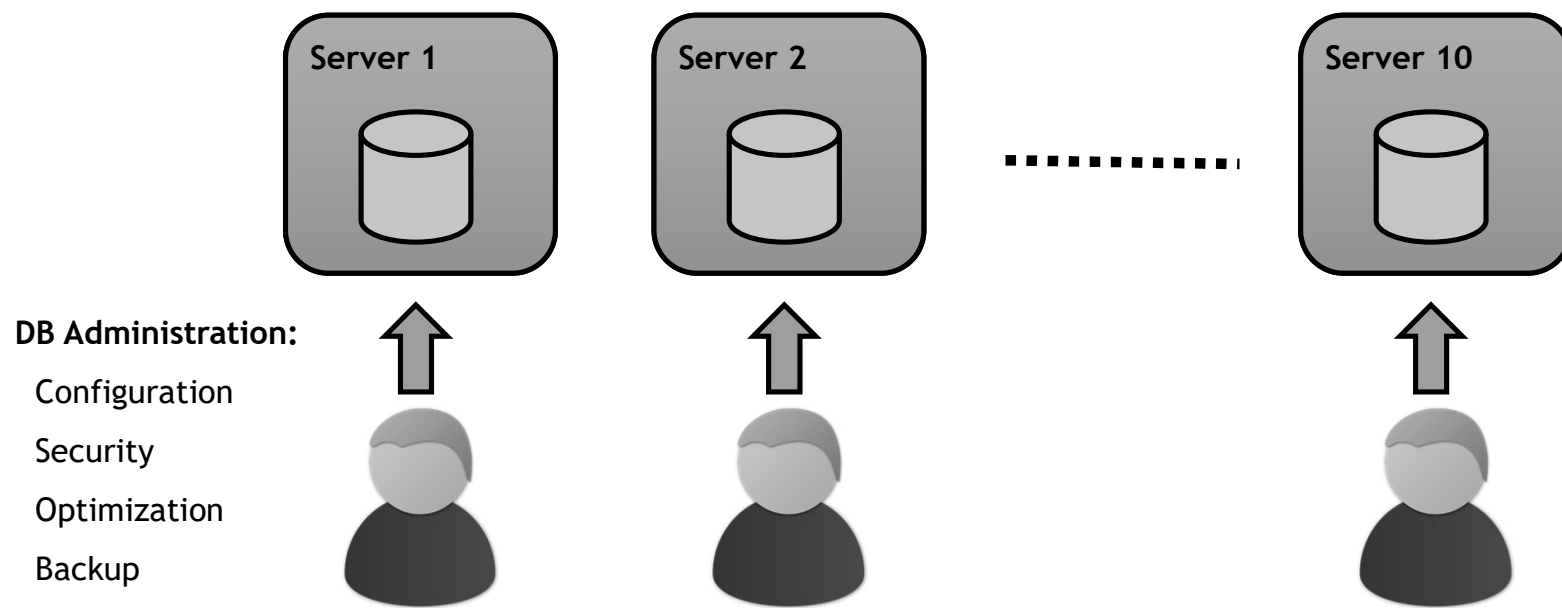Server 10

**Upgrade or PSU**

3 hours

30 DBA-working hours, more DBAs

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# Multiple databases on different machines challenges: administration time

Server 1

Server 2

Server 10

**DB Administration:**

Configuration

Security

Optimization

Backup

Many DBAs required

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# The Challenges

- Underutilization of IT infrastructure
- Inefficient use of DBA resources:
  - Provisioning
  - Patching and upgrading
  - Security and compliance
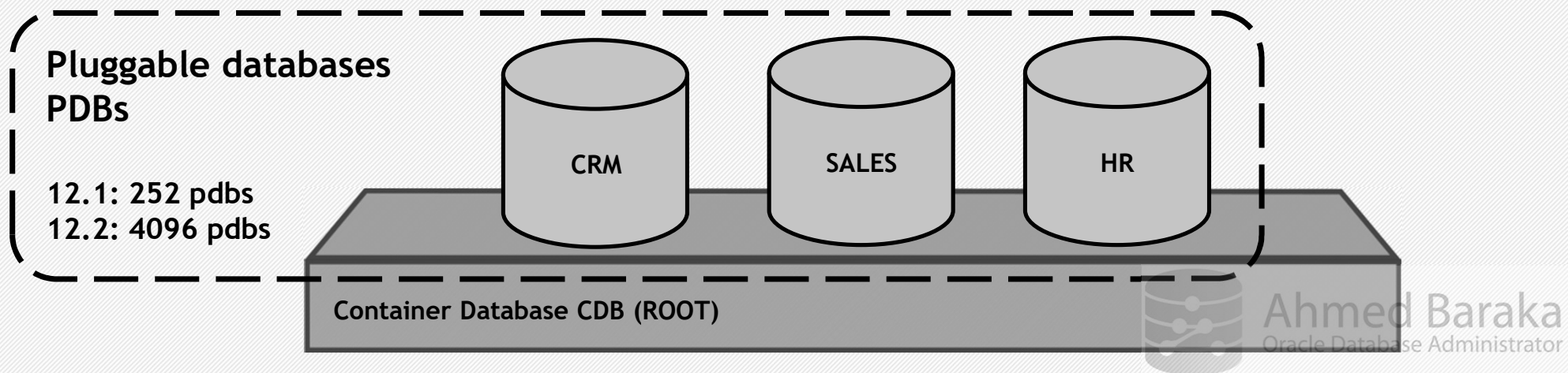  - Management
- Solution: consolidation

# Consolidation Models Available before 12c

| Consolidation Model | Pros | Cons |
|---|---|---|
| **VMs on a single Physical Server** | - Simple to implement<br>- Reduce the physical overhead<br>- Databases are isolated | - Virtual administration challenges still exist<br>- Every database has its own SGA and background processes |
| **Dedicated Database Physical Server** | - Little improvement in resource utilization<br>- Less physical server administration | - Every database has its own SGA and background processes |
| **Schema consolidation** | - High consolidation density<br>- Uses technical resources efficiently | - Conflict among applications<br>- Security issues might occur<br>- Raise challenges for some applications |

# What is the Oracle Database Multitenant Architecture?

- Consolidate one or more databases into a single housing container database.

**Pluggable databases PDBs**

**12.1: 252 pdbs**
**12.2: 4096 pdbs**

CRM

SALES

HR

**Container Database CDB (ROOT)**

# Oracle Database Multitenant Advantages

- Addresses the consolidation challenges:
  - Resources utilization
  - DBA resource costs
- Existing applications and schema do not need to change
- Tenant isolation
- Easy and efficient database cloning and moving
- Point-in-time recovery (BITR) as PDB level (12.2)
- Easier management of the physical database

# Summary

In this lecture, you should have learnt how to:

- Understand the business challenges that the Multitenant option is addressing

- Understand in high level how the Oracle Multitenant works

- Describe the benefits of using Oracle Multitenant option