ORACLE

# Database Migration Workbench

## with minimal downtime


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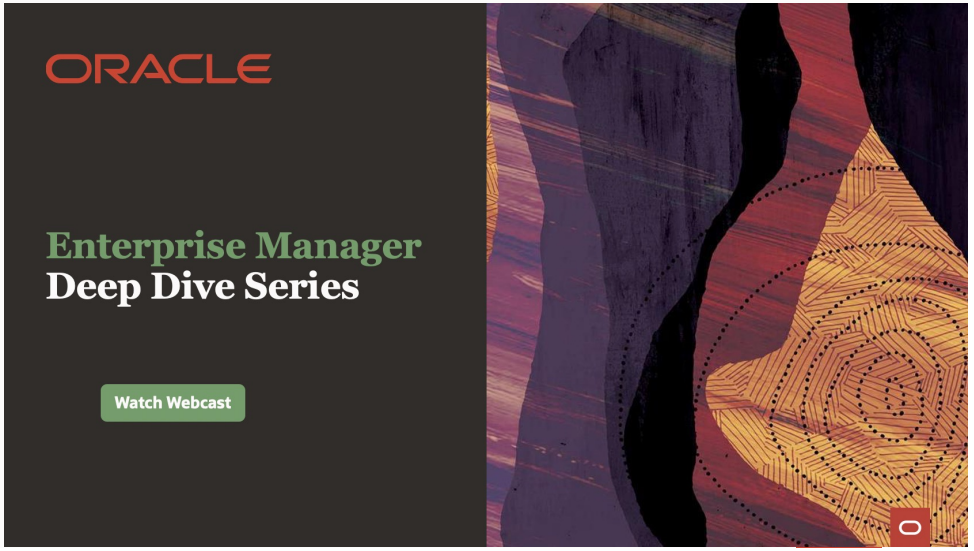

# Agenda

- Why Migrate?
- Enterprise Manager Migration Workbench
- Migration to Oracle Cloud
- New Migration Destinations
- Demo
- Q&A


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# Announcing Enterprise Manager 13.5

## What's New

### Hybrid Cloud Management

Fleet monitoring, management and data movement across entire IT estate – on-premises and in the cloud

### Ops Automation

Enhanced automation and modernization of key management tasks

### Extensibility

Open standards-based extensions for interoperability with 3rd party ecosystems

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# Hybrid Cloud Management

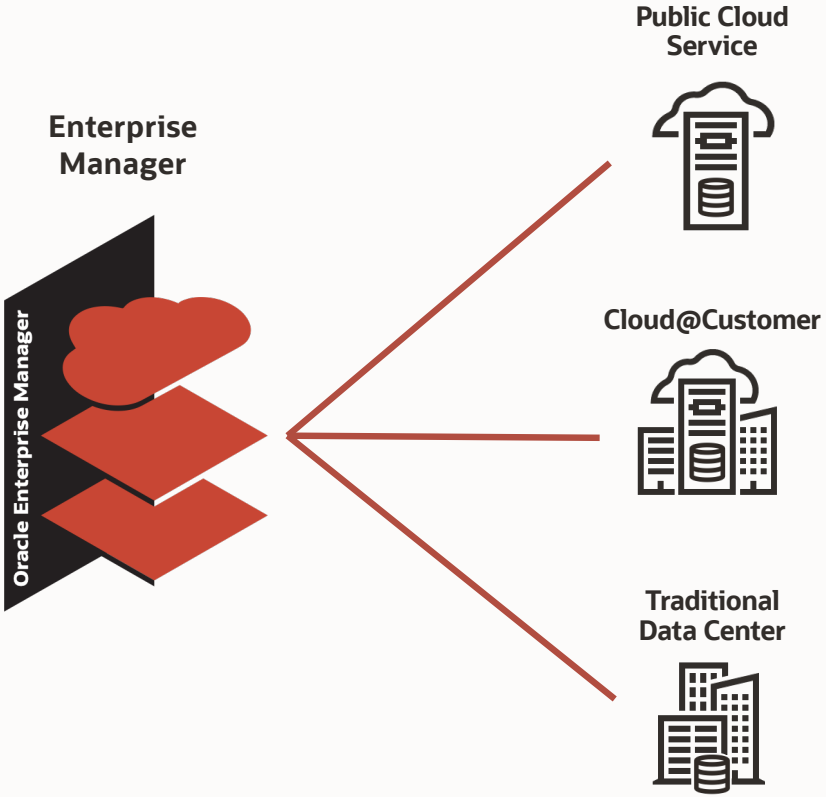
**Monitor and manage your hybrid fleet** from EM deployed on-premises or in the cloud

**Support for OCI Database resources** – Autonomous DB, ExaCS, ExaCC

Self-service deployment of databases across on-premises and OCI with **Hybrid DB-as-a-Service**

Simplify data movement from on-premises to OCI with **DB Migration Workbench**

Connect EM with OCI using **Cloud Bridge** for deep operational analytics

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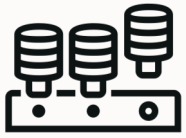
# Why Migrate?

Migrate to Oracle Cloud

Autonomous Database,
Database Cloud Service,
Exadata Cloud @ Customer,
Exadata Cloud Service

Move to Multitenant



Consolidate,
Manage Many as One

Upgrade Infrastructure

Hardware and Platform
Upgrade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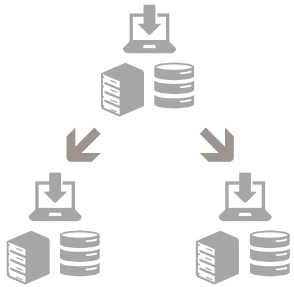
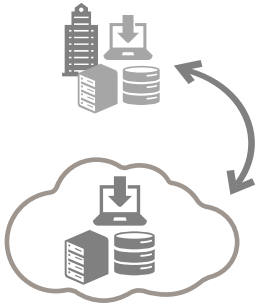
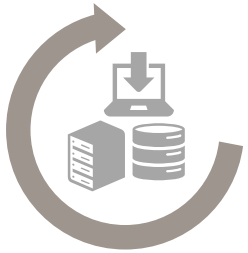
# Enterprise Manager

Single tool to Provision, Migrate, Monitor, Manage, Diagnose and Analyze

| PROVISIONING | MIGRATION TOOLS | CENTRALIZED MANAGEMENT | CLOUD INTEGRATION |
|---|---|---|---|
|  |  |  | |
| **Quick provisioning on Private or Public Cloud** | **Migrate database workloads with zero re-tooling and zero downtime** | **Easily upgrade and centrally manage databases** | **Integration with Object Store, Autonomous or non-Autonomous Databases** |

**COMMON ARCHITECTURE, STANDARDS AND PRODUCTS**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Enterprise Manager

# Migration Workbench

Consolidate, Migrate and Analyze


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# Migration Workbench Benefits

## Simple

Unified guided workflow for migrating to On-Premises, DBCS, and OCI

## End-to-End Automation

First class automation with DevOps tools by leveraging JSON

## Minimal Downtime

Real time monitoring of migration progress

Insight into time left to complete migration

## Accuracy

Automatic comparison of performance before and after migration


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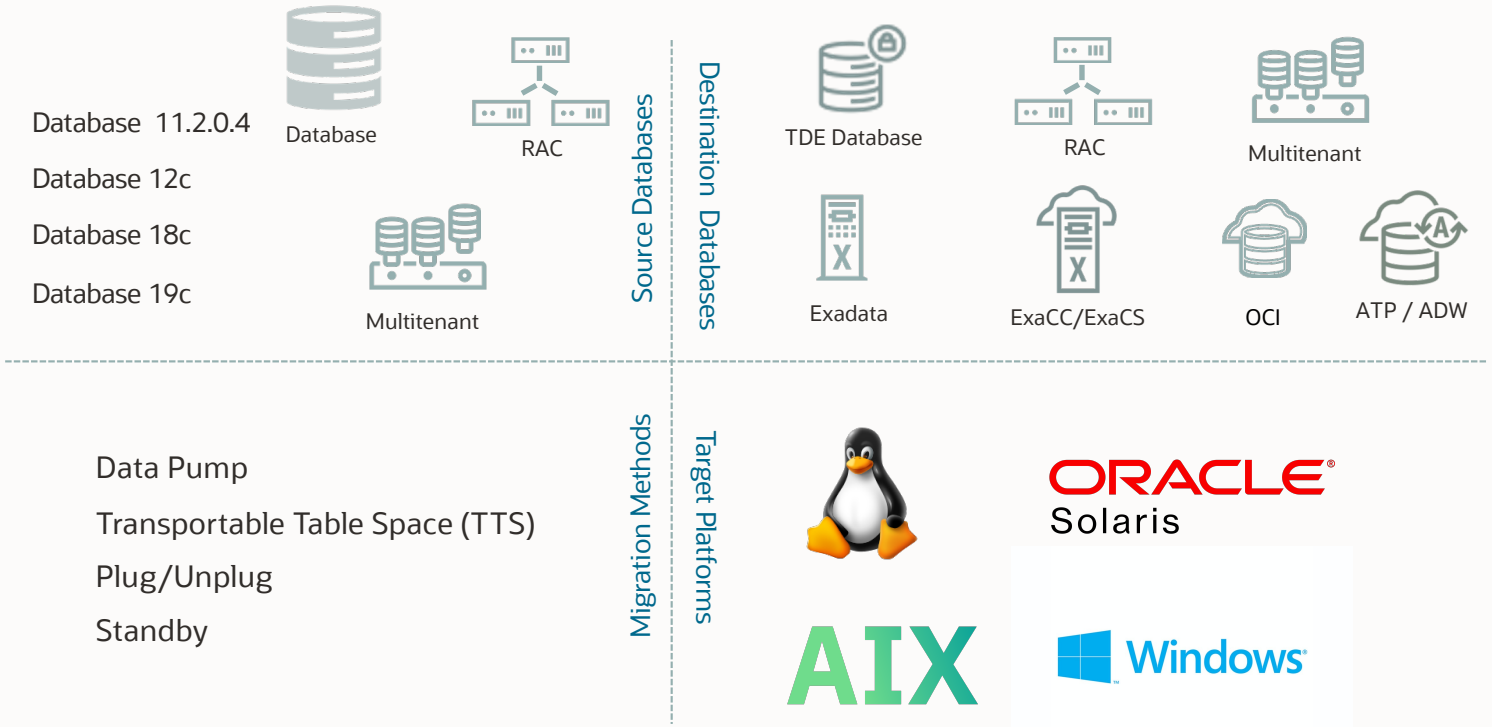
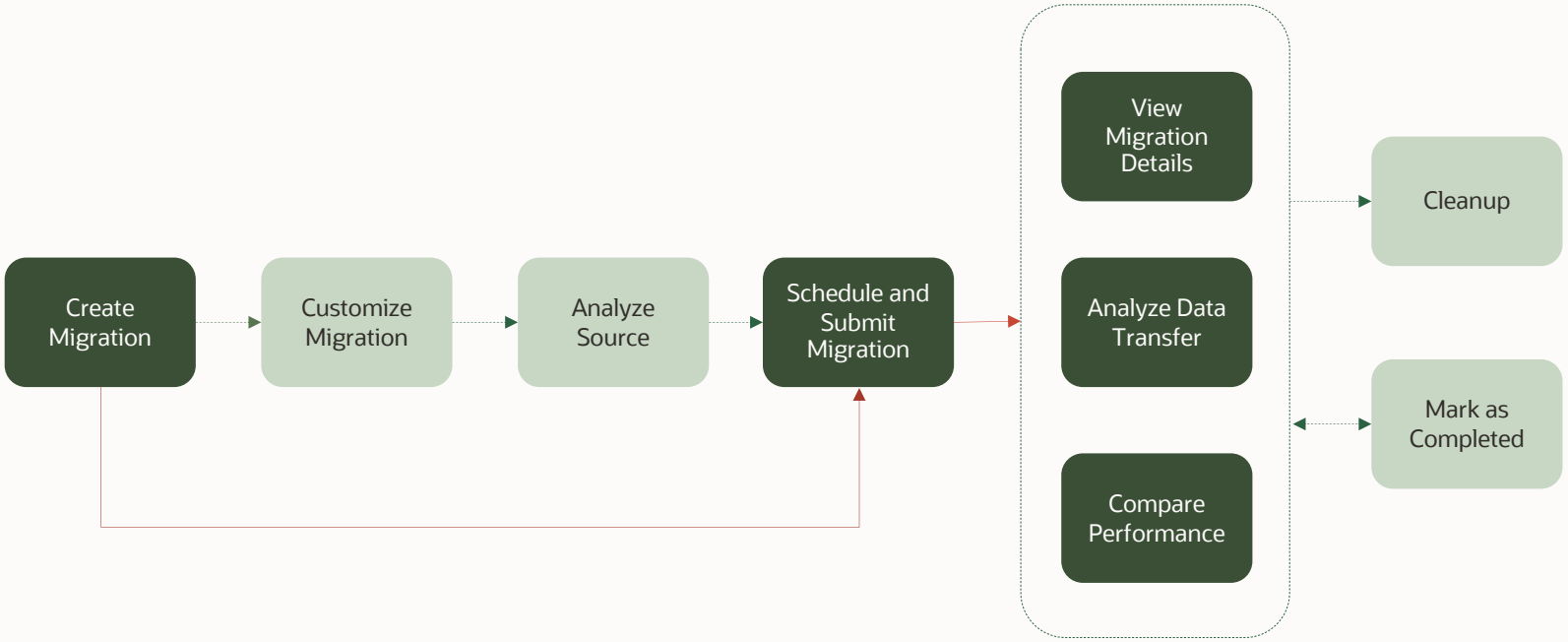
# Migration Workbench Landscape



# Complete Migration Process with Database Migration Workbench





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# Migrate your databases in 3 easy steps

## Plan

**Identify databases to migrate**

Unified guided wizard for all migrations

Analyze database schema before migration

## Migrate

**Customize, Schedule, Rollback**

Pause, resume and monitor progress

Integration with 3rd party tools using APIs

## Analyze

**Optimize for desired performance**

Post Migration Analyzer

Post Migration Performance Analysis with SPA


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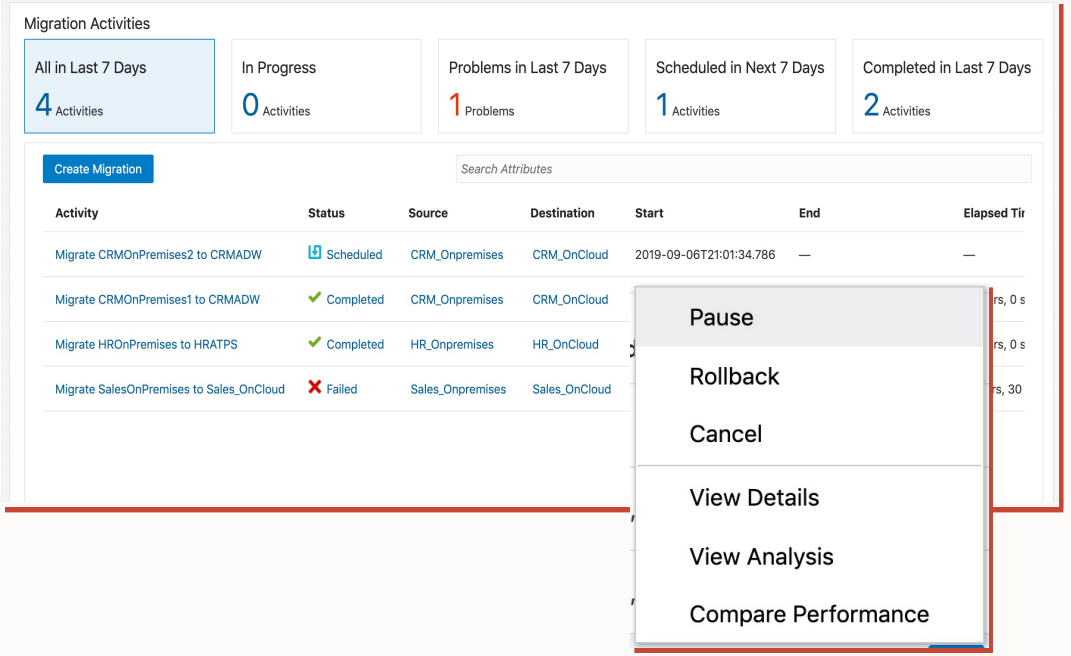
Plan

# Database Migration Workbench

## Launchpad for guided migration

- Single workbench that integrates all needs for migration – sizing, performance comparison
- Track migration in real-time
  - Currently in progress
  - Done in last 24 hours, 7 days or all
- Customizable migration workflows
  - Custom pre and post scripts
  - Export and Import options
  - Compare performance after migration
- Pause, Rollback or Cancel the entire workflow





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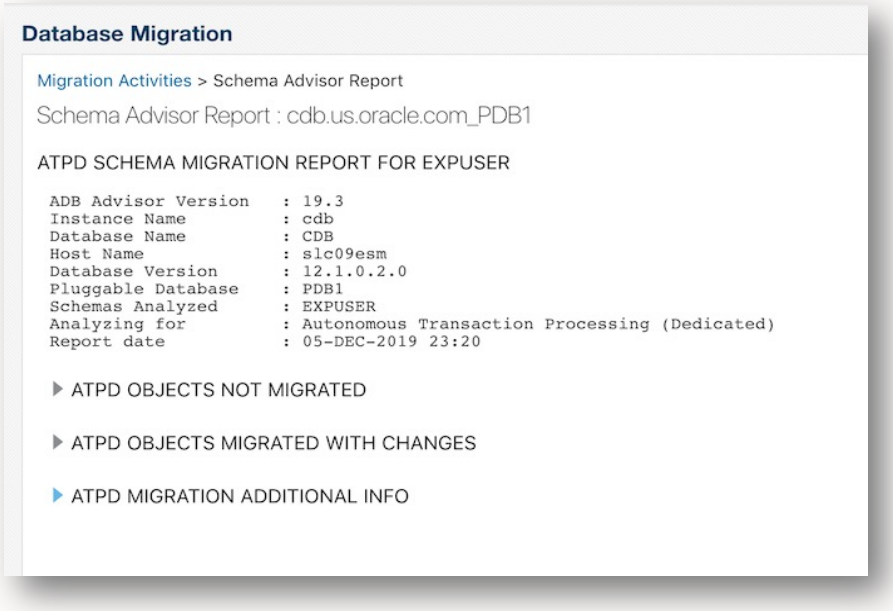
Plan

# Pre-Migration Advisor Tool

Runs on existing schema and generates a summary of migration status including

- Objects that cannot migrate due to lockdowns or restrictions on certain data types.
- Oracle Database Options that do not apply on destination database
- Objects that will migrate with certain corrective actions
- List of automated corrective actions





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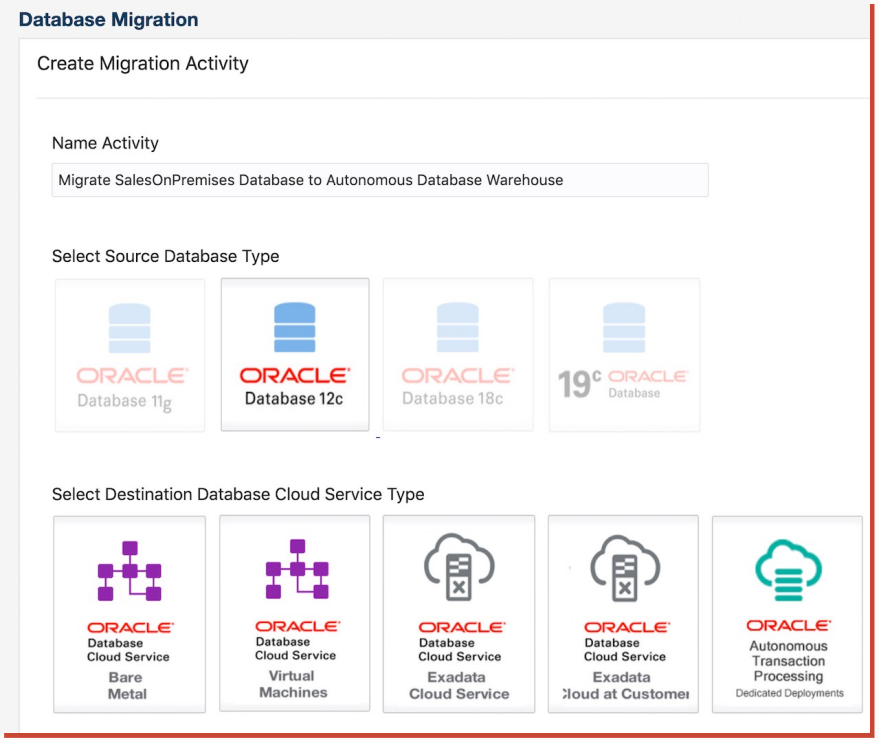
Migrate

# Migration Workbench Landscape

## Unified experience for all migration scenarios




- Autonomous Databases
  *Data Pump*
- Exadata Cloud @ Customer
  *Data Pump, RMAN, nZDT*
- Exadata Cloud Service
  *Data Pump, RMAN, nZDT*
- Databases running on VM and BM
  *Data Pump, RMAN, nZDT, Continuous Refresh*
- Databases running on OCI Compute
  *Data Pump, RMAN, nZDT, Continuous Refresh*
- Databases within own Data Center
  *Data Pump, RMAN, nZDT, Continuous Refresh*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Migrate

# Database Migration Workbench

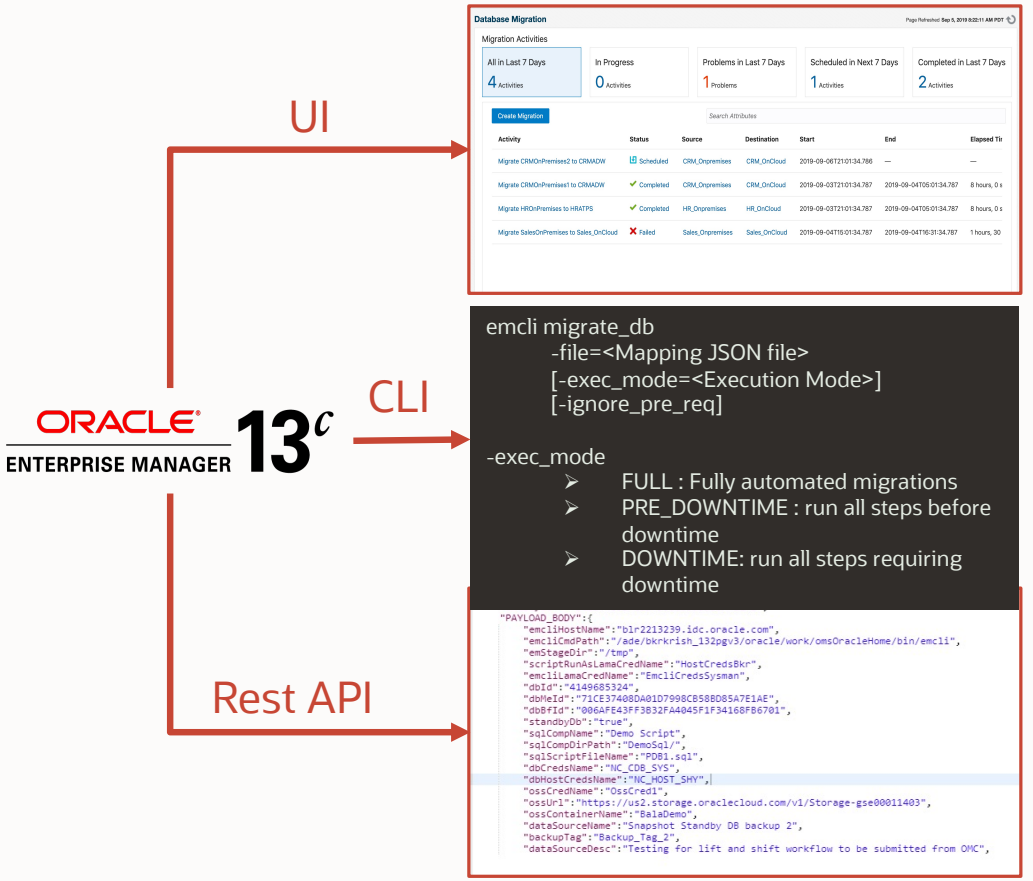
## Choice of tools

Functionality available via

- User Interface
- Command Line Interface
- Rest API

Complete control of DevOps

Integrate with Enterprise Automation Standards





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Migrate

# Minimum Downtime Migration

Online migration to minimize downtime of source database

- Minimizes downtime of source Database
- Online Migration using **Oracle Data Guard Standby**
- Best practices for MAA
- Create a standby database on Oracle Cloud
- Only downtime required during switch-over from primary to standby
- Options to run manual or fully automated migration using EMCLI

*emcli migrate_db*

*-file=<Mapping JSON file>*

*[-exec_mode=<Execution Mode>]*

*[-ignore_pre_req]*

*-exec_mode*

- FULL : Fully automated migrations
- PRE_DOWNTIME : run all steps before downtime
- DOWNTIME : run all steps requiring downtime


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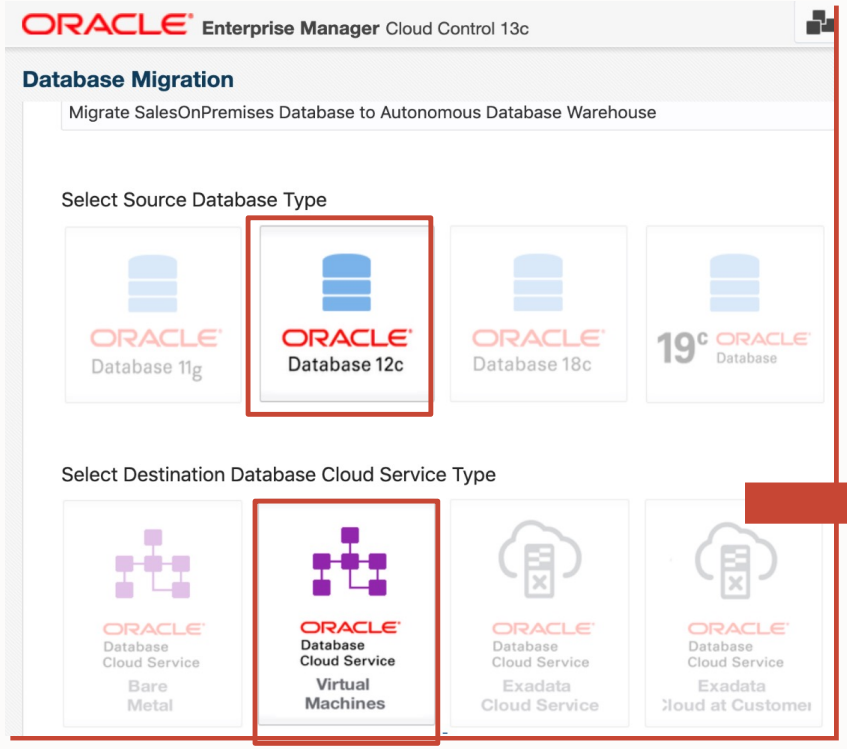
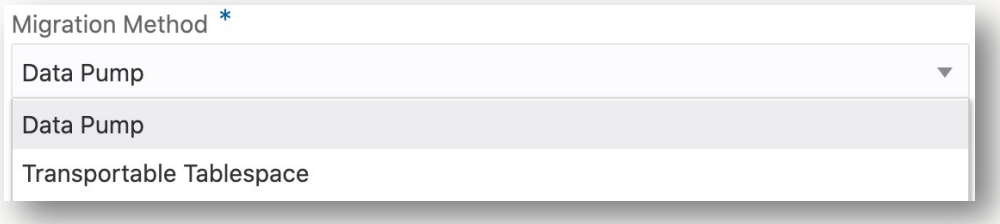
Migrate

# Migration Options for all configurations

Automatic recommendations for applicable migration methods




- Single workbench integrating all migration methods.
- Automatic recommendations for suitable migration methods.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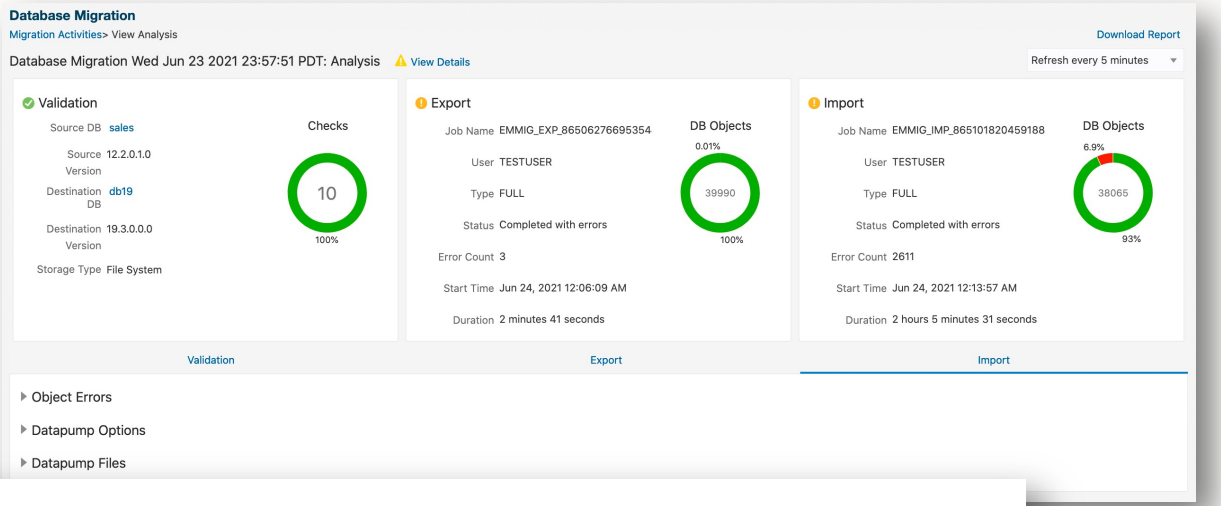
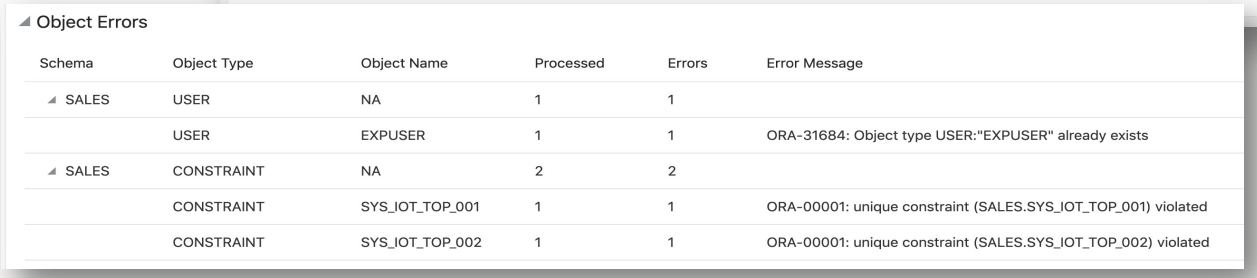
Analyze

# Analyze Migration Workflow

Identify and remediate failures efficiently

- Step-by-step analysis of migration
- Drill-down at the object level migration
- What objects succeeds or fail
- Deep insights and reasoning for failed objects



Object Errors

| Schema | Object Type | Object Name | Processed | Errors | Error Message |
|---|---|---|---|---|---|
| SALES | USER | NA | 1 | 1 | |
| | USER | EXPUSER | 1 | 1 | ORA-31684: Object type USER:"EXPUSER" already exists |
| SALES | CONSTRAINT | NA | 2 | 2 | |
| | CONSTRAINT | SYS_IOT_TOP_001 | 1 | 1 | ORA-00001: unique constraint (SALES.SYS_IOT_TOP_001) violated |
| | CONSTRAINT | SYS_IOT_TOP_002 | 1 | 1 | ORA-00001: unique constraint (SALES.SYS_IOT_TOP_002) violated |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# Performance Comparison

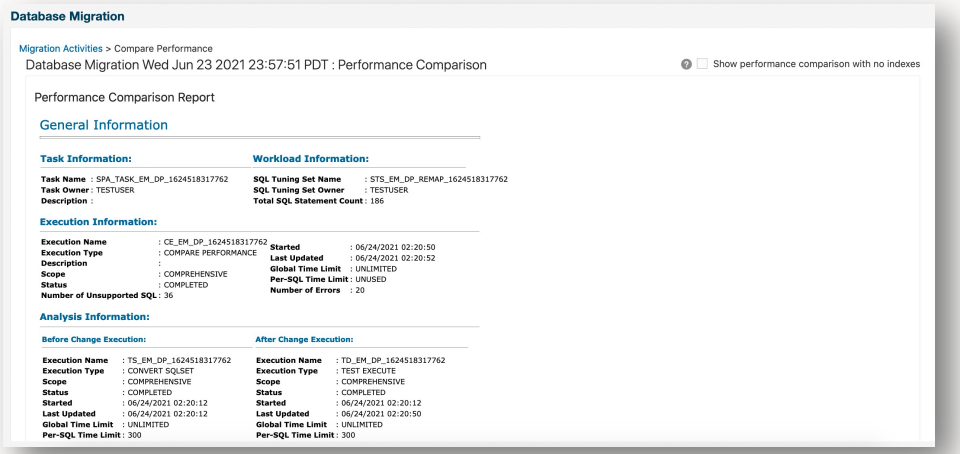
## Comparison using SQL Performance Analyzer

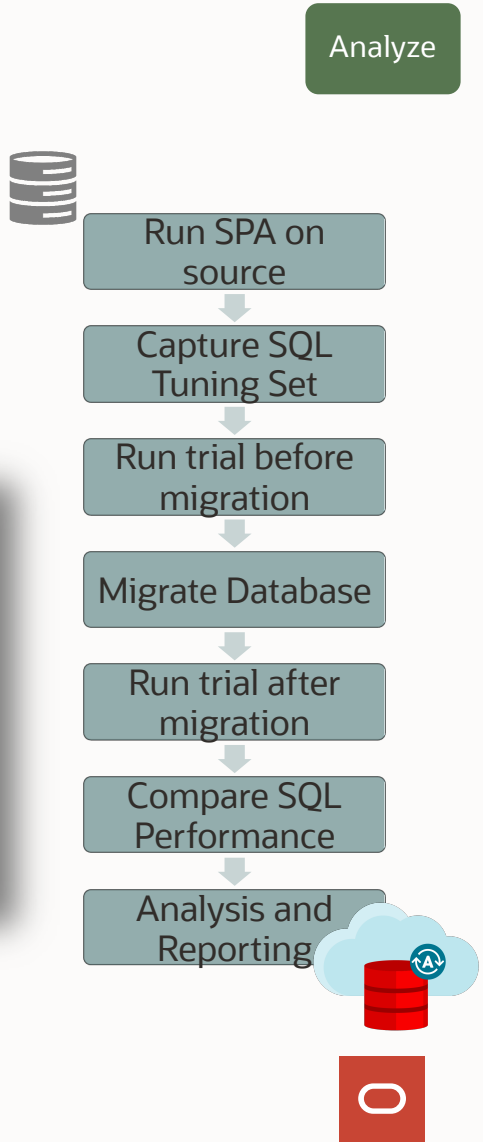
Compare SQL performance before and after migration

Based on historic transactional data, analyze potential impact on application

Comparison based on

- Elapsed Time
- CPU Time
- User I/O Time
- Buffer Gets
- Physical I/O
- Optimizer Cost
- I/O Interconnect Bytes





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Analyze

# Performance Comparison

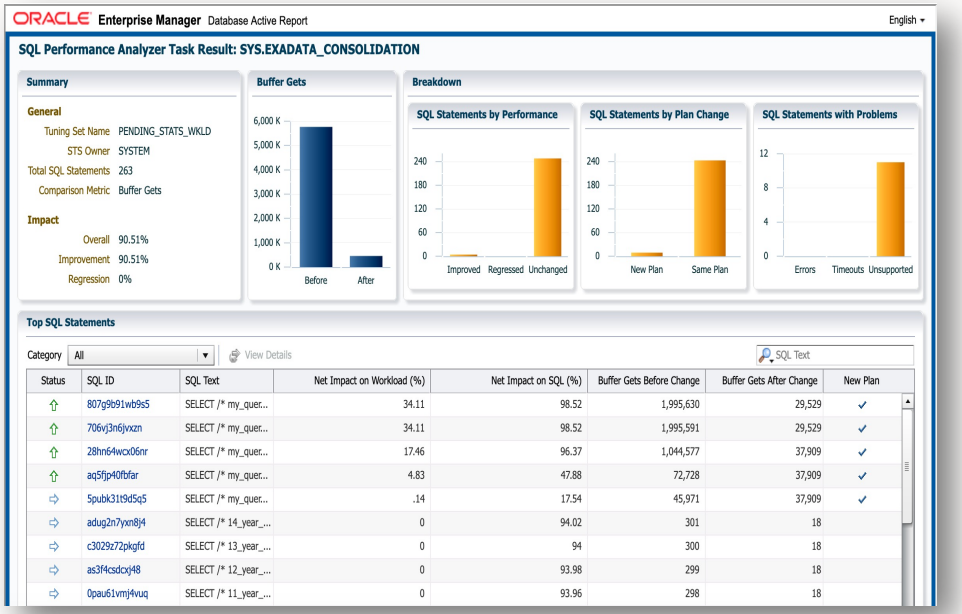
Simple and flexible

## DevOps

- Out-of-Box Solution
- No preparation required
- Simple and automatic

## Production

- User need to enable STS before start of migration
- This STS used to compare performance after migration
- Accurate and flexible





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# On-Premises to Cloud


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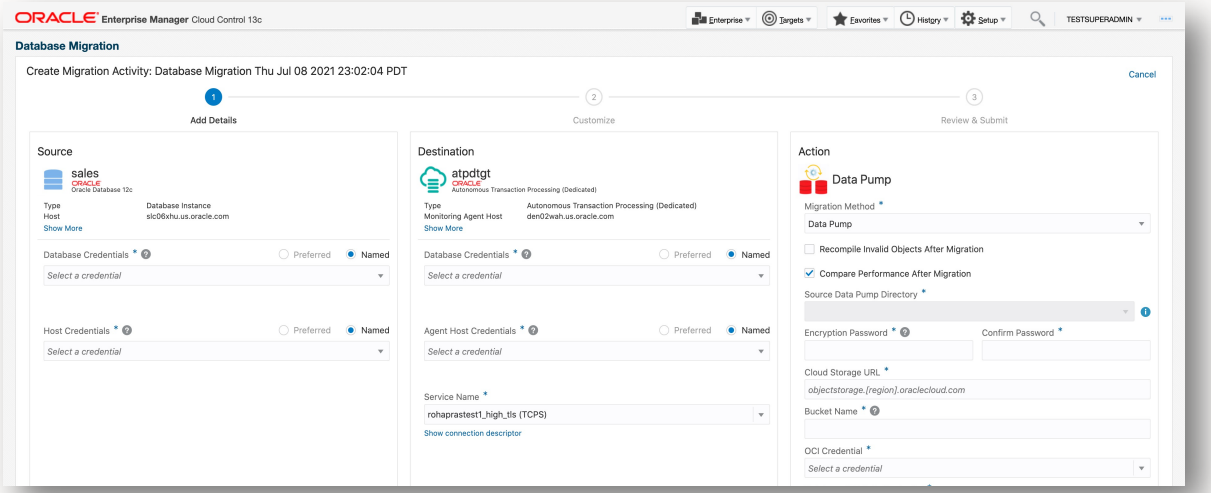
# On-Premises to Autonomous Migration

- Simplifies the migration of on-premises databases to Oracle Cloud Infrastructure with unified guided workflow
- Expedites the migration process by automating end-to-end workflow
- Reduces downtime by providing real-time progress of the migration
- Improves the accuracy of migrations by providing an automatic comparison of performance before and after migration





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# On-Premises to New Destinations

On-Premises, Exadata, ExaCC, ExaCS, DBCS (Bare Metal, VM)


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# Migration Destinations and Methods

Migration destinations

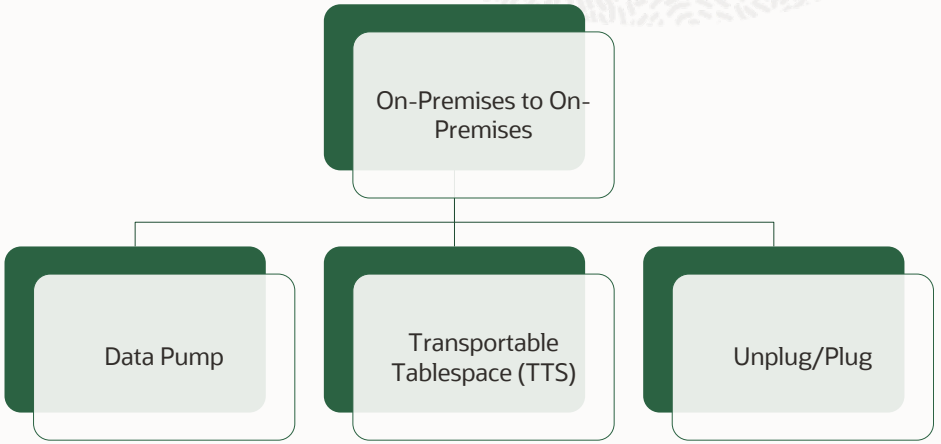
- On-Premises to On-Premises
- ExaCC, ExaCS
- DBCS - Bare Metal, VM

Multiple methods to support migration from On-Premises to On-Premises

- Data Pump
- Transportable Tablespace (TTS)
- Unplug/Plug

Various database configuration support – Single Instance, RAC and PDB

UI and EMCLI based migrations to integrate with existing workflows





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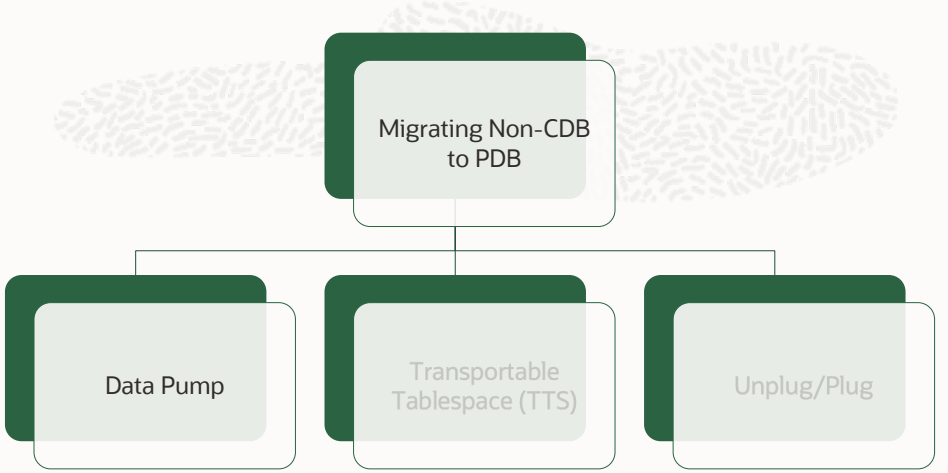
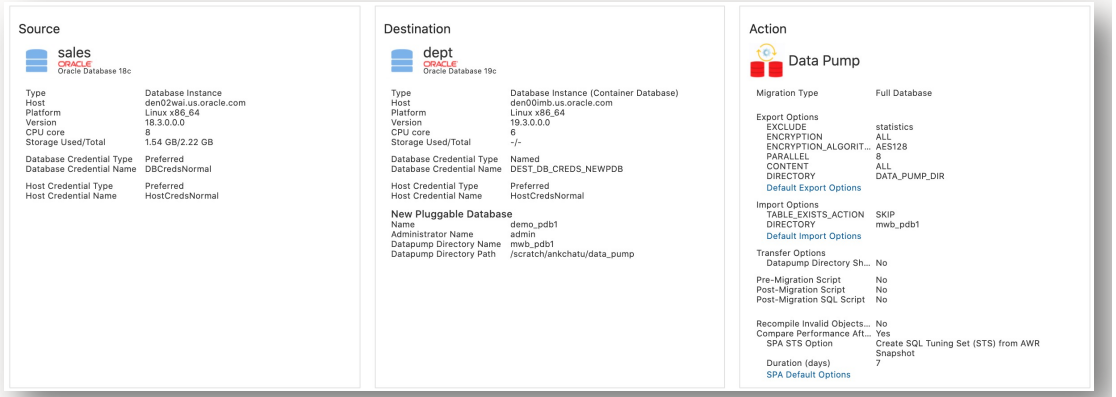
# Migration to Multitenant

- Data Pump Export/Import
- Supported DB Versions – 11.2.0.4 and above
- Benefits:
  - Schema based or Full Database
  - Cross Platform
  - Different Character Set compatibility
- Recommended for smaller databases
- Post migration report to check migration status





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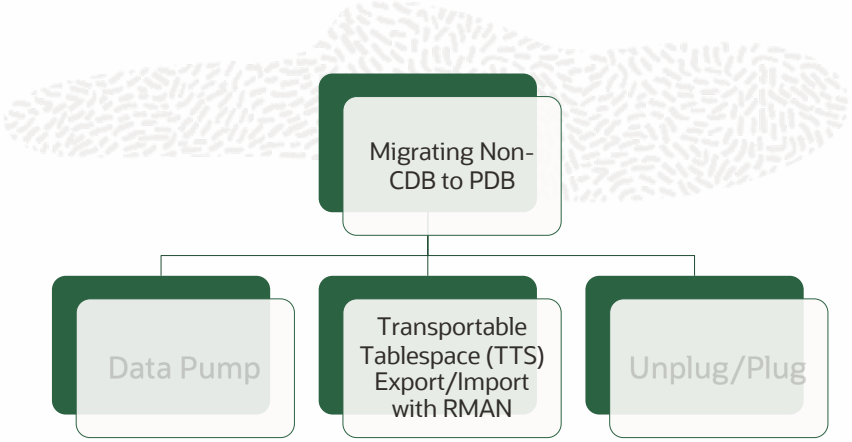
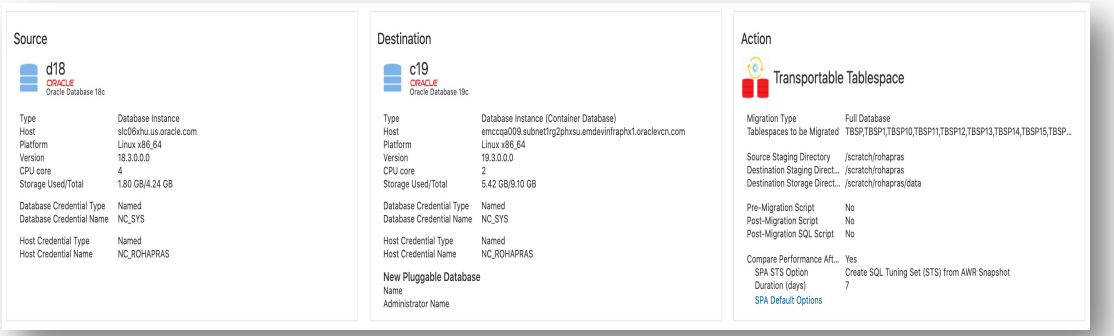
# Migration to Multitenant

- Transportable Tablespace (TTS) with incremental RMAN backups to minimize downtime
- Supported DB Versions – 11.2.0.4 and above
- Benefits:
  - Schema based or Full Database
  - Cross Platform
  - Compatible Character Set
  - Minimal Downtime
- Recommended for larger databases
- Post migration report to check migration status





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# Why customers are choosing Enterprise Manager Migration Workbench

**One Tool for all Migrations**

Unified migration experience for all types of migrations

**Variety of Migration Targets**

On-Premises, Exadata, DBCS (ExaCC/ExaCS, BM, VM) and Autonomous Database

**Integrated Performance Analyzer**

Insights on performance comparison before and after migration using proven technologies like SPA


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# Demo


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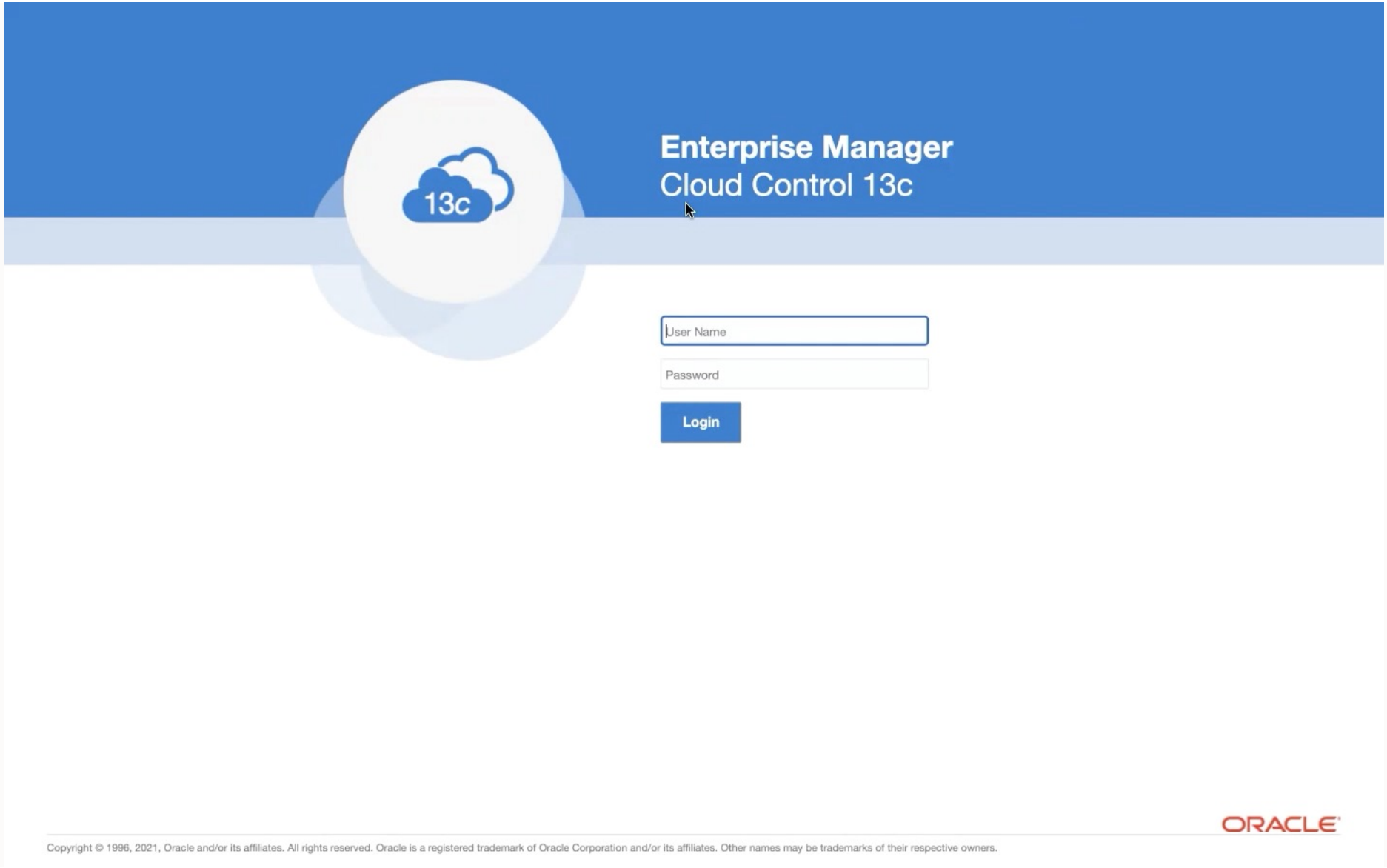


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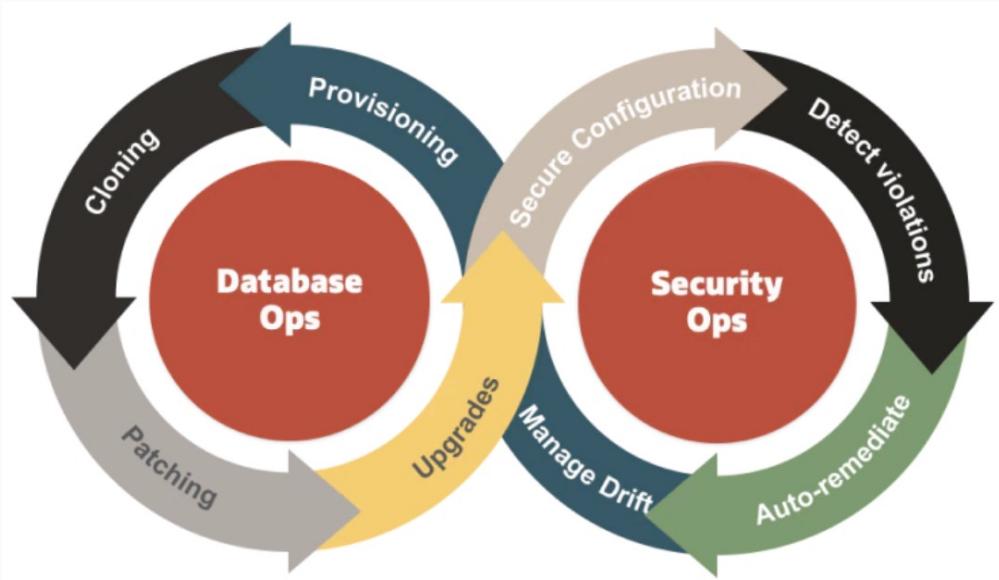
# What Questions Do You Want The Answers To?




Documentation:
EM 13.5 DB Lifecycle Management
>> Go to Database Migration

Webcasts/Workshops:
Enterprise Manager Deep Dives

Where can I find the slides, replay, resources?
Blogs.oracle.com/manageability …

Demonstration migrating to Autonomous Database [Youtube]

Product Information:
oracle.com/enterprise-manager/#rc30p2
>> Go to Database Ops Automation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