ORACLE MIGRATIONS MADE EASY

Webinar - May 18, 2022

Intro & Poll Questions A & B

AGENDA

Oracle Migrations Made Easy

- Why migrate applications from Oracle to Postgres with EDB?
- What are some factors to consider when migrating?
- How EDB makes migrations easier?
- How EDB supports your Postgres applications?

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LEAVING ORACLE

WHY LEAVE ORACLE?

- Price
- Business practices
- Deployment flexibility
- Agility and Innovation
- Consolidation

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WHAT OBSTACLES EXIST?

- Migrations can be hard
- Oracle skills
- Troublesome contracts
- Applications designed for Oracle

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MOVING TO POSTGRES

ORGANIZATIONS ARE MOVING TO POSTGRES

The Standard

Postgres is the database of choice

#1 Fastest growing DBMS

#1 Largest developer community

#1 Most loved database by developers

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FORWARD-THINKING ORGANIZATIONS ARE SPRINTING AHEAD

The race is on to power more enterprise applications with Postgres

migrating legacy | building new applications

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Postgres is the **economic game changer**

- Databases are the #1 software spend in IT
- Every enterprise application powered by Postgres frees up significant IT budget

LOWER DBMS LICENSE COSTS IMPROVES THE BOTTOM LINE AND ENABLES INNOVATION

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MODERN APPLICATIONS MODERN DATABASES

The Postgres technology and community are **uniquely suited** for powering modern enterprise applications

Range of Applications and Use Cases
System of record, support for modern data types

Unbeatable Tech Foundation
Performance, reliability, enterprise scale, security

Better Software, Faster
Continuous pulse of innovation, power of the crowd

Large Talent Pool
Vibrant open source development community

More Freedom
Unencumbered by lock-in, more vendor options

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THE WAY FORWARD

Making the move to Postgres easier

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The heartbeat of Postgres

75% of F500 Postgres customers

Most strategic usage

30% of Postgres code contributed

Source of innovation

1400+ Global customers

Customer requirements influencing the future direction of Postgres

>300 Dedicated Postgres engineers

Unparalleled expertise

3 of 7 Postgres Core Team Members

Central source of community influence and expertise

Delivering the Postgres you need for a migration from Oracle

Enterprise-Grade DBMS Capabilities

Databases and tools to power your enterprise apps

- Extreme high availability
- High performance at scale
- Advanced security
- Migration automation

Flexible Deployment Choice

Deploy Postgres anywhere

- multi-cloud, on prem, hybrid
- Containers, VM's

Expertise

Accelerate your Postgres deployment & Keep it running well

- Hire the best Postgres expertise
- Proven best practices

KNOWLEDGE AND EXPERTISE TO HELP REDUCE COSTS AND MITIGATE RISKS

24x7 support for any PostgreSQL deployment at any scale

Comprehensive migration tools and services

Deep compatibility with Oracle database

HOW WE DO IT

FACTORS TO CONSIDER WHEN MIGRATING

Schemas

- Objects and code
- Mapping data types
- Handling syntax differences
- Raising incompatibilities

Data

- Methodology: Bulk, ongoing, fallback
- Tools: ETL, validation

Infrastructure

- Hosting (cloud, on-prem, DBaaS)
- Deployment (VM, k8s)
- DBMS Optimization
- HA Requirements
- Security and Encryption

Application

- Code
- Languages
- Connectors
- Syntax
- Performance
- Optimization
- Indexing

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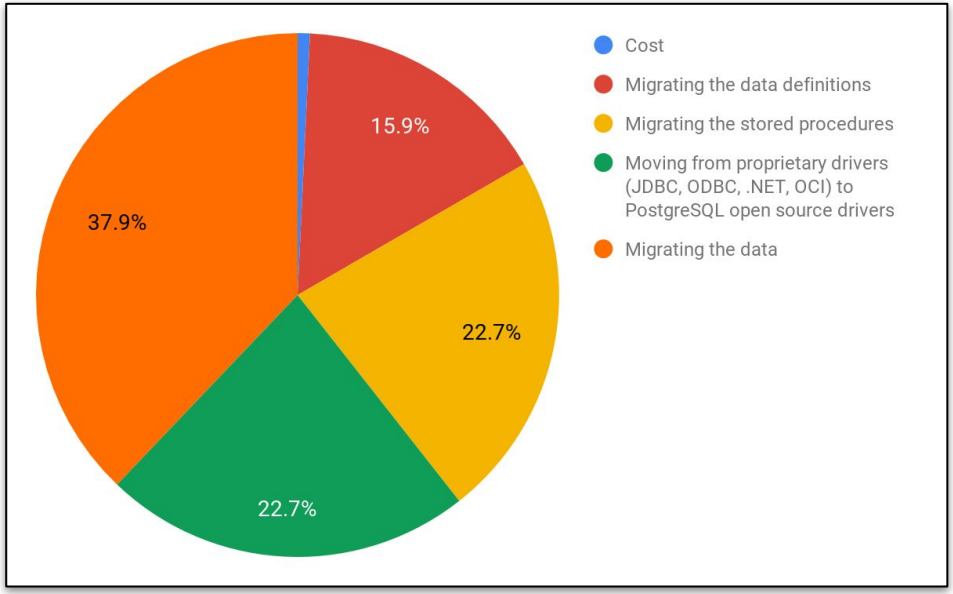
SURVEY: What is your biggest obstacle when migrating Oracle databases to Postgres?

EDB's cost, migration capabilities, and Oracle compatibility address all of these obstacles



Source: EDB Downloader Survey July 2020 (1,500 respondents)

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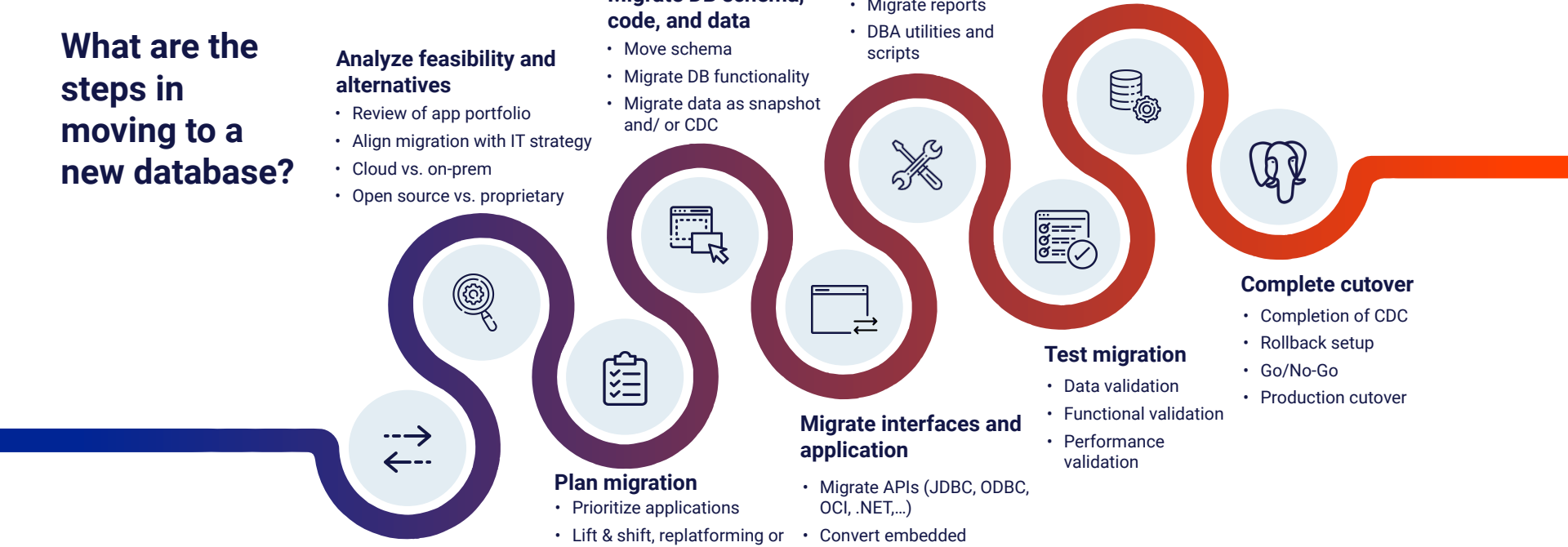
ORACLE APPLICATION DATABASE MIGRATION JOURNEY

What are the steps in moving to a new database?



Decide to migrate
- Business case
- Organizational alignment

Analyze feasibility and alternatives
- Review of app portfolio
- Align migration with IT strategy
- Cloud vs. on-prem
- Open source vs. proprietary

Plan migration
- Prioritize applications
- Lift & shift, replatforming or restructuring?
- Define non-functional requirements
- High-level solution design
- Estimate efforts

Migrate DB schema, code, and data
- Move schema
- Migrate DB functionality
- Migrate data as snapshot and/ or CDC

Migrate interfaces and application
- Migrate APIs (JDBC, ODBC, OCI, .NET,…)
- Convert embedded application SQL
- Migrate applications

Migrate reports and management tools
- Migrate reports
- DBA utilities and scripts

Test migration
- Data validation
- Functional validation
- Performance validation

Optimize and configure post migration system
- Database tuning
- Query tuning
- Application tuning
- Address HA, DR, security, authentication/ authorization reqs

Complete cutover
- Completion of CDC
- Rollback setup
- Go/No-Go
- Production cutover

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EDB COMPATIBILITY WITH ORACLE DATABASE

SCHEMA

DATA

CODE

API

TOOLS

Part of the way
SCHEMA AND DATA ONLY

Most of the way
SCHEMA, DATA AND CODE

Almost there
SCHEMA, DATA, CODE AND INTERFACE

All the way
SCHEMA, DATA, CODE, INTERFACE AND OPERATIONAL TOOLS

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ROBUST COMPATIBILITY WITH ORACLE

EDB Postgres Advanced Server's compatibility is wide and deep

- What are the areas of compatibility?
  - Oracle specific and syntax compatible database object types
  - Oracle specific data types
  - Oracle PL/SQL support as a built-in native procedural language
  - Oracle-like data dictionary views (i.e., ALL_, DBA_, USER_ views)
  - Oracle-like built in PL/SQL packages
  - Oracle-like database drivers
  - Oracle work-alike tools for DBAs
- What are the benefits of compatibility?
  - Significantly reduces the amount of time and effort required for a migration from Oracle
    - More schema, SQL, and code can run in Postgres without modification
    - Less schema, SQL, and code needs to be converted or rewritten
  - Eases the transition from Oracle to Postgres for Oracle DBAs and developers
    - Familiar database and application constructs and tools available to DBAs and developers

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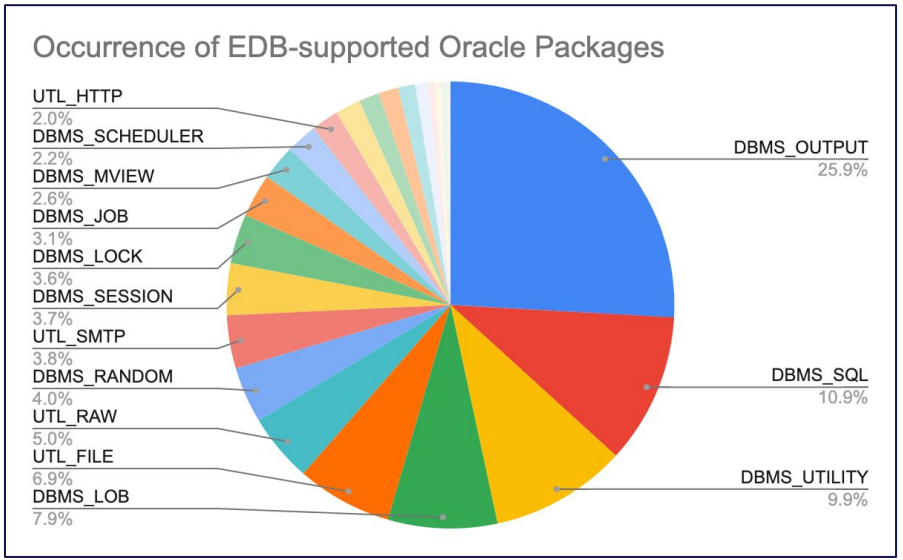
MIGRATION PORTAL COMPATIBILITY OBSERVATIONS (2021)

Practical findings

- Based on over 18 million DDL constructs analyzed since January, 2019
- 14% of all schemas had at least one reference to PRAGMA AUTONOMOUS_TRANSACTION
- 14% of all schemas had at least one HINT
- 32% of all schemas referred to at least one of the EDB supported Oracle packages



EDB's Oracle compatibility addresses practical challenges in Oracle migration

EDB POSTGRES ADVANCED SERVER

Benefits of compatibility

Your business

Lower costs and reduce risks

Your people

Leverage the existing skills of your Oracle DBAs and developers

Your apps

Leverage existing infrastructure with native PL/SQL support and OCI interoperability

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Poll Question C

EDB POSTGRES ADVANCED SERVER DEPLOYMENT OPTIONS

Migrate your database to where your business needs it

On-premises

Physical Servers
VMs
Kubernetes / Containers
Private Cloud

Kubernetes / Containers

Public Cloud - IaaS

Public Cloud - DBaaS

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Powered by EDB

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HOW CAN EDB HELP IN THE CLOUD?

BigAnimal, EDB's fully managed cloud offering on Amazon AWS & Microsoft Azure

Postgres Expertise

EDB's expertise goes above the infrastructure; we help steer the database roadmap and patch its bugs

Oracle Compatibility

Leave Oracle and further your cloud journey with a fully managed Postgres service

Continuous Availability

High availability of your PostgreSQL clusters so you're always on, always available

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FOUR ELEMENTS OF A SUCCESSFUL MIGRATION STRATEGY

Assessment

Analyze feasibility; plan, scope, prioritize, commit

Database Migration

Migrate schema, code, and data, and validate

Application Migration

Finish the migration: apps, reports, performance

Professional Services

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MIGRATION TOOLS AND SERVICES

Migration Portal

Free, web-based tool

Assess Oracle schema compatibility

Converts Oracle objects to EDB Postgres Advanced Server

Migration Toolkit

Command line tool

Granular control schema and data migration

From Oracle to EDB Postgres Advanced Server

Replication Server

Change data capture for large migrations with minimal downtime

Provides ability to perform replication between Oracle and Postgres

CLI and GUI options for configuring replication

Migration Services

For complex migrations

For organizations that are short-staffed

Helps ensure a smooth transition

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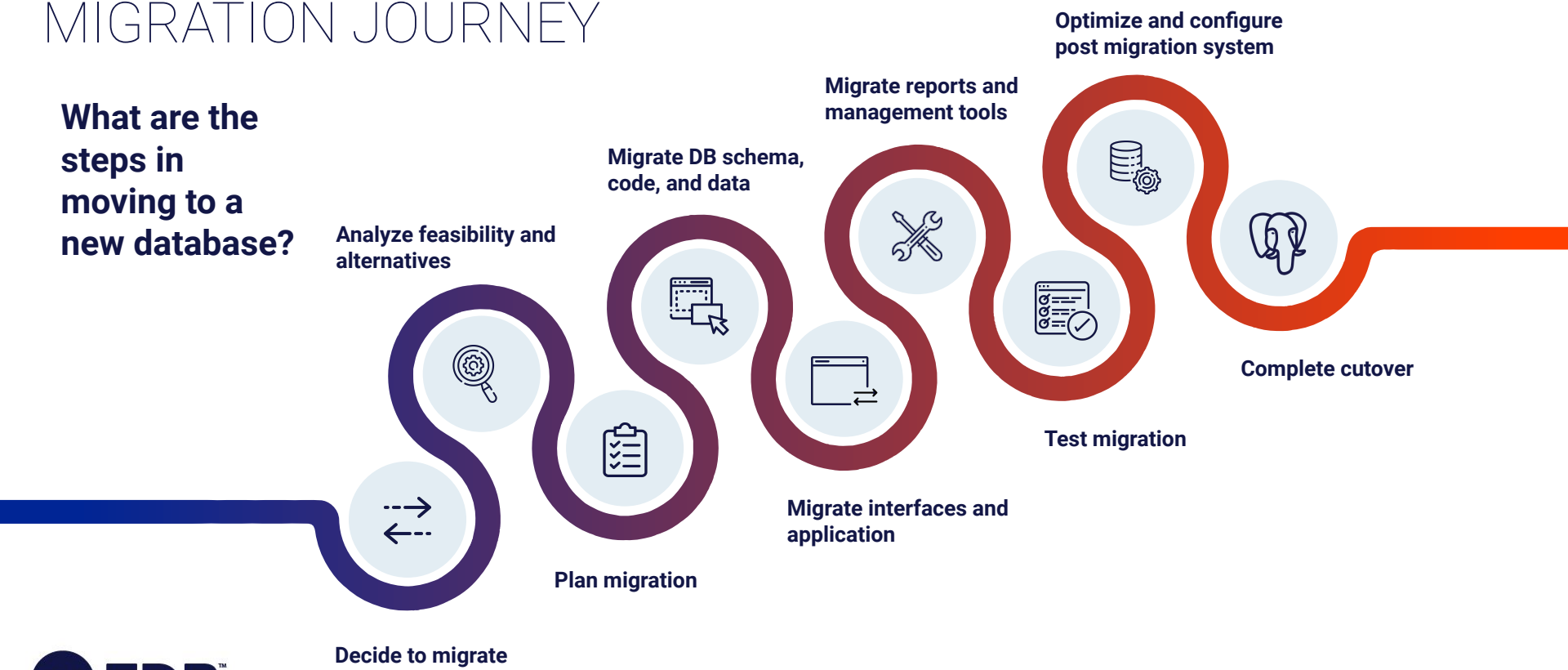
ORACLE APPLICATION DATABASE MIGRATION JOURNEY

What are the steps in moving to a new database?



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EDB TOOLS AND SERVICES FOR THE MIGRATION JOURNEY

Assess Feasibility

- **Migration Portal**
- *Migration Assessment Service*

Plan Migration

- *Migration Assessment Service*
- *Enterprise Architecture Service*
- *Solution Design Service*

Migrate DB Schema, Code, and Data

- EPAS (Oracle Compatible Postgres)
- **Migration Portal**
- **Migration Toolkit**
- **Replication Server**
- Database Links and FDW
- *Quick Deploy Service*
- *Embedded Postgres SME Service*

Migrate Application & Interfaces

- EPAS (Oracle Compatible Postgres)
- **Oracle Compatible Database Connectors**
  - JDBC, ODBC, OCI, .NET
- *Embedded Postgres SME Service*

Migrate Reports & Management Tools

- **EDB*Plus**
- **EDB*Loader**
- *Embedded Postgres SME Service*

Test Migration

- **LiveCompare**
- **Postgres Enterprise Manager (PEM)**
- *Embedded Postgres SME Service*

Optimize & Configure Post Migration System

- **Postgres Enterprise Manager (PEM)**
- **Barman**
- **EDB Failover Manager**
- **EDB Postgres Distributed**
- *Performance Tuning Service*
- *Monitoring Best Practices Service*
- *Backup Best Practices Service*
- *Embedded Postgres SME Service*

Complete Cutover

- **Replication Server**
- **LiveCompare**
- *Embedded Postgres SME Service*

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Bold = Tool | *Italic = Service* | Underlined = Compatibility

ORACLE TO POSTGRES MIGRATION DEMO

What's covered in the demo?

- Reviewing some DDL and SQL constructs in Oracle that can be "tricky" to migrate without compatibility
- Using the Migration Portal to assess Oracle schema DDL, to resolve compatibility issues, and to load the converted schema into an EDB Postgres Advanced Server (EPAS) database
- Using the Migration Toolkit to migrate data from Oracle to the EPAS database
- Using LiveCompare to validate that the data was fully migrated and consistent in both the source and target databases
- Using pgAdmin (or PEM) to review the contents of some of the migrated objects and functionality of migrated views

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EDB PROFESSIONAL SERVICES FOR DATABASE MIGRATIONS TO POSTGRES

Why use EDB Professional services for your migration journey

- Some migrations are more complex than others
- EDB has over 15 years of experience in helping customers with their migrations
- You may not have sufficient resources to perform a migration on your own
- You may not have sufficient PostgreSQL expertise
- You need help in assessing, prioritizing, and planning migrations for a large number of databases in your organization

WHAT IS NEEDED TO SUPPORT THE MIGRATED SYSTEM?

The needs will be similar to the legacy system

- Operational tools and processes to support
  - Monitoring and management
  - Backup and Recovery
  - High availability
  - Security and Auditing
  - Reporting
- Periodic minor version updates and possible major version upgrades
- Trained administrators and users

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ORACLE AND EDB OPERATIONAL TOOLS MATRIX

Required Operational Capability	Oracle	Postgres On-Premises and IaaS	Postgres BigAnimal
Monitoring and Management	Oracle Enterprise Manager	PEM | pgAdmin	PEM | pgAdmin Cloud Provided Tools
Backup and Recovery	RMAN	Barman | pgBackRest	provided by EDB Cloud managed service
High Availability (4-9s)	Active Data Guard	EDB Failover Manager (EFM) repmgr	provided by EDB Cloud managed service
High Availability (5-9s)	Real Application Clusters	EDB Postgres Distributed	EDB Postgres Distributed [H2 2022]
Advanced Replication: Bi-Directional Replication	Golden Gate	EDB Postgres Distributed Replication Server	EDB Postgres Distributed [H2 2022] Replication Server (as pub/sub DB)
Advanced Replication: Geo-distributed Replication	Golden Gate	EDB Postgres Distributed Replication Server	EDB Postgres Distributed [Early 2023] Replication Server (as pub/sub DB)
Advanced Replication: Heterogeneous Replication	Golden Gate	Replication Server	Replication Server (as pub/sub DB)
Cross Database Data Comparison	Golden Gate VeriData	Live Compare	Live Compare
Auditing	Oracle Auditing	EDB Audit [EPAS] pgAudit [PostgreSQL]	EDB Audit [EPAS] pgAudit [PostgreSQL]
Geospatial Data	Oracle Spatial	PostGIS	PostGIS [TBD]

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WHAT ARE SOME MIGRATION BEST PRACTICES?

- Don’t skip or skim over steps in the migration journey
  - Do the planning
  - Identify and understand the functional and non-functional requirements
  - Complete the solution design early to understand IT resource needs
- Use dev and test environments to identify and resolve migration issues prior to migration in production environment
- Get application developers and system administrators involved early in the migration journey to work with the database team
- Set up an environment where the application can be tested with the database in a manner that closely approximates the production environment and usage
- Defer loading indexes and constraints until after migrating the data
- Engage the assistance of migration experts and PostgreSQL experts for more complex migrations
- Ensure operations personnel are trained prior to post-migration operations

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RECOMMENDED NEXT STEPS

- Schedule a Lunch and Learn
  - Contact EDB to schedule a deep dive on your project needs and EDB compatibility with Oracle
- Do a Migration Assessment
  - Try the Migration Portal!
  - Migration Discovery exercise with EDB
- Review the Migration Overview Handbook
  - Discusses
    - Migration considerations
    - Migration journey
    - EDB tools
    - Compatibility with Oracle

THANK YOU

(We look forward to talking to you more)

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