

Break Free from Oracle:

*Proven strategies for
migrating databases to
Postgres*

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Agenda

Break Free from Oracle:
*Proven strategies for migrating
databases to Postgres*

1. Why leave Oracle database
2. Why PostgreSQL
3. Why EDB
4. How we do it
5. How we support operations
6. Next steps



Poll questions (A) & (B)



Why leave the Oracle database



Price

Oracle's high cost
Restrictive and complicated contracts



Agility

70% of new apps use open source
Adopt modern software architectures



Deployment options

Organizations move to any Cloud
Transition to Containers / Cloud Native



Innovation

Oracle software is in maintenance mode
Postgres innovates in many directions



Consolidation

Focus IT spend on fewer platforms
PostgreSQL fits many workloads



Future-proof

PostgreSQL inherently innovates as
the market evolves



What obstacles exist?

Some of the challenges when migrating Oracle databases



Migrations are hard

- Much assessment and effort required
- Across schema, data, and application



Oracle skills

- Businesses have invested Oracle training
- Concern of losing those skills/expertise



Troublesome contracts

- Oracle licenses are complicated
- And audits are disruptive



Apps designed for Oracle

- Oracle-specifics ingrained in the app
- Difficult to migrate one without the other



Why adopt Postgres



Why move to Postgres?

It does everything...



Migration



New App Development



Replatforming to Cloud and Containers



System of Record



System of Analysis



System of Engagement

It works everywhere...



Public Cloud - IaaS



Public Cloud - DBaaS



Private Cloud



Virtual Machines



Bare Metal



Kubernetes



You're not alone

**Here are the top 5 reasons
enterprises leave Oracle
for PostgreSQL**



**Innovation action is
in open source**



**Avoid vendor
lock-in**



**Easier to replatform
to cloud/hybrid**



**Smoother path to
Digital Transformation**



**Significant cost
savings**



Why EDB for breaking free from Oracle



We're the PostgreSQL experts



Key PostgreSQL Contributions

EDB

- Heap Only Tuples (HOT)
- Materialized Views
- Parallel Query
- JIT Compilation
- Serializable Parallel Query

2ndQuadrant

- Hot Standby
- Logical Replication
- Transaction Control in Procedures
- Generated Columns



We have the most PostgreSQL experts

EDB TEAM INCLUDES:

- 300+ PostgreSQL technologists
- 26 PostgreSQL community contributors and committers
- Including founders and leaders like



Michael Stonebraker

“Father of Postgres” and
EDB Advisor



Bruce Momjian

Co-founder, PostgreSQL
Development Corp and
PostgreSQL Core Team



Peter Eisentraut

PostgreSQL Core Team
member



Robert Haas

PostgreSQL Major
Contributor and
Committer



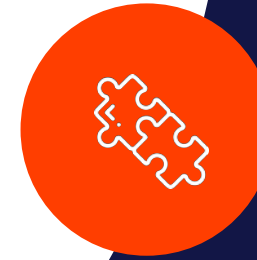
Simon Riggs

PostgreSQL Major
Contributor, Founder of
2ndQuadrant



More than 15 years of experience

Knowledge and expertise to help reduce costs and mitigate risks



Deep compatibility with Oracle database



Comprehensive migration tools and services



24x7 support for any PostgreSQL deployment at any scale



EDB delivers the Postgres you need

Open, flexible, and enterprise-grade



Databases

PostgreSQL and extensions
for enterprise workloads



Tools

Monitoring, management,
scalability, high availability



Deployments

On-prem to the cloud, virtual
machines to Kubernetes



Expertise

24/7 technical support, remote
DBAs, professional services



How we do it



What factors should be considered 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)
- DMBS Optimization
- HA Requirements
- Security and Encryption

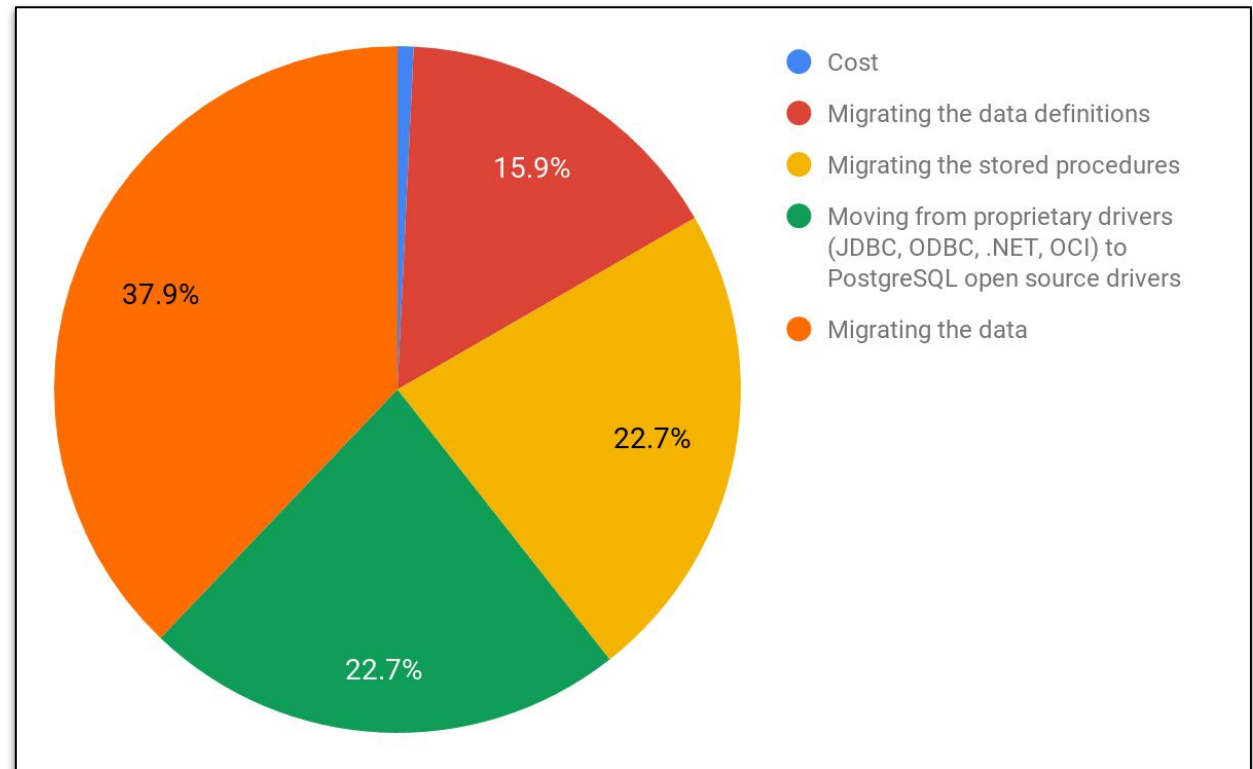


Application

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

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)



Legacy Application Database Migration Journey

What are the steps in moving to a new database?

Analyze feasibility and alternatives

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

Migrate DB schema, code, and data

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

Migrate reports and management tools

- Migrate reports
- DBA utilities and scripts

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

Test migration

- Data validation
- Functional validation
- Performance validation

Migrate interfaces and application

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

Plan migration

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

Decide to migrate

- Business case
- Organizational alignment



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





Robust Compatibility with Oracle

EDB Postgres Advanced Server's compatibility is wide and deep

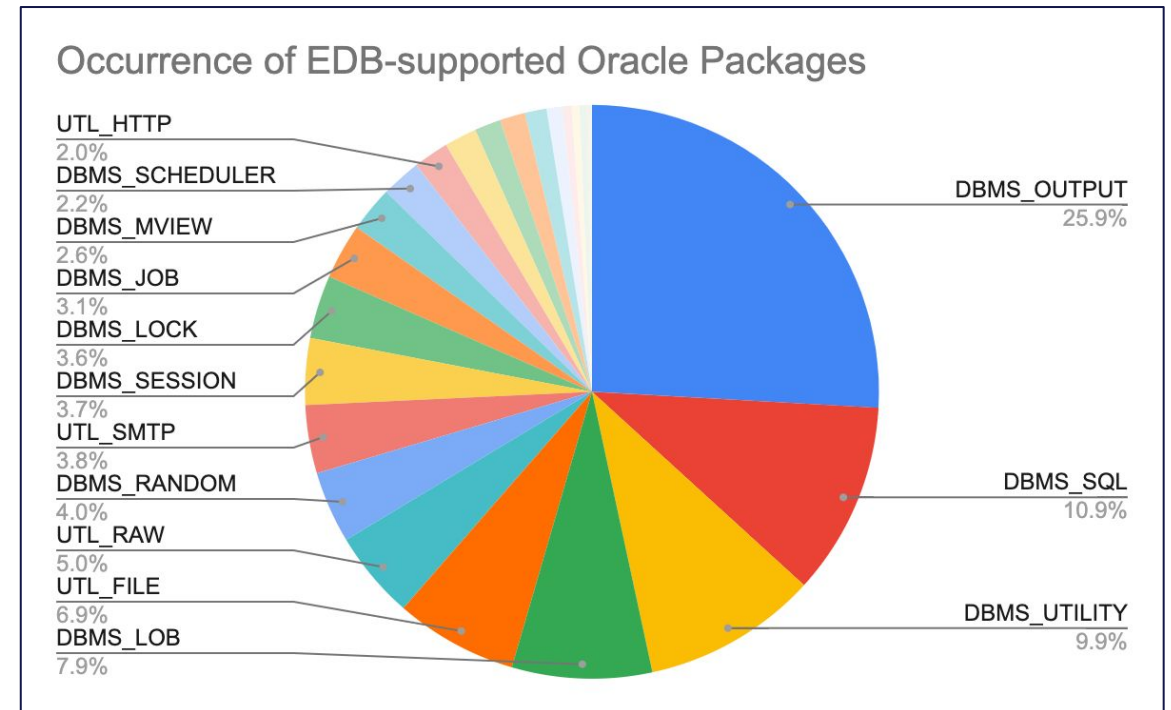
- What are the areas of compatibility?
 - Oracle specific and syntax compatible database object types
 - Oracle specific data types
 - Oracle PL/SQL support as a built-in native procedural language
 - Oracle-like data dictionary views (i.e., ALL_, DBA_, USER_ views)
 - Oracle-like built in PL/SQL packages
 - 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

Migration Portal - 2021 Observations

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

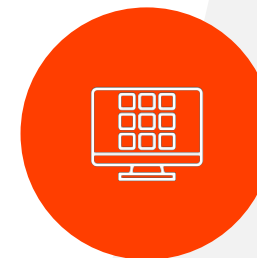
EDB's Oracle compatibility addresses practical challenges in Oracle migration





EDB Postgres Advanced Server

Benefits of compatibility



Your apps

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



Your people

Leverage the existing skills of your Oracle DBAs and developers



Your business

Lower costs and reduce risks



Poll question (C)



EDB Postgres Advanced Server deployment options

Migrate your database to where your business needs it



On-Premises

Physical Servers
VMs
Containers
Private Cloud



Kubernetes / Containers



Public Cloud - IaaS



Public Cloud - DBaaS





How can EDB help in the cloud?



BigAnimal, EDB's fully managed cloud offering on 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



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

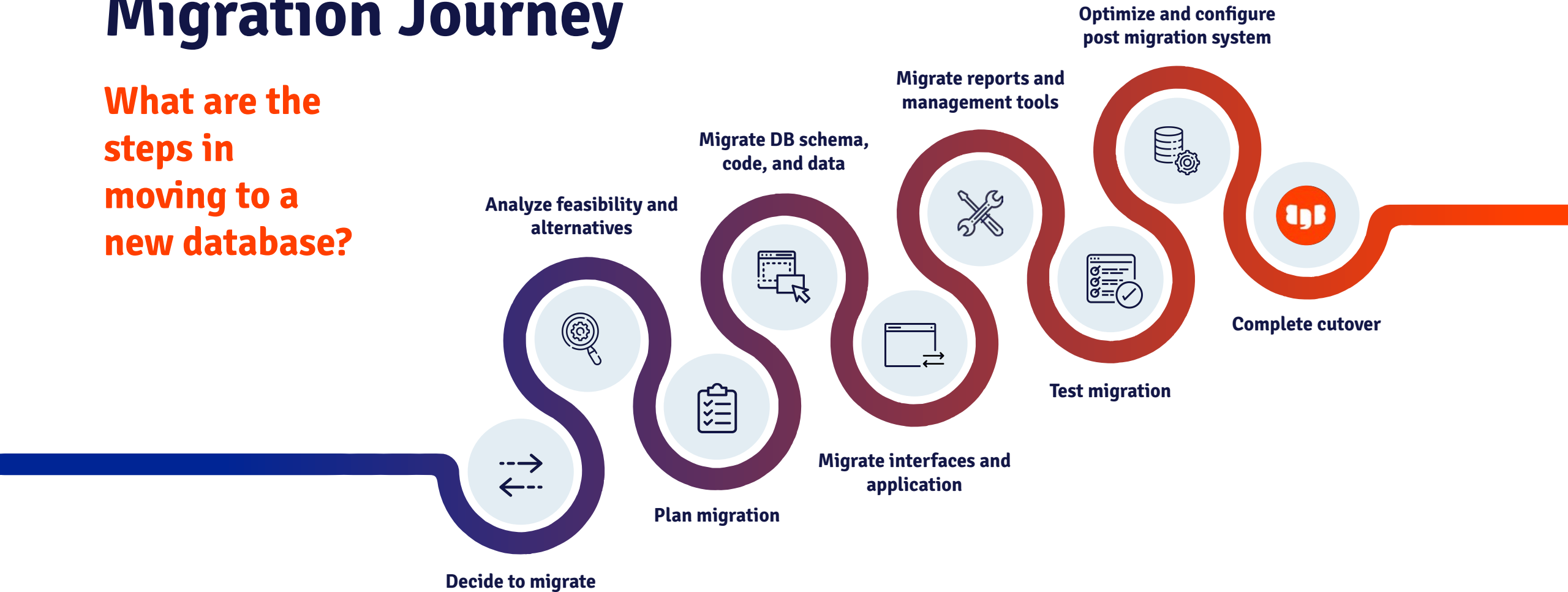
For organizations that are short-staffed

Helps ensure a smooth transition



Legacy Application Database Migration Journey

What are the steps in moving to a new database?





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**
- **Postgres-BDR**
- *Performance Tuning Service*
- *Monitoring Best Practices Service*
- *Backup Best Practices Service*
- *Embedded Postgres SME Service*



Complete Cutover

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

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 PEM to review the contents of some of the migrated objects and functionality of migrated views



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



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 Azure Monitor
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	Postgres-BDR	Postgres-BDR [H1 2022]
Advanced Replication: Bi-Directional Replication	Golden Gate	Postgres-BDR Replication Server	Postgres-BDR [H2 2022] Replication Server (as pub/sub DB)
Advanced Replication: Geo-distributed Replication	Golden Gate	Postgres-BDR Replication Server	Postgres-BDR [H2 2022] 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]



Recommended next steps



Lunch and Learn

- Contact EDB to schedule a deep dive on your project needs and EDB compatibility with Oracle



Migration Assessment

- Try the migration portal!
- Migration Discovery exercise with EDB



Migration Whitepaper

- All the details
- All the process
- All the tools