JPMorganChase

The Migration Blueprint to EDB Postgres

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Speaker Introduction

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Gianni is Vice President at EDB, with 30 years of open-source expertise, contributing to PostgreSQL, BDR, repmgr and TPA.
Lead author of the PostgreSQL Administration Cookbook, he specializes in High Availability and Active-Active replication.

He holds a PhD in Mathematics and formerly led Professional Services at 2ndQuadrant.

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Agenda

Today’s Migration Blueprint Journey

Setting the Stage (5 min.)

- Why EDBPostgres:TheMigrationAccelerator
- EDB Migration Framework: ACTIONS Overview

Deep Dive: Oracle to EDB and Migration Framework (20 min.)

- Oracle Migration Complexity
- Automated Conversion Strategies
- EDB Migration Factory Toolkit
- Critical Gotchas and Solutions
- EDB Migration Framework: ACTIONS
- Ensuring Success

Breaking Cloud Lock-in (8 min.)

- AWSRDS/AuroraEscape Patterns
- Cloud-Native to Portable Architecture

Q&A (10–12 mins.)

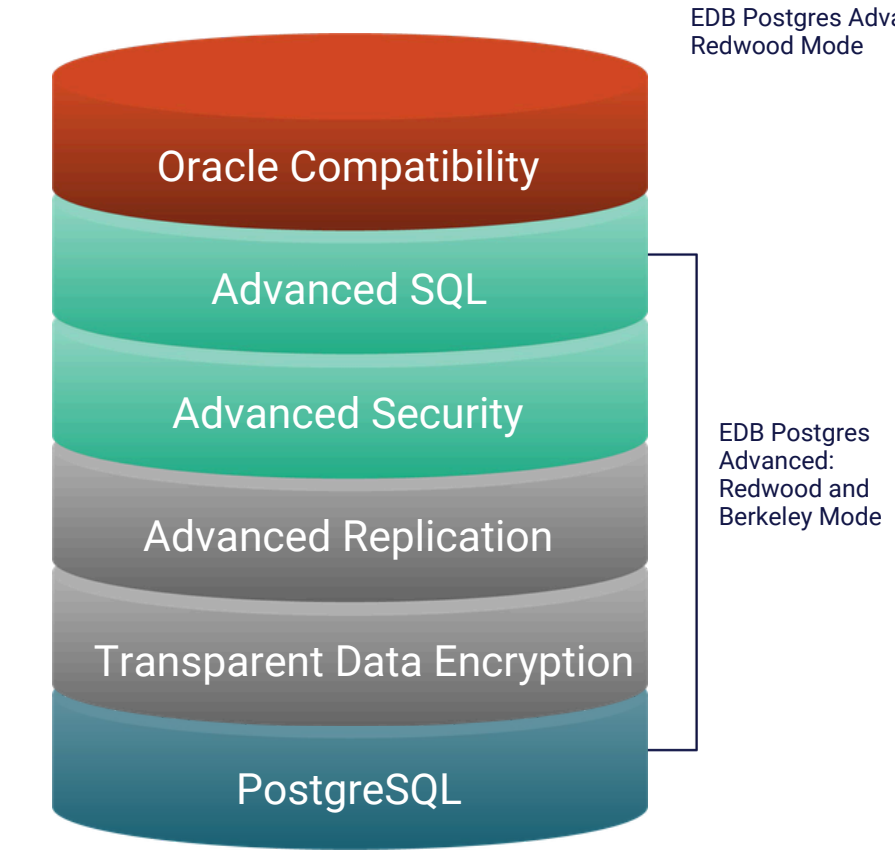
1. Setting the Stage

1.1. **Why EDB Postgres:** The Migration Accelerator

EDB's Oracle compatibility advantage

Built-in Oracle features (no code changes)

- PL/SQL execution: Procedures,functions,packages run as-is
- Oracle packages: DBMS_OUTPUT, UTL_FILE, DBMS_JOB suppor ted
- Data types: VARCHAR2, NUMBER, DATE with time preserved
- SQL syntax: CONNECT BY, ROWNUM, DUAL table work natively



Enterprise - EDB Postgres Advanced Server

1.2. **Why EDB Postgres:** The Migration Accelerator

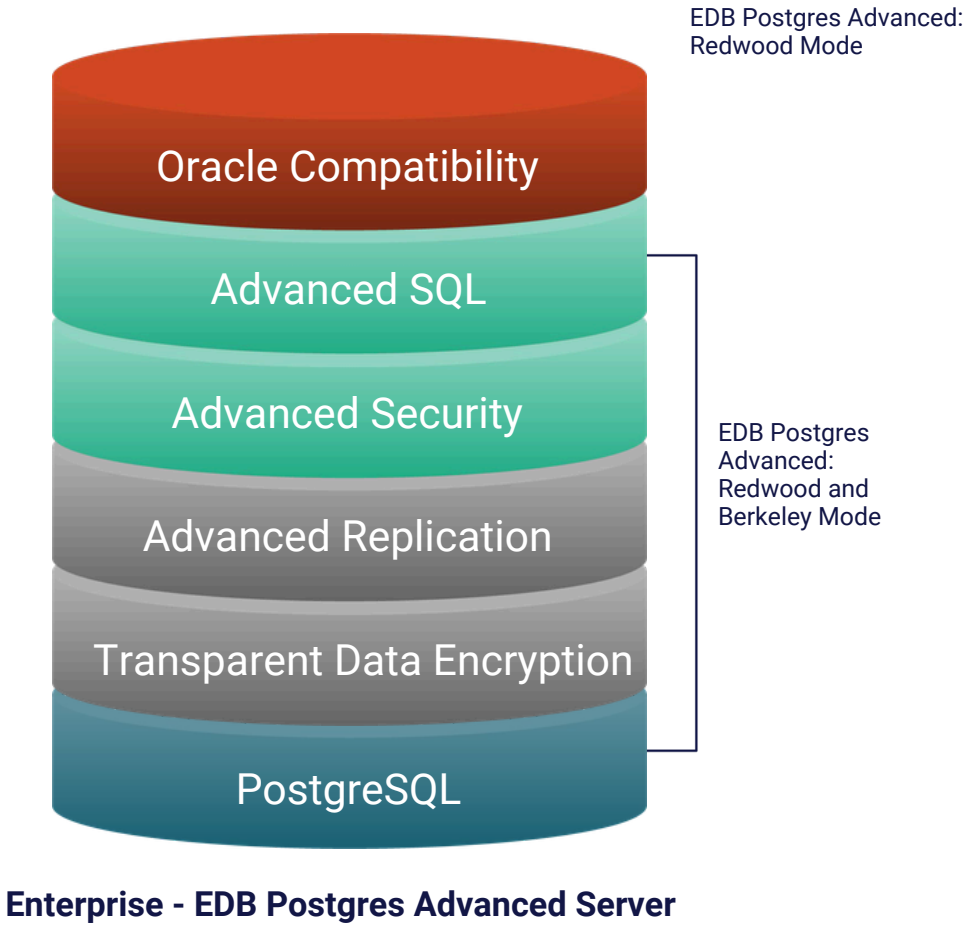
EDB's Oracle compatibility advantage

Critical migration enablers

- Hierarchicalqueries:CONNECT BY PRIOR works natively
- edb_redwood_strings: Handles Oracle NULL/empty string behavior
- Oracle-style triggers: NEW/OLD syntax compatibility
- Global temporary tables: Session-based temp table support

EDB Migration Toolkit Suite

- Migration Portal: Cloud-based assessment (no installation)
- Migration Toolkit: Automated schema and data transfer
- SPL Check: PL/SQL code validation
- LiveCompare: Zero-downtime data validation



Enterprise - EDB Postgres Advanced Server

The bottom line: Preserve Oracle investments (70%–80% code compatibility). reduce migration risk with proven tools, Achieve PostgreSQL benefits without complete rewrite. Oracle compatibility + open source freedom = EDB Postgres

1.2. EDB Migration Framework: ACTIONS Overview

7 phases to database freedom

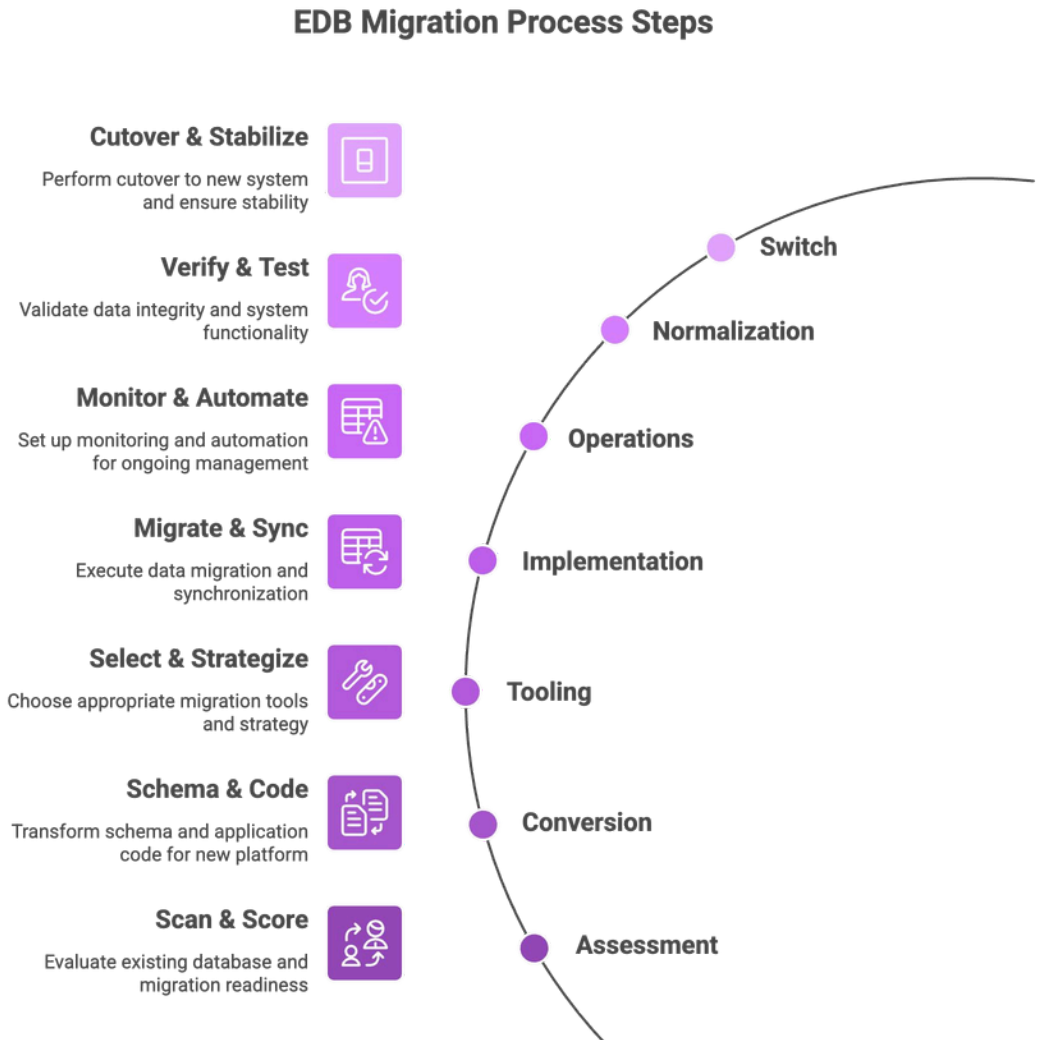
A - Assessment	Scan -> Score -> Size
C - Conversion	Schema -> Code -> Validation
T - Tooling	Right tools -> Right strategy
I - Implementation	Migrate -> Sync -> Optimize
O - Operation	Monitor -> Automate -> Manage
N - Normalization	Verify -> Test -> Certify
S - Switch	Cutover -> Stabilize-> Succeed

Why ACTIONS framework delivers

Traditional Migration	EDB ACTIONS Framework
6–12 months	2–4 months
40% failure rate	<1% rollback rate
Trial and error	Predictable phases
Multiple vendors	Integrated toolkit

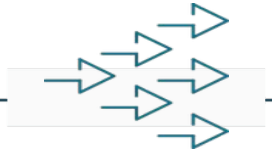
Key differentiators

Automatedassessmentidentifies issues before they become problems
Built-in validation at every phase reduces risk
Proven playbooks for Oracle and Cloud PostgreSQL scenarios



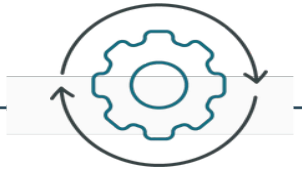
JPMC’s Three Target Use Cases

SECURELY BUILD, TEST, AND LAUNCH SOVEREIGN AI APPLICATIONS



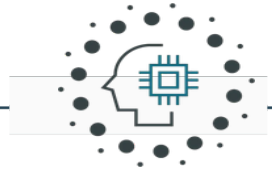
Modernization Use Case 1
New App OSS to EDB PG

1. Scenarios
   a. Tier 1-2 Triple A, Double A Same DC
   b. Tier 3-4 Active Passive DR
2. Targets
   a. Reference Architecture
   b. App Migration Process
   c. Differentiation & Benchmarks
   d. Decisioning App Modernization
3. Demonstration
   a. Efficiency
   b. Innovate Faster
   c. Revenue Growth
4. KPI Outcomes



Modernization Use Case 2
AWS RDS-Aurora to EDB PG

1. Scenarios
   a. Tier 1-2 Triple A, Double A Same DC
   b. Tier 3-4 Active Passive DR
2. Content per Scenario
   a. Reference Architecture
   b. App Migration Process
   c. Differentiation & Benchmarks
   d. Decisioning App Modernization
3. Demonstration
   a. Efficiency
   b. Innovate Faster
   c. Revenue Growth
4. KPI Outcomes



Modernization Use Case 3
Database to EDB PG

1. Scenarios
   a. Tier 1-2 Triple A, Double A Same DC
   b. Tier 3-4 Active Passive DR
   c. Start with Oracle - Next: SQL Server, Cockroach, MS SQL, Sybase, DB2
2. Content per Scenario
   a. Reference Architecture
   b. App Migration Process
   c. Differentiation & Benchmarks
   d. Decisioning App Modernization
3. Demonstration
   a. Efficiency
   b. Innovate Faster
   c. Revenue Growth
4. KPI Outcomes

2. Deep Dive: Oracle to EDB and Migration Framework

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2.1. Oracle Migration Complexity: The Real Challenges

What makes Oracle migrations complex

Technical debt

- 15+ yearsofPL/SQL accumulation
- 10,000+ stored procedures and packages
- Deep application dependencies on Oracle features
- RAC clusters with active-active requirements

Oracle lock-in features

- Advancedqueuing: Message processing
- DBMS packages: Business logic embedded
- Materialized views: Fast refresh dependencies
- Flashback: Temporal queries in applications
- RAC: High availability requirements

Business constraints

- Zero data-loss tolerance
- <1 hour maintenance windows
- Regulatory compliance requirements
- Performance SLAs must be maintained

How EDB solves this

- ❖70%–80% automatic PL/SQL compatibility
- ❖Oracle packages run natively (DBMS_ , UTL_)
- ❖Near-zero downtime with Replication Server
- ❖Performance parity or better for most workloads

2.2. Automated Conversion Strategies: What Works, What Needs Attention

Your Oracle code running on EDB

```
CREATE PACKAGE BODY payroll_pkg AS
  PROCEDURE calculate_salary(emp_id NUMBER) IS
    v_salary NUMBER(10,2);
    v_bonus  VARCHAR2(100);
  BEGIN
    SELECT salary INTO v_salary FROM employees WHERE id = emp_id;
    DBMS_OUTPUT.PUT_LINE('Salary: ' || v_salary);
    UTL_FILE.PUT_LINE(file_handle, 'Processed');
    COMMIT;
  EXCEPTION
    WHEN NO_DATA_FOUND THEN
      DBMS_JOB.SUBMIT(job_id, 'retry_process');
  END;
END payroll_pkg;
```

Status: Runs UNCHANGED on EDB Postgres

What works automatically (80%)

- PL/SQL packages, procedures, functions
- Oracle packages (DBMS_ , UTL_)
- Exception handling with Oracle codes
- Cursors, loops, conditional logic
- Data types (VARCHAR2, NUMBER, DATE)

What needs attention (20%)

- RAC dependencies → Single instance design
- Flashback queries → Temporal tables
- Advanced queuing → Message queue tools
- Materialized view fast refresh → Standard refresh

2.3. EDB Migration Factory Toolkit: Integrated Tool Suite

One platform, complete migration

EDB Migration Factory Toolkit

Phase	Tools	Purpose
Assess	Migration Portal	Cloud-based complexity scoring
Convert	Migration Toolkit + SPL Check	80% automatic schema/code conversion
Migrate	Replication Server	CDC for zero-downtime migration
Validate	LiveCompare	Continuous data verification
Operate	PEM + Failover Manager	Monitoring and HA management

Why integration matters

- **Without EDB:** 10+ separate tools, 6 months of integration, compatibility issues
- **With EDB:** Single platform, pre-integrated, proven compatibility

Key advantages

- **All tools designed to work together**
- **Single-vendor support**
- **Unified licensing model**
- **40% faster project delivery**

From assessment to production — one toolkit does it all

2.4. Critical Gotchas and Solutions: Oracle and Cloud Migration Pitfalls

Oracle → EDB: The hidden surprises

Gotcha	Impact	EDB Solution
Empty strings = NULL	Application logic breaks	*edb_redwood_strings = true*
DUAL table queries	Syntax errors	DUAL supported natively
Sequence.CURRVAL	Session not found	Use *LASTVAL() or RETURNING*
Global temp tables	Data visible across sessions	EDB session-based temps Extension: *pgtt*
DATE includes time	Time stamp mismatches	Oracle-compatible *DATE* type

Key insight: Most “gotchas” have built-in **EDB solutions**—just enable them.

Test these scenarios first; save weeks of debugging later.

2.5. EDB Migration Framework ACTIONS:
Architectural Compatibility and Assessment

Architectural Compatibility

- **Oracle SGA/PGA/RAC** → EDB simpler cluster model + read replicas
- **Oracle background processes** → PostgreSQL process-per-connection (use PgBouncer connection pooler)
- **Data Guard/Flashback** → EDB streaming replication + Failover Manager

EDB Oracle Compatibility

- 85% PL/SQL syntax supported (packages, triggers, functions)
- **Native Oracle packages**: DBMS_OUTPUT, UTL_FILE, DBMS_JOB
- **Compatible types:** VARCHAR2, NUMBER, DATE + CONNECT BY queries

Gaps Requiring Redesign and need requirement investigation

- RAC, Fast Refresh MVs, and Flashback

Application Changes

- **Drivers**: OCI/JDBC → EDB drivers
- **Connections**: TNS → host:port; Shared servers → PgBouncer
- **PL/SQL:** 70-80% runs unchanged with minor adjustments

Assessment

EDB:

-
- Migration Portal (web-based)
- Migration Toolkit, and Professional Services custom tools

Community/Third-party:

- ora2pg (SHOW_REPORT)
- AWS SCT

Manual using Oracle Catalogs: Identify licensed features, top SQL, dependencies & workload patterns

- DBA_FEATURE_USAGE_STATISTICS
- V$SQL
- DBA_DEPENDENCIES
- AWR

Know the gaps before you leap – assessment prevents migration creep

2.5. EDB Migration Framework ACTIONS:
Conversion

Automated Conversion (80-85% coverage)

- **EDB Migration Portal:** Web-based, generates downloadable DDL scripts
- **EDB Migration Toolkit:** Tables, indexes, constraints, views, PL/SQL objects
- **Preserves Oracle-compatible mode** (VARCHAR2, NUMBER, DATE)

Manual Conversion Required

- **Index-organized tables** → Regular tables
- **Virtual columns** → Generated columns/views
- **External tables** → Foreign Data Wrappers
- **RAC-specific objects** → Remove/redesign

Key Conversion Challenges

- **SQL:** MODEL → CTEs, PIVOT/UNPIVOT → crosstab/CASE, MERGE → minor adjustments
- **PL/SQL:** Remove EDITIONABLE, adjust PRAGMA, bulk operations syntax
- **Storage:** Bitmap → B-tree/GIN, fast refresh MVs not supported, result cache → app-level

Conversion Tools

EDB:

-
- Migration Portal (web-based)
- Migration Toolkit, and
  SPL Check (validates converted code)

Community/Third-party:

- ora2pg

Validation

- Run *spl_check_function()* for PL/SQL validation
- Compare object counts Oracle vs EDB
- Test procedures with production-like data
- Document remaining incompatibilities for manual fix

80% automated, 20% expertise – EDB compatibility does the heavy lifting

2.5. EDB Migration Framework ACTIONS:
Tooling and Planning

EDB Migration Suite

- **Migration Portal:** Cloud-based assessment & DDL conversion (no infrastructure needed)
- **Migration Toolkit:** Schema + data migration with Oracle compatibility
- **SPL Check:** PL/SQL code validation post-conversion
- LiveCompare: Data validation between Oracle & EDB

Supplementary Tools

- **ora2pg:** Complexity assessment & custom migrations
- **Replication Server**: Near-zero downtime via CDC
- **pgBackRest/Barman:** Backup (replaces RMAN)
- **PgBouncer:** Connection pooling (replaces shared servers)

Planning Phases

- **Discovery:** Migration Portal assessment, AWR analysis, RAC dependencies, sizing
- **Preparation:** Schema conversion, test environment, Replication Server config, team training
- **Execution:** Phased migration (non-critical → read-heavy → core), LiveCompare validation

Complexity Multipliers & Timeline

- **Heavy PL/SQL:** +2x time | RAC conversion: +3x | Oracle-specific features: +2x
- **Simple migrations**: 4-6 weeks | Complex systems: 3-4 months

Risk Mitigation

- Run SPL Check early to identify code issues Test LiveCompare
- with actual data volumes Plan for unsupported features
- (Flashback, Advanced Queuing) Maintain Oracle 30 days for
- rollback

Success Criteria

- Proceed if PL/SQL compatibility >70% and performance meets SLAs
- Effort split: 70% schema/code conversion, 30% data migration

Right tools + right plan = predictable outcomes

2.5. EDB Migration Framework ACTIONS:
Implementation (Data & Migration)

Offline migration (simple and reliable)

- Stop app → Migrateschema → Transferdata → Validate → Start app
- Tools: Migration Toolkit or pg_dump/restore
- Best for: Dev/test environments, weekend maintenance windows

Hybrid approach (balanced)

- Initial load (weekend)→ CDCsync (weekdays) → Brief cutover
- Tools: MTK for bulk + Replication Server for changes
- Best for: Most production systems

Online migration (mission critical)

- Setup CDC → Continuoussync → Validate → Zero-downtime cutover
- Tools: EDB Replication Server or AWS DMS
- Best for: 24x7 operations, multi-TB databases

Choose your strategy based on requirements

Database Size	Downtime Window	Strategy	Tools
< 100GB	2–4 hours	Offline migration	EDB MTK, pg_dump
100GB–1TB	< 1 hour	Hybrid approach	EDB MTK + EDB Replication Server
> 1TB	Near-zero	Online CDC	EDB Replication Server/DMS

Key decision factor: Acceptable downtime drives strategy, not just size

Right strategy = successful migration

2.5. EDB Migration Framework ACTIONS:
Operation (monitoring, automation, observability)

Monitoring Transition

- AWR/ASH → pg_stat_statements, edb_wait_states
- OEM → Postgres Enterprise Manager (PEM)
- V$SYSSTAT → pg_stat_database; Alert logs → pgBadger
- New concepts: vacuum activity, bloat monitoring

Automation Migration

- DBMS_SCHEDULER → DBMS_JOB / pg_cron
- Data Guard broker → EDB Failover Manager
- RMAN → pgBackRest / Barman
- Shared servers → PgBouncer

Aler ting

- PL/SQL errors, package failures, replication lag
- Connection exhaustion, vacuum freeze warnings

Integration

- PEM REST API → existing monitoring tools
- Export to Prometheus/Grafana for unified dashboard

Different platform, same visibility – transition tools, not practices

2.5. EDB Migration Framework ACTIONS:
Normalization and Validation

Data Validation

- **LiveCompare** for automated row counts and data comparison
- Exclude Oracle-specific columns (ROWID, ORA_ROWSCN)
- Enable **edb_redwood_strings** = true for empty string = NULL

Schema Validation

- **Compare object counts:** Oracle DBA_OBJECTS vs EDB catalog
- Verify constraints, indexes, sequences match

Code Validation

- **SPL Check:** spl_check_function() on all procedures
- Test DBMS_*, UTL_* packages and exception handling

Acceptance Targets

- **Data:** 100% verified by LiveCompare
- **Code:** All PL/SQL executing without errors
- **Performance:** Within 20% of Oracle baselines
- **Issues:** Zero critical discrepancies

Trust but verify: Validation ensures migration success, not hope.

2.5. EDB Migration Framework ACTIONS:
Switch and Support

Go-Live Preparation

- **LiveCompare** for automated row counts and data comparison
- Exclude Oracle-specific columns (ROWID, ORA_ROWSCN)
- Enable **edb_redwood_strings** = true for empty string = NULL

Cutover Execution

- **Update connections:** TNS → EDB, jdbc:oracle:thin → jdbc:edb://
- Final Replication Server sync or Migration Toolkit delta
- **LiveCompare** validation → Switch apps → Keep Oracle for rollback
-

Stabilization (First 72 Hours)

- Monitor PL/SQL errors, connection pools, vacuum activity
- Watch for NULL/empty string edge cases
- Train DBAs: PEM navigation, pgBackRest vs RMA**N**

Success Criteria

- 14 days stable operation without critical issues
- 30 days Oracle read-only as safety net
- Performance meeting/exceeding Oracle baselines

Rehearse like it's live, switch with confidence, support to success.

2.6. Ensuring Success: Optimization and Verification

The 3 pillars of migration excellence

- Performanceoptimization:Transform bottlenecks into breakthroughs with parallel processing, intelligent indexing, and EDB-optimized query patterns that deliver sub-second response times
- Data integrity assurance: Zero-tolerance validation using LiveCompare's real-time verification, cryptographic checksums, and automated reconciliation ensuring 100% data fidelity
- Application continuity: Seamless transition with EDB SPL Check validating PL/SQL compatibility, preserving transaction semantics, and maintaining business-critical SLAs

Success metrics that matter

- 99.999% data accuracy guaranteed
- <20% performance variance from baseline
- Zero business disruption during cutover
- 100% application functionality preserved

Your safety net: LiveCompare + SPL check = Migration confidence

3. Breaking Cloud Lock-in

3.1. Breaking Cloud Lock-in: From RDS/Aurora to Freedom

Cloud PostgreSQL limitations vs. EDB freedom

Cloud Constraints	EDB Solution
No super-user access	Full administrative control
Limited extensions (~80)	200+ extensions available
Single vendor lock-in	Deploy anywhere: Multi-cloud/on-prem
Forced maintenance windows	Maintenance on your schedule
Proprietary backup formats	Standard PostgreSQL tools

Strategic migration: RDS/Aurora PostgreSQL → EDB PostgreSQL

The beauty: 100% PostgreSQL compatible

- Nocodechanges required
- Same SQL, same drivers
- Extensions work identically
- Zero application refactoring

Migration approach

1. Setup: EDB Postgres target environment
2. Sync: Logical replication from RDS/Aurora
3. Validate: LiveCompare ensures data integrity
4. Cutover: Update connection endpoints
5. Freedom: Fullcontrol achieved

Strategic advantages

- Deployanywhere: AWStoday, Azure tomorrow, on-prem next year
- No vendor pricing surprises: Predictable costs
- Full feature access: Super user, all extensions, custom builds
- Your rules: Backup, maintenance, upgrades on your terms

Same PostgreSQL—your infrastructure, your control.

3.2. Cloud-Native to Portable Architecture

Architectural transformation

From managed services constraints

AWS RDS/Aurora → EDB Postgres (pn-premises/IaaS)

- Proprietary APIs → PostgreSQL native protocol
- Black-box operations → Full OS/kernel access
- Limited parameters → Complete postgresql.conf control
- Vendor-specific HA → Patroni/repmgr/EDB Failover Manager

Technical comparison matrix

Capability	AWS RDS/Aurora	EDB Portable Architecture	Advantage
Parameter control	~200 modifiable	300+ full access	Complete tuning
Extension support	40–60 extensions	Unlimited	No restrictions
Replication lag	Opaque metrics	Byte-level control	Predictable RPO
Cost predictability	Variable IOPS/storage	Fixed infrastructure	60% TCO reduction

Portable architecture stack

- Infrastructure layer
  - Deployment targets: VMware vSphere | OpenStack | Bare Metal | AWS EC2 | Azure VMs
  - Storage flexibility: SAN/NAS | Local NVMe | Software-defined (Ceph/GlusterFS)
  - Network architecture: Self-managed VPC | Direct Connect | MPLS

- Database architecture components
  - High availability: Streaming replication + automatic failover
  - Load balancing: HAProxy/PgBouncer/Pgpool-II
  - Backup strategies: Barman/pgBackRest to any S3-compatible storage
  - Monitoring: Prometheus + Grafana + pg_stat_statements

Migration path: RDS Snapshot → S3 → pg_restore → EDB Postgres → Production

4. Q&A and Next Steps

Thank You

Please complete the survey for EDB Days Track 4 now.

EDB POSTGRES AI

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