

VNA-SB-026 | Database X to Database Y | Mainframe & LUW Database Replatforming | Canyon Ochre

IBM Db2 for z/OS, iSeries (AS/400) & Db2 LUW Migration to Oracle Database 23ai & Exadata

Escalating IBM mainframe MLC/MIPS charges and Db2 LUW subscription renewals consume millions in IT budget while locking core data inside EBCDIC tables and legacy SQL PL routines. We engineer zero-downtime migrations from IBM Db2 (z/OS, iSeries, and LUW) to Oracle Database 23ai using automated SQL PL-to-PL/SQL AST translation, EBCDIC-to-AL32UTF8 character set conversion, and Oracle GoldenGate for Db2 real-time Change Data Capture.

Search Queries & Scope Covered: IBM Db2 to Oracle migration | migrate Db2 z/OS mainframe to Oracle Exadata 23ai | convert Db2 SQL PL stored procedures to Oracle PL/SQL | IBM iSeries AS/400 Db2 400 to Oracle migration | EBCDIC COMP-3 packed decimal to Oracle NUMBER conversion

SOURCE LEGACY STACK (STACK X)		MODERNIZED TARGET ARCHITECTURE (STACK Y)	
IBM Db2 for z/OS (Mainframe), Db2 for i (AS/400), Db2 LUW 11.5, SQL PL, EBCDIC, JCL/COBOL		Oracle Database 23ai on OCI / Exadata / ODA X11, PL/SQL Packages, GoldenGate Db2 CDC	
MIPS & LICENSE SAVINGS	SQL PL -> PL/SQL AST	EBCDIC / COMP-3 PARITY	CUTOVER WINDOW
55% - 78% Lower TCO	91% Automated Translation	100% Bit-Level Verified	Near-Zero via GoldenGate Db2

1. Problem Space & Architectural Bottlenecks

- IBM z/OS Monthly License Charges (MLC) and MIPS-based pricing penalize every new analytics query, API call, or digital channel hitting Db2.
- Db2 z/OS and AS/400 schemas rely on EBCDIC collating sequences, packed decimal (COMP-3) copybooks, and Db2-specific SQLCODE/SQLSTATE cursor semantics that break naive migration tools.
- Tightly coupled CICS screens, green-screen 5250 RPG programs, and overnight JCL/COBOL batch jobs require phased coexistence with the new database.

2. Technical Solution & Reference Architecture

- 2.1 Automated DDL & Data Type Mapping: Convert Db2 TABLESPACES, GRAPHIC/VARGRAPHIC, DECFLOAT, and packed decimals into Oracle 23ai tablespaces, NUMBER, and UTF-8 columns with linguistic binary sort (`NLS\_SORT=EBCDIC`) where legacy sort order is required.
- 2.2 SQL PL & Embedded SQL Translation: Parse Db2 SQL PL procedures, DB2triggers, and Pro*COBOL / embedded SQL cursor loops into compiled Oracle 23ai PL/SQL packages.
- 2.3 Batch & UI Modernization: Convert JCL/SORT batch steps into high-speed Oracle bulk PL/SQL (`FORALL`) and `DBMS\_SCHEDULER` chains, while replacing CICS / 5250 green screens with Oracle APEX 24.2.
- 2.4 Real-Time Coexistence: Stream live transactions from Db2 z/OS (IFI 306 log read) or Db2 LUW into Oracle 23ai via Oracle GoldenGate for parallel validation before final cutover.

3. Artifact-by-Artifact Conversion & Modernization Matrix

Legacy Artifact / Baseline Workload	Modernized Oracle / Cloud Target	Engineering Method & Outcome
Db2 SQL PL Stored Procedures & UDFs	Oracle 23ai PL/SQL Packages & Pipelined Functions	AST translation of DECLARE CURSOR WITH HOLD, SQLCODE handlers, and DGTG temp tables
EBCDIC Character Data & Collating Sequence	Oracle AL32UTF8 + NLS_SORT=EBCDIC Functional Indexes	Transcode CCSID 37/500/1140 to UTF-8 while preserving exact mainframe ORDER BY behavior
COBOL Copybooks & Packed Decimal (COMP-3)	Oracle 23ai NUMBER(p,s) + External Tables / SQL*Loader	Unpack binary COMP/COMP-3 fields with automated precision and checksum reconciliation
CICS BMS Maps & AS/400 5250 Display Files (DSPF)	Oracle APEX 24.2 Keyboard-Driven Web Forms & Grids	Preserve sub-second hotkey data-entry ergonomics inside modern browser pages
JCL / DFSORT Overnight Batch Streams	DBMS_SCHEDULER Chains + Parallel SQL / PL/SQL	Replace multi-hour tape/disk sort steps with in-database parallel hash joins

4. Oracle APEX & Ancillary Engineering Toolchain

- Oracle Database 23ai on Exadata Cloud@Customer (ExaCC), OCI, or ODA X11
- Oracle GoldenGate for Db2 (z/OS IFI 306, iSeries Journal, and Db2 LUW CDC)
- Oracle SQL Developer Migration Workbench & Viscosity SQL PL AST Transpiler
- Oracle APEX 24.2 (Mainframe CICS / 5250 Green-Screen Replacement)
- Oracle SQLcl Liquibase & utPLSQL Automated Reconciliation Harness

Anonymized Production Proof: Migrated a 14 TB IBM Db2 environment (3,100 tables and 1,450 SQL PL stored procedures) to Oracle Database on Exadata with GoldenGate real-time replication, cutting annual IBM software maintenance by 64% and reducing nightly batch execution from 4.5 hours to 38 minutes.

5. Principal Architect Q&A

Q: How do you handle mainframe applications that rely on EBCDIC sort order (where numbers sort after letters)?

A: In EBCDIC, uppercase letters sort before digits (0-9), whereas in ASCII/UTF-8 digits sort before letters. For queries and batch programs that depend on mainframe sort order, we apply Oracle linguistic sorting (NLSSORT with EBCDIC) and function-based indexes so data is stored cleanly in UTF-8 while returning identical sort order.

Q: Can we migrate Db2 to Oracle in phases while CICS or COBOL applications are still running?

A: Yes. Using Oracle GoldenGate for Db2 (supporting z/OS, iSeries journals, and LUW logs), we maintain sub-second bi-directional or uni-directional replication between Db2 and Oracle 23ai so workloads can cut over domain by domain.