

# AI-Enabled Data Migration Strategy to Oracle Cloud ERP

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**Abstract**—Data migration is an important component of any enterprise transformation initiative. It provides the capability to migrate data from on-premises legacy systems such as Oracle E-Business Suite, PeopleSoft, JD Edwards, or SAP to Oracle Cloud ERP. A good data migration strategy ensures the successful transfer of accurate, clean, and complete data while minimizing business disruption. This paper presents a comprehensive data migration framework, integrating traditional methodologies with AI-driven enhancements to improve efficiency, accuracy, compliance, and governance.

**Keywords**—Oracle Cloud, Data Migration Strategy, Artificial Intelligence(AI) , Machine Learning(ML) , Data Transformation, Automation

## I. INTRODUCTION

Oracle Cloud ERP provides businesses with better processes, integrated intelligence, and cloud-scalable infrastructure. However, its adoption requires careful planning of data migration. A flawed delivery can lead to system errors, reconciliation failures, and loss of user trust. The goal of this strategy is to establish a repeatable, auditable, and AI-augmented migration approach that ensures business continuity. This paper provides a strategy to be followed for a smooth and successful data transformation to Oracle Cloud ERP.

## II. PROBLEM STATEMENT

### A. Complexity:

Data Migration can get very complex depending on the entities involved. Large number of entities with cross reference relations pose a challenge to data migration.

### B. Data Quality:

Data Quality can be problematic due to missing information, invalid records, duplicate records.

### C. Data Mapping :

Legacy data structures often do not align with Oracle Cloud ERP's FBDI templates and modernized chart of accounts, requiring extensive transformation

### D. Scalability Limitations :

Manual approaches struggle to handle large, diverse datasets across multiple business units or geographies.

### E. Testing Gaps :

Inadequate validation increases the risk of reconciliation failures and downstream process disruptions.

### F. Governance and Compliance Risks:

Without proper lineage tracking and controls, enterprises face audit, regulatory, and security challenges.

## III. MIGRATION METHODOLOGY

### A. Data Assessment & Profiling:

- Document all legacy sources.
- Evaluate data quality.
- Identify duplicates, anomalies, missing values.
- Define data cleansing rules and governance structures.

### B. Data Mapping and Transformation:

- Use FBDI (File-Based Data Import) templates and ADFdi spreadsheets provided by Oracle Cloud ERP.
- Create Mapping documents:
  - Legacy → Oracle Cloud ERP attributes.
  - Code conversions (e.g., old GL accounts → new COA structure).
  - Reference data mappings (payment terms, units of measure, tax codes).
- Implement transformation logic in ETL tools (ODI, Informatica, or PL/SQL).

### C. Data Loading Architecture:

- Staging Database to hold extracted data.
- ETL Process
  - Extract → Stage (from legacy).
  - Transform → Apply mapping, validation, enrichment.
  - Load → Use FBDI or rest web services.

### D. Iterative Migration Cycles:

- Conduct multiple mock migrations
  - Unit Test: Small datasets
  - SIT: Full data loads for System Integration.
  - UAT: Business SME's validate functional correctness.
- Refine mapping, cleansing, and load logic after each cycle.

E. Data Reconciliation & Validation:

- Develop control reports:
- Legacy vs Cloud counts (e.g., number of suppliers, invoices).
- Balances (AP, AR, GL).
- Exception/error reports (e.g., invalid COA segment combinations).

F. Cutover & Go-Live:

- Define downtime window for final load.
- Freeze legacy data entry.
- Load deltas (new transactions since last mock).
- Establish rollback procedures.

G. Post-Go-Live Support:

- Keep legacy systems read-only for audit/reference.
- Monitor data load jobs and reconciliation dashboards.
- Provide hyper care support for the first few closes and reporting cycles.
- Transition to steady-state data governance.

#### IV. AI ENABLED ENHANCEMENTS

A. Automated Data Quality Assessment:

Use ML-based data profiling tools. Traditional profiling relies on rules (e.g., “field cannot be null”). ML tools go beyond rules and learn patterns in the data to identify missing values that follow non-obvious trends. Identify invalid values (e.g. vendor codes that don’t align with typical formats).

B. Duplicate & Similar Record Detection:

Legacy systems often contain dirty master data (e.g., duplicate customers, suppliers). ML models use fuzzy matching (string similarity, NLP, embeddings) to detect duplicates. E.g. “IBM Inc.” vs. “I.B.M. Corporation” vs. “International Business Machines.”. This improves duplication and merging decisions before loading into Oracle Cloud ERP.

C. Outlier & Anomaly Detection:

ML models (Isolation Forest, Autoencoders, etc.) detect data points that don’t fit normal patterns. E.g. Unusual invoice amounts. Inactive supplier suddenly having transactions. GL entries, which do not match historical posting behavior. These anomalies can be flagged for review before migration, reducing financial reconciliation issues later.

D. Data Categorization & Classification:

ML classifiers can auto-tag and group data to align with Oracle Cloud ERP requirements. E.g. Categorizing items into product families. Mapping suppliers to regions based on addresses. Auto suggestion of chart of accounts mappings.

E. Automated Data Mapping:

Deploy AI-based mapping engines to suggest legacy-to-Oracle attribute mappings. NLP models read Oracle Cloud ERP FBDI templates and legacy table/column names → auto-suggest mappings. E.g. Cust\_Name (legacy) → Customer\_Name (Cloud ERP). Reinforcement learning from past migrations: mappings improve with every cycle.

F. Intelligent Transformation Rules:

AI can generate transformation scripts:

- Convert legacy chart of accounts → new COA structure using trained models on historical mappings.
- AI-driven unit of measure conversion (kg ↔ lb, days ↔ months).
- Predictive models flag inconsistent transformations before loading.

G. Smart Data Cleansing & Enrichment:

- AI-based deduplication for master data (customers, suppliers, items) using fuzzy matching.
- Address validation via geocoding APIs.
- Enrichment with external registries (DUNS, tax authorities).
- AI assistants embedded into migration workflows to recommend corrections. E.g. Supplier ABC missing Tax Registration — fetch from external registry?
- Duplicate customer detected — merge with ID 123?”

H. AI-Augmented Testing & Validation:

- AI bots simulate mock load scenarios and predict likely failure points.
- Automated reconciliation of balances and record counts.
- Compare legacy balances vs. Oracle Cloud balances using anomaly detection.
- Highlight suspicious gaps (e.g., AR balance mismatch due to missing invoices).
- Outlier detection for migrated transactions.
- AI-generated SQL scripts for reconciliation.

I. AI-Enhanced Governance:

- Automated lineage maps for audit trails.
- Compliance checks for GDPR, SOX, and other regulations.
- Continuous monitoring of post-go-live data quality.

J. Predictive Cutover & Risk Management:

- ML models trained on past migration projects predict migration runtime for each cycle (helps cutover planning).
- AI suggests optimal sequencing of migration objects (e.g., load COA (Chart of Accounts) and suppliers before open invoices).
- Real-time monitoring: AI flags data load bottlenecks and recommends corrective actions.

#### K. Post-Go-Live AI Monitoring:

- Use AI anomaly detection on transactional data. E.g. Spot outliers (e.g., sudden supplier overpayments, misclassified GL entries).
- Ensure migrated data aligns with business usage patterns.
- Chatbot for end-users:

“Why is my supplier not visible?” → Bot checks if migration failed or if supplier was deactivated.

#### V. DATA MIGRATION ARCHITECTURE

- Business Team → legacy data ownership.
- ETL/Data Engineering → staging & transformation.
- AI Augmentation → profiling, auto-mapping, cleansing and anomaly detection.
- Oracle Cloud ERP → ingestion through FBDI/ADFDI/APIs.

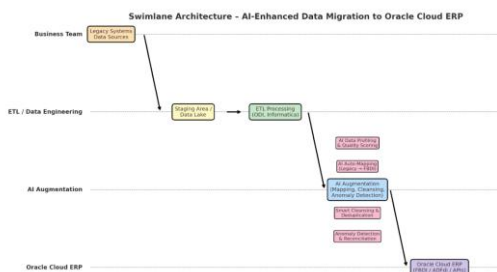


Fig. 1. Swimlane Architecture–AI Enhanced Data Migration to Oracle Cloud ERP.

#### VI. AI-ENHANCED GOVERNANCE

- Create data lineage maps with AI to trace how legacy data flowed into Cloud ERP.
- AI audit assistant generates compliance reports for SOX/GDPR automatically.
- Continuous learning loop: every migration cycle trains the AI model for faster, more accurate next runs.

#### VII. BENEFITS OF AI-ENHANCED STRATEGY

- Efficiency: Reduces mapping, profiling, and validation effort by 40–50%.
- Accuracy: Improves data integrity with anomaly detection and intelligent rules.
- Governance: Ensures compliance and audit readiness.
- Scalability: Enables smoother rollouts across subsidiaries.
- Business Confidence: SMEs trust the migrated data due to cleaner validation and reconciliation.

#### VIII. BEST PRACTICES

- Start with master data migration before transactional data.
- Use Oracle Cloud Data Management tools (e.g., FSM tasks, FBDI loaders).
- Engage functional consultants for COA, supplier, customer setups.
- Automate as much as possible—manual loads are risky at scale.

Keep compliance and audit requirements in mind (SOX, GDPR).

#### IX. CONCLUSION

Migrating to Oracle Cloud ERP requires more than just technical execution. It demands a structured, intelligent, and business-aligned strategy. By combining traditional ETL-driven migration best practices with AI-powered profiling, mapping, cleansing, validation, and governance, enterprises can reduce migration risk, ensure compliance, and accelerate time-to-value. This approach establishes a repeatable framework for current and future Oracle Cloud ERP transformations.

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