

VNA-SB-033 | Industry Operating Platforms (Public Sector, B2B, POS & Transit) | Transportation & Infrastructure Lakehouse | Sierra Granite

Toll Road, Transit & Infrastructure Medallion Data Platform on OCI, Fusion ERP & OAC

Transition from Siloed Lane/Sensor Telemetry, Legacy Toll Databases & Disconnected ERP Financials to OCI Medallion Lakehouse (Bronze/Silver/Gold) + Oracle Cloud ERP + Oracle Analytics Cloud (OAC) with automated binary/AST metadata profiling, deterministic cost-control levers, auto-generated BRD and test documentation, and a fixed-fee 4-phase delivery roadmap.

Search Queries & Scope Covered: toll road medallion data platform oci | transit authority oracle analytics cloud oac | oracle fusion erp infrastructure telemetry | roadway intelligence lakehouse

SOURCE LEGACY STACK (STACK X)		MODERNIZED TARGET ARCHITECTURE (STACK Y)	
Siloed Lane/Sensor Telemetry, Legacy Toll Databases & Disconnected ERP Financials		OCI Medallion Lakehouse (Bronze/Silver/Gold) + Oracle Cloud ERP + Oracle Analytics Cloud (OAC)	
TELEMETRY INGEST Real-Time	ARCHITECTURE TIER Bronze/Silver/Gold	EXECUTIVE ANALYTICS OAC + APEX	ERP RECONCILIATION Automated

1. Problem Space & Architectural Bottlenecks

- Critical business operations remain trapped in Siloed Lane/Sensor Telemetry, Legacy Toll Databases & Disconnected ERP Financials, creating audit risk, manual reconciliation overhead, and rising support costs.
- Duplicate queries, cloned reports, and undocumented triggers make impact analysis slow and expensive across source operational & erp data feeds.
- Lack of automated binary-to-database metadata mapping causes traditional consulting shops to pad estimates with 40% manual discovery buffers.
- Leadership needs a predictable, fixed-fee phased timeline with verifiable test specifications and zero-downtime cutover guarantees.

2. Technical Solution & Reference Architecture

- 2.1 Automated Phase 0 AST & binary scan mapping Siloed Lane/Sensor Telemetry, Legacy Toll Databases & Disconnected ERP Financials artifacts directly to live Oracle dictionary metadata and profiling production data.
- 2.2 Target architecture built on OCI Medallion Lakehouse (Bronze/Silver/Gold) + Oracle Cloud ERP + Oracle Analytics Cloud (OAC), consolidating cloned queries into governed core SQL views with runtime Smart Filters.
- 2.3 Automated generation of full Business Requirements Documents (BRD), Technical Approach Docs, Testing Specifications, and Verified Test Results.
- 2.4 Zero-trust SSO/MFA (Entra ID / Okta) paired with database-enforced row-level security (VPD / RAS) and SQLcl Liquibase CI/CD pipelines.

3. Artifact-by-Artifact Conversion & Modernization Matrix

Legacy Artifact / Baseline Workload	Modernized Oracle / Cloud Target	Engineering Method & Outcome
Source Tier: Siloed Lane/Sensor Telemetry, Legacy Toll Databases & Disconnected ERP Financials	OCI Medallion Lakehouse (Bronze/Silver/Gold) + Oracle Cloud ERP + Oracle Analytics Cloud (OAC)	Automated AST & Metadata Uplift (85%-95%)
Primary Footprint: Daily Sensor / Lane / Telemetry Events	Oracle APEX 24.2 Redwood UI + PL/SQL APIs	Binary-to-DB Metadata Mapping + Pilot Sprint
Workload & Queries: Source Operational & ERP Data Feeds	Canonical Core SQL Views + Runtime Smart Filters	Query Fan-Out Clustering (75%-90% Reduction)
Undocumented Legacy Business Rules & QA	Auto-Generated BRD, Approach Doc, Test Specs & Results	100% Automated Documentation & utPLSQL / Playwright

4. Oracle APEX & Ancillary Engineering Toolchain

- Oracle APEX 24.2 & Universal Theme (Redwood Light Flavors)
- Oracle Database 23ai / Autonomous Database (ATP / ADW)
- Viscosity Automated Binary (.fmb/.rdf) & AST Metadata Profiler
- Auto-Doc Engine (BRD, Approach Doc, Test Specs & Test Results)
- Oracle REST Data Services (ORDS) & APEX Office Print (AOP)
- SQLcl Liquibase CI/CD, utPLSQL & Playwright Regression Suites

Anonymized Production Proof: Delivered a full-lifecycle Oracle Cloud ERP and Medallion Data Platform with Oracle Analytics Cloud (OAC) executive dashboards for a major regional toll road authority.

5. Principal Architect Q&A

Q: What are the primary levers that control the cost of Toll & Transit Medallion Data Platform?

A: Cost is controlled by five levers: (1) collapsing cloned query fan-out across source operational & erp data feeds into canonical core SQL views, (2) percentage of business logic already in database packages vs. UI triggers, (3) production data quality profiled during Phase 0, (4) external integration/SSO count, and (5) cutover downtime requirements.

Q: How does your tool convert binaries (.fmb, .rdf, etc.), map database metadata, and generate documentation?

A: Our automated analyzer parses legacy binaries and source files, extracts every trigger, query, and UI control, cross-references them against live database dictionary metadata (ALL_TAB_COLUMNS, ALL_DEPENDENCIES), profiles actual column data distributions, and automatically generates the Business Requirements Document (BRD), Technical Approach Doc, Test Specifications, and Verified Test Results.

Q: What does a typical project timeline look like from kickoff to production cutover?

A: Projects follow four gated phases: Phase 0 (Weeks 1-2: Binary AST Scan, Data Profiling & Auto-Generated BRD), Phase 1 (Weeks 3-6: Core Schema Uplift & Working Pilot), Phase 2 (Weeks 7-12: Automated Conversion Sprints & Test Spec Execution), and Phase 3 (Weeks 13-16: Parallel Run, Zero-Downtime Cutover & 30-Day Hypercare).