POLESTAR ANALYTICS

CASE STUDY

How a Leading US Telecom Provider **Cut Big Query Costs by 52%** Through AI-Driven FinOps Transformation

Client Overview

Our client is a **leading US-based broadband and internet services provider**. As the business scaled, their reliance on Google Cloud Platform's BigQuery grew significantly - but **without the governance, design standards, or cost controls** to match. The result was a **fragile and expensive analytics environment** plagued by unchecked cloud spend, fragmented data infrastructure, and recurring inefficiencies that the team had no sustainable way to resolve.

Polestar Analytics was engaged to transform the client's BigQuery ecosystem through large-scale optimization, AI-driven automation, real-time observability, and a sustained FinOps discipline.

Business Challenges

Diagnosing the environment revealed four deeply interconnected problem areas -

01

Table & Query Inefficiencies

- Poor table design with lack of partitioning, clustering and search Indexing.
- Inefficient views and query patterns
- Limited use of materialized views and pre-aggregations

Impact: High compute costs, slow performance, and fragile scalability

02

Cloud Cost Inefficiency & Financial Leakage

- Uncontrolled BigQuery costs driven by high byte scans and slot consumption
- Large volumes of unused or stale datasets, tables, and reports
- Limited automation, alerts, or warning mechanisms

Impact: Unnecessary cloud spend, low cost predictability, manual tasks, and weak financial accountability

03

Fragmented Analytics & Low-Value Consumption

- Dashboards triggering queries despite having no recent viewers
- No prioritization by business criticality
- Wrong loading strategy and historical data sitting in staging tables

Impact: Wasted compute & storage costs and a noisy analytics environment

04

Governance, Operating Model & FinOps Maturity Gaps

- Knowledge gaps in cost-efficient query and data design practices
- Dependency on manual processes and delayed approvals
- Weak governance controls

Impact: Savings are not sustained; inefficiencies recur over time

Solutions Overview

The client's challenges required a connected, layered approach not isolated fixes. Polestar Analytics designed four solutions that work as a single system:

Optimize

Fix poorly designed tables, Views queries and ETL queries driving unnecessary cost

Automate

Scale those fixes across the entire environment without manual effort

Intelligentize

Use AI to continuously surface new optimization opportunities

Monitor

Track cost, performance, and health in real time

Tech Stack:

- GCP BigQuery
- PL/SQL
- Python
- Vertex AI
- Gemini 2.5 Flash

Solution

01

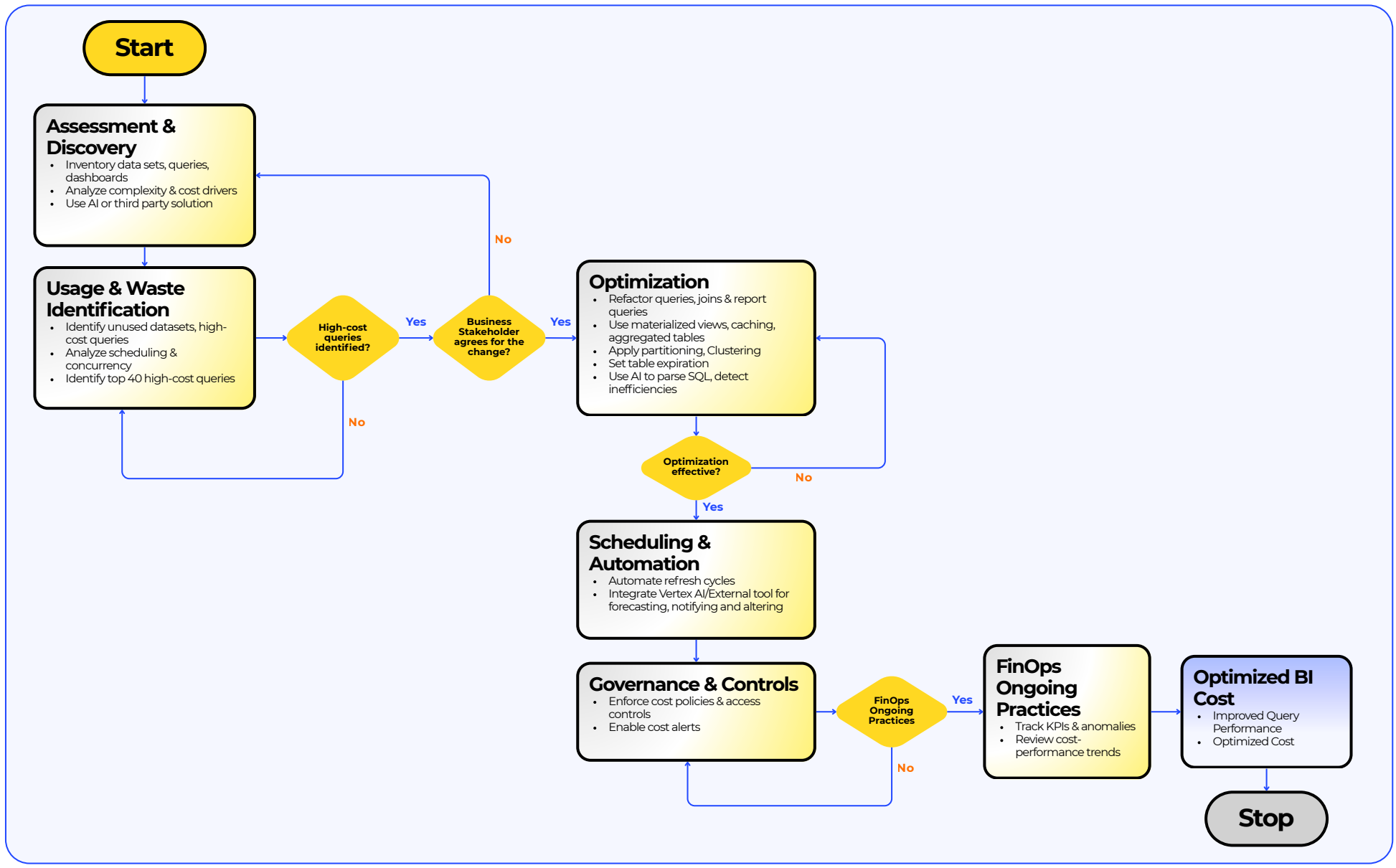
BigQuery Optimization & Best Practice Documentation

We audited the client's most expensive tables, views, and queries - applying partitioning, clustering, Search Indexing, and query refactoring to cut byte scans, slot consumption, and compute costs at the source.

We also analysed their loading strategies, ETL processes. Implemented/Suggested correct loading strategy like stage should be truncate and load and improved their ETL processes by removing multiple or redundant queries - costing high byte and slot consumption.

Findings were documented and handed over to the internal team to build lasting capability and prevent recurrence.

BQ Optimization: Flow Diagram (Phase 1)



Solution

02

Bulk Migration & Inventory Tables Framework

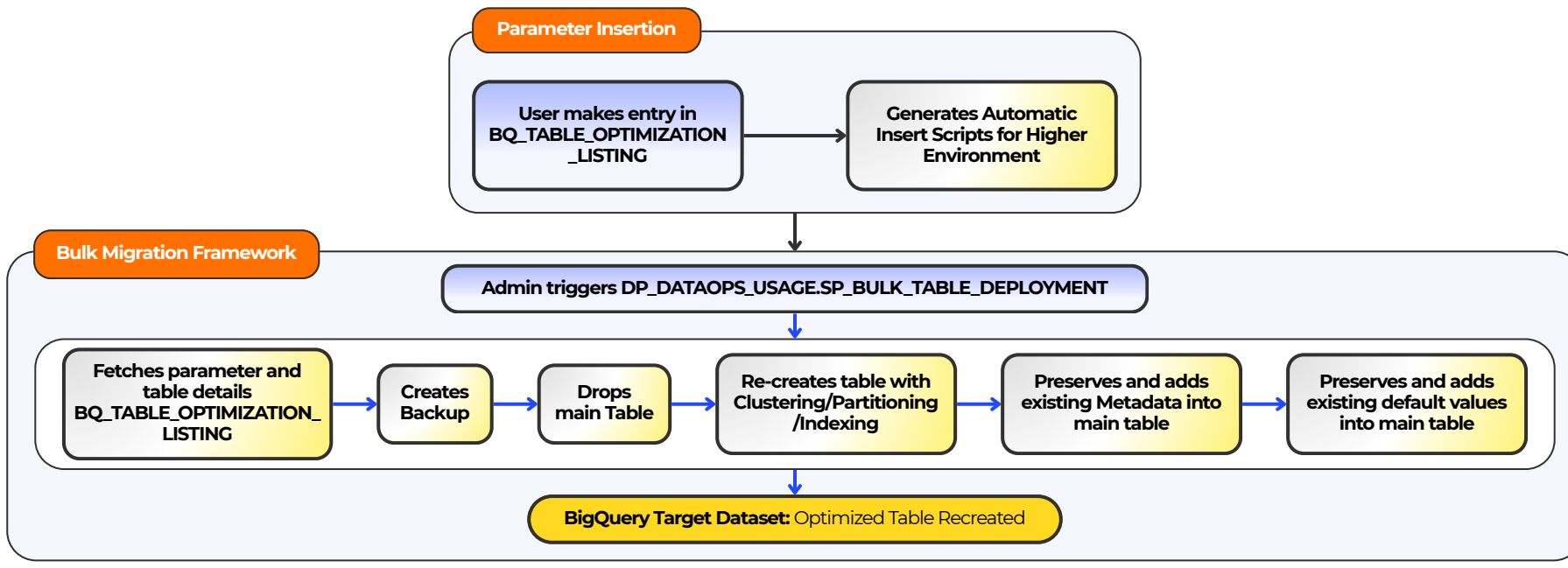
We built an automated framework that reads optimization rules from a central config table and deploys partitioning, clustering, and search indexes across all projects - replacing hours of manual DDL work with a single stored procedure execution.

We also replaced expensive live INFORMATION_SCHEMA scans with lightweight pre-aggregated Inventory Tables, giving the team fast, granular cost and usage visibility at project, dataset, query, and table level.

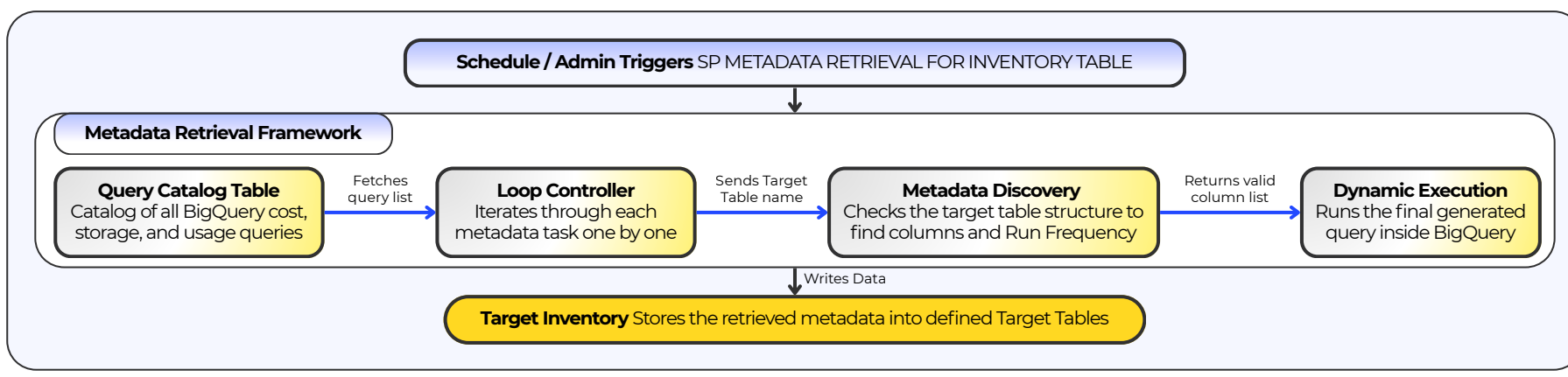
Key Advantages

- Automated, scalable optimization deployment
- Repeatable process with built-in backup handling
- Preserves all existing metadata automatically
- Centralized governance with full deployment history

Bulk Migration Framework



Inventory Framework



Solution

03

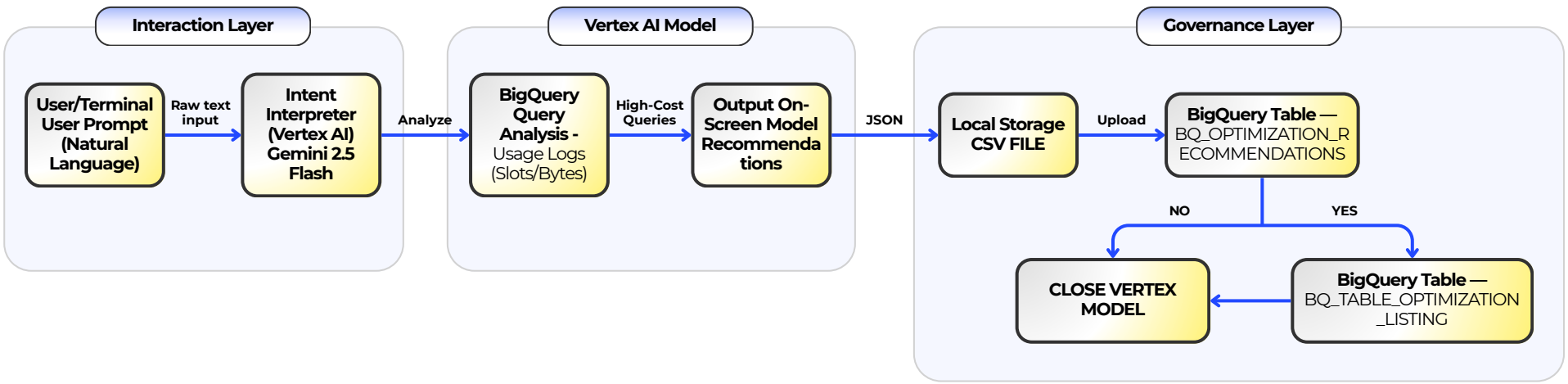
Vertex AI Model for Optimization Recommendations

We deployed a Vertex AI model (Gemini 2.5 Flash) that reads from the Inventory Tables, analyzes expensive queries and base tables, and generates recommendations for partitioning, clustering, and search indexing - feeding them directly back into the Bulk Migration Framework, creating a closed-loop optimization cycle.

Key Capabilities

- Automated cost analysis using historical query metrics
- Partitioning, clustering, and search index recommendations per query pattern
- Preserves all existing metadata automatically

Vertex AI Architecture



Solution

04

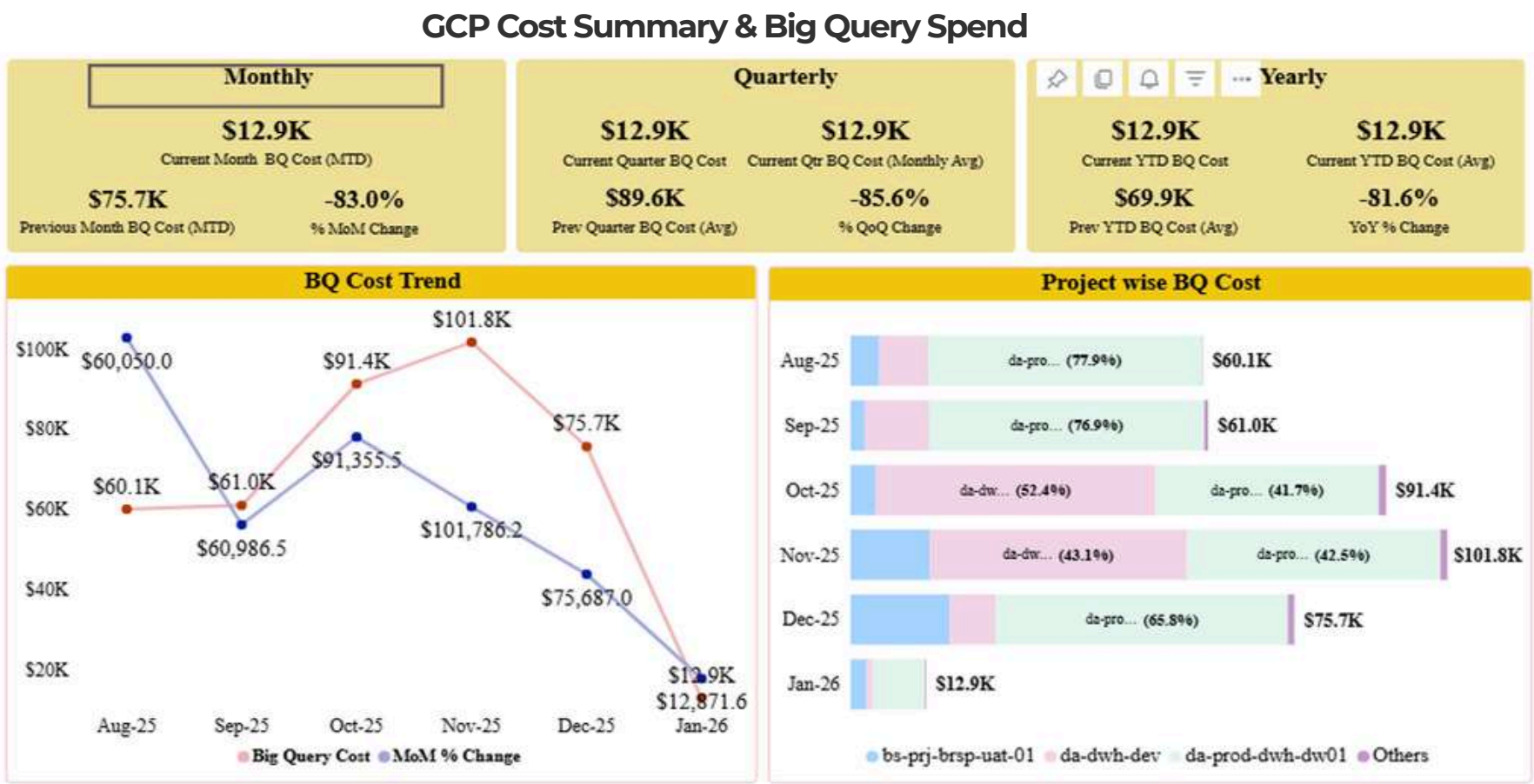
Observability Dashboard

We delivered a centralized dashboard giving leadership and engineering teams a live view of cost, usage, performance, and optimization health - ensuring all progress stays visible and sustained.

Key Capabilities

- Unified spend view across all projects and time periods
- Cost trend comparisons for early anomaly detection
- Breakdown by project, user, and workload for accountability
- Flags high-cost queries, inactive tables, and unoptimized assets

Observability Dashboard architecture



Business Impact

Metric	Result
Reduction in BigQuery cost consumption	**52%** across 91 optimized queries
Estimated BigQuery savings over 3 years	**$325K**
Additional savings from Bulk & Vertex AI frameworks	**$400K – $1M**
Inactive datasets & tables identified	**70K** across 12 projects

Beyond the numbers, the client now has:

- A scalable, automated optimization framework that runs without manual intervention
- An AI-powered system that continuously identifies and acts on new opportunities
- Full visibility into cloud spend, performance, and governance health
- A sustainable FinOps discipline — ensuring savings compound over time, not erode

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About

Polestar Analytics

Polestar Analytics is a leader in **Data, Analytics, AI,** and **Enterprise Planning** helping organizations to unlock intelligent outcomes through our proprietary products like **1Platform, accelerators,** and **services.** Our expertise spans data engineering, data science, agentic and generative **AI,** and advanced planning for **CPG/Retail, Pharmaceuticals, Manufacturing, IT/ITeS,** and **Financial Services.**

Reach out to us today!