

PROJECT ZENITH

Algorithmic Portfolio Optimization Engine (APOE)

Vertex Capital Group | Quantitative Finance Initiative

Date:	August 4, 2026	Status:	Approved
Project Manager:	Sarah Jenkins, PMP	Sponsor:	Marcus Vance, Managing Director
Lead Architect:	Dr. Elena Rostova	Version:	1.0 (Final)

1 Executive Summary

Vertex Capital Group operates in highly dynamic global markets where the speed and accuracy of portfolio rebalancing directly dictate competitive advantage. The purpose of **Project Zenith** is to develop and deploy the *Algorithmic Portfolio Optimization Engine* (APOE). This proprietary system will replace our legacy batch-processing rebalancer, transitioning Vertex to a real-time, multi-asset risk-controlled optimization framework.

By leveraging advanced modern optimization algorithms (quadratic programming, second-order cone programming) and integrating direct low-latency market data streams, APOE will drastically reduce execution slippage and improve risk-adjusted yields. This project aligns with Vertex's 2026 Strategic Vision to maintain technological leadership in quantitative asset management. As outlined by Markowitz (1952) and modernized by Black and Litterman (1992), efficient frontier computation must be dynamic; Project Zenith realizes this necessity.

2 Project Objectives & Scope

2.1 Primary Objectives

The project aims to achieve the following quantitative and qualitative goals:

- **Latency Reduction:** Decrease the portfolio optimization cycle time from 15 minutes to under 500 milliseconds for a universe of 5,000 active instruments.
- **Transaction Cost Mitigation:** Incorporate transaction cost models directly into the optimization objective function, targeting an annual 12% reduction in trading slippage costs.
- **Risk Management Integration:** Enable real-time Value-at-Risk (VaR) and Conditional Value-at-Risk (CVaR) constraints during optimization runs.

- **Scalability:** Support concurrently managing up to 200 distinct portfolio configurations with varying constraint models.

2.2 Scope Boundaries

To ensure project execution remains disciplined and focused, the scope boundaries are defined as follows:

In-Scope	Out-of-Scope
• Development of the core optimization engine using C++20 and specialized solvers. • REST and gRPC API development for integration with downstream execution systems. • Configuration dashboard for portfolio managers to adjust risk parameters. • Backtesting framework spanning 10 years of historical tick data.	• Direct execution routing (APOE will output target portfolios, not route orders). • Integration with retail brokerages (strictly institutional trading). • Frontend mobile application development (APOE dashboard will be web-only). • Proprietary alpha signal generation models.

3 Stakeholders & Governance

The success of Project Zenith relies on a clear governance structure. Table 1 details the core project team and their respective roles.

Table 1: Key Project Stakeholders

Name	Title	Project Role & Responsibility
Marcus Vance	Managing Director	Project Sponsor: Provides funding, strategic direction, and final sign-off.
Sarah Jenkins	Senior Project Manager	Project Manager: Manages timelines, resources, communication, and risk mitigation.
Dr. Elena Rostova	Head of Quantitative Research	Lead Architect: Oversees algorithmic design, solver selection, and mathematical validation.
David Vance	Chief Risk Officer	Risk Advisor: Ensures risk constraints and compliance policies are strictly adhered to.
Robert Chen	Director of Trading Operations	Operations Lead: Coordinates deployment and integration with the execution management system.

The project governance framework requires bi-weekly steering committee meetings led by Sarah Jenkins. Major scope changes or budget allocations exceeding \$50,000 must be formally escalated to the Project Sponsor, Marcus Vance, for approval.

4 Milestones & Budget

4.1 Project Timeline

The project is structured into four distinct phases. Figure 1 illustrates the major milestone schedule for the delivery of APOE.

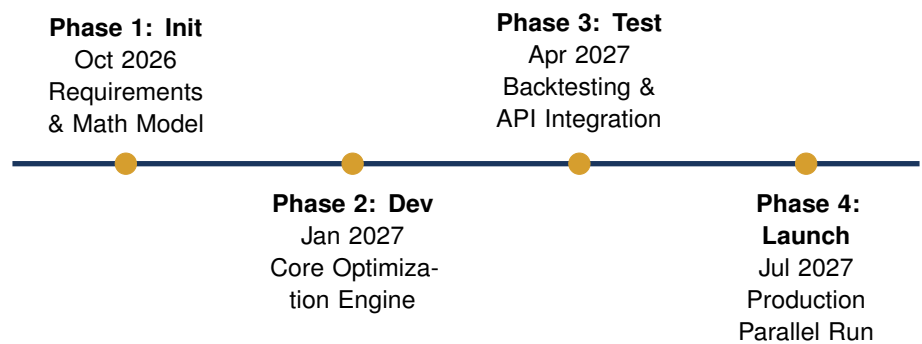


Figure 1: Project Zenith Milestone Roadmap

4.2 Budget Allocation

The total approved budget for Project Zenith is \$1,250,000, allocated across the following resource categories:

- **Internal Quantitative & Dev Personnel:** \$750,000 (60%)
- **Commercial Solver Licenses:** \$200,000 (16%)
- **Infrastructure & Cloud Compute:** \$180,000 (14.4%)
- **Contingency Reserve (Risk Mitigation):** \$120,000 (9.6%)

5 Risks & Approvals

5.1 Risk Assessment

Table 2 outlines the key risks associated with Project Zenith, alongside their likelihood, impact, and mitigation strategies.

5.2 Approval Signatures

By signing below, the stakeholders agree to the terms, scope, and resource allocations outlined in this Project Charter.

Table 2: Project Risk Matrix

Risk Event	Likelihood	Impact	Mitigation Strategy
Solver convergence failure on edge cases	Medium	High	Implement fallback heuristic solvers (e.g., standard quadratic programming) to guarantee a sub-optimal but feasible solution within latency limits.
Real-time data feed latency spikes	Low	High	Deploy dedicated fiber connections to local market centers and use memory-mapped queues for processing.
Integration delays with legacy systems	High	Medium	Design clean gRPC interface boundaries early and use mocked endpoints for concurrent testing.

Marcus Vance

Project Sponsor

Date: _____

Sarah Jenkins, PMP

Project Manager

Date: _____

Dr. Elena Rostova

Lead Architect

Date: _____

David Vance

Chief Risk Officer

Date: _____

References

- Black, Fischer and Robert Litterman (1992). “Global portfolio optimization”. In: *Financial Analysts Journal* 48.5, pp. 28–43.
- Markowitz, Harry (1952). “Portfolio selection”. In: *The Journal of Finance* 7.1, pp. 77–91.