Case Study: Collateral Optimization Using Julia

IQdigitec modernizes enterprise-grade risk management for a $1.4 trillion financial institution.

IQDIGITEC **Swaps and Derivatives**

Collateralized Hedge Optimization

Overview

IQdigitec is a Canadian-based global software and advisory firm delivering mission-critical enterprise systems for major corporations and governments. When a multinational insurance company with over **$1.4 trillion AUM** sought to modernize its legacy collateral optimization platform, they partnered with IQdigitec to deliver a faster, auditable, and future-ready solution.

The Challenge

The client manages complex **non-cleared OTC derivatives** and **swaps** across more than 120 global banking counterparties. Their legacy CAR Optimizer, built in **APL**, struggled with scalability, license costs, and a shrinking talent pool. They needed a new platform that could:

- Rapidly evaluate **thousands of bond instruments** to minimize the liquid assets required for collateralization.
- Handle intricate rules under **ISDA Master Agreements** and **Credit Support Annexes (CSA)**, including "haircuts" and cross-entity lending scenarios.
- Improve governance, transparency, and computational performance while fitting seamlessly into an enterprise-scale environment.

The Solution

After evaluating **Python, R, and Matlab**, IQdigitec's architecture team, led by **Al Wong (Technology Architect)**, **Anurag Agarwal (CTO)**, and **Marcel Joaquin (Corporate Finance Specialist),** selected **Julia** as the optimal platform.
"Julia delivered the scalability and performance we needed to replace legacy APL while preserving speed and flexibility for future models." Al Wong, Technology Architect

Key Advantages of Julia

- **High performance:** Combines the ease of interpreted languages with the speed of compiled ones.
- **Open source:** Constantly updated with an active global community.
- **Readable & auditable:** Clear syntax that regulators and in-house developers can easily maintain.
- **Cloud-ready:** Simple transition from private to public cloud environments.
- **Enterprise-fit:** Enables faster compute times, improved optimization logic, and better governance.

Implementation & Results

- **Legacy conversion:** 600 lines of APL migrated to Julia in just **4 weeks**.
- **Performance:** Julia code executed **equal or faster** than APL, with headroom for additional optimization.
- **Scalability:** Capable of processing significantly **larger datasets** for multi-counterparty scenarios.
- **Maintainability:** Simplified scripting allows analysts to run ad-hoc collateral simulations independently.
- **Governance:** Clear, well-documented code supports internal audit and regulatory reviews.

"The use of Julia delivered both better governance with more auditable code, documentation completeness, and performance benchmarks that exceeded expectations." Marcel Joaquin, Corporate Finance Specialist

Outcome

The new **Collateralized Hedge Optimization** system achieved measurable improvements in efficiency, governance, and cost control—while providing a foundation for the client's roadmap to modernize other legacy applications.
"Julia combines the best of both worlds—ease of use and compiled-level performance." Anurag Agarwal, CTO

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