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Experience

SENIOR SOFTWARE ENGINEER (L4) | VALKYRIE TRADING | CHICAGO, ILLINOIS | FEB 2020 – MARCH 2025

Catastrophic Risk Scenario Analysis (Randgrid) | C++ (Linux Server) and C# (Windows Server & Frontend) | Risk Management

- Spearheaded the development of 'worst-mode', a what-if scenario analysis service focused on computing and displaying catastrophic slide (PnL) risk to traders given a set of volatility shocks and future movements at distinct increments surrounding the underlying future price; feature-set required additions to several multi-threaded distributed asynchronous systems (servers) written in C# and C++, aggregate risk metrics streamed to thin WPF client using gRPC.
- Utilized various third party libraries such as alglib and nlohmann when converting Python code into C++ and parsing JSON test data provided by the quantitative research team; followed TDD best-practices in writing unit tests (using googletest) to verify that C++ risk calculators outputted values identical to that of their Python counterparts; worst-mode risk used extensively by Head of Risk in assessing catastrophic risk at parent (summation) and child (individual) portfolio levels.

Automated Future Spread Trader (Hati) | C++ (Linux Server) | Automated High-Frequency

- Completed the server-side development of a direct-market access mean-reversion market-making strategy on a tight-timeline focused on concurrently trading the nearest future spread (roll) for a distinct set of configurable products groups. In doing so, employed several techniques such as core-pinning (isolcpu, taskset, pthread_setaffinity) ensuring order management and market data related threads remained 'hot', monopolizing their respective NUMA cores.
- Collaborated with a senior developer, responsible for frontend development, in architecting the communication layer used to displaying order state and receiving algorithm-altering parameter changes to / from traders. Hati was highlighted as a money-maker in the firm's quarterly town hall; increased market share in ES and ZN product groups by 33% (relative change).

Timeseries Market Data Aggregator (MDA) | C# (Linux Server) | Big Data

- Developed a server application responsible for snapshotting, binning, and persisting firm-generated theoretical valuations, market-by-price orderbook state, and market trades (open, high, low, close) at 1-second intervals for futures and future spreads of interest into Cassandra. Application configured to support and persist multiple product groups (ES, GC, ZN, ZB, etcetera) in parallel, making judicious use of C#'s task parallel library and asynchronous programming. Application has become a core part of the firm's data infrastructure; timeseries data consumed daily by the quantitative research team.

ES-SPX Underlying Adjustment Model Service (Skuld) | C# (Windows Server) | Option Pricing

- Worked alongside the Head of Quant Research, leading the creation of a model-adjustment parameter service used to produce an 'underlying adjustment' applied to CME ES futures in pricing CBOE SP(X) equity options as their underlying for various option class expirations; server both streamed said underlying adjustment to relevant services (e.g. GreeksServer, used to calculate option class expiration-level risks) in a pub-sub fashion, and persisted computed values to Cassandra in five second intervals for research purposes. Service (Skuld) is currently the backbone of our SP and SPX equity options trading operations.

Open-Source Contributions

THE MONERO PROJECT | C#

- Wrote a C# library for Monero, the largest privacy-preserving cryptocurrency by market capitalization (3 billion USD), which communicates with the coin's native wallet and daemon clients via its JSON-RPC API.
- Featured on Monero's official website as the only audited C# library being used by over 8000 applications worldwide.
- Contributed half a dozen PRs related to code quality, feature expansion and bug fixes (notably #**9838**, #**9842**, #**9847**, #**9875**).

MDP3 AND SIMPLE BINARY ENCODING (SBE) WIRESHARK PLUGIN | LUA

- Applied several fixes to a SBE network-data packet parsing code-generator maintained by the Open Markets Initiative used for inspecting both UDP (market data) and TCP (order entry) traffic in PCAP files; Wireshark plugin utilized by dozens of trading firms for inspecting network traffic, repository cloned several thousand times since contribution.

Additional Information

- **Technologies, Tools and Protocols:** C# 10, C++ 17, q/KDB (limited experience) | gRPC, Protobuf | MySQL, Cassandra, InfluxDB | GitLab, VS2024, VS Code, Vim | Grafana, Artifactory, Conan, Rundeck, Sensu, Kibana | SBE, FIX, MDP3, PITCH
- **Interests:** Motorcycles, boxing / sparring, men's fashion, crypto, retro video game collecting, sci-fi films/novels.

Education

QUEEN'S UNIVERSITY | KINGSTON, ONTARIO | CLASS OF 2018 | 4.11 / 4.30 CUMULATIVE GPA | TOP 3%