MACD + The Sim Theory Scheduler: A Case Study

Goal

In June 2024, Simulation Theory needed a good candidate algorithm to demonstrate exactly how much a stand-alone implementation of the Sim Theory Scheduler can improve upon publicly available, common implementations of said algorithm.

A MACD algorithm[1] was chosen because it meets the requirements in the following ways:

- ➔ Widely used
- ➔ Well documented
- ➔ Used in situations where throughput is critical

Hypothesis

A Sim Theory team member can implement the MACD algorithm using the Simulation Theory Scheduler and C API in a way that would outperform common MACD implementations.

Implementation

This implementation of the Scheduler was stand-alone and not integrated into or constrained by an existing code base, so this testing demonstrated exactly how efficient the Scheduler is with no limiting conditions.

Additionally, this implementation was written in C in order to test and verify the recent transition to a pure C API. This testing was designed to facilitate future development and compatibility across more programming languages.

All testing was completed on an AMD Ryzen 9 7950x, Windows 10 system with 64GB of RAM.

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[1] Moving average convergence/divergence (MACD) is a technical indicator to help investors identify price trends, measure trend momentum, and identify entry points for buying or selling.
Moving average convergence/divergence (MACD) is a trend-following momentum indicator that shows the relationship between two exponential moving averages (EMAs) of a security's price. MACD was developed in the 1970s by Gerald Appel, and is one of the most popular technical tools, readily available on most trading platforms offered by online stock brokers.

Results

Within a 2 day development lifecycle, a member of the Simulation Theory team was able to fully implement the MACD algorithm using the Scheduler and C API as well as gather enough data to show an interpretable result.

Trading View Data

The testing data set used while running the commonly available MACD implementation consisted of the following:

- ➔ 20 year history of 1 stock
- ➔ @ a 5 minute resolution
- ➔ 5 days a week minus federal holidays
- ➔ 4am - 8pm
- ➔ Correcting for market closures

- ➔ Approximately **934,399 samples**
- ➔ Approximately **35MB of data**

Execution time: about 15-18 seconds

Simulation Theory's Scheduler Data

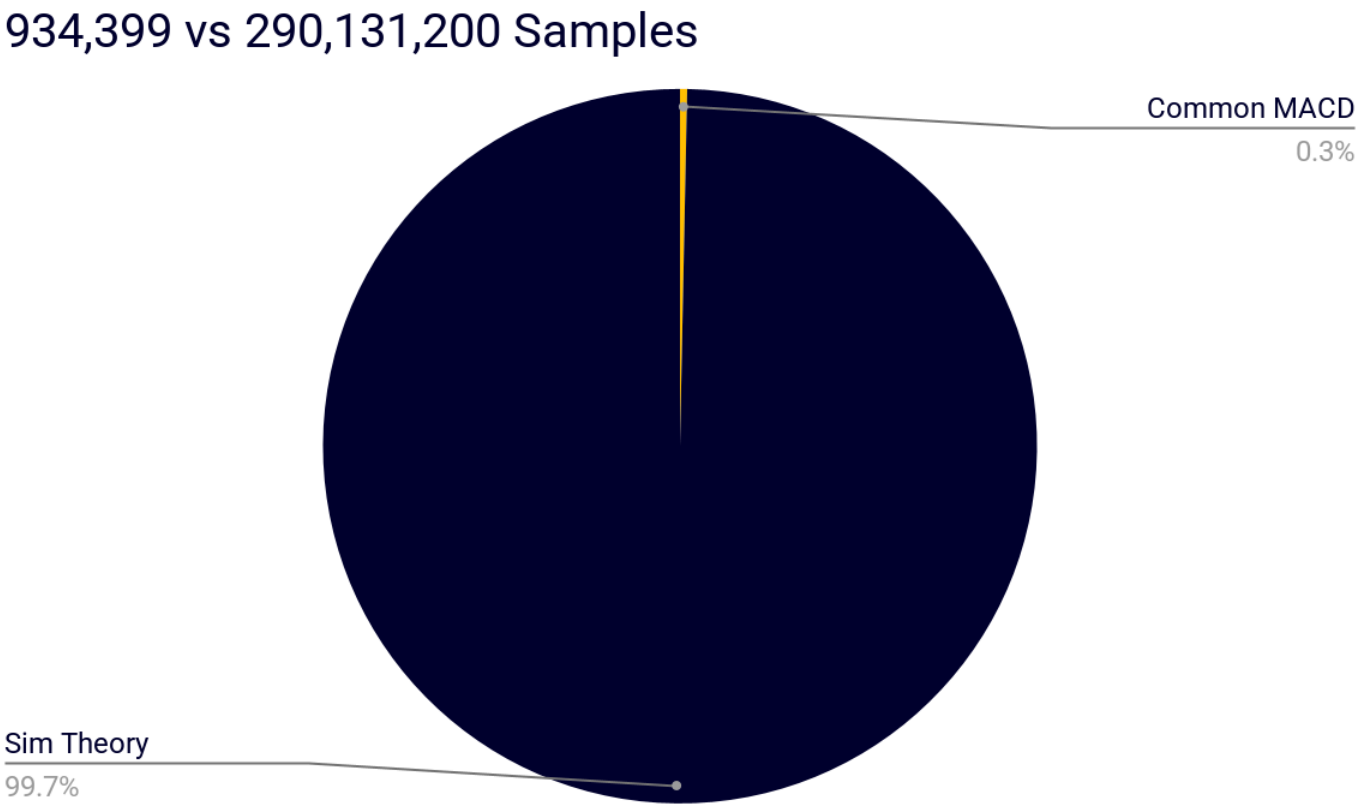
The testing data set used while running the Simulation Theory implementation consisted of the following:

- ➔ 20 year history of 3 stocks
- ➔ @ 10 second, 30 second, 1 minute, and 5 minute resolutions
- ➔ 7 days a week
- ➔ 24 hours a day
- ➔ No market closure correction

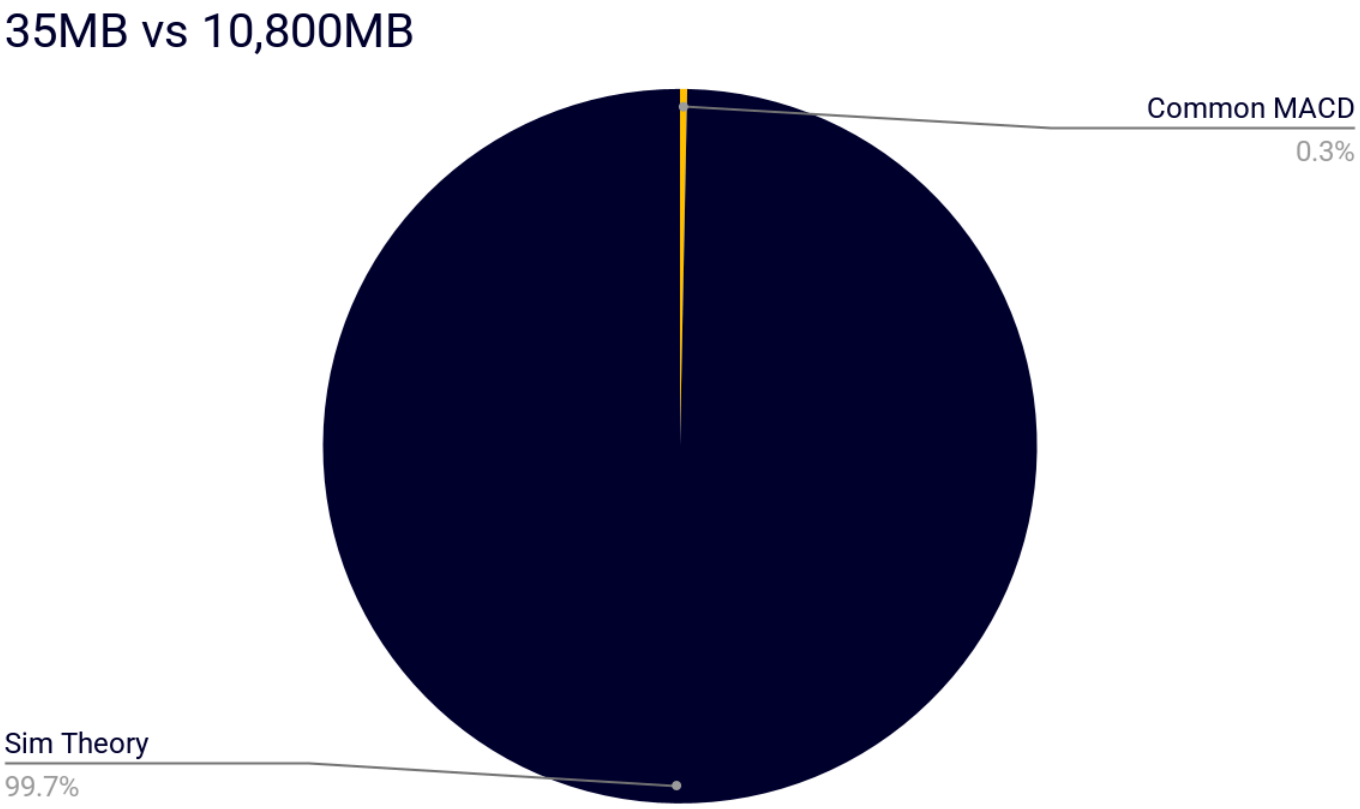
- ➔ Approximately **290,131,200 samples**
- ➔ Approximately **10.8GB of data**

Execution Time: about 2.5 seconds

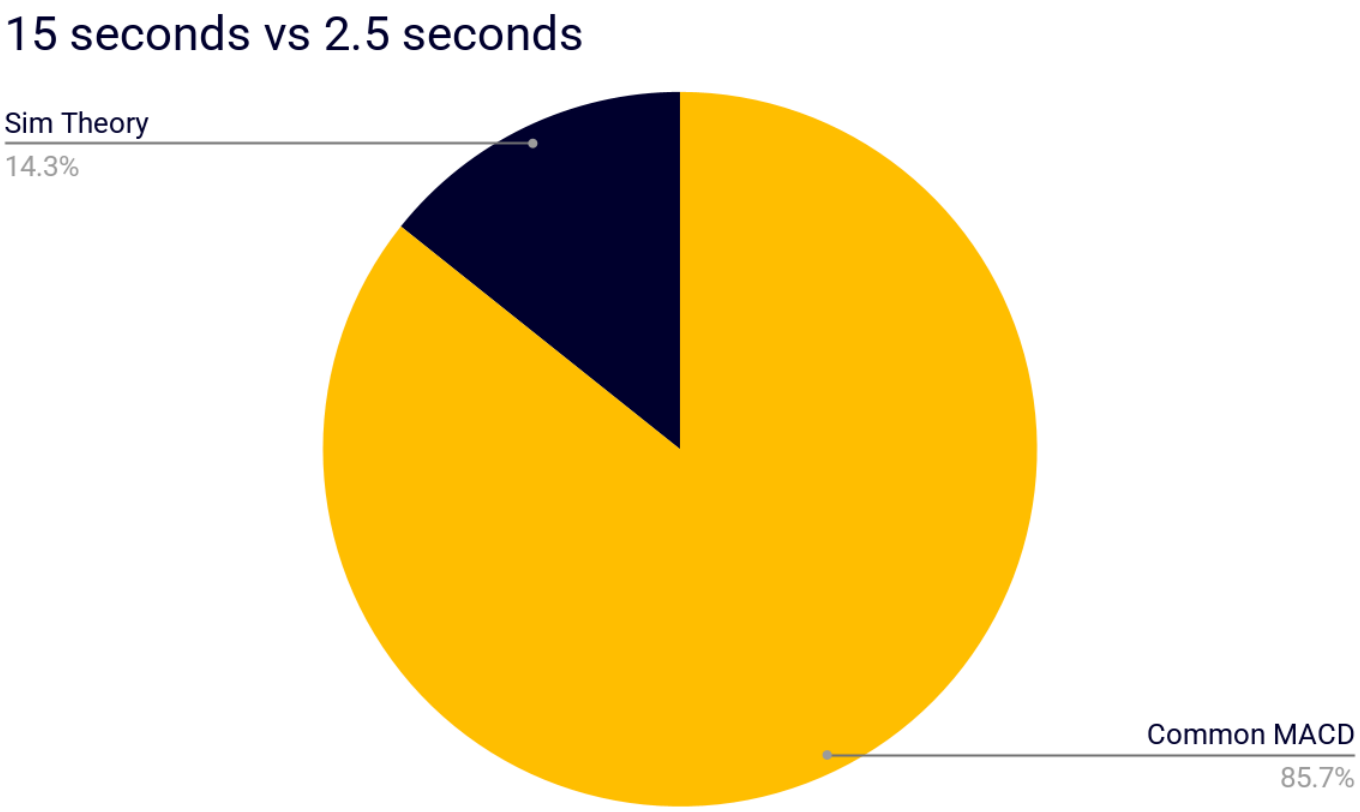
Visualization of Total Samples Processed by each Implementation



Visualization of Total Data Processed by Each Implementation



Visualization of Total Processing Time by Each Implementation



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