Aether Engine

Aether Engine is a spatial simulation application built on Hadean. It scales across different processors and physical machines, utilising more computing power as the simulations grow in complexity and size.

Muxer

Muxer provides a framework for optimising the communication flow of geographically distributed clients and compute clusters. It supports data aggregation, buffering, prioritisation and conditional routing of traffic through customisable out-of-the-box algorithms.

FEATURES

- Distributed load balancing
- Extensible simulation framework
- Parallel computation across a distributed network
- Optimised bandwidth / netcode
- Simple API

About Hadean

The Hadean Platform implements a unique process model that transforms the performance, reliability and scalability of cloud computing. It underpins a number of libraries that solve intractable distributed problems, instilling a set of core properties that allows them to run at massive scale. These libraries act as an interface for developers looking to build out complex, high-performance applications across a distributed cloud and edge network.

Agent Based Modelling in Finance

Modelling and simulation have undoubtedly become critical functions of the financial world, with algorithmic trading, credit scoring and capital budgeting, to name but a few, becoming greatly enhanced. Computer software and the flow of Big Data have opened realms of possibilities for analysts, who can now make calculations using real figures that were once thought unobtainable. However, with an increasingly connected world comes the influence of vast numbers of new agents and their individual effects. This factor now necessitates the specific use of agent based simulation to make sense of the emergent behaviour and resulting consequences.

Often financial modelling takes a top down approach, by applying macroeconomic theories and factors to particular situations. In cases of emergence, this is ineffective, as it has to be modelled from the ground up, with the motivations and actions of the players taking centre stage. Markets often exude a volatile nature, resulting in occurances such as flash crashes (2010, 2013, 2017), or even artificial surges like the recent GameStop fiasco. By modelling the agents involved, fluctuations such as these are better understood.

Agent based simulation is a natural solution for addressing the emergent scenarios, ascribing data to each of the interacting agents. However, reflecting the myriad of motivations and interactions of agents is computationally demanding and moreover, often unpredictable. Their complicated origin can make emergent factors seem mysterious or even counter-intuitive, meaning that simulations have to be equipped to deal with entity complexity and dynamic shifting of data - something which existing compute and simulation models are ill-equipped to handle.

Challenges Facing Agent Based Modelling in Finance Today

- Current architecture is ill equipped to deal with unpredictable surges in demand common to agent based models, restricting scale and detail of simulations
- Large data sets cannot be effectively aggregated from different sources, limiting the detail of simulations
- Re-running simulations and tweaking variables from checkpoints is unfeasible, reducing interactivity and giving a one-dimensional viewpoint that fails to represent multiple iterations
- Large-scale simulations require expensive specialist engineering expertise
- Poor latency / connectivity and reliance on mobile networks limits the accessibility and participation of simulations

> Creating high-fidelity, scalable, low-latency and widely-distributed simulations presents many technical challenges... Hadean has developed a set of technologies that will support scaling up these types of simulations fully leveraging existing cloud infrastructures.
>
> Distec Grand Final, Judge's Appraisal

HADEAN

Benefits of Hadean

Massive and Complex Simulations
Create massive scale simulations that thoroughly emulate the intricacies of financial markets and involve millions of entities, providing far greater insight to influence decision making

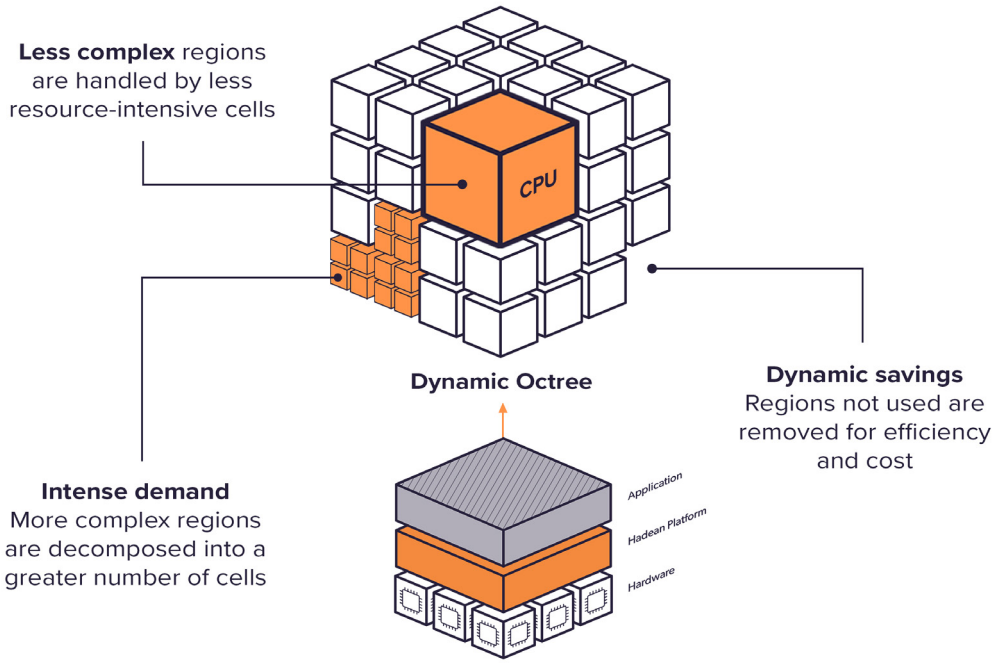
Dynamic Load Balancing
Resource is dynamically allocated to the simulation, ensuring stability despite unpredictable and rapidly changing circumstances

High Performance
Repeat simulations multiple times from checkpoints while adjusting variables to analyse situations from different angles

Low-Latency Data Aggregation in Real Time
Channel data from multiple disparate sources into one architecture, greater reflecting the complexities of modern markets

Cloud Nativity
Integrate existing tools into a cloud-first architecture and let them scale without complex reengineering

Unrestricted Accessibility
Let thousands of concurrent users join and interact with the simulation



Find out more

Download The Hadean Architecture whitepaper and discover how to create simulations of unprecedented size and complexity.

https://hadean.com/project/the-hadean-architecture-whitepaper/

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