AGENT-BASED MODELING

Simudyne, Dell & Cloudera

Efficiently generate Risk Scenarios to improve decision making

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Industry
Financial Services

Website
Simudyne.com

Company Overview
Simudyne is a simulation technology company. It uses advanced analytics and AI alongside agent-based modeling and simulation to help institutions, exchanges and governments solve complex problems and make better decisions.

Product Overview
Simudyne's technology is the only enterprise-ready simulation platform certified to run on Cloudera's hybrid data cloud platform. Using Java or Scala, Simudyne helps modelers, data scientists and quants to build models that reflect the complexity of the real world. With Simudyne, you can massively scale your computer simulations while efficiently collaborating through a unified platform.

Solution Highlights
Cloudera has partnered with Simudyne to jointly bring a suite of advanced computational simulation capabilities to financial firms.

- Create high fidelity models of complex financial markets
- Run simulations at massive scale
- Evaluate and stress-test decisions in a safe environment
- Run in the cloud, on premises or in a hybrid environment
- Fully integrated into your big data platform

Scenario testing is used by the Bank of England as part of their latest stress testing approach to assess the resilience of the UK banking sector. [2]

Risk Scenarios and Disclosures Demands are on the rise

Enhanced scenario analysis is a critical component of a firm's risk management strategy. As highly dynamic events unfold across the globe in social, health and political arenas, economic implications are under constant pressure. Ongoing stress testing requirements issued by regulators aim to help preserve the stability of the financial sector. For example, the latest stress tests issued by the Federal Reserve[1] are intended to maintain oversight and ensure capital requirements. Another evolving area is climate risk. There is increased pressure for firms to provide disclosures on progress towards climate goals. With the increased interest from corporates and scrutiny by regulators, institutions need to better model, measure and manage the economic and financial effects of climate change. Whether assessing short term or longer-term risk, firms need the ability to generate scenarios to improve insight into the range of impact and potential strategies available to address the inherent commercial risks and opportunities in the years ahead.

Better Assess Market Dynamics with ABM

Agent-based Models (ABMs) are computer models for simulating the actions and interactions of autonomous elements (such as organizations, groups, or individual people). It is widely used in science to search for explanatory insight into the collective future behavior of elements who obey (or may disobey) rules. Each element (or agent) is an entity which may be modified to assess its resulting impact on a complex system, such as a financial market or the planet's climate. All act with realistic behaviors to produce collective outcomes that may not be discoverable with traditional modeling techniques.

The strength of these models is that they show how even very simple individual behaviors can combine to form complex outcomes observed in the real world.

When combined, machine learning and agent-based simulation are highly complementary. They better capture the dynamics and interactions in complex systems that change over time. Simulations are a critical tool for managing risk, capital markets trading, portfolio management, marketing and policy making because they:

- Provide a more robust and holistic view of possible future outcomes
- Offer a solid understanding of the key factors and dynamics underlying these outcomes

Scenarios generated using ABM provide the insights banks and asset managers need to measure and manage risk.

Financial Services Use Cases

Some sample business areas that are improved by ABM include:

- Balance Sheet & P&L Forecasting
- Simulating Credit Risk
- Climate Risk Management
- Simulating Equity Markets
- Mortgage Market modeling
- Central Clearing Party Model
- Portfolio Management

DATA SCIENCE AND AGENT-BASED SIMULATION

About Dell
Dell and Cloudera have collaborated with Simudyne to jointly enable the Simudyne solution on Dell EMC PowerScale.

PowerScale was specifically designed to help customers bring much needed structure to their unstructured data. PowerScale brings new levels of flexibility, manageability and protection to support any data workload, simplify management at scale and protect data at scale.
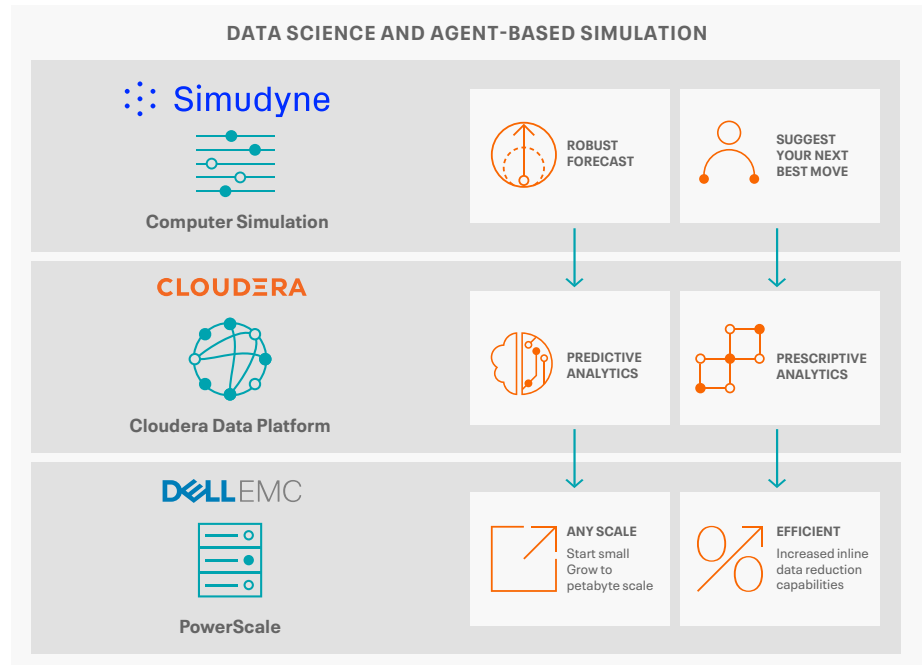
About Cloudera
At Cloudera, we believe that data can make what is impossible today, possible tomorrow. We empower people to transform complex data into clear and actionable insights. Cloudera delivers an enterprise data cloud for any data, anywhere, from the Edge to AI. Powered by the relentless innovation of the open source community, Cloudera advances digital transformation for the world's largest enterprises.

Learn more at cloudera.com

An ABM Partnership

Technology advancements in the last ten years, such as improved processors, faster and more cost-effective storage, and cloud computing, have made feasible the widespread institutional use of agent-based modeling and simulation. These developments are particularly relevant for larger and more complex ABMs that combine variables to measure risk at the balance sheet and portfolio levels for banks and asset managers. These comprehensive models are increasingly critical for estimating exposure for institutions – credit, climate, counterparty, etc. The added benefit is that the models can also be used to evaluate scenarios that explore the potential feedback effects of mitigation strategies and regulatory policy variation.

Simudyne, a simulation technology company is natively built on Cloudera's hybrid data cloud. The solution offers a suite of advanced computational simulation capabilities to financial firms.

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Leveraging Dell EMC PowerScale, firms can execute Agent-Based Modeling with greater efficiency.

- Scale storage when data growth outpaces compute with separated compute & storage
- Minimize data replication and avoid creating data silos
- Improve chargebacks and reduce datacenter footprint with lower hardware requirements, improving TCO

In an uncertain world, Agent-Based Modeling enables firms to create scenarios to better understand risks and adjust strategy accordingly. To learn more about how Simudyne can be used in areas such as central counterparty risk, market simulation or climate risk modeling, visit simudyne.com.

Sources
[1] https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20210212a1.pdf
[2] https://www.bankofengland.co.uk/prudential-regulation/publication/2021/june/climate-related-financial-disclosure-2020-21