DLT 2.0: IT'S ALL ABOUT SCALABILITY

Mykola Maksymenko

softserve

Distributed ledger technology (DLT) is changing the way leaders make transactions, create contracts, and conduct the overall business. But a major problem is on the horizon for many DLT solutions: scalability. Many DLT solutions came about without an end-game or a goal in mind, and simply grew. Take Bitcoin, a cryptocurrency reliant on DLT's blockchain. Bitcoin, for all of its popularity, was not made for scalability, and as its popularity has grown, its speed has lagged considerably. For example, while the Visa network is capable of handling 24,000 transactions per second, the Bitcoin network is limited to approximately five.

Part of this problem stems from a lack of predictability within the given DLT structure. After all, how can one predict the direction of a solution that is built, quite literally, block by block?

But, while evasive for many, creating a scalable DLT solution is possible.

In this white paper, we will address solving problems of scalability within DLT solutions by using agent-based modeling as a predictive tool.

Applications for DLT

There are many applications for DLT, from identity protection and security, to real-time payments and banking interoperability. The primary benefit of DLT is its immutable storage, which keeps records transparent and unchangeable. DLT is efficient and transparent. It enables new (distributed) functionalities and removes the need for a third party. Additionally, cryptocurrencies or tokens are used for payments, facilitating various transactions and automatically covering the cost of system maintenance.

But even with all the benefits that DLT has to offer, too often scalability is missing. What happens when the network grows? Can the infrastructure keep up with the demand?

To ensure the network is sustainable, businesses should start with the end goal in mind and work backwards. When too much focus is placed on the immediate mechanics of individual transactions and network participants, businesses often fail to recognize how these solutions will evolve. And disregarding the long-term outlook causes a larger problem as interactions become increasingly complex.

Long-term predictability can be difficult to achieve without the right knowledge, and self-organization may lead to the sudden collapse of the entire network.

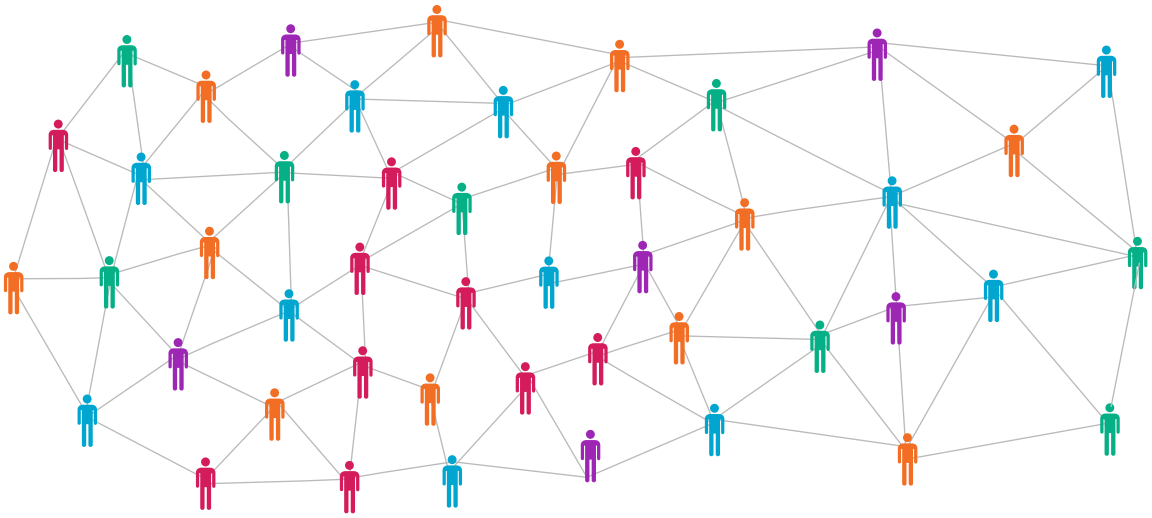
How can a business ensure long-term scalability with DLT? The answer is agent-based modeling.

Agent-based modeling

Agent-based modeling (ABM) is a powerful simulation modeling methodology that has existed for decades but applying it to DLT is a relatively new concept.

ABM leverages reverse engineering. However, on a higher level, it provides a detailed simulation of the business ecosystem. The simulation is composed of a collection of autonomous decision-making entities called agents which interact via a prescribed set of rules. For various systems, these agents are formed from a variety of groups as diverse as entire households, institutional investors, and even individual customers.

ABM accommodates a wider range of developing behavior than conventional models. It provides a natural description of a system, linking the behavior of individual agents together to deliver results that are comprehensive and dynamic rather than linear and static. ABM is flexible and proven to deal with emergent phenomena in a number of scientific areas. As a result, it is used by more and more businesses.



The application of ABM to DLT to simulate scalability is a natural step. Agent-based modeling relies on looking at larger, dynamic patterns of the way different components interact, producing simulations that are very near to real outcomes.

With this kind of complex analytical capability:

- Predictability becomes more sophisticated.
- Individual agents, possible transactions, and strategies are well-defined as nodes on the blockchain.
- Actions are discrete and the system becomes naturally scalable.

Simulating a business network and all transactions at a larger scale allows for checking ongoing stability and efficiency. This means businesses can avoid the surprising collapses and unpredictable events that are common with DLTs that have not considered the longterm implications of growth.

There are two facets of ABM simulations:

1. Discrete event simulations that model step-by-step transactions in the DLT, and
2. Object-oriented programming that models every participant on the network as an object, each having properties and methods to interact with the environment.

Then it's a matter of utilizing insights from statistics, behavioral economics, game theory, and artificial intelligence to make the behavior of the "agents" in the simulation as close to real life as possible.

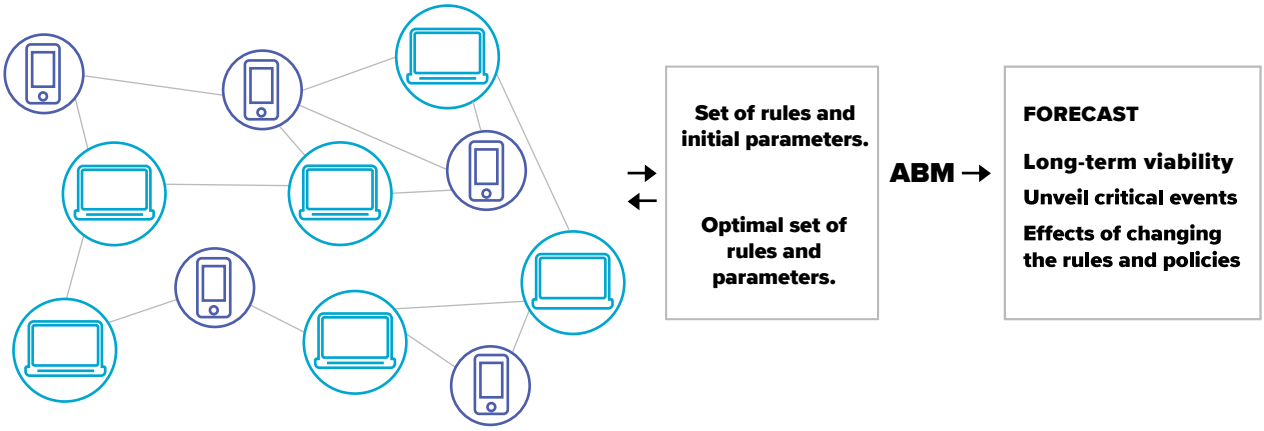
Proceed with caution

With such great capabilities, why isn't ABM always applied to DLT structures?

First, the complexity of a successful DLT structure implemented through ABM rests on technological expertise. Despite the value of the methodology, the applicable expertise to implement it is a rare commodity, worldwide. Navigating the nuances of DLT through ABM relies on an advanced knowledge across a spectrum of fundamental disciplines, including statistical physics or bioinformatics.

At SoftServe, our PhD-level experts are top in their field, with connections to top academic groups. This allows us to deliver effective ABM-driven DLT solutions for our clients.

Financial services managers should also consider the importance of setting expectations and carrying out due diligence to drive the ultimate solution. While this may seem obvious, extra care should be taken due to the nature of DLT structure, supporting platforms and technologies, and approach to ensure all parties have the same achievable goal in mind. The lack of a fixed goal or trajectory is often why DLT solutions fail, a point that cannot be overemphasized. This is why ABM is so crucial. To avoid financial and functionality risks it is crucial to test and prove, rather than to make assumptions in strategy, design, and planning.



Let's review DLT in action in two SoftServe case studies:

Commodity Trading

Commodity trading depends on managing a complex system of letters of credit between counterparties, which is costly and extremely time-consuming. SoftServe's work with one client in particular proved the sustainability and scalability as the commodity exchange grew.

The client used blockchain to alleviate information asymmetry and the cost of transaction—the leading causes of trade finance gaps. The solution has a number of benefits. The DLT-based platform is an alternative to the conventional method of using letters of credit within commodity financing. Eliminating letters of credit only requires a nominal commission for the transaction and reduces management time.

Ultimately, the solution means trades can be executed more quickly. Commodity trading can be constrained by time if the commodity has to be delivered at a particular date. If the letter of credit cycle is too long, the trade will not happen—DLT resolves this issue.

Considering the number of institutional investors and variously-sized enterprises, scaling the entire ecosystem is advantageous to all parties. Yet scaling has to be stable and predictable. The solution was to use ABM to study and assess transaction loads and ensure the scalability of the financial ecosystem.

DLT also increases availability. Banks tend to focus more on high-volume borrowers due to regulatory requirements. As a result, small import/export firms can experience difficulty accessing financing via traditional methods. DLT creates a bridge to a larger number of firms of various sizes, opening the gateway for new business in a scalable format.

Adjoint

The possibilities of DLT aren't limited to commodity trading. ABM-based DLT is applicable across the spectrum of financial services business, from transactions to loans, to insurance. A working model allows for the detailed understanding of all aspects of a projected system. The model includes insights on the possibilities of the system, the investigation of the optimal set of rules and transactions, and the discovery of dynamics and critical events in various stress scenarios.

SoftServe **partnered with Adjoint** to apply this methodology, accelerating automation through smart contracts to improve transactional privacy and security. Adjoint's Uplink is an open-source platform designed to quickly deploy, maintain, verify, and execute smart contracts globally on a private, permission-based distributed ledger. SoftServe works with Adjoint to help customers assimilate and on-board the Uplink platform effectively.

By using smart contracts fueled by blockchain, the platform helps propel the development of domain-specific distributed applications to reduce costs, mitigate risks, and improve margins.

Scale for the future

ABM ensures scalable DLT. Through complex simulations, ABM-based DLT structures are able to predict immeasurable scenarios that feed into the overall value of the ledger, reducing surprises while promoting system sustainability. By moving beyond linear predictions, ABM intuitively models nonlinear and chaotic behaviors at the individual agent level. This benefit carries a considerable amount of value. DLT solutions powered by ABM enable predictability that is so often unattainable by those launching into the technology.

Unsure how your DLT solution will scale? **Contact SoftServe today** to discuss how ABM and DLT can help your business.

ABOUT US

SoftServe is a global digital authority and consulting company, operating at the cutting edge of technology. We reveal, transform, accelerate, and optimize the way large enterprises and software companies do business. With expertise across healthcare, retail, media, financial services, software, and more, we implement end-to-end solutions to deliver the innovation, quality, and speed that our clients' users expect.

SoftServe delivers open innovation – from generating compelling new ideas, to developing and implementing transformational products and services. Our work and client experience is built on a foundation of empathetic, human-focused experience design that ensures continuity from concept to release.

Ultimately, we empower businesses to re-identify their differentiation, accelerate market position, and vigorously compete in today's digital, global economy.

Visit our **website**, **blog**, **Facebook**, **Twitter**, and **LinkedIn** pages.

USA HQ

201 W 5th Street, Suite 1550
Austin, TX 75703
+1 866 687 3588

EUROPEAN HQ

One Canada Square
Canary Wharf
London E14 5AB
+44 (0)800 302 9436

info@softserveinc.com
www.softserveinc.com

softserve