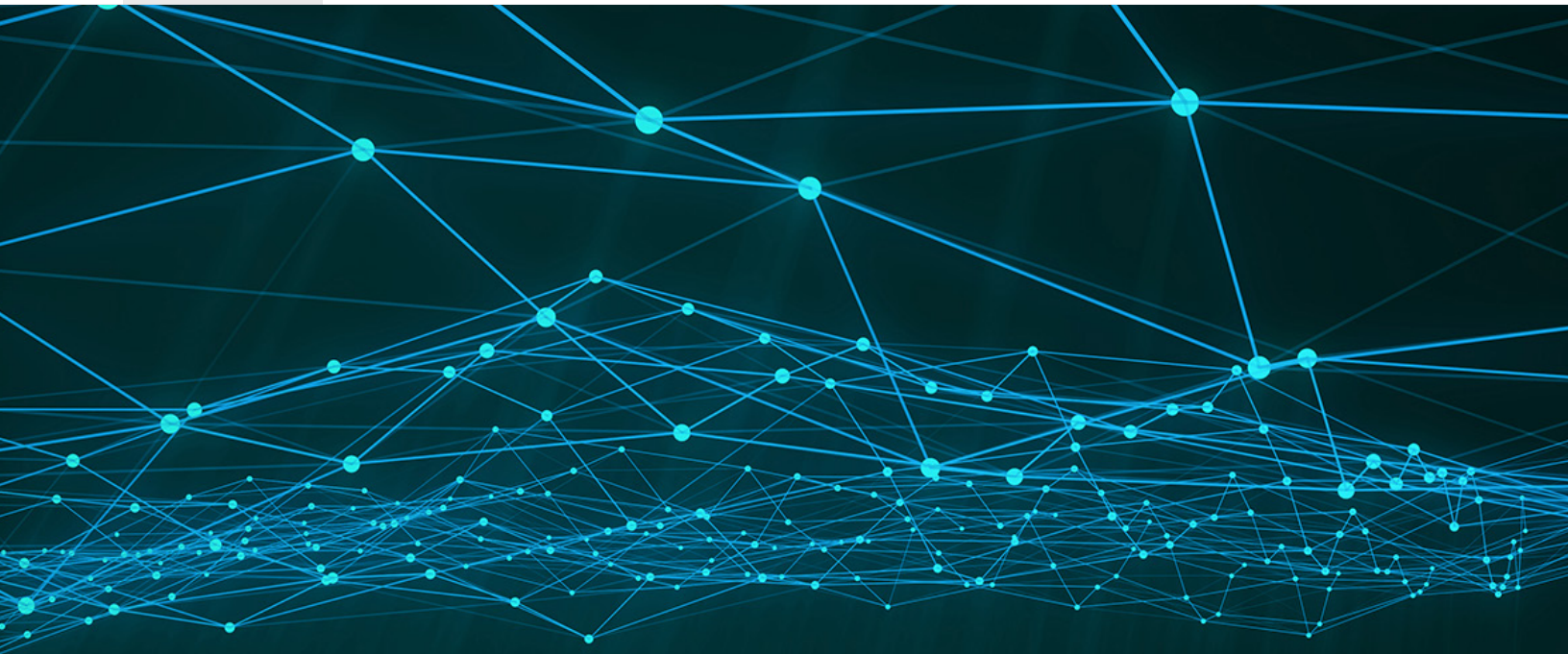
One Network Enterprises™



Bridge to Blockchain

A Platform for Orchestrating Multi Enterprise Business Networks

Blockchains are enabling multiple parties to engage in trusted supply chain transactions and data relationships that were difficult or near-impossible with enterprise-centric, "walled garden" and EDI approaches of the past 15 years. In this paper, we explain why multi-party business network technology is an essential part of the solution for global businesses.

By Geoffrey Annseley

One Network Enterprises™

INTRODUCTION

By now most forward-looking corporate business leaders, IT leaders and business consulting companies realize that the 3rd generation of blockchain networks fundamentally works, and sooner or later is going to impact every market and corporation in one or more important dimensions. Scaling issues are quickly disappearing and transaction costs on many networks are plummeting.

The time for experiments to validate capability is coming to an end. More and more companies are making bold statements around their vision for utilizing block chains, many large iconic cloud companies are in stealth mode buying Blockchain companies and pouring money into their own Blockchain research. Some are motivated by fear of disruption while others see new business opportunities and a once in a lifetime chance to get an edge on the competition or move into previously impenetrable markets. Yet others are struggling with the basics of how Blockchain can help their business or just flat out ignoring the technology hoping that it will not impact their business for years to come. Many organizations are still completely unaware of Blockchain based organizations already targeting their business models directly armed with advanced well-funded Blockchain platforms. Many decentralized Blockchain based organizations aim to completely disrupt brittle, complex B2B and B2C processes in both technical and economic dimensions.

The problem is ERP, Planning, and B2B systems were not designed to operate in the Blockchain-based multi-party network world.

One of the core ideas behind the vast majority of Blockchain networks and projects is to bypass the “middleman”, including many “enterprise and cloud services”, combined with enabling parties at any location in a business network to transact directly with each other and simplify business processes. But the applications that populate today’s corporate IT landscape were designed around servicing one centralized single corporation at a time. It is no surprise then that the value of moving enterprise applications and single company business processes that involve one party to a Blockchain network is small or negative. Processes that involve two or more parties with N-way shared objects and applications will benefit from underlying Blockchain technology. To realize value and create applications that can function in a multi-party network requires significant investment and innovative thinking.

Corporations cannot easily abandon current IT investments and jump into or easily integrate to the blockchain world. Without some type of well thought out platform approach supporting the two completely different worlds of traditional company-centric enterprise applications and multi-party network based blockchain applications, companies will struggle to take advantage of Blockchain’s promise. Instead, a bridge or “hybrid” approach will prove valuable and pragmatic for many corporations as they embrace Blockchain while continuing to extract value from current IT investments.

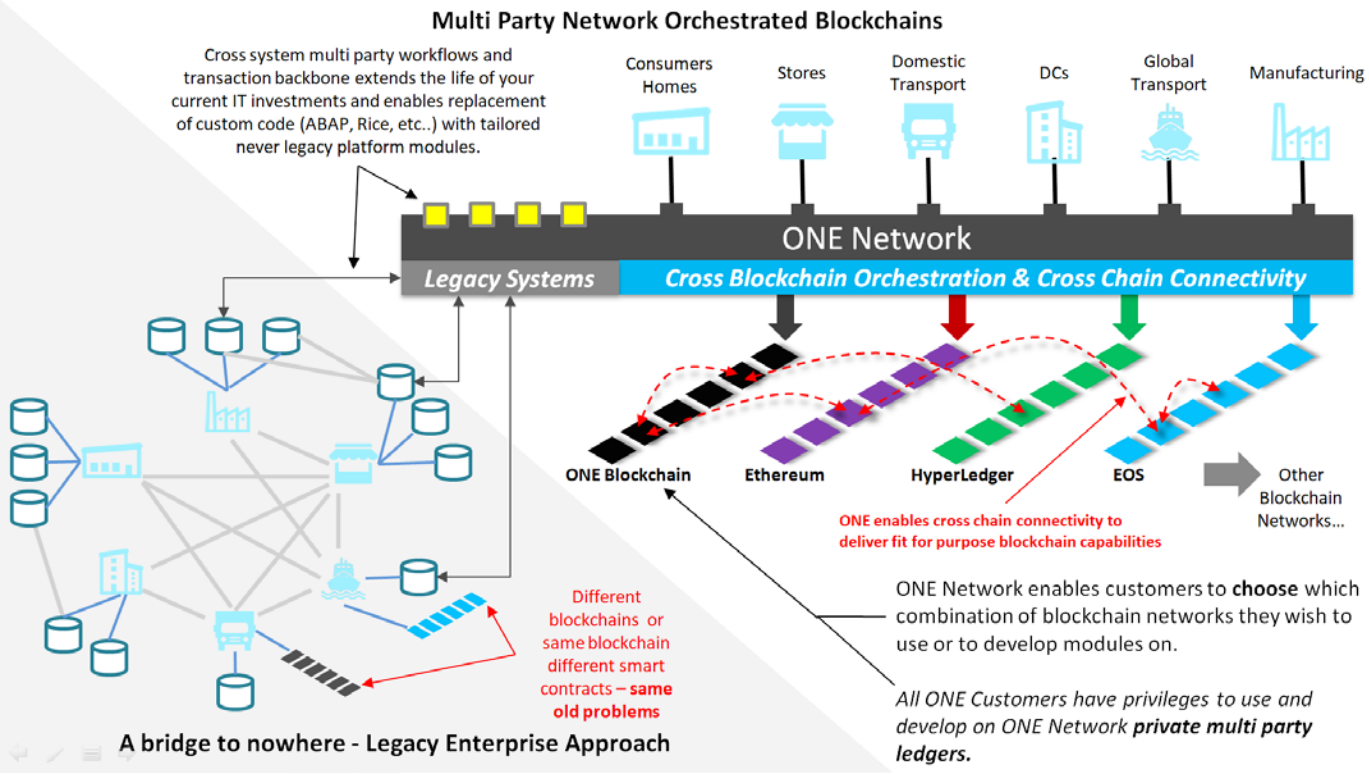


FIGURE 1 ORCHESTRATION ACROSS LEGACY SYSTEMS AND MULTI PARTY BLOCKCHAIN NETWORKS

A BRIDGE TO BLOCKCHAIN

One Network Enterprises (ONE) has designed a multi-party business network platform that operates across and multiple Blockchain networks.

The platform is designed to support a combination of:

1. Private network communities on private blockchains restricted to trusted verified parties
2. Private network communities on public blockchains restricted to trusted verified parties
3. Public network communities on public blockchains with or without permissions controls
4. Integration and interoperability across private ERP and IT systems across N-Organizations
5. Network of Network capabilities embrace 3rd party Cloud services

Combining these capabilities with battle-hardened network-aware autonomous AI agents, machine learning agents, and a modular adaptive development platform is enabling ONE to deliver innovative solutions that solve long standing business problems where traditional enterprise solutions have failed.

CHARACTERISTICS OF LEGACY SYSTEMS (THE TYPICAL CURRENT IT LANDSCAPE)

- Exponential explosion of point-to-point EDI connections
- Data replication = having no single version of truth (SVOT) drives constant reconciliation and lack of trust
- Data latency = inconsistent state of understanding
- Silo MDMs = Master Data Model mismatches which drives up complexity
- Explosion of system-to-system cross references
- Huge learning curve and massive amounts of DApp code
- No business multi-party network-aware services because legacy apps were designed to be used by one company not N
- No standard blockchain across organizations – defeats the purpose of using blockchains
- No blockchain proof-of-service standards
- After huge IT investments, supply chains and other business networks perform poorly

CHARACTERISTICS OF MULTI PARTY BLOCKCHAIN NETWORKS

- Significant reduction of EDI. In fact, for pure blockchain (no legacy systems) there is no EDI
- Shared objects, a shared ledger, and a single version of the truth
- Real time – no data latency
- Multi-party & Community Master Data - reduces errors and synchronizes changes
- Reduced number of cross references for legacy systems
- Fast development of network & blockchain applications – DApps
- Rich set of business network-aware services and multi-party applications
- Cross blockchain orchestration and chaining – standard open proof-of-service
- Unparalleled business agility, performance, security and reduced time to market for new solutions

TRADITIONAL CENTRALIZED ENTERPRISE VS DECENTRALIZED NETWORK SYSTEMS AND PROCESSES

The traditional legacy approach to business networks and related business processes has been single company-centric with bolt on B2B EDI and one way "web portal" technologies. Today each company has its own funky mix of private systems, custom point solutions, single company planning processes, single company system of record, no single source of truth between companies, centralized cloud service providers providing one company applications on the cloud, point-to-point B2B EDI, one way WEB Portals, single company MDM systems, all mixed in with manual Excel and ad hoc email collaboration.

After the trillions of dollars invested in corporate IT services and B2B applications, companies struggle with trust that revolves around multi-party relationships and transactions. This might sound familiar:

- "We don't trust our channel partners forecast"
- "No, we won't share our data (POS, Forecasts, Test Results) due to security, replication, control issues"
- "Yes, we trust our suppliers but need to verify they are doing what they say they are doing"
- "We don't trust your production schedule so we are ordering ahead and buffering more inventory"
- "On the last NPI ramp we found out about supply issues way too late"
- "We have contaminated or damaged products and it takes weeks to sort out root cause"
- "We can't tell our customer exactly where the materials are from nor can we guarantee we don't use child or slave labor. Actually, we can't even understand this ourselves!"
- "The construction team showed up but the equipment wasn't delivered – we wasted another day!"
- "We don't trust our 3PL's ETA estimates so we hedge a lot"

This results in cumbersome reconciliation processes:

- "3-way and 4-way purchase order-service-invoice match processes"
- "Freight audit and pay"
- "Inventory reconciliation"
- "Just pay the charge if it is within 5% of expected amounts"

Accountability issues:

- "Who's responsible for lost, stolen or damaged goods?"
- "Who's responsible for the delay and resulting expedite charges?"
- "Who's responsible for storage or demurrage charges"
- "Confusion around shared inventory write-offs and associated charges"
- "Who pays the non-compliance penalties"

This landscape forces a proliferation of manual fill-in-the-gap processes between systems and companies. This "mess" has spawned entire consulting industries and esoteric complex point software solutions. It is also one of the drivers behind many "data lake + analytics" and experimental blockchain projects by companies struggling to become more efficient and agile.

Companies that have taken the time to understand Blockchain realize that the majority of this waste can be nullified by intelligent use of multi-party networks and Blockchain technology. But without solving the root problems caused by isolated processes and one company systems significant value likely will never be harvested from "cool" single company Blockchain IT projects or by high end analytics solutions.

ERP and planning systems (both Cloud and on premise) were designed for use by 1 company. Legacy collaboration systems have been designed for collaboration between 2 companies. These traditional models are and will continue to exist. However, companies want and need to move forward to support advanced multiparty processes.

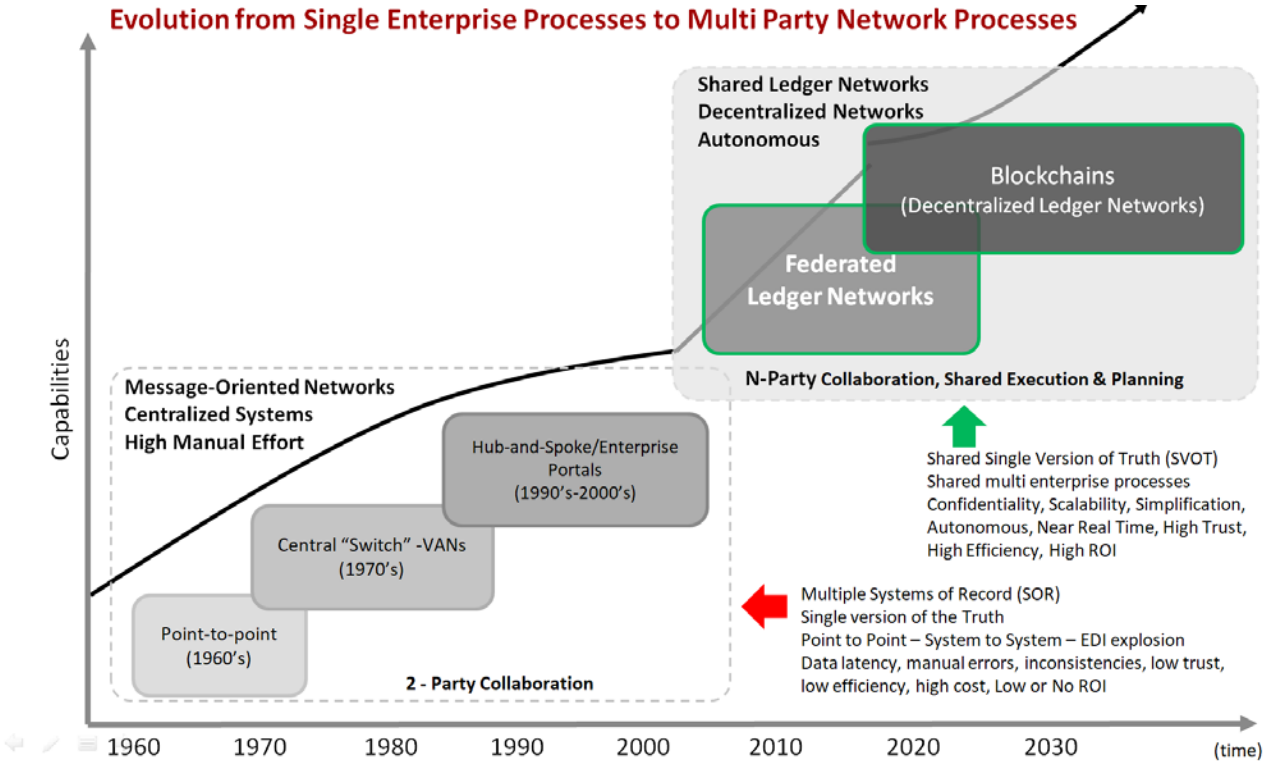


FIGURE 2 ONE NETWORK PROVIDES NETWORK ORCHESTRATION - OPEN & PERMISSION ENABLED SYSTEMS OF ENGAGEMENT

SIRENS OF THE BLOCKCHAIN ERA - BLOCKCHAIN AS A SERVICE

We are seeing the emergence of "Blockchain as a Service" (BaaS) from well-known cloud service and traditional ERP providers that are eager to get into the game or avoid being disrupted. These new BaaS services are going to disappoint many. The problem with these BaaS services is that they lack the key elements of multi-party business services required to make even basic network applications useful. Many IT organization comfortable with these brand names will engage with these services only to find out that they have to develop massive amounts of complex code to make anything remotely valuable. Many will abandon their blockchain projects and claim that the technology isn't ready for enterprise applications and play the waiting game. This is going to lead to the classic new technology "disillusionment" phase for many.

Providing single company centric cloud APIs and templates on top of Blockchain networks like Ethereum and Hyperledger ***will prevent*** *the development and realization of applications that businesses need to optimize their operations, create new business models and optimize multi party business processes.*

A PLATFORM FOR BRIDGING LEGACY IT SYSTEMS WITH BLOCKCHAIN NETWORKS

Businesses need a bridge between legacy IT systems and Blockchain networks to enable business and IT to transition to Blockchain when and where it makes sense. This strategy is practical, lowers risk and avoids lock in to one Blockchain network while leveraging your existing IT investments. While blockchain networks like Ethereum are well-established, it is still early to bet on one Blockchain network and likely that corporations will want and need to leverage multiple networks. Some IT organizations will choose a best-of-breed approach using networks that specialize in various dimensions of capability such as distributed storage, high frequency payments, smart contracts, supercomputing access, identity management, social networks, and news networks, while others will prefer to leverage a single blockchain network such as that described by Telegram/TON, and other similar broad scope Blockchain networks.

To get value out of Blockchain there are layers of functionality beyond simple DApps or simple smart contracts required to deliver real world solutions. Very few companies are familiar with what is required to build and support multi party applications with N-way network technology.

A platform designed to enable efficient business networks must be built on the ideas of shared systems, shared applications, single version of the truth, common or community master data, N-way multi-party workflows, and decentralized (economic, logical and physical) computing.

MULTI-PARTY NETWORK SERVICES ARE REQUIRED IN THE BLOCKCHAIN WORLD

One Network has pioneered an approach that provides a bridge between enterprise-centric IT systems and associated business processes and multi-party business networks that leverage multiple types of Blockchain networks. One Network was built on the concept of multi-party networks, multi-party processes, optimizing trading partner networks, eliminating the middle man, and enabling companies at any level in a business network to transact directly with each other. In part due to being designed with "business network" principles One Network has been able to quickly and easily incorporate Blockchain technology and networks to provide practical and valuable services that are out of the lab in working production driving value for many companies. In addition, One Network provides a global multi-party network that acts as a transaction and synchronization platform functioning across N corporate IT systems and N corporations at the same time. ONE provides a gateway to both a private Blockchain that runs on a global federated network as well as public Blockchain networks including Ethereum and Hyperledger. Key capabilities provided by ONE and required to enable efficient development and delivery of multi-party Blockchain applications include:

1. Multi-Party Permissions Framework
2. Multi-Party and Community Master Data Management
3. Multi-Party Workflows
4. Multi-Party Transaction Backbone
5. Multi-Party Transactional Business Objects such as Sales Orders, Purchase Orders, and Transport Orders
6. Proof-of-Service Frameworks to enable Smart Contracts
7. Network-based decision and execution agent frameworks
8. On chain and Off chain transaction processing and data storage
9. On chain and Off chain asset tracking
10. Development tools and public APIs

These are the basic layers required to create useful business applications and services on Blockchain networks. To create innovative applications and services requires several more layers including:

1. Business Network AI Frameworks
2. Business Network Machine Learning Framework
3. Business Network Planning and Automated Decision Execution Frameworks
4. Interfaces to allow humans to collaborate efficiently with AI decision making agents

One Network provides all of the above capabilities as the foundation behind their multi-party solutions and applications. IT and 3rd party developers have access to the same services and APIs to create and tailor applications unique to an industry or particular business network or individual company.

BUT WHAT ABOUT MY ERP AND OTHER INTERNAL SYSTEMS?

One Network is designed to communicate to any number of ERP and other single company-centric systems. This requires a multi-layer integration and sequencing capability that traverses master data, transactions, events, plans, projects, sites, business functions and decisions. At the system integration level, ONE performs the following functions:

1. Updating internal IT and ERP systems with network transactions translated into single company traditional transactions
2. Updating of shared network objects and connected Blockchain networks with the semantics of internally generated transactions that are relevant to multi-party processes.
3. Synchronization of master data across N entities
4. Network community master data management
5. Permissions constrained access to past and predicted or recommended decisions, alerts, KPIs to all concerned network participants

ORCHESTRATION ACROSS BLOCKCHAIN NETWORKS

Betting on one Blockchain network is a fool's game at this point in time. There will be many different Blockchain networks required to meet any one corporation's or trading partner network's needs. While Ethereum and Hyperledger have strong smart contract capabilities, other networks provide valuable functionality that corporations will want to leverage, for example:

- Smart Contracts: Ethereum, Hyperledger, NEO
- Data Storage and Distributed Blockchain Storage: STORJ, FILEIO, TON
- Access to Off Chain High Performance Computing Services: RLC, ADA
- High Transaction Volume Payments: NANO, XRP, Stellar
- IoT: IOTA
- Identity Services: TheKey, BlockAuth
- Credit Check Services: BLOOM

One Network's platform links to multiple Blockchain networks to access specialized services. This strategy will provide flexibility, scalability and reduced risk as the winners in the Blockchain race change over time.

SMART CONTRACTS - YOUR TRADING PARTNERS NEED TO BE ON THE NETWORK

A community of one on a Blockchain network is of no value. One of the problems individual companies face as they move to Blockchain is that most of their trading partners are not using Blockchain yet. One Network has built out a robust multi-party business network consisting of over 90,000 companies and 17,000 transportation carriers. This network is now on-demand Blockchain-enabled through One Network's platform. ONE has published open source code on GitHub to allow 3rd parties to build their own nodes and transaction directly on Blockchain with the ONE's business network. Any company joining One Network has immediate access to connect and transact with partners already on the network.

ONE, for example, provides smart contract capabilities on the One Network "Backchain". This supports the writing of any One Network multi-party transaction to the Blockchain by self-intersecting all permutations of the multi-party transaction using the read-permissions-calculated slices, cryptographically hashing all these permutations, merkelizing a set of these and then anchoring the result into the Blockchain using a specialized Backchain smart contract.

This algorithm is patent pending. As companies move from single user Blockchain applications to more sophisticated network applications they will require more sophisticated platform services to enable efficient application development. ONE provides advanced multi-party network-aware applications and services to enable companies to rapidly adopt Blockchain, reduce risk and transform their business while preserving their IT investment.

SMART CONTRACTS AND PROOF OF SERVICE

"Smart contracts" may be the most transformative blockchain applications. These automate payments and the transfer of currency or other assets as negotiated conditions are met. For example, a smart contract might send a payment to a supplier as soon as a shipment is delivered. A firm could signal via blockchain that a particular good has been received—or the product could have GPS functionality, which would automatically log a location update that, in turn, triggers a payment. One Network has, for many years, provided these smart contract services to network member corporations in the form of shared purchase orders, transport orders, contracts, and single version of the truth-based collaboration, tracking, proof of delivery, and payment automation. It is a natural step to enable these services on Blockchain and provide easier open access to these services for more companies.

ONE has developed protocols that are used to validate contract terms (purchase order contracts for example). This is referred to as "Proof-of-service". "Proof-of-service" can take many forms but will typically be described by one or more transactions posted by the service provider(s) against a smart contract. The smart contract will validate each transaction and trigger proof-of-service validation markers. Proof-of-service may require many transactions in a particular sequence to be executed before the contract is fulfilled and payment can be released. Easy no code modeling of meta contracts, contract conditions, terms, and formulas will be key capabilities required to create fully functional contracts for complex business processes. Along with contract modeling, flexible proof-of-service protocols must be configurable per trading partner network and industry to gain wide adoption. Proof-of-service protocols defined by One Network or the One Network community will be open sourced to allow 3rd parties to transact with community members.

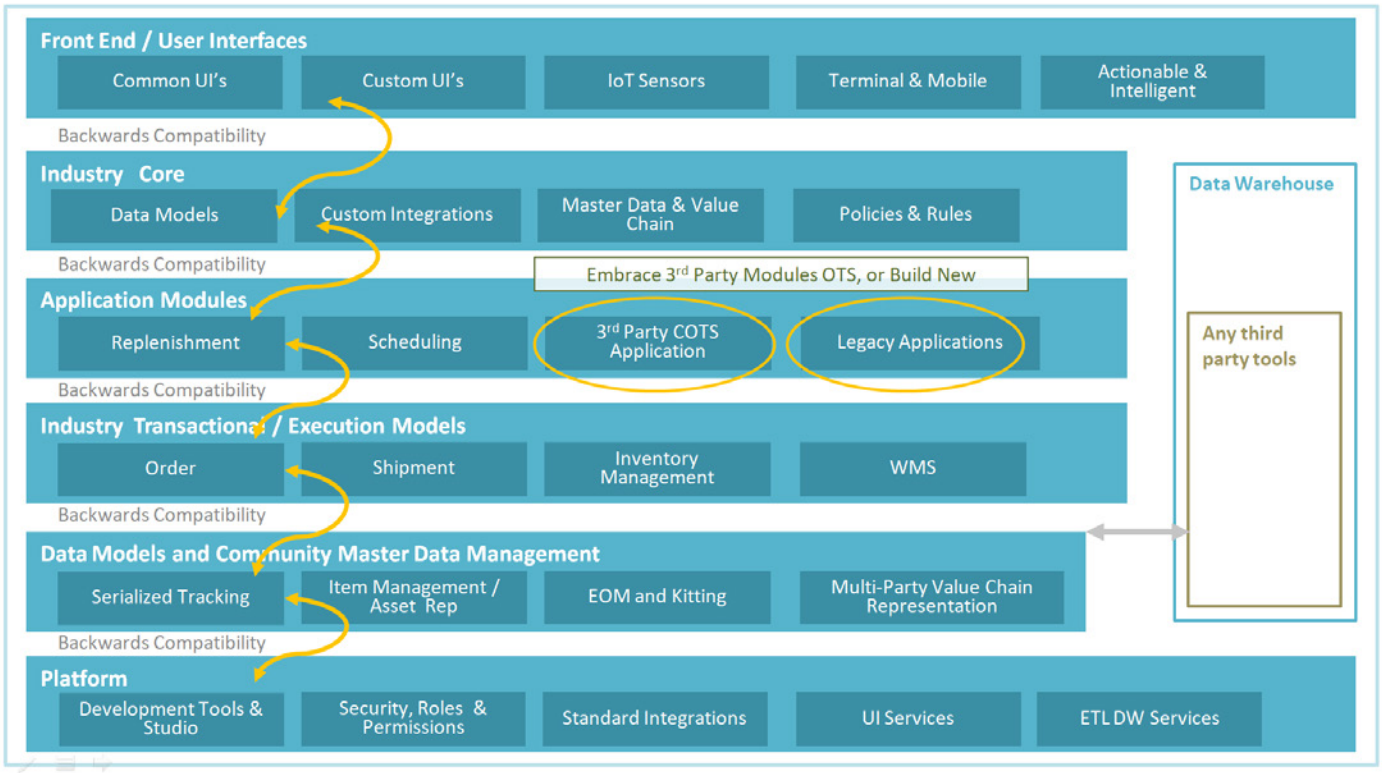


FIGURE 3 EXTEND EXISTING SERVICES OR BUILD YOUR OWN

SERVICES AND PLATFORM CAPABILITIES REQUIRED TO DEPLOY OR DEVELOP MULTI PARTY APPLICATIONS

ONE has developed an innovative platform for developing general platform services, industry tailored services and sophisticated multi party network applications. IT and other 3rd party developers can develop at any layer in the platform stack using over 900 public APIs. Any language that runs on the JVM platform can be used (Java, Renjin, Jython, and more). Any transaction on ONE can be blockchain-enabled, providing companies with future options as well as a practical path to leveraging blockchain networks now.

CONTROL TOWERS ON BLOCKCHAIN

Blockchains and networks provide a grand opportunity for realizing the vision of control towers. The ability to orchestrate entire trading partner networks and optimize the consumer and customer experience across all parties is becoming vital for companies to remain competitive and adopt new business models. Blockchains are enabling multiple parties to engage in trusted transactions and data relationships that were difficult or near impossible with the "walled garden" and EDI approach companies have been investing in for the past 15 years.

LOCAL PRIVATE MULTI PARTY NETWORKS & PUBLIC OPEN NETWORKS

Many companies will need both private multi-party networks combined with the ability to participate in public open Blockchain networks. ONE provides multiple types of Blockchain enabled multi-party networks. Private Blockchain networks restrict membership to certain companies to connect and transaction for certain business processes. ONE also provides increased privacy on public blockchains by applying its tested multi-party permissions and encryption model to information stored in each block.

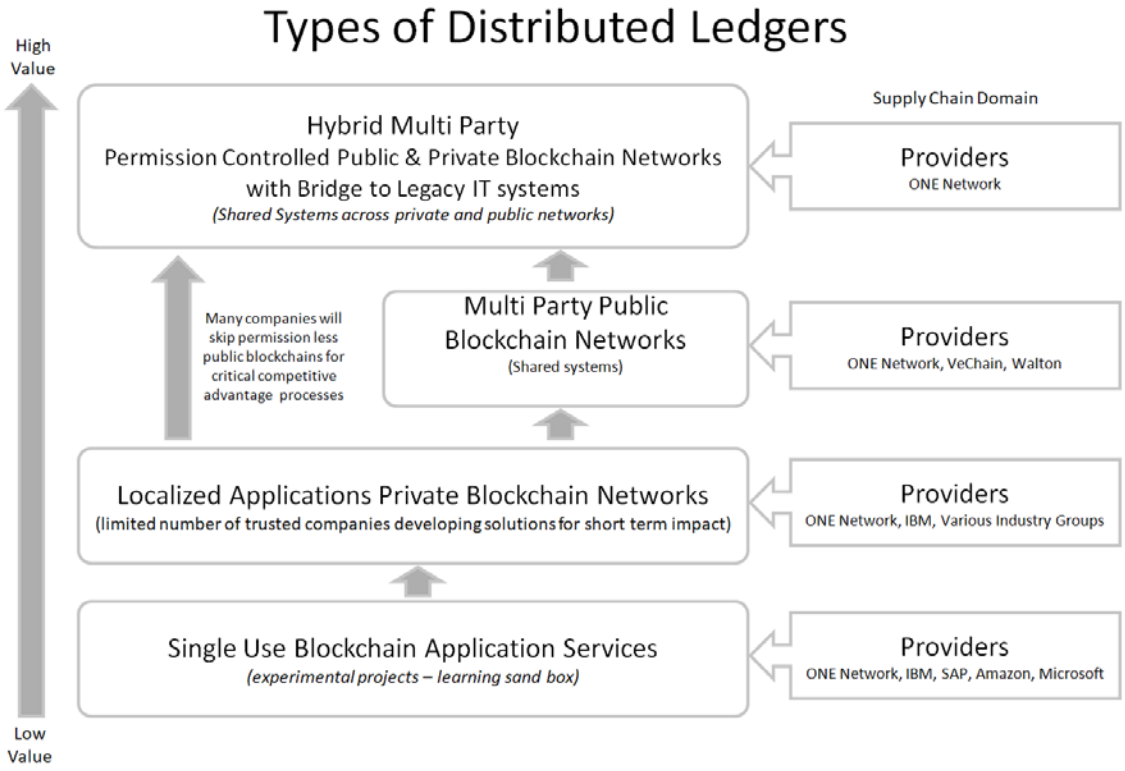
ONCE WE START TRANSACTING ON NETWORKS WHAT ABOUT PLANNING, PREDICTING AND MACHINE LEARNING?

Once companies start transacting across networks, the value of the historical information stored in the network becomes tremendously valuable for five key processes.

1. Auditability
2. Traceability
3. Master Data Model Tuning
4. Planning and Prediction
5. Machine Learning

FIGURE 4 CONTROL TOWERS ON BLOCKCHAIN NETWORK - A RADICAL SHIFT FOR SUPPLY CHAINS

To enable these functions requires algorithms and applications that are designed from the start to be network and multi-party aware. The naïve approach to getting higher order value from this data will likely be for IT groups to pull network data into a legacy database (or data lake), try to normalize it and then run legacy planning and analytics engines in batch mode. That's similar to what companies do today. But this path is fraught with pitfalls and very few will get any value from this approach, other than IT groups that get to work on a fun project for a couple of years. The litany of issues starts with data latency between execution and planning, planning systems connectivity and other network relationships.



Instead, a design that applies algorithms that run directly on the networks and are designed to be network-aware will win the day. AI-based intelligent agents that are aware of corporate boundaries, N-way permissions models, many-to-many links between blocks directly stored in the network and connectivity between blocks in different networks will drive superior plans, projections, predictive alerting, predictive analytics and lead to better trained neural networks. Indeed, the massive amount of data that is already available on private and public networks is providing innovative companies with the data needed to train the next generation of AI for business. Those companies with access to the largest amount of data dimensions that are correlated in some meaningful way are in the pole position to **lead the AI race**.

IN CONCLUSION

Blockchain platforms vary widely in terms capability, disclosure, confidentiality, anonymity, cost to use, and speed. Companies will need to leverage more than one blockchain network to realize the benefits of game-changing business models. These Blockchains are enabling multiple parties to engage in trusted supply chain transactions and data relationships that were difficult or near impossible with the enterprise-centric and EDI-based approaches of the past 15 years. One Network Enterprises provides a platform that provides a practical, no-compromise path to realizing value from blockchain networks now, along with future flexibility as the blockchain landscape matures. This multi-party business network technology is an essential part of the solution for global businesses, and we encourage you to contact us to learn more.

ABOUT ONE NETWORK

One Network is the intelligent business platform for autonomous supply chain management. Powered by NEO, One Network's machine learning and intelligent agent technology, this multi-party digital platform delivers rapid results at a fraction of the cost of legacy solutions. The platform includes modular, adaptable industry solutions for multi-party business that help companies lower costs, improve service levels and run more efficiently, with less waste. This SaaS and aPaaS platform enables leading global organizations to achieve dramatic supply chain network benefits and efficiencies across their ecosystem of business partners. One Network offers developer tools that allow organizations to design, build and run multi-party applications. Leading global organizations have joined One Network, helping to transform industries like Retail, Food Service, Consumer Goods, Automotive, Healthcare, Public Sector, Defense and Logistics. To date, more than 75,000 companies have joined One Network's Real Time Value Network™ (RTVN™). Headquartered in Dallas, One Network also has offices in Japan, Europe, and India. For more information, please visit www.onenetwork.com.

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