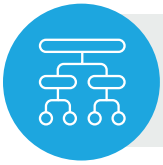
The Future is Here:

How Blockchain Helps Build Smarter Supply Chains

Imagine a world with Blockchain...

Every month, a pharmaceutical company imported hundreds of different types of medication from Asia for distribution across Europe through a combination of air and groundtransportation.



The company's supply chain leaders had to coordinate efforts with as many as 19 intermediaries to successfully obtain and transport all the medication they needed to meet customer demand.

It was incredibly complex work because each of the partners only had visibility into their portion of the product journey.

And since air cargo capacity is typically confirmed just a few hours before departure, there was never enough time to effectively plan (much less to react) to changes and delays.

The company's supply chain leaders knew there had to be a better way to do this. There had to be a way to enable deeper levels of collaboration and trust among trading partners – and they found it with blockchain.

In a blockchain network, everyone has permissioned shared access to the latest status updates and can work from the same set of detailed, trusted information to improve planning and on-time delivery rates.

In addition, the companies added IoT-based shipment tracking data to monitor both the location and condition of the shipments. And if goods are damaged or delayed, everyone knows and the parties can quickly and easily collaborate on next steps.

Finally, they have a shared, single version of the truth – from order inception through final delivery – that makes their supply chain smarter, faster and just plain better.

With a blockchain-based solution, the pharmaceutical company eliminates blind spots, uncertainty and inefficiencies across its global supply chain. Freight forwarders spend less time tracking goods and arguing over invoices. Airlines can plan their cargo capacity and fuel needs. Customs has more time to clear documents. And ground handlers can better plan for loading cargo on planes.

It is a true win-win solution for everyone.

Sound impossible? It's not. This vision of a smarter supply chain is completely within reach by using your existing systems and tools, along with blockchain.

The Future of Supply Chain is Here

Mature supply chains are beginning to function within a network of networks.[1] – Gartner

Modern supply chains are complex and interdependent, involving multiple parties and multiple networks around the world. In a recent survey of supply chain professionals, 70% categorized their supply chain as "very" or "extremely" complex.[2]

Exacerbating this complexity, customer expectations around selection, delivery, immediacy and flexibility are on the rise, forcing us to rethink how we engage at every step along the supply chain. Even though more than half of these same professionals consider their supply chain a competitive advantage, it's hard to turn this into a reality given the blind spots, inefficiencies and uncertainties across today's trading networks.

The bottom line? Complexity and pressures to deliver will continue to mount for supply chain leaders in every industry.

But what if you and your trading partners were in 100% agreement on...

- Where goods are at any point in time.
- Their physical condition.
- Changes made during the transaction lifecycle.
- Who or what is causing a delay.
- The quality and authenticity of goods and services sourced.
- Contractual terms and conditions as they change.

... all the details that make supply chains work better.

Gartner forecasts that the business value from blockchain across all industries will reach $3.1 trillion by 2030 through cost reduction and revenue growth.[3]

This is possible, with blockchain. As the market leader in B2B collaboration and order management, IBM connects thousands of companies using EDI, other messaging protocols and web services to eliminate manual, paper-based processes and deliver significant and persistent supply chain efficiencies through digital automation.

And while EDI remains essential and widely used, blockchain can elevate EDI gains driven in the last 40+ years by enabling a shared version of events with permissioned, trusted data that is identical across multiple enterprises.

There's no need to throw out all your investments to go forward in the new world of supply chain efficiency. We believe that traditional methods like EDI, when complemented and extended by emerging technologies like Artificial Intelligence (AI) and blockchain, will be the fastest path to realizing a new era of B2B transaction efficiency gains.

Most supply chain leaders know there is potential for blockchain, but they don't have a clear understanding of how it can deliver value to their supply chain at scale – or even how to get started.

Let's demystify blockchain, so you can move forward with confidence.

On any given day, your supply chain could hold surprises.

Change in address.

Bob orders a TV from a major electronics retailer and later realizes his old address is in the system. He changes his address online, but it doesn't flow through in time. Calls from the carrier confirm delivery to the old address.

Reconfigured shipment.

A robotics manufacturer places an order for 1,500 items, confirmed for delivery on 38 pallets. Instead, the supplier uses 36 high-capacity pallets but doesn't update the Advanced Ship Notice (ASN) causing confusion when the order arrives.

Carrier delay.

An exporter of natural resources uses a network of rail, ocean and ground logistics providers to transport materials from its mines to their final destinations. Timing is everything. But with no standard communication channel between network partners, the ocean carrier doesn't know the railcars will arrive at the port late, resulting in demurrage charges. A cumbersome, manual process also makes it hard to determine which company is responsible for the late penalties.

Reputation at risk.

With limited visibility into the quality and authenticity of all the intermediaries, a clothing manufacturer doesn't know that one of their partners is working with an embargoed supplier.

And these surprises can be very costly.

Change in address.

Bob spends hours on the phone with the carrier and the store's customer service rep who finally determines the only way to be sure the TV gets to the right address is to ship another.

Reconfigured shipment.

Only 36 pallets arrive. The manufacturer calls the supplier to report an incomplete order and request immediate shipment of the remaining two pallets, the customer service representative at the supplier has limited information so he complies, issuing two more pallets – resulting in costly delivery of more items than the manufacturer ordered. Later, when invoiced for the total number of items, the manufacturer disputes the invoice amount.

Carrier delay.

Without visibility into the status, the cargo ship has already left with an underfilled container. The cargo must be stored offsite due to hazmat regulations and the limited and costly storage facilities available onsite at the port.

Reputation at risk.

When ethical or governmental guidelines aren't followed, the clothing manufacturer – and every trading partner in the chain – is at risk for sanctions, penalties and client dissatisfaction.

Blockchain in the Supply Chain

Supply chain management is a ripe territory for blockchain concepts because of the distributed, multi-enterprise nature of complex global value chains that routinely conduct business among multiple parties. – Gartner.[4]

In supply chains today, trading partners have visibility into documents they own, and they each retain and interpret those documents in their own way. When transactions go as planned, supply chains work as intended with On Time In Full (OTIF) delivery. But all supply chain processes are subject to delayed, incomplete, incorrect or damaged shipments. These disruptions trigger rounds of phone calls, emails and reams of paperwork. Productivity tanks and costs mount as parties engage to sort out the "we said/they said" of what really happened, and what actions each of them must take to resolve the issues.

In most supply chains, communication is point-to-point and one direction. There is no single, shared record of events across multiple parties. Damages or changes – malicious or accidental – may surface in the moment, or weeks later when shipments are unpacked or invoices are due, which can take 90 days or more in some cases after goods are delivered. Affected parties spend too many resources investigating discrepancies. As supply chains become more complex, the inefficiencies that arise due to insufficient visibility and different versions of the truth can cripple operations.

What if you could know instantly about reconfigured shipments to avoid manual resolutions and delays in receiving orders and processing invoices? End-to-end shipment visibility, possible through blockchain, can deliver savings of approximately $300 per shipment.

That's where blockchain comes in.

The attributes of blockchain technology are ideally suited to networks of partners, big and small. By providing a shared, single version of the truth through a shared ledger, blockchain increases trust and creates efficiencies by eliminating the "we said/they said" problem and creating a shared understanding of all possible disruptions that could impact OTIF delivery.

With blockchain, transaction records are immutable, or tamperproof, and agreed upon by all parties. Immutability creates an audit trail. Privacy is maintained by permissioning appropriate levels of data visibility for different parties. And business rules are shared and enforced by the system through smart contracts.

One global computer manufacturer currently credits a national retailer about $23 million annually for unsaleable product claims.

With blockchain, improved visibility to damage, quality and accuracy claims that render products unsaleable, can save companies millions of dollars.

Using blockchain to automate the reconciliation of invoices to purchase orders can reduce processing costs by $7-$50 per disputed invoice.

These innate capabilities of blockchain drive accuracy, efficiencies and cost savings in multiple downstream operations like order to delivery, invoice reconciliation and returns management, to name a few.

Blockchain unlocks the true value of collaboration across different partners and drives a lower cost to serve all parties in the chain. You learn immediately of discrepancies in the supply chain and can spend time collaborating on the next-best action, rather than trying to sort out how you got there. You can also automate processes within the supply chain. Instead of mailing or calling to request approval, you can use smart contracts to drive consensus on the blockchain and trigger the next step. As your supply chain network grows and connects to other blockchain-based networks, the value grows.

IBM's Approach to Blockchain

"What the internet did for communications, blockchain will do for trusted transactions." — Ginni Rometty

IBM has been connecting supply chain trading partners for longer than anyone else in the industry. We're now using our strengths in connecting systems to systems and networks to networks, to take a leadership role in blockchain. Hundreds of clients globally and across industries have adopted the IBM Blockchain platform. We've partnered with our clients, from design to implementation of enterprise-ready blockchain solutions, helping them seize opportunities for disruptive innovation.

IBM is devising new ways to make blockchain enterprise-ready. One of the many U.S. patents we've been awarded in blockchain technology is for a method to remove steps for settling transactions among multiple parties, even untrusted ones, without involving a third party.

For example, our project with Maersk, the world's largest container shipping company, uses blockchain technology to help transform the global, cross-border supply chain. The learnings from this early collaboration are driving the clear need for a solution that eliminates millions of pieces of paper, reduces fraud and increases transparency for global container shipping by digitizing the supply chain process from end-to-end and providing highly secure sharing of information among trading partners.

With IBM Food Trust, we're working to improve food safety and traceability by providing trusted information about the origin and condition of our food supply. This blockchain solution is in use with clients across the food industry, such as Carrefour, Dole, Driscoll's, Golden State Foods, Nestlé, Tyson Foods, Walmart and others.

And this is just the beginning of what IBM, our partners and our clients can – and will – do on the IBM Blockchain platform. Already, our platform is enabling hundreds of clients and developers to build and scale active networks across complex use cases, including cross-border payments, supply chains and digital identification. IBM's approach to blockchain-based supply chain solutions provides an efficient path to get started with blockchain, so you can focus on what matters most to your business – deepening trust with all your trading partners to unlock the true value of collaboration.

According to The World Economic Forum, by reducing barriers within the international supply chain, global trade could increase by nearly 15%, boosting economies and creating jobs.

The Power of IBM Blockchain Solutions for the Supply Chain

"Disruptive technologies like blockchain and Artificial Intelligence have the potential to transform the supply chain, bringing a whole new level of efficiency, real-time traceability, transparency and insights. The business gains from these technologies depend on how quickly they are integrated with existing B2B ecosystems on a large scale while making interoperability and backward compatibility with existing systems and standards, like EDI, an essential part of the process." — Gerald Ollivier, World Bank

We are at the forefront of many industry-wide initiatives that will fundamentally change how we do business with each other. But not all blockchain projects have to be massive in size and scale. Many companies want to start solving challenges they have today by simply moving from point-to-point communications with a single partner to being able to collaborate and leverage many-to-many communications with blockchain.

For supply chain leaders who want to get a jump on their competition or simply want to look for ways to reduce the manual overhead, yet need to leverage their existing investments, IBM is enabling multi-party blockchain-based collaboration to tackle supply chain challenges.

Organizations can realize immediate value with their blockchain projects beginning with order to delivery visibility, invoice reconciliation and returns management. These applications inherently benefit from the multi-party shared record and are purpose-built for the supply chain. Think of these applications as individual building blocks that you snap together in a combination suited to your organization's most pressing business challenges.

These supply chain applications are enabled by IBM Sterling Delivery Transaction Intelligence with Watson, a portfolio of blockchain-enabled applications that provide multi-party, immutable transaction records with your buyers, suppliers, carriers and other value chain participants.

Sterling Delivery Transaction Intelligence provides rapid time to value on your investment by leveraging the power of IBM Blockchain along with existing industry standards like EDI and RESTful APIs.

Blockchain & AI – the winning combination

When you combine AI and blockchain, the impact is exponentially enhanced. Supply chain solutions can embed AI and blockchain technology in meaningful ways, such as to drive improved insights and usability of the vast data affecting supply chain organizations.

From correlation and anomaly detection in business transactions, to gaining insights by tapping into internal and external data sources, with AI and blockchain organizations can proactively get ahead of events.

When AI and blockchain are combined they can enable a powerful platform that provides both a source of shared, immutable data for suppliers and partners –with the capability to immediately identify trading partner behaviors and events. To learn more about how AI and blockchain can help you build a smarter supply chain, click here.

Blockchain eliminates surprises with a shared, single version of the truth, resulting in greater efficiency and trust.

Change in address.

Everyone can see the new address in real time. Bob's TV arrives on time at his new home instead of days later, eliminating phone calls and saving the cost of sending a second TV.

Reconfigured shipment.

The supplier updates the ASN for all parties to see, eliminating confusion and disputes. The carrier avoids a hit to its delivery scorecard, the manufacturer keeps to its production schedule and the supplier doesn't need to reship the order, draw down inventory and incur additional costs. And invoices can be paid on time.

Carrier delay.

With a common trusted view among carriers across all modes of transportation, the entire transportation network is now coordinated with the utmost precision to maintain delivery schedules and eliminate unnecessary costs.

Reputation at risk.

The clothing manufacturer can validate supplier identity and demonstrate they have taken reasonable steps to conduct due diligence and avoid penalties – even if an entity acts maliciously.

Get Started with Sterling Delivery Transaction Intelligence

The Sterling Delivery Transaction Intelligence portfolio of applications is designed for businesses to realize value in a short amount of time. Since onboarding your partners is fast and leverages existing digital transaction systems, business value from a multi-party immutable, shared record can start in days, not weeks.

Sterling Delivery Transaction Intelligence delivers purpose-built applications to solve pressing challenges you face. The first application, Sterling Delivery Transaction Intelligence, provides real-time transaction visibility from order to delivery across multiple trading partners. Sterling Delivery Transaction Intelligence empowers you to proactively address transaction discrepancies or updates real time, in-process – versus reactively when, for example, an incorrect shipment is sitting on the dock.

IBM helps you rapidly get value from blockchain. Achieve value with as few as two to three trading partners. As more partners join, the business value increases.

Shared business rules and agreements on specified data views ensure access to only the data provisioned for a specific partner. Secure, tamperproof transaction records aid in resolving transaction anomalies and deliver efficiency gains.

Sterling Delivery Transaction Intelligence applications are integrated with IBM Sterling Supply Chain Business Network (SCBN), but access to these applications is not limited solely to SCBN clients. Blockchain founders, or the user who starts the permissioned ledger, as well as desired trading partners, can be in the SCBN network or outside of the network. In addition, founders can transact with their trading partners utilizing their existing supply network messaging protocols, including EDI and RESTful APIs.

As a network-of-networked applications, Sterling Delivery Transaction Intelligence is designed to be interoperable with other blockchain networks, including those being developed for food safety and traceability and global shipping.

Benefits of Sterling Delivery Transaction Intelligence:

- **Eliminate blind spots across multiple trading partner relationships with comprehensive visibility of orders, delivery and fulfillment.**
- **Based on accurate and real-time data, make confident decisions to take actions such as query data-driven anomalies or propose process changes.**

From here, you can easily add more capabilities that will benefit from multi-party, permissioned access to the same data with additional applications for challenges like invoice resolution, returns management and more.

Interested in participating in an exclusive client preview of new IBM Blockchain applications for the supply chain?

As we develop Sterling Delivery Transaction Intelligence applications, we are engaging with clients who assist in shaping the offerings by:

- Providing input into new application capabilities
- Participating in application Previews to test new applications and functionality
- Offering feedback that shapes future product requirements and roadmaps

Learn more about:

- TradeLens at www.tradelens.com
- IBM Food Trust at www.ibm.com/food
- IBM Sterling Delivery Transaction Intelligence with Watson at ibm.biz/DeliveryTransactionIntelligence

To explore participating in a client preview of upcoming offerings, please email Lori Brofford at lbroffor@us.ibm.com.

Conclusion

IBM is leading the way in blockchain solutions for the enterprise. Of the 209 global companies surveyed by PwC and MIT6, 94% report that their extended supply chain is changing more frequently and 95% agree that discrepancies between supply chain entities have increased. We can help you overcome the complexity and pressures to deliver by leveraging blockchain.

We are working in partnership with industry leaders to develop blockchain-based supply chain networks and supply chain applications. Our focus is to help you adapt your supply chain to the realities of global transactions today by embracing blockchain. IBM offers a clear path forward with rapid time to business value.

Footnotes:

1. Gartner, "The Impact of the 'Network of Networks' on the Supply Chain and What Leaders Can Do About It," 11/7/2017
2. GEODIS 2017 Supply Chain Worldwide Survey
3. Gartner, "Top 10 Strategic Technology Trends for 2018: Blockchain," 3/8/2018
4. https://consumergoods.com/idc-blockchain-spending-hit-92-billion-2021
5. PwC and the MIT Forum for Supply Chain Innovation, "Making the right risk decisions to strengthen operations performance"