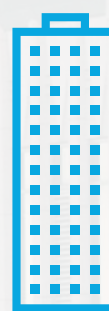




# ENTERPRISE

— guide to —

# BLOCKCHAIN



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# WHAT IS BLOCKCHAIN?

Blockchain in its simplest form is digital information divided into blocks and linked together in a public or private peer-to-peer network. Let's look at this simplified example below. Each block represents a country. Contained inside each block are city names from that country.



Each block contains a set of unique characters, derived from the information contained inside that block, called a hash. The block of U.S.A. has cities Chicago, New York, and Houston. So for this example, the hash could be "CNYH".



Every successive block includes the previous block's hash, binding the blocks together. This hash makes the blocks tamper proof. If someone edits the first block to add Boston, the new hash becomes "CNYHB". The succeeding block of England has already stored the hash as "CNYH". This creates a mismatch, which in turn, breaks the chain and through consensus the update is rejected.

Internet apps, like Facebook, are currently centralized. All data and programs are housed on company-owned servers. When using a web service, your device requests need-to-know information. On a blockchain, the ownership of data is fully distributed. Data doesn't live on just one device or server, but is replicated on all the devices in the network.

The distributed nature of blockchain also greatly enhances security. Each device checks and validates the block for consistency across the entire network. The information is hosted locally on each individual device, making the system virtually incorruptible or immutable (once data is added it can't be changed or deleted). If someone does modify a block on their device the chain will be broken and the network will consider what the majority says as correct.

## TYPES OF NETWORKS



### CENTRALIZED

Most common type of network. Users connect to a central server, which is the agent for all interactions.

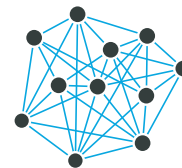


### DECENTRALIZED

A network of computers configured to allow file sharing with everyone or with selected users.

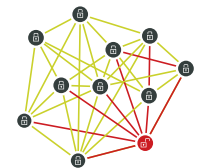
## BLOCKCHAIN USER TYPES

Can be public or private and vary in size and structure



### ANONYMOUS

Each user has a copy of the blockchain and participates in confirming transactions independently.



### REGISTERED

Permission is required for users to have a copy of the blockchain and participate in confirming transactions.

## HOW BLOCKCHAIN WORKS

When a transaction is requested on the system, it is broadcast to a peer-to-peer (P2P) network consisting of interconnected computers. Each computer in the P2P network is called a node. Each node checks and validates the transaction for consistency across the entire network.

Once validated, the transaction is put into a group with others to create a block of data to be added to the ledger. At regular intervals, these blocks are grouped, logged, and linked in a chain with other blocks – a blockchain. Once logged, this chain is permanent and can't be altered.



# WHY ENTERPRISE SHOULD BE USING IT

Blockchain is designed to be a principle-based regulation system that provides high safety standards, legal certainty, and a stable environment for transactions. It provides an unchanging, transparent record of the truth inside an organization.

Blockchain and smart contracts have the potential to increase the speed and efficiency at which businesses are run. Business decisions will benefit from instantaneous tracking of supply chain, when services are rendered, or inventory levels. When handled correctly, the security built into blockchain could add a new level of trust and transparency all while addressing data protection and privacy concerns.

Enterprise blockchains requires special consideration. Smart contracts code the logic of a business process (including pricing, discounting, bundles, frequency of transactions, dependencies, etc.) directly into the transaction. If the blockchain is public, it would enable competitors to track business activities and understand the business processes used in its operations.

To prevent the dissemination of intellectual property, enterprise blockchains should employ two important concepts not found in most public chains: **permissioning** and **private transactions**. Permissioned blockchains run on trusted nodes and only authorized users can take part in transactions. Private transactions are typically run through corresponding private smart contracts that hide business logic from unauthorized users.

## WHY IS IT SO IMPORTANT FOR ENTERPRISE?

- Faster transaction times
- Reduce costs
- Improve security
- Reduce or find fraud
- Transparency
- Incentivize specific consumer behavior
- Building customer loyalty

## USE CASES



**BANKING**



**AUTOMOBILES**



**AVIATION**



**TELCOS**



**RETAIL**

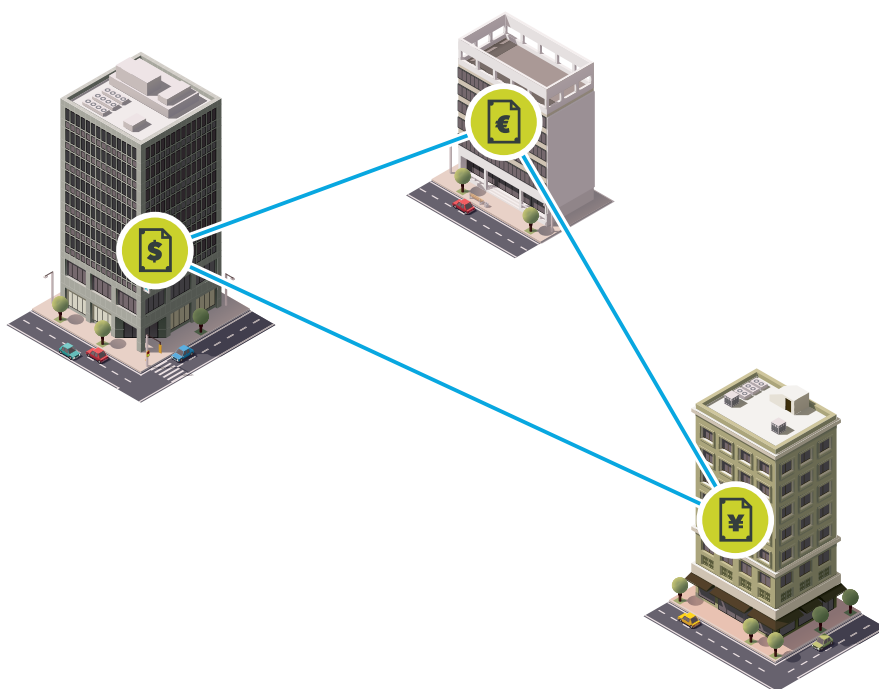


## USE CASE

## BANKING

The digital revolution has completely transformed media and technology, but has only had that effect on parts of the finance industry. One aspect stuck in the past is cross-border transactions. Western Union is still a major player and they still operate with a similar business model that they've always had. Banks are still relegated to a complex infrastructure dating back to the 1970's for simple transactions, such as sending money abroad.

Why? It's a result of the finance industry using highly secured private databases. The only thing digitization has done is speed up the sorting of information into private databases. Blockchain has the potential to revolutionize this process by allowing financial institutions to create direct links between each other. Not only will this completely eliminate correspondent banking, but speeding up transactions, increase security, and provide a new level of transparency. The security inherent in blockchain will also be a huge benefit for the banking sector.



## SMART CONTRACTS

## HOW IT ALL WORKS

1

PRE-PROGRAMMED  
CONTRACT

The agreement rules and conditions are established by all parties and then coded.

2



## CHAIN OF EVENTS

If the events specified by the conditions happen, then the code automatically executes.

3

EXECUTION AND  
VALUE TRANSFER

Once in process, the terms of the contract will automatically transfer the value to the correct parties.

4



## SETTLEMENT

The transfer of value to counterparties are recorded to the blockchain.





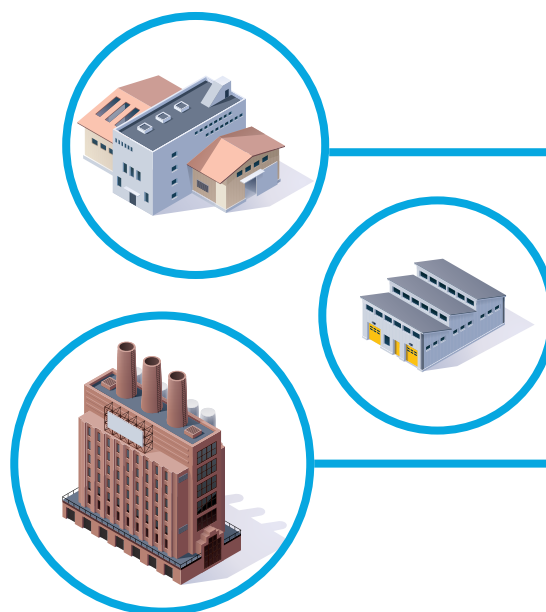
## USE CASE

# AUTOMOBILES

Blockchain has many automotive applications. A few appealing applications of blockchain for automobile manufacturers are the ability to record the transfer of individual parts from suppliers, to a manufacturing facility, which parts are on a specific automobile, the completion of an automobile on the assembly line, the delivery to the dealership, and all final sale information. While tracking may be in place inside the manufacturer, blockchain could play a crucial role in transparency with suppliers and end consumers. It could also streamline the tracking of parts, recalls, and repairs done by the serviced department.

For dealerships, blockchain could also be used to monitor vehicle history. This is especially important in the used car industry where fraud and poor maintenance can lead to lost revenue and questionable sales. Blockchain would allow tracking in a way that would empower future buyers to better verify purchases and eliminate the headache of car shopping.

While some of this is being tracked through the vehicle identification number (VIN), recording all information to the blockchain, would provide an immutable record of parts changed, service records, odometer records, and other crucial information. The goal should be to take some of the guesswork out of car purchases.



### SUPPLIERS

Blockchain provides a unique digital ID for each part produced from each supplier. This ID contains key data such as the manufacture date and other important ownership-related data.

Production levels, capabilities, and other data important to the manufacturer can also be stored and shared via the blockchain.



### IN THE REAL-WORLD

Volkswagen recently led a proof of concept (PoC) to test vehicle telematics tracking using blockchain. In this PoC, a vehicle's mileage data, engine usage history, repair and maintenance history, and other data were captured to the blockchain. This data would allow manufacturers, dealers, buyers, insurance companies, and other players to know a vehicle's exact history and activity.

VW's interest stems from a desire to stop odometer fraud. It is estimated that one-third of all used cars sold in Germany have manipulated odometers.



## SEE IT IN ACTION!

YOU CAN VIEW OUR CAR DEMO APP RIGHT NOW AND DOWNLOAD THE SOURCE CODE

[TRY IT NOW >](#)

### MANUFACTURER

Each step of the manufacturing process and the part used is recorded to the blockchain as the vehicle moves through assembly.

This affords the manufacturer better traceability, improved inventory management, fast resolution of ownership issues, and will help with the more autonomous factories of the future.

### DEALERSHIP

Dealership receives the new car into inventory, facilitates the sale, and manages the ongoing service.

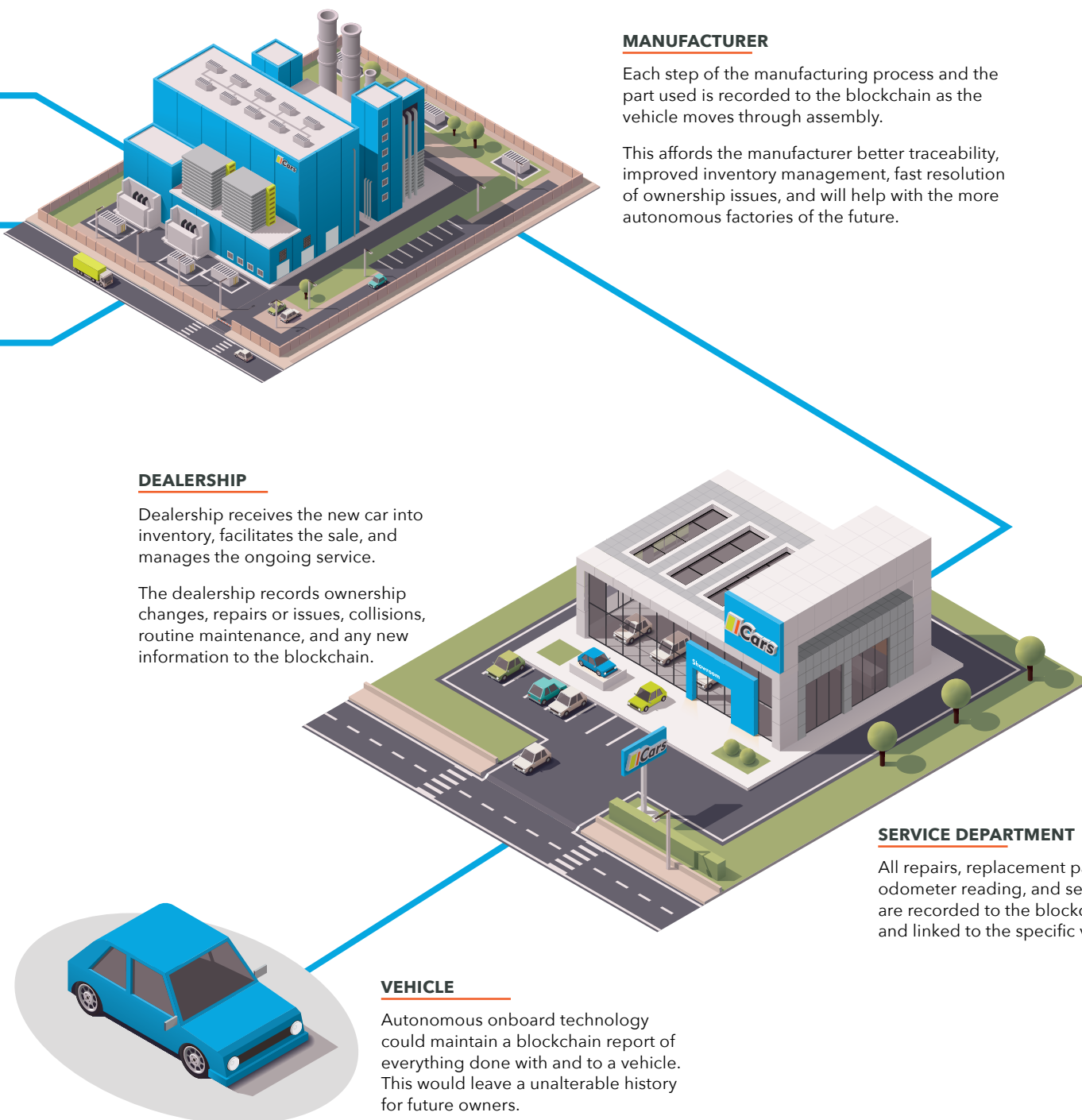
The dealership records ownership changes, repairs or issues, collisions, routine maintenance, and any new information to the blockchain.

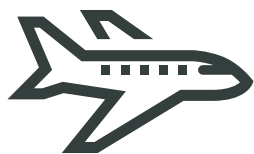
### SERVICE DEPARTMENT

All repairs, replacement parts, odometer reading, and servicing are recorded to the blockchain and linked to the specific vehicle.

### VEHICLE

Autonomous onboard technology could maintain a blockchain report of everything done with and to a vehicle. This would leave a unalterable history for future owners.





# USE CASE AVIATION

Aviation has several major areas blockchain could make a valuable difference. Improved could be made in ticketing, security, and maintenance.

## TICKETING

Since an e-ticket is essentially a database entry (information from a paper ticket, digitized, stored, and referenced in a large database), blockchain could be used to tokenize it. If airlines implemented smart contracts in conjunction with the "ticket", they could inject business logic and terms and conditions around the "ticket." This would enable "tickets" to be sold in real time by many different partners from anywhere in the world.

## SECURITY

Data privacy is an important issue when it comes to passenger records, crew information, and flight and cargo manifests. The importance of protecting this information is at an all-time high, as it would have serious repercussions if the data was breached. A secure blockchain creates a very different and less vulnerable way of managing and sharing the necessary information. Only authorized users would have access or be able to read the data.

## MAINTENANCE

Blockchain has the potential to transform maintenance logs. Currently they are housed in huge databases and some are still in paper binders. A key way blockchain can fix this is to help confirm the aircraft parts being purchased are legitimate and meet quality specifications. Blockchain could also offer a immutable record of the provenance of every part on a plane, tell every time it has been handled and by whom, from the moment of manufacture. This level of transparency is unheard of in the industry, and implementing it would take maintenance, safety and aircraft security to higher heights.





# USE CASE TELCOS

Telcos' adoption of blockchain could have major positive implications for the industry. With implementation, telcos could find new revenue streams, improved security, and better customer relationships.

## DIGITAL ASSET TRANSACTION

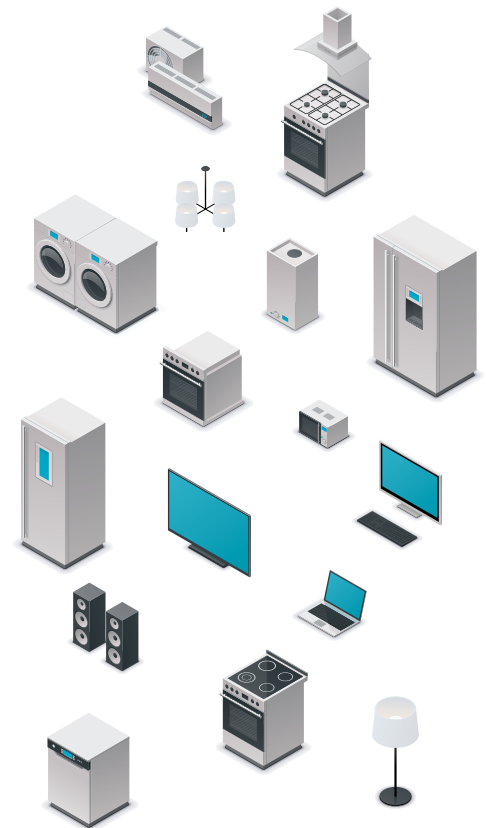
Telco companies could implement payments using blockchains. Enabling blockchain for micropayments for music, mobile games, in-app purchases, and other services could build security and trust with users. To increase revenue, telcos could also use blockchains to enable new customer-to-customer money transfer services. By employing blockchains to handle the transactions, companies could make their wallets incredibly secure and substantially cheaper for the user.

## IDENTITY

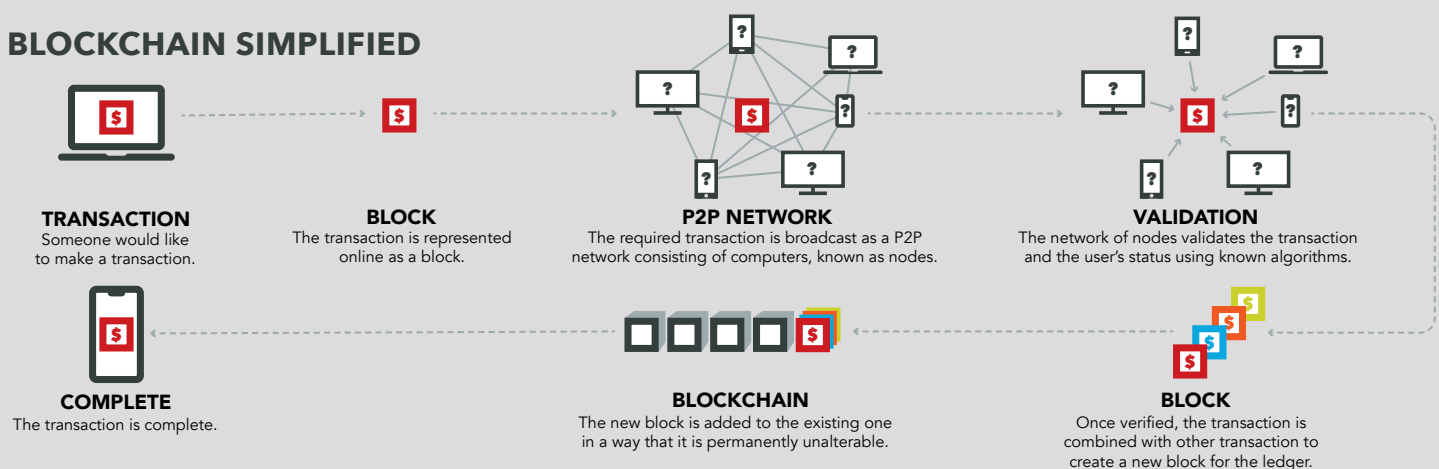
Identity verification costs enterprise organizations hundreds of billions of dollars. Blockchain-based systems are in development and telcos could lead way. They already manage vast amounts of customer data and with blockchain, it would make business sense for them to act as a source of identity and authentication.

## INTERNET OF THINGS

Telcos are in a unique position to take blockchain adoption to the Internet of Things (IoT). IoT devices are predicted to become a \$100 billion industry by 2020 and would require millions of machine-to-machine (M2M) payments and interactions to work. Telcos have a unique opportunity to set the standards for the communication and usher in the next era of digital blockchain services.



## BLOCKCHAIN SIMPLIFIED





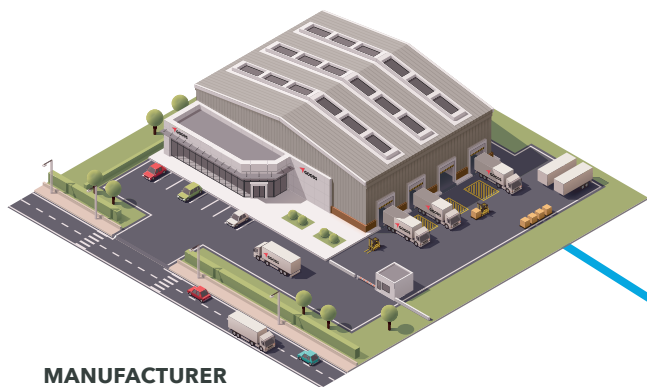
## USE CASE

# RETAIL

Brand-conscious consumers need reassurance the product being sold is the genuine article and not an imitation. Blockchain would allow customers to track all the data about the product from raw materials, to manufacturing, to shipment, and finally to the store shelf. It will provide a transparent and reassuring guarantee a consumer is buying the genuine article.

Retail supply chain and inventory management can also be managed by blockchain. Retailers would be able to keep track of goods from dispatching of product, final shipment, delivery, and beyond the final sale. The recorded data cannot be manipulated by any means, eliminating the chances of fraud. This would also help in dealing with theft and resale of stolen goods.

Smart contracts would be an interesting addition for retailers and benefit consumers. Blockchain would allow cases of claims or settling conflicts without the need for court proceedings and documentation. Storing the smart contracts in a digital ledger would eliminate receipts, insurance papers, or warranty documents on behalf of consumers, but still provide the reassurance of recourse if something didn't meet their expectations.

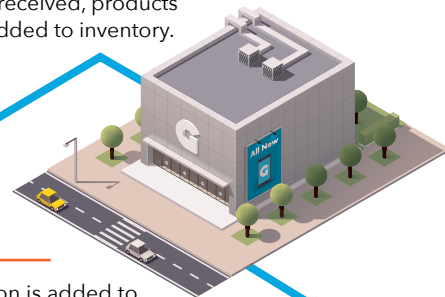


### MANUFACTURER

Physical goods created and added to the blockchain. Proof of authenticity added along with shipping information.

### RETAILER

The goods arrive at the retail location. Blockchain is updated with shipment received, products and price are added to inventory.



### SALE

Sale information is added to the blockchain. Purchaser's information is added for warranty, security, rewards, and marketing.

### CONSUMER

Consumer is protected by the retailer with blockchain proof of authenticity and product history.

Smart contract is also generated with the receipt, warranty, and insurance information for customer service.



# CHALLENGES AND CONSIDERATIONS

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As with any new technology, there are challenges and questions for businesses to consider when adopting blockchain. Currently, the biggest hurdle is many blockchain technologies are not ready or are untested for large-scale commercial implementation. Most enterprises also lack internal blockchain knowledge and developer talent to implement it.

Assuming these technical challenges are overcome, companies must evaluate the trade-offs. Blockchain enables data robustness and eliminates the middle man from the process, but they historically have slower transaction times and less data privacy than centralized databases.

Another major challenge facing business is re-orientation towards working with competitors, suppliers, and customers along the value chain. Blockchain would involve connecting and sharing databases and processes and other important business information. Persuading some parties to work together and implement the new technology may prove difficult.

Enterprise-level companies also manage significant regulatory and reputational risk. Financial services must handle blockchain implementation carefully due to strict regulation. Still, more companies across many industries are hesitant to be associated with the technology used in the cryptocurrency craze. Moreover, in many enterprises, the overriding concern is an unresolved assumption of trust and accuracy in the data inputs and the initial connections from the physical to the digital world.

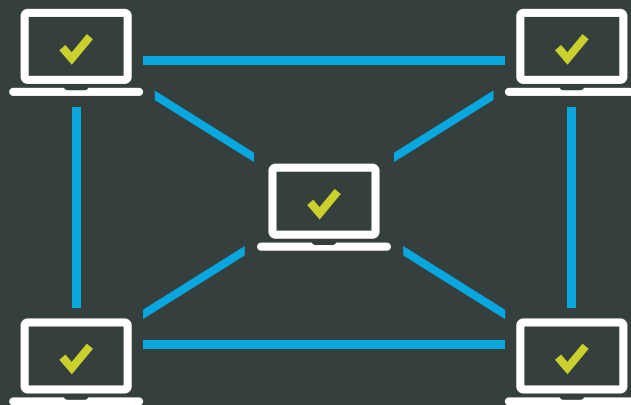
As with any new technology, there is hope and expectation for new capabilities with blockchain, but there are also very real technical and implementation challenges that arise with the technology's arguably premature state. The current rate of development, increasing interest, and expanding investment are all indicators of blockchain importance and growing future.

# DAPPS

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Get started developing your distributed applications (DApps) at [SIMBACHain.com](https://simbachain.com).

We can help springboard your development with SIMBA web app and mobile app templates that utilize the power of the SIMBA API.



A DApp has its backend code (smart contract) running on a decentralized peer-to-peer network. The apps frontend (webapp) can be hosted on decentralized storage.

**DAPP = FRONTEND + CONTRACTS**