> *Working with Rajesh and the team is a conversation. They are always looking to ensure the final product is one you are happy with*

[track • genesis]

To note the progression or course of *The initial block of a block chain*

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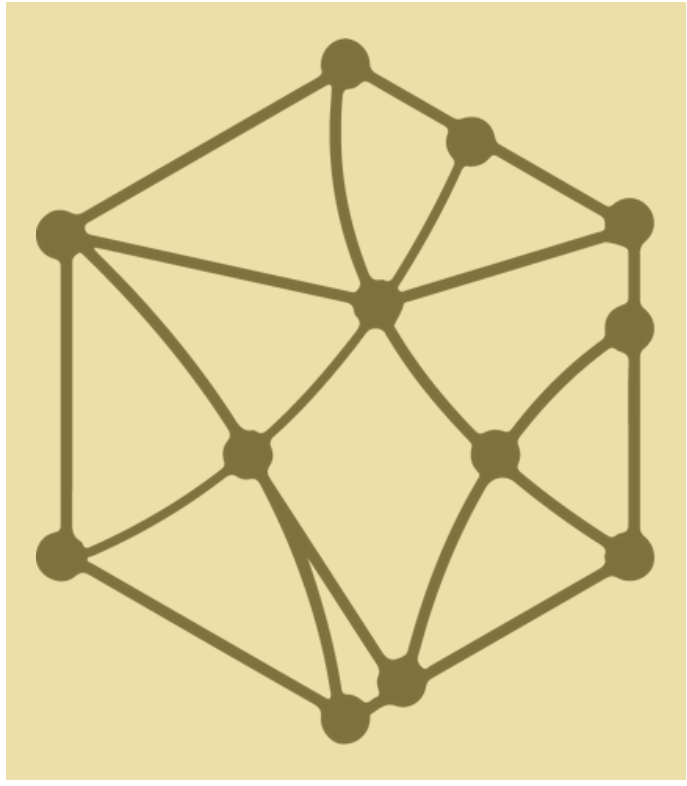

How Blockchain, when implemented in your business, can improve your efficiency and product story with an added focus on sustainability.

> *Using Blockchain correctly in your businesses creates ethical, sustainable and profitable processes that benefit both the stakeholders and consumers.*

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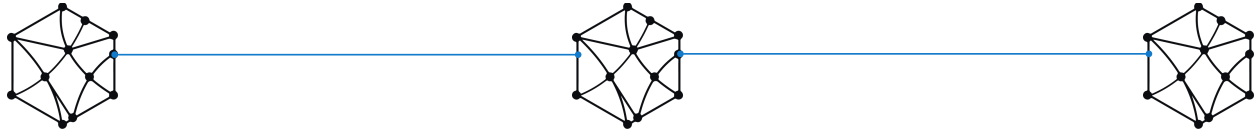
What is Blockchain?

Blockchain is a decentralized, distributed, immutable ledger consisting of records known as blocks that are linked together within a network using cryptography. A new record is created as a transaction and hence a block is made.

Within each block, information is stored and indeed, the blocks are interlinked with the following and previous blocks (except the genesis block). They share real-time information. Cryptographic links (hashes) join the blocks.



Decentralised Ledger

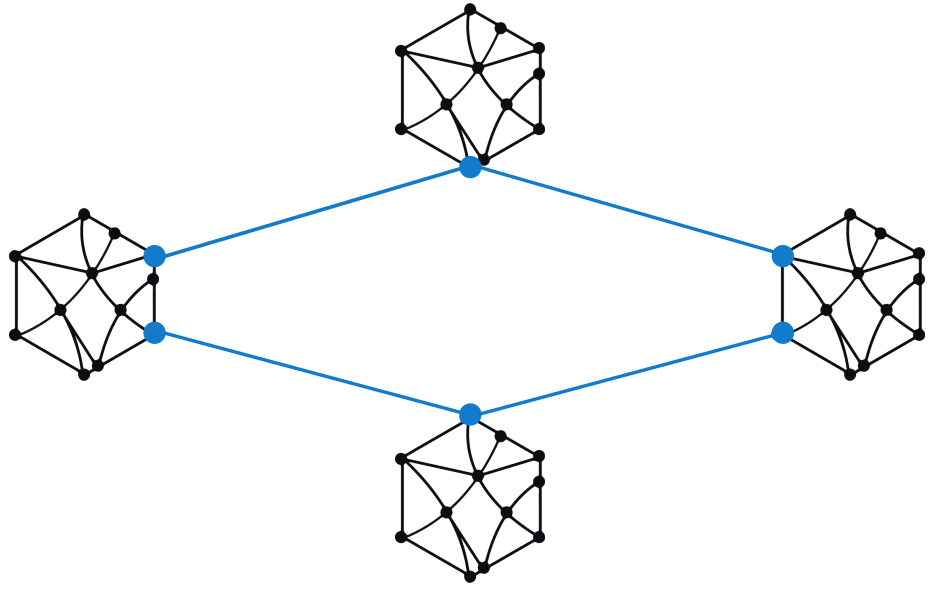
Ledgers are a record of transactions and indeed, within a decentralised setting, each stakeholder within the system will receive a copy of the ledger. Blockchain itself is a distributed ledger, because it distributes and meshes together information simultaneously for all network participants, alongside providing them with records of transactions and all proposed changes. New blocks can only be added to the end of chain.

Hashes

Hash codes are the cryptographic function that gives blockchain one of the main pillars of its security. This cryptographic puzzle is uniquely given to each block in the chain. The hash of the first block is incorporated into the hash of the second meaning that to edit one block, you must edit all of the other blocks in the chain as well or the computer wont recognise it

What is Blockchain?

P2P Networks & Consensus Mechanisms



P2P Networks are essentially a system of two or more computers that are connected and share data without using a server computer. Blockchain is a p2p network in that each node shares data and each has an equal stake within the system.
Within a private blockchain setting, consensus algorithms exist as a set of rules for which the blockchain network follows in connection with adding information to the system. The type of mechanism used depends on what the blockchain network is being used for and the principles agreed upon within such a network. There are various mechanisms, for example, RAFT1 and proof of elapsed time (PoET).

RAFT1: 1 randomly assigned leader has access to the system for a certain amount of time

PoET: Lottery system that provides an equal chance to all nodes to 'win'. In this context, winning means obtaining the authorisation to input a block onto the chain. The PoET algorithm generates a random wait time for each node and the node with the shortest wait time wins.

How does it Improve Current Systems?

Records aren't linked, you only need access to a traditional database system to make changes. Currently, within all supply chain networks, all stakeholders have their own systems. No integration leads to inefficiencies which cost both time and money. For example, when a fashion company purchases materials from a supplier, they receive a paper receipt. Both parties involved in the transaction input the sale into their system *but there is no link*. Blockchain networks also have *distributed consensus and validation systems* in place for when proposed blocks are to be added to the network. This is unlike today's systems which are centralised and work based off permissions. This can lead to trust issues.

> **END 2 END TRACEABILITY OF THE SUPPLY CHAIN & UNLIKE CURRENT DATABASES, THE NETWORK WILL STILL BE LIVE IF ONE OF THE NODE'S SYSTEMS ARE DOWN.**

Blockchain solving Provenance – Traditional database systems cannot account for humans discovering a risk with a particular product. Currently, Shops check a batch and then ask first line suppliers to look into issues. *No integrated system leads to a lengthy and costly process*. However, blockchain allows consumers to search for product information using, for example, a batch number. Therefore, the provenance improves and it incentivises a more integrated system where all nodes in the supply chain work together to solve dilemmas.

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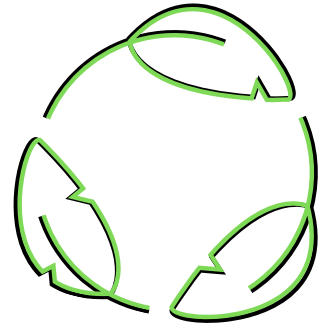
Sustainability



Carbon Footprint Measure

We can help clients pick between inputs used within their supply chain based off of their environmental impact. The measure will also allow consumers to view the environmental impact of particular firm's goods and thus make improved environmental decisions through being better informed.

Public vs. Private Blockchain

Within a public blockchain setting, there is a high energy usage through the consensus mechanism. Individuals compete for the 'reward' from solving the cryptographic puzzle which will add a new block to the chain. This process is known as mining. However, TrackGenesis uses a private decentralised ledger technology for its dApp and integration services, which isn't completely decentralised given only authorised parties will have a key to access the system. The benefits of this is transparency, security but also more sustainable use of power.

Coding for Sustainability

Real-time data gathering means geographical demand can be better measured and less waste will be produced. We provide a service to consumers which enhances their ability as active CSR agents.

We can help firms incentivise their consumers to act in a sustainable manner Utilising Ethereum's layer 2 network - which is less environmentally harmful given that it doesn't use the proof of work consensus algorithm - we create fungible tokens. These can be applied, for example, within the fashion industry. A system would exist whereby consumers who recycle obtain tokens which can be redeemed for product discounts. The system is similar to a supermarket loyalty initiative. The tokens can be decentralised and thus, even if business stops, other parties can see the individual owns said tokens.

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Security

(Besides the genesis block) Within a blockchain, all the blocks are linked through ***hash codes.*** Cryptographic transactions are what creates the hash. The hash becomes invalid when an individual tampers with a particular block and thus a system-wide error arises. Thus, it is an immutable system because altering one block would break the chain.
However, hashes aren't secure enough and thus blockchain has other security measures such as proof of work and proof of elapsed time to slow down the speed at which a 'tamperer' could theoretically alter the system.

Security through distribution (***P2P networks***): When a stakeholder is accepted into the system and joins the network, they obtain a full record of the data which includes the blockchain based transactions. When someone attempts to create a new block, each 'node' within the network receives a copy of this proposal. Consensus mechanism in place to prevent tampering and thus without a widespread approval, the block won't be instilled within the system.

Linked to the aforementioned point, we design ***smart contracts*** which, via cyphered records of transactions and no outside intermediary involvement, create a more trusted network. Once in place, no altering of the predetermined information can occur without consensus. Alongside creating a more secure and trusted network, smart contracts can also be used to automatically transfer funds or information when said predetermined conditions are met within the system.

Counterfeit goods – our system has unique identifiers (product specific QR codes) which can be tracked around the world. When product batches are created, the producer inputs codes into the system and thus consumers or resellers will be able to identify whether the product is legitimate or not. It would be near impossible for an individual selling a fake to create an identical system.

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Our Services

Blockchain Based Software Applications (DApps)

TrackGenesis supports companies in managing their daily operations by developing web and mobile applications with a blockchain network as a backend. This application type is ideal for various use cases, including when multiple stakeholders are working towards a common goal within a supply chain. The applications we build can also incorporate smart contracts which lead to funds being automatically transferred when predetermined conditions are met. Ultimately, our applications make real-time tamper-proof and decentralised data a reality and revolutionise today's supply chains operations.

Integrating an Existing Application with a Blockchain Network

We can integrate your existing application, such as an ERP, with a blockchain network using APIs. By doing such, stakeholders won't see any changes to existing processes, yet you will obtain the benefits from blockchain utilisation including increased operational efficiency. Using private enterprise-grade blockchain frameworks and its advanced privacy controls means your data is secured and only shared with authorised network participants.

By also incorporating our carbon footprint calculator, your firm can improve its CSR and display to consumers that you are taking action to save the planet.

Our Services

Fungible Tokens and NFTs

We help companies create both Fungible and Non-Fungible Tokens (NFTs). Fungible tokens, otherwise known as ERC-20 tokens, can be deployed in existing blockchain networks such as Ethereum or Binance. Working like any other cryptocurrency, the tokens can be applied, alongside a proper marketing campaign and well-defined tokenomics, to raise investment for a company. Other applications include building a loyalty point system for consumers, whereby the tokens are rewards for a certain action.
NFTs represent ownership of a digital or physical asset. TrackGenesis can help you digitally verify a unique item.

Digital Certificates

With the power of blockchain technology, TrackGenesis can cryptographically seal a digital certificate when its created. Thus, third parties will be able to verify legitimate certifications knowing they haven't been altered since issue. We can work with public sector organisations or certificate-issuing authorities (CAs) when doing such.

Our Services

Upgrading Legacy Applications

TrackGenesis assists companies upgrade their legacy applications to the latest web and mobile applications. If you are still functioning with Microsoft excel, word or access which incorporate macros, TrackGenesis can help you enhance your operations to the point whereby you hold a cutting-edge application running on all devices.

Software Consultancy

Alongside blockchain, TrackGenesis are experts in software development technologies. If you are planning a future project, contact us for advice on the technology stack which will suit your needs and help your operations excel.

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Stakeholders & the System

How do Stakeholders Contribute?

The decentralisation of data means that all stakeholders in the system can safely and securely input the necessary information without the pressure of external influences. Given said details are updated in real-time, no stakeholder will lack the required information for business to operate smoothly and there is a decreased likelihood of a bottleneck arising.

We aim to offer simple and efficient integration within established processes. For each industry and the supply chain within such, the data required will be different. The data input can be done as simply as scanning a QR code with a smartphone but, the input process can also be completed by machinery with the relevant sensors working on the production line (IOT devices). This allows the uptake of Blockchain software to span a multitude of industries, processes and budgets.

What are the benefits to you? Amongst others, there will be reduced paperwork and less time chasing up funds due to features such as smart contracts. In addition, there is less hostility and more unification between supply chain stakeholders due to the system's transparent nature. This reduces the chances of a bottleneck arising.

Our user interface design is simple and hence little extra training is required.

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TrackGenesis & You

With a *dedicated and experienced* team, we can provide Blockchain-based solutions which are *tailored* to your Business needs.

No Greenwashing!

TrackGenesis provides: Integrated Systems across *all of your devices; real-time data; complete transparency*; a platform where your information is *securely* held and which provides *honest consumer feedback* through our Marketing capabilities

TrackGenesis leads to: A Loyal Consumer base, Trust with Stakeholders, Profitability and Sustainability.

Want to hear about our Success Stories? Follow our socials and Blog to find out more!

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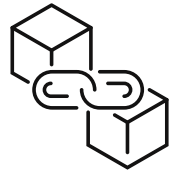
FAQs

1. How do you ensure the initial information inputted into the system is transparent and correct? We integrate IOT devices such as temperature scanners with the system to prevent human error. IOT devices can also capture the geo-location of where a raw material comes from. Our system also allows for the involvement of a certification-based system.

2. *Firms don't want to waste funds by removing their current systems, can you integrate with, for example, ERP systems?* TrackGenesis has a methodology which allows for blockchain to be integrated with a firm's existing ERP system. We can configure the system so that there is an automatic transmission of information from the ERP to the blockchain network.

3. *Not all suppliers have access to high end technology, how would they input information into the system?* We can create a mobile application which would allow suppliers to input information into the system. This can be developed for clients. With phones today having features such as a capacity for their geo-location to be captured, it certainly works.



FAQs Cont.

4. Initial investment required from a tier 1 supplier within the supply chain? Depends on level of integration – If suppliers have an existing ERP system which holds accurate information, we can link said ERP system with the blockchain network using APIs. The expense would not be physical hardware, rather system development. The cost would increase if a more intricate system is built which incorporates IOT devices.

5. ***What's in it for the suppliers within the chain?*** Of course, there is financial and time costs, however with governments implementing environmental rules and consumers caring more about a firm's CSR than ever before, we believe transparency is a key motivator. Our application will communicate with the distributed ledger technology which is tamper-proof, and which doesn't necessarily need to overtake the existing day-to-day systems already in place.

6. ***Barriers of implementing a blockchain network within the system?*** Developers' responsibility to make the transition smooth (for example, integrating with the ERP systems), educating the interested parties and reduce the change impact as much as possible. Another barrier is the tension between two suppliers in a chain who don't necessarily trust each other. Given the power of smart contracts and a decentralised 'middle-man' blockchain service, we believe we can overcome this issue and lead to a more efficient supply chain. We have solutions to other dilemmas you may be considering. Get in touch for further information.

7. ***Given computational power is not free, how is the private blockchain network powered?*** Cloud servers can host a day-to-day database where all information is controlled.

Got another question? Contact us via our website or socials and we will provide you with an answer you can trust!

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CONTACT Us

See how TrackGenesis Ltd's qualified team can help with your business needs. We guarantee you a personalised blockchain solution that goes hand in hand with your supply chain.

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