QF4 TECHNOLOGIES

Customer value is our only metric

BLOCKCHAIN

Provider of Innovation and Technology Services

qf4tech.com

OUR COMPANY

QF4 Technologies is an international consulting firm that helps companies implement Agile, Blockchain, and Life Sciences services. Our solutions bridge the gap between process and technology and focus on the teams who carry them out. Our solutions address the fragmented way Agile, Blockchain, and Life Sciences initiatives are implemented. Focusing on unifying teams and processes, we deliver an integrated approach that supports the goals of any organization. QF4's strength in integrated solutions is rooted in our breadth of expertise and experience.

OUR MISSION

QF4 Technologies mission is to empower organizations and people to be more effective, efficient, and successful in delivering their products and services to the marketplace. To leverage technology to help organizations be more transparent and improve operational efficiency. In essence – to be the catalyst and model for setting the standards for product development and creating a transparent and collaborative environment, where people are motivated to take ownership of their work and reach their potential.

OUR VISION

Nothing less than realizing the full potential of our clients and helping them unlock their greatest asset for maximum success, we call knowledge, in this complex world we live in.

OUR PARTNERS

IC Blockchain
International Consortium for Blockchain

What is blockchain?

A blockchain is a decentralized digital ledger of various kinds of transactions which is saved on thousands of computers around the globe, in a way that prevents fraudulent alteration of those transactions. Blockchain technology increases transaction security while also speeding up the exchange of information in a way that is cost-effective and more transparent, by eliminating third parties (such as notaries and banks) whose main role was to provide a trust and certification element in transactions.

QF4 Technologies can demonstrate how blockchain can improve banking, supply-chain, and other transaction networks to bring forth new opportunities for innovation and growth while reducing costs and risks. We will evaluate potential blockchains for your project, including Ethereum, Hyperledger, EOS, NEO, Tezos, and Qtum, and choose the best fit, like when to use private permissioned blockchains such as Quorum.

CURRENT AREAS OF DEVELOPMENT

Blockchain in capital markets

Blockchain technology can simplify and streamline the entire trade process and provide an automated trade lifecycle where all parties in the transaction have access to the exact same data about a trade.

In this scenario, the technology would substantially reduce infrastructure costs, enable effective data management, transparency, faster processing cycles, minimal reconciliation and even cut out some of the middlemen such as brokers.

Blockchain for cross-border payments

Blockchain can improve cross border payments by speeding up and simplifying the process, while reducing costs significantly and cutting out many of the traditional middlemen. At the same time, it would make money remittances more affordable.

Until now, the costs of remittance were 5-20%. Blockchain technology could reduce the costs to 2-3% of the total amount and provide guaranteed, real-time transactions across borders.

Blockchain to improve digital identity

When online identity is moved to a blockchain-enabled infrastructure, users are able to choose how they identify themselves and with whom their identity is shared.

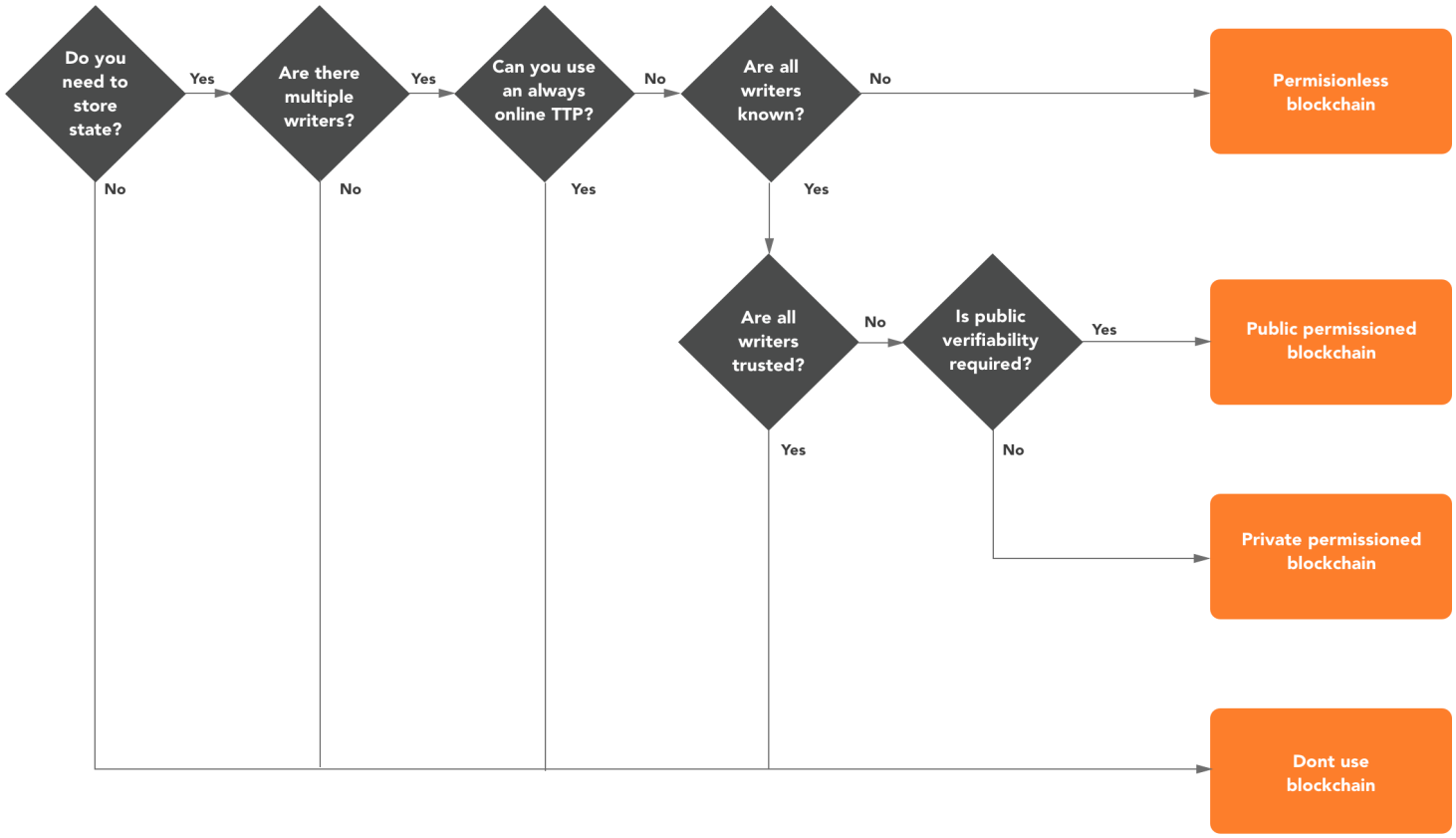
Users are still required to register their identity on a blockchain, but once they have, they don't need a new registration for every service provider, provided those providers are also connected to the blockchain.

Blockchain in loyalty and reward

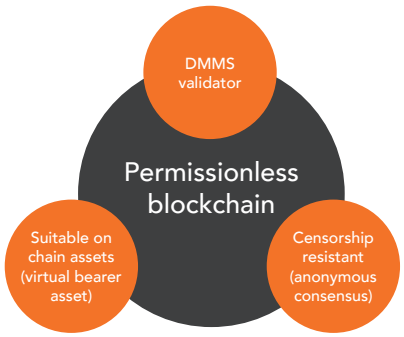
Blockchain technology offers many benefits, including transparency and traceability of transactions. This can allow banks and insurers to create more captivating loyalty and rewards programs and help realize the full value of these customer loyalty programs.

BLOCKCHAIN ASSESSMENT

QF4 Technologies does Blockchain Assessments for organizations looking into how to best leverage the Blockchain technology to improve their overall business and operations. We will evaluate possible Use Cases using the below assessment model, and then make further recommendations for possible PoCs and analysis. Contact us if you would like to find out more information about our assessment model and service.



PERMISSIONLESS BLOCKCHAIN



- Permissionless Blockchain means that any participant is able to become a validator for a blockchain.
- Bitcoin and Ethereum are the most prominent examples of Permissionless blockchains, which are public and decentralized.
- No central authority or trusted third party manages who is allowed to join the network, or bans illegitimate users from connecting to the network.
- Anyone can read the chain, make legitimate changes or write a new block into the chain.
- Most of the DMMS (dynamic membership multi-party signature) validators join Permissionless blockchain as a DMMS digital signature to sign blockheaders is formed by group of signers of no fixed size.
- Highly Immutable blocks, as any tempering requires > 51% of participant node consensus in a very large public blockchain which is almost impossible.
- Some Permission less blockchains also support PoS (proof of stake) based consensus
- High public verifiability with each state change validated by verifiers, e.g. miners on bitcoin's or ethereum's blockchain

Pros

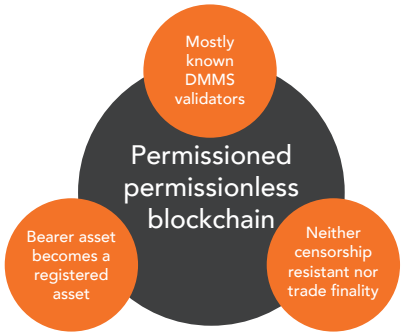
- Decentralized trustless public blockchain supporting a high number of readers and writers.
- High public verifiability with all readers having same blockchain state at all times.
- High security and immutability as Blockchain is mathematically very hard to hack as the cost of hacking becomes too high for a system where every node connected is synced with the entire Blockchain database and more importantly, once a hack is discovered, the value of the hacked coins would diminish exponentially.
- Consistent state of blockchain across all users.

Cons

- Since all transactions in public blockchain need to be verified by thousands of users so transaction verification process is time consuming causing low latency and low throughput.
- Users have to pay a larger amount of transactional fee compared to private blockchain.
- All Transactions are shared and publically accessible, though private data can be concealed by using cryptographic primitives.
- Scalability and Data Privacy is a concern.

PERMISSIONED BLOCKCHAIN

- A permissioned Blockchain requires only pre-selected parties to validate transactions. Permissioned blockchains have been proposed to authorize only a confined group of users to participate in the blockchain network.
- A central authority (consortium) determines and gives right to the predefined peers to write, read , monitor or audit the transactions on blockchain with a public verifiability of content is desired.
- The participants require some means of identifying each other while not necessarily fully trusting each other.
- The Permissioned Blockchains maintain the privacy of a user's data, without consolidating power with a single organization.



Pros

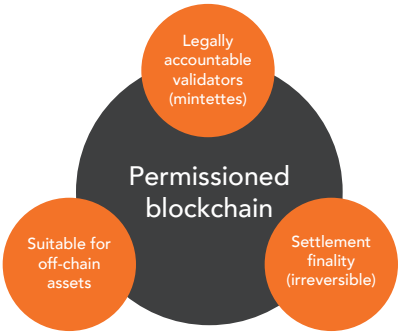
- High transactional throughput and transactions are quicker as lesser number of transaction validators are required to validate the transactions stored in blockchain. Scalability is high.
- High Immutability guaranteed with access controlled by central authority. Security and Data privacy is high.
- Public verifiability of content is possible.

Cons

- Transparency and anonymity are not fully implemented but rather controlled by consortium organization entities.
- Single point of failure and bringing various organizations to use a common model.
- Number of writers and readers are low compared to public blockchain.
- Centrally managed.

PRIVATE PERMISSIONED BLOCKCHAIN

- Permission to write data onto the blockchain is controlled by a single organization which is highly trusted by all other users
- This organization may/may not allow users to have access to read the data, as public readability might not be necessary in most cases.
- In some situations, the organization might want the public to audit the data. Limited/restricted read permissions also provide a greater level of privacy to the users, a feature not available in Public Blockchains.



Pros

- High transactional throughput and quicker transactions.
- High Immutability guaranteed with access controlled by central authority.
- Different user defined consensus algorithm based implementation approaches possible.

Cons

- Transparency and anonymity are not fully implemented but rather controlled by single central organization.
- Single point of failure.
- Number of writers and readers are low compared to public blockchain.
- Centrally managed.

	Permissionless Blockchain	Public Permissioned Blockchain	Private Permissioned Blockchain	Central Database
Throughput	Low	High	High	Very High
Latency	Slow	Medium	Medium	Fast
Number of readers	High	High	High	High
Number of writers	High	Low	Low	High
Number of untrusted writers	High	Low	Low	None
Consensus mechanism	Mainly PoW, some PoS	Supports multiple approaches but mostly uses BFT protocols (e.g. PBFT [6])	Supports multiple approaches but mostly uses BFT protocols (e.g. PBFT [6])	None
Centrally managed	No	Yes	Yes	Yes
Censorship	Censorship Resistant (Anonymous consensus)	Not Censorship Resistant	Not Censorship Resistant	N/A
Validators	All are Dynamic Membership Multi-party Signature(DMMS) validators (not always known writers)	Mostly known DMMS validators	Legally accountable validators	Only trusted validators
Assets Suitability	Suitable for on-chain assets (virtual bearer asset) e.g. , bitcoin/ ether	Bearer asset becomes registered asset	Suitable for off-chain assets (securities, fiat, titles)	Suitable for online/offline assets
Settlement Finality (Irreversible)	Yes	No	No	No

BLOCKCHAIN DEVELOPMENT

A blockchain is a decentralized digital ledger that saves transactions on thousands of computers around the globe. These are registered in a way that inhibits their subsequent modification. Blockchain technology increases the security and speeds up the exchange of information in a way that is cost-effective and more transparent. It also dispenses with third parties whose main role was to provide a trust and certification element in transactions (such as notaries and banks). The high importance of blockchain has attracted the attention of organizations in different sectors, with banking sector being the most active at this stage. Blockchain has resulted in the development of thousands of new job positions and new startups ranging from mobile payment solutions to health care applications.

Our Engineering Capabilities

- Blockchain deployment and development with web3, solidity, cakeshop and truffle.
- Smart contracts and custom dapp frameworks like OpenZeppelin.
- Application and data science engineering using Python.
- Enterprise native mobile apps with Swift and Objective-C.
- Web platforms using Phoneix / Elixir and serverless architecture.

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