



The Power of a Trusted Digital Ecosystem Using Enterprise Blockchain



May 2017

This report can be downloaded
at www.skyrepublic.com

About Sky Republic

Founded in 2016, Sky Republic is comprised of software technologists dedicated to the development of enterprise blockchains and Trusted Digital Ecosystems that are trustworthy to build and scale ground-breaking B2B/B2C solutions. Our passion and decades of experience designing, building and bringing to market advanced B2B middleware and application infrastructure solutions has provided us with the required skills and expertise to understand how enterprise blockchain – also called distributed ledger technologies (DLT) – can streamline and enhance the Digital Business. Sky Republic believes Trusted Digital Ecosystems will revolutionize the way individuals and organizations interact, the way businesses collaborate with one another, and deliver a new level of automation and security of business transactions for the Programmable Economy.

www.skyrepublic.com

About our founder



Chris Fabre

Before founding Sky Republic to unleash blockchain business potential, Chris Fabre served as Axway Chief Executive Officer for 10 years. During his tenure, Axway helped the largest Enterprises around the globe leverage digital and B2B middleware for strategic initiatives especially in Finance, Supply Chain, and Healthcare. It established five world-wide leadership positions in its core software markets, grew revenues above \$300M through strong organic growth and seven acquisitions, and went public in 2011. With his background as both CTO and product management leader, Chris possesses the ability to recognize and capitalize on emerging trends that can drive sustainable value for customers and shareholders.

“We hope you find the information in this report useful and we look forward to your feedback. Please contact us if you have questions or would like more detail.”

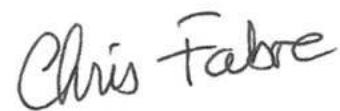
A handwritten signature in black ink that reads "Chris Fabre". The signature is written in a cursive, slightly slanted style.

Table of contents

The Programmable Economy: Digital Business requires trust automation	1
Limitations of permission-less blockchain approaches	2
Distributed ledgers and smart contracts define blockchain for the enterprise	3
A Trusted Digital Ecosystem powered by distributed ledgers & smart contracts	5
Industry use case examples	7
Conclusion	9
Appendix	10

Figures

Figure 1: Trusted Digital Ecosystem (TDE) overview	1
Figure 2: Smart contracts & distributed ledgers	3
Figure 3: Blockchain and the law	4
Figure 4: How a smart contract in a TDE works	6
Figure 5: Real estate example using a TDE	7
Figure 6: Summary of TDE benefits	9

The Programmable Economy: Digital Business requires trust automation

The Programmable Economy is here, as we continue to see the impact this transformation is having on how companies and organizations transact business. New forms of commerce and economic activity, new programmable business models, new legal structures, are all causing enterprises and governments to rethink the traditional methods by which they interact with their customers and constituencies.

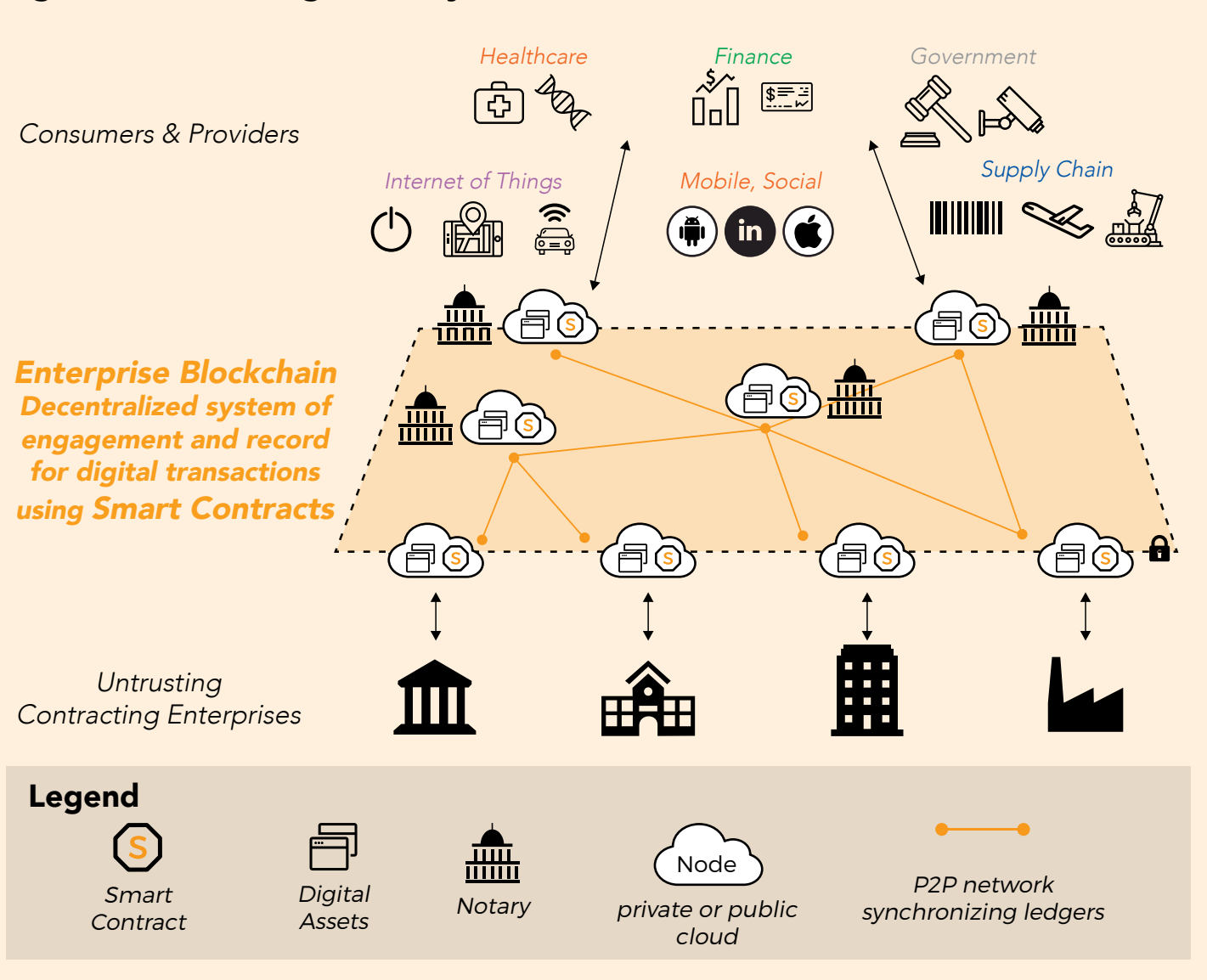
Gartner created the term "Programmable Economy" in 2014 to refer to this emerging phenomenon, describing it as a natively "smart" economic system that supports and/or manages the production and consumption of goods and services. It enables diverse scenarios of exchanging value, both monetary and non-monetary¹. It is expected the information about business transactions – and their digital representation – that flow among various parties to a contract (e.g., buyer, seller, third-party beneficiaries, regulators, etc.) will have their own programmable rules. This will result in new concepts that include "smart contracts," "smart property," "dynamic

digital personas," smart business models, cryptocurrencies and distributed autonomous organizations.

Though when put into a real-world context this transformation has been more evolutionary than revolutionary. Since the 1980's, we've learned how to secure eCommerce transactions, and using intermediaries like SWIFT to handle inter-banking needs. In its early phase – known as the API Economy – the Programmable Economy was about creating new customer experiences that mixed the digital and real worlds.

Now, we've entered an era where digital transactions can happen at a speed and scale never seen before between unknown entities, which can even include 'things' and soon Artificial Intelligence bots. In this new context, establishing and automating trust at an affordable cost has become a true challenge. Trust is about knowing with absolute certainty the status of the transaction throughout the process, as well as who did what, and, most importantly, the confidence that commitments will be fulfilled.

Figure 1: Trusted Digital Ecosystem (TDE) overview



Against this backdrop the “blockchain” has emerged as a relatively new architectural paradigm that is enabling new business models. Much has been written and talked about over the past couple of years regarding the merits – and risks – associated with blockchain and smart contracts. The increasing investment by both corporate IT and large enterprise software vendors, rising number of proof-of-concepts (POCs), as well as a growing number of software start-ups, suggest many are trying to grab the tiger by the tail.

Though if one were to follow the classic hype cycle, we are clearly in the “trough of disillusionment”. Work continues to move from concept to real-world implementation in order to fully realize the benefits this new approach has to offer by increasing the speed, affordability, security, reliability and audibility of processing various business transactions.

Sky Republic believes blockchain and smart contracts could revolutionize the processing and automation of digital transactions – to the same extent what the Cloud and application programming interfaces (APIs) have done to streamline and enable the Digital Business.

As blockchain architectures evolve and mature, additional features and operational capabilities will be required for

enterprise usage – which can be found in offerings like API management, B2B integration, Software-as-a-Service (SaaS), or digital business networks. This evolution will be required to make blockchains and smart contracts true enablers of the Programmable Economy, the primary consequence and benefit of which is automating the digital business within a trusted ecosystem.

It is within a Trusted Digital Ecosystem (TDE) where trust can be automated, end-to-end, and established through identity verification of all contracting parties (with non-repudiable signatures) that contractual commitments and obligations can be delivered as promised. Throughout the entire process – from contract creation to settlement – the TDE can keep track of, and govern, all interactions between parties to provide added assurance.

Furthermore, by having an immutable record of the party interactions, any disputes that may arise can be resolved by relying on undeniable evidence of the transaction history.

It is with “trust automation” in mind that Sky Republic intends to use distributed ledgers and smart contracts to provide a Trusted Digital Ecosystem for automating business transactions that is enterprise-ready. (Figure 1)

Limitations of permission-less blockchain approaches

While Sky Republic recognizes blockchain’s uniqueness and broader potential, the term “Blockchain” is mainly associated with its initial and crypto-currency implementations (e.g., Bitcoin and later Ethereum²). As they are public and open in nature, the term “permission-less blockchains” is used to name them more precisely.

The early generations of blockchain offer capabilities that are insufficient for the enterprise world, and therefore incapable of providing a Trusted Digital Ecosystem. In addition to limitations in terms of speed and scalability, there are several fundamental issues that have yet to be fully addressed to make permission-less blockchains capable of meeting the demands needed to support the Digital Business:

- Permission-less means that anyone can be part of the network and participate in the ledger without their identity first being established. Also, because transactions are transparent and visible to all blockchain participants, there is a lack of privacy that is expected with most business transactions. More importantly, it means there is no way to determine if the data that is entered into the ledger is accurate and valid – i.e. who should I trust?
- Bitcoin’s ‘proof-of-work’ consensus method³ is sensitive to the 51% attack issue⁴ and is reliant on the use of ‘miners’ who can see all transactions³. This approach could lead to nefarious collusion among these miners for their own gain and profit. Furthermore, the overall algorithm doesn’t guarantee that transactions are absolute until a significant amount of time has passed, offers poor scalability, and uses lots of electricity.
- Given the anonymity of blockchain members and absence of legal documentation, permission-less smart contracts have no legal framework and provide no safety net if things go wrong.
- Where immutability is a key feature of blockchains, what happens when a legal dispute occurs, and either by mutual consent or a court order the contract must be changed or perhaps cancelled altogether? How is an unforeseeable “force majeure” in the blockchain handled? Permission-less blockchains offer no answer to these real-life questions.
- Current Blockchain-as-a-Service (BaaS) offerings, often based on cloud vendors’ public cloud platforms, only provide developer tools. Therefore, the onus is on the customer to have to build their own blockchain solution, or pay for costly professional services to build it for them.

Given all the media attention attributed to Bitcoin – and later Ethereum – the resulting hype has triggered a renewed interest in the way they combine technologies like cryptography or consensus algorithms, though these technologies have been studied for decades in the field of distributed systems. As many looked to extend blockchain’s architectural concepts to different use cases to solve a wide range of business problems⁵, a number of limitations became clear. For example, one important business requirement is that a distributed ledger maintain permissioned access by its participants (after validating their identities). As a result, distributed ledger technologies (DLT) – the latest generation of blockchain for the enterprise – was born. This explains why DLT is sometimes referred to as a “permissioned” blockchain.

Distributed ledgers and smart contracts define blockchain for the enterprise

To satisfy enterprise requirements a second generation of blockchain implementations – now called distributed ledger technology – has more recently emerged. While they share some architectural principles with permissionless blockchains, like decentralization, DLT addresses and resolves the issues exposed in the previous section.

It has been widely accepted that only DLT is technically capable of satisfying B2B, B2C and other B2X (e.g., Internet-of-Things) use cases. DLT is implemented as an alternative to a centralized approach, where all transactions are sent to and maintained by a central owner or authority, and often involve several intermediaries.

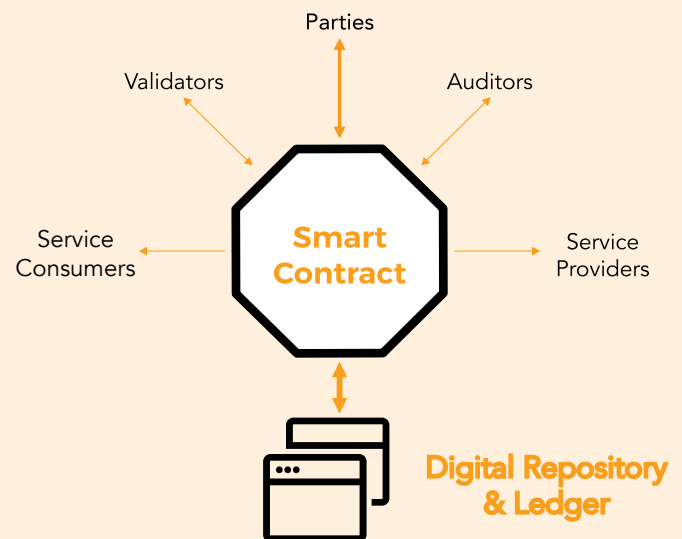
In fact, it can be argued that many of these intermediaries only add costs to the business process, and yet provide very limited value. Though some middlemen will of course remain, their value will have to be significant, and not linked to data ownership or some mandatory gateway.

In contrast to a centralized approach, DLT enable ledgers to be spread across all participants of an ecosystem, or ‘nodes’, across a peer-to-peer network. Nodes can create and/or validate new data, with each node maintaining a copy of the ecosystem ledger that is synchronized with all others to ensure that each member has real-time access to the most current data.

The benefits of a DLT approach – that is, ledgers that are immutable and shared among a network of member nodes with no central authority controlling the business – includes full real-time transparency with little to no integration requirements. Time needed to settle each transaction is accelerated since reconciliation across several different ledgers is automated, while also reducing costs by streamlining back-office and administrative processes. Additionally, accuracy of data ledgers will improve as the risk of human error is reduced and integration processes are simplified.

As much as distributed ledger technologies represent an innovative and compelling approach to how organizations can streamline and secure their digital business transactions, DLT’s associated smart contracts represent the killer app. A smart contract is a legally binding and tamper-proof agreement between two or more parties that is automated through the use of distributed software (though some parts may require human input and control).

Figure 2: Smart Contracts & Distributed Ledgers



One of the key advantages of a Trusted Digital Ecosystem is that interactions between entities are made through a smart contract. It offers services to its parties, its consumers (which can be other smart contracts), as well as itself utilizing services provided by other smart contracts and external providers. Each business interaction is immutably recorded in the participants’ distributed ledger and legally enforceable, creating an entirely Trusted Digital Ecosystem. Also, shared data or digital assets can be managed by the smart contract for the ecosystem in its digital repository and available in real time to potential validators and auditors.

Smart contracts – agreed to and implemented among two or more parties – are self-executing by automatically verifying and enforcing contractual clauses once predetermined conditions are triggered (Figure 2).

These protocols could considerably reduce administrative costs as they can be executed multilaterally, while also eliminating uncertainty around the exact terms or the execution process. In effect, smart contracts are the entities that maintain the repository of digital assets, while processing the transactions and feeding the ledger in a tamper-proof and verifiable way.

The key distinctions between smart contracts and automated services provided on traditional centralized systems are: (1) smart contracts are developed and deployed by multiple entities to achieve specific multilateral business objectives; and (2), once deployed, a smart contract cannot be overridden without following programmed and agreed upon procedures.

Technology by itself, however, will never be the silver bullet that will allow mainstream adoption of these new and innovative business models, since automating contracts within a secure and trusted ecosystem is only part of the equation.

Smart contracts must also meet the same criteria as a normal contract to ensure the party's rights and obligations are legally enforceable by the courts. It is this combination of 'law and code' that is required to make smart contracts a viable business solution.

Smart contracts must address the following:

- All involved parties are known to one another, with their identities verified
- Confidentiality of the transaction is maintained, unless agreed to otherwise by all contract parties
- Merchandise or services to be exchanged, and their price, are clearly defined
- Interactions among parties that result in changes to the contract's terms, as well as defined outcomes, can be certified
- Events associated with a contract can be corrected in response to a court order

Furthermore, everything must be stipulated in a natural language that can be clearly understood by each party, as well as the courts.

In effect, smart contracts are composed of legal documents and corresponding software programs – as is the 'law and code' principle stated above. These software programs power distributed ledgers and govern the transactions flowing across the ledgers.

It is in this area of smart contracts where Sky Republic sees the greatest market opportunity: they are the elementary building blocks needed for Trusted Digital Ecosystems to automate business transactions that are verifiable and self-governing.

The promise is indeed compelling: smart contracts can manage and execute complicated multi-party agreements beyond the capability of any singular organization. They greatly reduce administrative overhead, and could even help create new kind of co-created services (e.g., banks use a smart contract to provide payment and wire transfer services to its community of customers).

Sky Republic intends to leverage the best of what a DLT-based architecture and smart contracts has to offer, such as decentralization, security, and immutability. It will also take advantage of the maturity of digital B2B middleware technologies that can greatly ease implementation, identity verification, integration with existing systems and processes, and governance of digital ecosystems. It is Sky Republic's view that only by taking the best of both worlds will distributed ledgers and smart contracts become a viable business strategy.



Figure 3: Blockchain and the law

As of April 2017 at least eight U.S. States have worked on bills accepting or promoting the use of blockchain technology, and a couple of them have already passed them into law (Vermont and Arizona). The bills cover a wide range of purposes, from increasing transparency in state operations to protecting consumers from added taxation. Some States granted legal value to blockchain signatures and smart contracts, while describing them as "immutable" and providing "uncensored truth."⁶

While this government trend is another indicator of blockchain adoption, Sky Republic nevertheless understands that recognizing the legality of a blockchain transaction "signature" is pointless if the identity of the signer can't be defined and verified from processing the transaction message offline. The same challenge applies with a lack of clear definition of legal responsibility for transactions initiated by a smart contract. As of today, the use of standard, implicit or any variant of public key infrastructures (PKI) in conjunction with certificate authorities (CA) remains the only enforceable and proven authentication methods available. In permission-less cryptocurrency blockchains, signatures are sufficient to establish proof of ownership. Though without proof of identity, transaction parties have no legal safety net if something goes wrong.

Furthermore, many financial applications are subject to "Know Your Customer" (KYC) regulations, as well as other contexts. So having an immutable ledger or digital repository without knowing from whom the data originated has limited practical value. In cases where the ledger is filled with data submitted by the parties, such as supply chain provenance for example, nothing would guarantee that the ledger data is truthful and accurate if nobody can be held legally accountable.

A Trusted Digital Ecosystem powered by distributed ledgers & smart contracts

The potential benefits from the deployment of distributed ledgers and smart contracts is no doubt compelling, though work continues to make these innovations suitable for the real-world. One answer can be found in a decentralized ecosystem that provides contract parties with a trusted service, automating the implementation of a contract's subject matter, tracking party compliance, and governing the contract on their behalf. This would ensure any action or event will be legally enforceable.

Sky Republic believes trust automation can best be accomplished through the development of a Trusted Digital Ecosystem that has been engineered to function and serve as both:

- a 'system of engagement' – a system by which parties can interact with one another in the context of creating, processing and settling a business contract
- and, a 'system of record' – a decentralized system that is used to retain a copy of the contract that is kept secure, confidential and immutable.

A Trusted Digital Ecosystem can provide a secure and permissioned environment for digital business that is also decentralized and transparent. It's an excellent compromise between control and total cost of ownership (TCO).

Whereas DLT is intended to address the blockchain limitations listed previously in this report, Sky Republic considers the following as additional key requirements needed to enable a Trusted Digital Ecosystem (TDE):

- Ability for the smart contract to interact with external services in order to maximize the automation of contract compliance and governance. While this is critically important, it is also a major limitation in traditional blockchains (e.g., Bitcoin, Ethereum, etc.) which can only change ownership of a record inside of its own system. Blockchain 'crypto-contracts' are unable to interact with outside services because they are executed in parallel

by unknown and non-liable miners (by definition miners could never be held liable). Interacting with exterior services to improve automation and contract execution, dialog with 'things' (i.e., IoT), or use business services like payments and oracles is a must for smart contracts.

- Automation of the contract finalization phase ("execution" in legalese). The TDE can orchestrate customizations and the signature process (including notarization) through reusable templates that can expedite finalizing contract related software agents.

More capabilities can be added to this list and are expected to be provided out of the box. Also, by choosing a more complete solution you're not buying a development framework and having to build the required platform yourself, or operate/maintain the system's runtime services once it's in production.

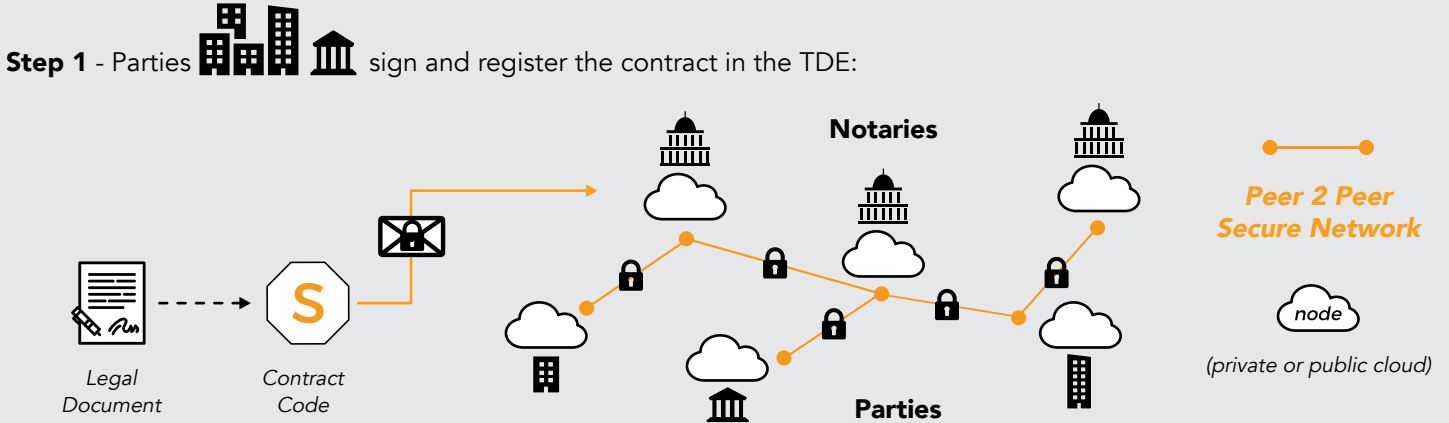
It is also important to note that the TDE goes beyond traditional digital business systems to enable business automation in two ways:

- Providing accountability and transparency among parties by maintaining a distributed ledger for each contract. It consists, in an immutable chain of blocks, a recording of all transactions or events received from the parties or generated by the contract during processing.
- Disintermediation of business relationships. Parties can directly transact in full "control" as they own the smart contracts which are run by decentralized notary nodes on the TDE to process their transactions.

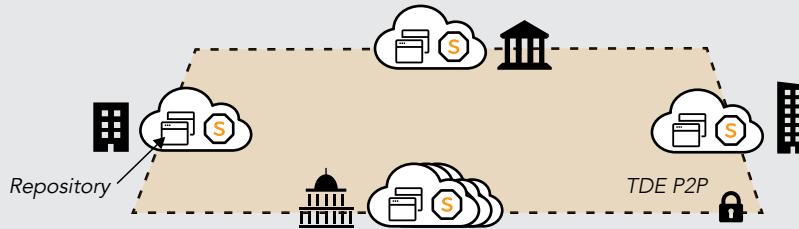
It is important to emphasize that a "notary" in this context is software run by an entity legally committed to operate smart contracts in Sky Republic TDEs on behalf of the contract parties. Notaries and Sky Republic are liable to the parties, and when data is extremely sensitive all messages can be encrypted so that only the parties and the notaries can see it.


Figure 4: How a smart contract in a Trusted Digital Ecosystem works




During execution, each party using a software node provided by the TDE can report events related to the contract and receive events reported by other parties, or even the contract itself. The TDE provides to all parties a certified distributed ledger of all events reported and verified for the contract called the contract ledger. Providing a "single version of truth" among the parties, the contract ledger is guaranteed to be immutable and similar among parties, which can verify its validity offline, especially verify identities of entities involved.

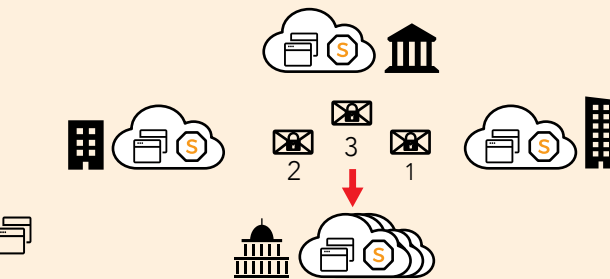
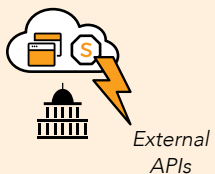


Step 2 - Parties and notaries initializes their copy of the smart contract on their nodes. It creates the contract repository with the initial list of assets:

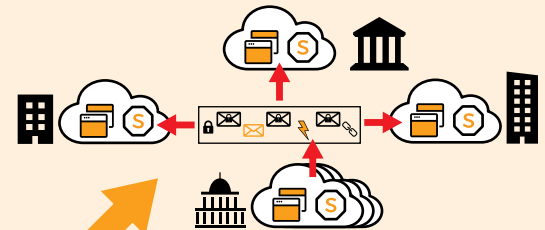


STEP 3 - parties send immutable transactions  to the contract. TDE orders them and route them to the notaries in charge of the Smart Contract.

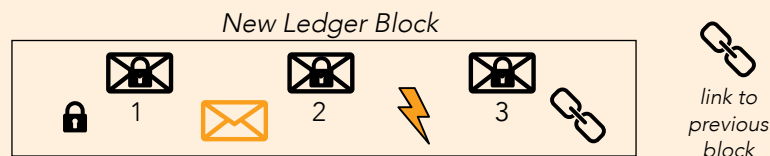
STEP 4 - a notary processes the transactions with its copy of the contract. Contract uses its repository and external services . It can generate new transactions  and updates of its repository .



STEP 6 - each party processes the new block with its smart contract to verify it, update contract repository and decide its next actions (-> **Step 3**).



STEP 5 - All events are recorded in a new immutable ledger block which is sent to all parties and other notaries.



Industry use case examples

Smart Contracts will offer the most benefits when used to govern a repository of digital assets, or provide digital services among its parties, as well as consumers and providers (“digital” in this context means automated and giving full control to its users).

As illustrated in the following real estate example (Figure 5), a distributed ledger could maintain an entire history of property transactions and ownership records. Fraud, falsifying ownership, or errors in governmental ownership ledgers could be eliminated, while associated costs (e.g., title insurance, notary, registration, and legal fees) and time spent on verifying ownership could be significantly reduced.

By connecting all participants in a real estate transaction, which typically would include the seller, buyer, and external service providers (e.g., property agents, banks, notaries, property authority, etc.), a Trusted Digital Ecosystem could increase the speed of the property transaction process. In fact, the transaction would only be executed once all verification requirements are met. It might also allow property buyers and sellers to easily access comparative data on property transactions they are interested in.

Figure 5: Real estate example using a TDE

Smart Contracts involved:



1. Manages home purchase workflows between a buyer and a seller, i.e. offers, counters, inspections, appraisals, payment and title management.

This smart contract has one instance per home purchase which starts and ends with it.

It uses two external services in this example:

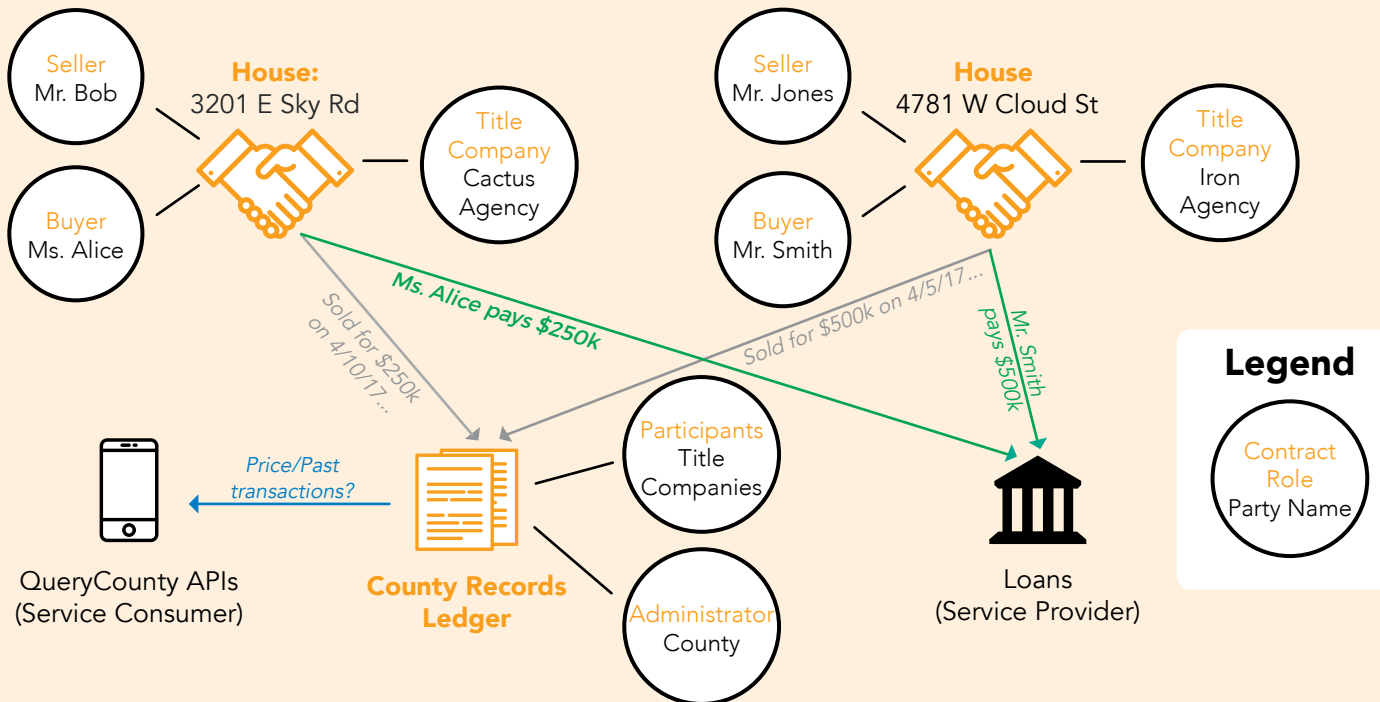
- Green arrow: payment for buyer’s loan service
- Grey arrow: registration in county records ledger of the transaction when finalized



2. Manages county records ledger of house ownership and transactions. It lists who owns which house and all transactions completed in the past.

This smart contract has only one instance always running with parties being the county itself and all title companies.

It offers a free service (blue arrow) to query completed among transactions.



While the following use cases are currently being explored by many, Sky Republic believes they represent additional examples of when a Trusted Digital Ecosystem (TDE) can provide a significant value-add.

SUPPLY CHAIN

At the heart of sophisticated MRP (material requirements planning) is inventory allocations (and deallocations) tied to specific order bills (orders exposed through multi-level bills-of-material netted off against inventories). Often contracts by way of blanket purchase orders are placed on supplier's systems⁷. The TDE can allow these purchase orders to be automated by smart contracts to execute and govern business agreements. For example, inventories often need to include quality certifications – after inspection of these certifications, smart contracts can execute triggering payment workflows. This is already common in automotive, and high volume repetitive manufactures such as Dell.

INTERNET OF THINGS (IoT)

There are a number of possible IoT scenarios where DLT and smart contracts could play an important role to provide a significant value-add. More commonly, DLT can link smart devices while maintaining a ledger with the entire history of smart devices' data exchanges and leverage the collected data to optimize device usage; various sectors could leverage IoT data in combination with smart contracts (e.g., activation of insurance claims once IoT sensors measure a defect). In effect, the TDE would provide the trust, record of ownership, transparency, and the overall (decentralized) communication backbone for IoT. Smart contracts could then be applied on the data in the distributed ledger to keep track of business rules and take actions based on thresholds that have been met, or maybe have been breached (e.g., a driverless vehicle that has failed an inspection can be grounded)⁸.

- Consider a typical supply chain example⁹ where a shipping container that leaves the manufacturer's site, is transported via railway to the neighboring port, is then shipped to the destination port, transported again to the distributor's facilities, until it finally reaches the retailer's site. This complex, multi-step process involves several stakeholders and checks along the way, with each stakeholder usually maintaining their own database to keep track of the asset, which they update based on inputs from the other parties along the chain. A TDE that is set up to track this asset would mean that there is now one shared database to keep track of, where updates come with cryptographic verifiability, get propagated along the network automatically, and create an auditable trail of information. When the shipping carrier reaches the destination port, they send a signed message to a predetermined and agreed-upon smart contract to allow everyone on the chain to know that the container has arrived at its destination port. Since the transaction is signed, it acts as a cryptographically verifiable receipt of the shipping company's claim that the container has reached the destination port. The receiver at the port can then post to the same smart contract to confirm that it is in possession of the container.

INSURANCE

Smart contracts powered by distributed ledgers could provide customers and insurers with the means to manage claims in a transparent, responsive, and irrefutable manner. Contracts and claims could be recorded onto a ledger and validated by the network, ensuring only valid claims are paid¹⁰. For example, the TDE would reject multiple claims for one accident because the ecosystem would know that a claim had already been made. Smart contracts would also enforce the claims – for instance, triggering payments automatically when certain conditions are met (and validated).

TRADE FINANCE

The TDE could automate the still manual trade finance process. Some opportunities include: (1) transforming letters of credit to smart contracts with automated payments; (2) digitizing printed documents, such as bills of lading and storing them as metadata; and (3) creating a record of ownership in each step. This would result in lower costs, increased efficiency, improved transparency, reduced risk for fraud and reduced human errors¹¹.

CAPITAL MARKETS

The TDE could oversee the life cycle of securities (e.g., equity, debt, derivatives, repos, loans, asset-backed securities) and commodities in the areas of: (1) issuance, ownership, and trade; (2) post-trade clearing and settlement; and (3) custody and securities servicing. A shared synchronized ledger among participants could eliminate the need to reconcile various independent ledgers and improve process workflows, with a clear view of asset and/or process ownership throughout the chain, as well as leverage smart contracts to eliminate manual processes. Smart contracts could also be leveraged for other securities, such as: (1) derivatives that automatically post margin on the occurrence of a margin call or automatically pay out when a counterparty defaults; (2) syndicated loans with automated cashflows among lenders; and (3) loans with collateral that is locked (e.g., deactivate private keys) when the borrower misses payment. For securities that are directly managed by the Trusted Digital Ecosystem, the role, and associated fees of custodian banks, which currently hold securities for safekeeping and offer various servicing activities, could be reduced¹¹.

- According to a July 2016 report by Moody's Investor Service, ICAP plc successfully tested smart contracts for post-trade operations of bilaterally executed spot/forward foreign exchange block trades. Using a permissioned blockchain with nine participant nodes, the test proved that the blockchain is a common golden source of user transactions that enhances data accuracy and transaction speed, provides a distributed copy to users' local servers, limits visibility of secured messages to permissioned participants only, and improves reconciliation and operations processes. This successful use case could also be implemented via a Trusted Digital Ecosystem powered by distributed ledgers.

Conclusion

As mentioned at the beginning of this report, the overall blockchain market – which includes permission-less blockchains, distributed ledgers and smart contracts – has seen an increasing investment by both corporate IT and large enterprise software vendors, a rising number of POCs, as well as a growing number of software start-ups.

Market sizing data estimates the global blockchain market to grow rapidly from USD 210.2 million in 2016 to over 2.3 billion by 2021 (61.5% CAGR), with the highest CAGR during this forecast period coming from the application and solution provider segment¹². This means that many enterprises will be looking to the vendor community for blockchain, DLT and smart contract related solutions, perhaps more often than trying to build blockchain solutions in-house.

At the same time, C-level executives, business line managers, and IT architects are all learning how to overcome the hurdles and mitigate potential risks of deploying these kinds of new technologies and business models. Leading analysts observe that while most company executives have heard about blockchain, few understand the technology and the potential impact to their business.

A 2016 Gartner survey found that 91% of board directors have heard of blockchain and distributed ledger technology, with 36% seeing it as an opportunity and 21% viewing it as a threat. However, Gartner analysts' interactions with executives indicate that most board members don't really know much about distributed ledger technologies¹³.

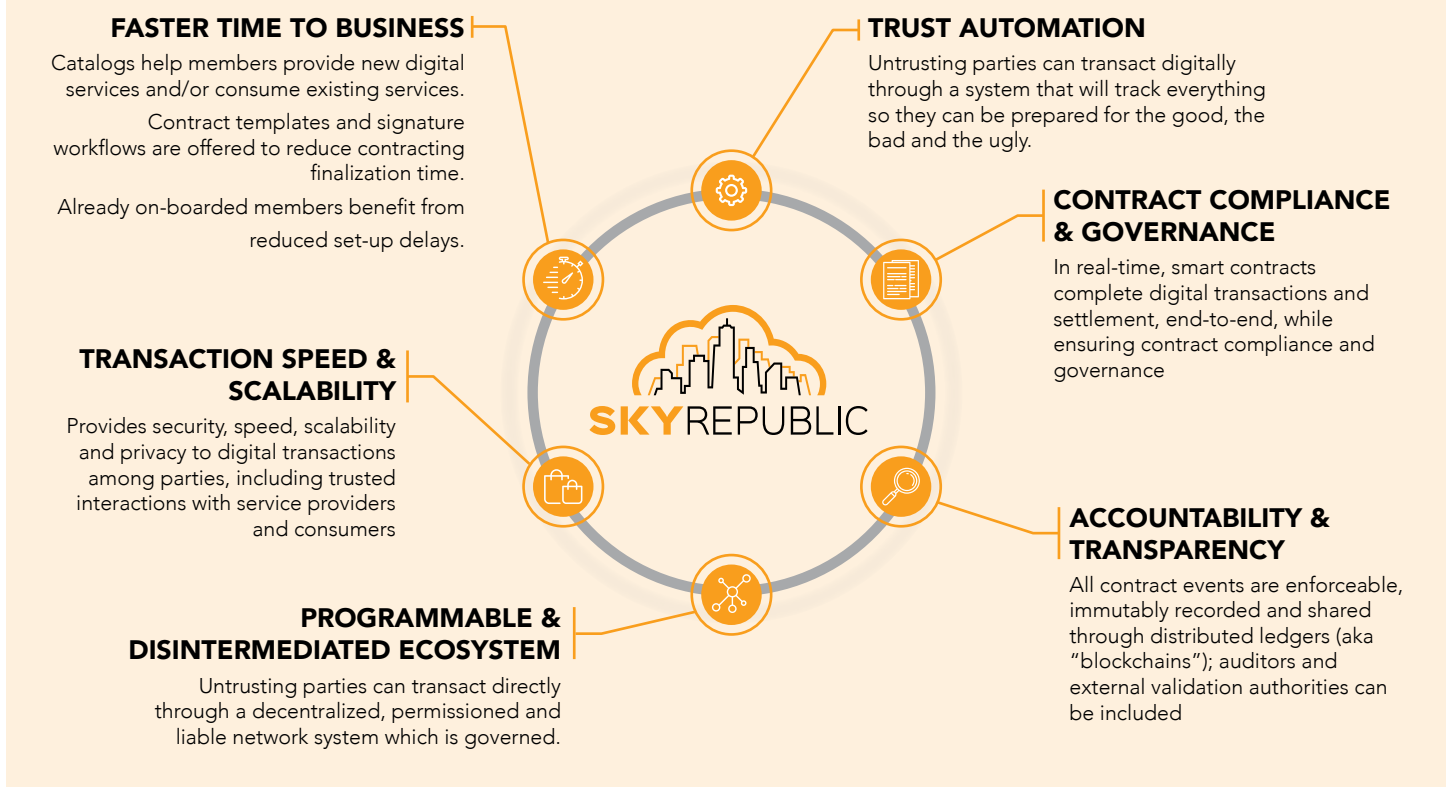
Consequently, many CIOs are challenged having to explain the strategic implications of these new and evolving technologies without getting bogged down in the technical details.

Sky Republic's vision, collective skill sets and domain expertise is reflected in this report, and positions the company for success. The company continues with its R&D investment and plans to deliver a Trusted Digital Ecosystem in 2017. Sky Republic believes this TDE will revolutionize the way individuals and organizations interact, the way businesses collaborate with one another, deliver a new level of automation and security of business transactions, and, ultimately, the productivity and sustainability in the era of the Programmable Economy.

Sky Republic is also prepared – and well qualified – to help with enterprise blockchain education, business benefit/risk assessments, and strategic planning. In addition, the company can assist enterprise architects experiment, develop, and deploy blockchain related technologies.

For more information contact Sky Republic at info@skyrepublic.com, or visit us at www.skyrepublic.com.

Figure 6: Summary of Trusted Digital Ecosystem benefits



Appendix

Reference sources:


1. "Gartner Says the Programmable Economy Has the Potential to Disrupt Every Facet of the Global Economy", October 8, 2015 <http://www.gartner.com/newsroom/id/3146018>
2. Ethereum whitepaper <https://github.com/ethereum/wiki/wiki/White-Paper>
3. "How Bitcoin Mining Works", Coindesk, December 22, 2014 <http://www.coindesk.com/information/how-bitcoin-mining-works/>
4. Investopedia, <http://www.investopedia.com/terms/1/51-attack.asp>
5. See: <http://www.r3cev.com/blog/2016/8/24/the-corda-non-technical-whitepaper> and <https://www.hyperledger.org/>
6. "US States working on blockchain legislation in 2017", Brave New Coin, April 2, 2017 <https://bravenewcoin.com/news/us-states-working-on-blockchain-legislation-in-2017/>
7. Hyperledger Project Wiki <https://wiki.hyperledger.org/requirements/use-cases/use-case-supply-chain-logistics>
8. "What Blockchain Can Do for IoT", DZone/IoT Zone, February 15, 2017 <https://dzone.com/articles/what-blockchain-can-do-for-the-internet-of-things>
9. "Blockchain and Smart Contracts for the Internet of Things", IEEE, May 10, 2016 <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7467408>
10. Deloitte report: "Blockchain Enigma. Paradox. Opportunity", 2016
11. Moody's Investors Service report: "Robust, Cost-effective Applications Key to Unlocking Blockchain's Potential Credit Benefits", July 21, 2016 https://www.moody.com/research/Moodys-Blockchain-can-bring-benefits-to-the-financial-industry-and--PR_352414
12. MarketWatch, October 13, 2016 <http://www.marketwatch.com/story/blockchain-technology-market-growing-at-615-cagr-to-2021-2016-10-13-22203054>
13. "What CIOs Should Tell the Board of Directors About Blockchain", Gartner, February 14, 2017 <https://www.gartner.com/doc/3606027/cios-tell-board-directors-blockchain>

Other external resources:

- Report: "Smart Contract Templates: foundations, design landscape and research directions", Revised March 15, 2017 https://www.researchgate.net/publication/305779577_Smart_Contract_Templates_foundations_design_landscape_and_research_directions
- Mastering Bitcoin - First Edition by Andreas M. Antonopoulos LLC O'Reilly Media, 2014
- N. Szabo: "Formalizing and Securing Relationships on Public Networks", First Mind, 2(9), 1997
- "ICAP's Post Trade Risk and Information Division Announces Completion of a Blockchain Proof of Technology", March 15, 2016 <http://newsroom.icap.com/icaps-post-trade-risk-and-information-division-announces-completion-of-a-blockchain-proof-of-technology>
- "Blockchain For Health Data and Its Potential Use in Health IT and Health Care Related Research" <https://www.healthit.gov/sites/default/files/11-74-ablockchainforhealthcare.pdf>
- Financial Industry Regulatory Authority : "Distributed Ledger Technology: Implications of Blockchain for the Securities Industry" <http://www.finra.org/industry/blockchain-report>
- European Security and Markets Authority: "The Distributed Ledger Technology Applied to Securities Markets" https://www.esma.europa.eu/sites/default/files/library/2016-773_dp_dlt.pdf
- Federal Reserve "Distributed ledger technology in payments, clearing, and settlement" <https://www.federalreserve.gov/econresdata/feds/2016/files/2016095pap.pdf>



 8149 N 87th Place,
Scottsdale Arizona, 85258

 +1 480 315 6572

 info@skyrepublic.com

 www.skyrepublic.com

