



DISTRIBUTED TECHNOLOGY



AUCTIONING

www.shelf.network

Shelf network

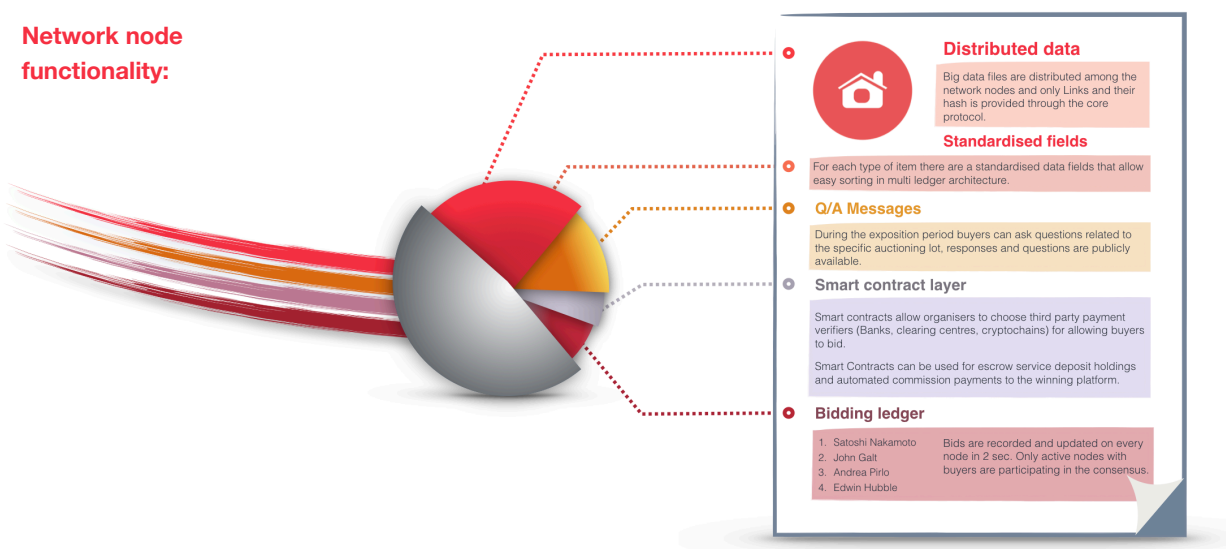
Shelf is the online, asset distribution and sub-contracting network to sell any type of asset through auctioning. It provides a revolutionary B2B model of outsource, where single asset can be dispensed to n-number of sub merchant's e-commerce or re-marketing websites and traded simultaneously in real time, without central administrator or bidding server.

Blockchain technology as it's foundation frees seller from centralised approach by allowing multiple counterparts to 'plug in' to a protocol. Effectively, blockchain creates the ledgers for these platforms, which are updated as soon as transactions, bids occur in the network. Multiple trading platforms, across the globe, provide a much wider pool of buyers, perfecting competition.

Auctioning network platform has never existed as a separate product in an online world, due to the centralised nature of bid record keeping. Shelf system is the world's first distributed product that allows merchants and sellers to easily collaborate and trade in an informational synchronised ecosystem.

Distributed approach allows to scale and open trades to the globe, in a transparent and easy-to-use way. It is especially a technology we believe governments, financial sector, dealers across the world can benefit from.

Network node functionality:



Network provides tools, needed for an effective management of e-commerce processes. **Standardised fields** for each asset is the next generation of MLS (multiple listing service), and allows the content distribution. additional **Data** such as pictures, documents, media are provided through links and hashes by the standardised field, but are stored and seeded in a distributed manner. **Messaging service** through protocol allows direct communication between the seller - sub agents and buyers.

Smart contract layer provides the universal mechanism of lot creation, where entire process of auctioning: deposit receiver, third party payment verifier, commission payment for the sub-agent, exposition and trade period is pre-programmed by the seller in a user friendly and simple compiler. **Blockchain ledger** guarantees the process transparency and allows multiple network parties to collaborate and bid in a distributed ecosystem.

Unlike the majority blockchain systems, there is no internal cryptocurrency in the Shelf network, but required proof of payments signed by the banks or payment services (including cryptocurrency blockchains) are acting as an economical barrier against Sybil and DDoS attacks and on the other hand allows distributed protocol system to be easily compatible with current business environment, providing extra financial security to the trades.

The consensus model between the network nodes is two layered, and bases on Proof of payment confirmations (such as deposit and registration fees) and JP Morgan's developed open source project "Juno", which is the next generation of Raft algorithm and can raise transaction speed up to 5,000 transactions per second and can scale across national boundaries.

Shelf system under the MVP version name: Auction 3.0, is currently piloting in Ukraine on state land trades and lease of communal property. Auction is as well used in Deposits Guarantee fund for trading bankrupt bank's mortgaged assets.

Current limitations

In today's world there is no solution that would allow the distribution of unique asset on multiple trading e-commerce websites and allow synchronised bidding, this technical limitation affects the entire business process and forms market as clustered or centralised under one single service provider.

In a mono block model both sellers and buyers are bind to a particular trading platform (merchant) that has an exclusive right to trade particular assets. Such existing architectural approach is difficult to scale in to an universal solution and is limited through the exclusives of a sole service provider for asset trade. On the other hand, the system has a single point of failure, due to the centralised database and especially with governmental auctions or procurements, the risk of manipulation rises.

Solution

The idea of decentralised auction platform was to build a perfect networking tool, where sellers and sub agent - merchants could plug in without any limitation or accreditation by central bodies and participate in a distributed trading process, though benefiting from registration fees, commissions and additional service provision to the buyers.

The breakthrough of the distributed architecture is that it allows the real time bidding for the same item from different merchant platforms and can foster trades by allowing global collaboration of sub-agents.

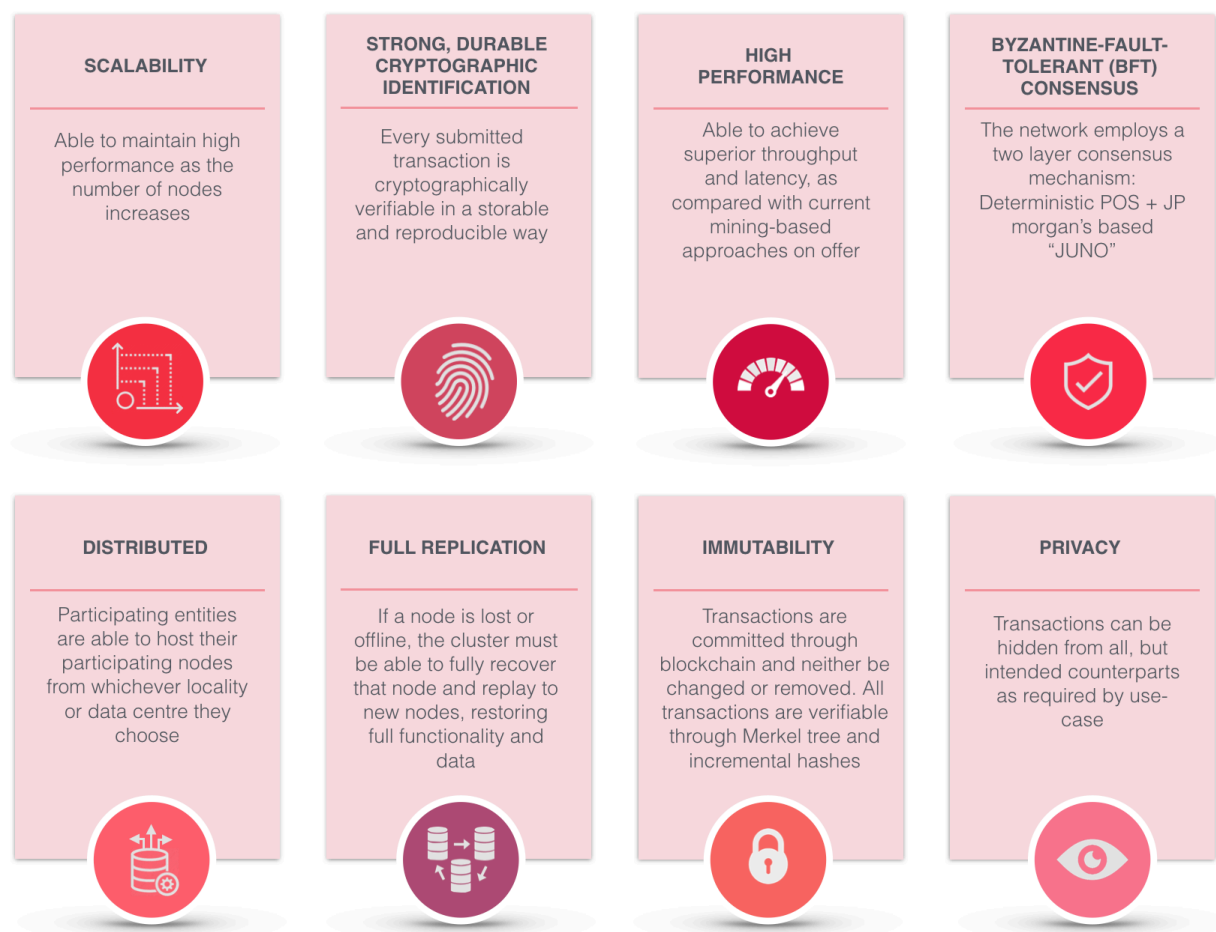
The open access to the information and momentous engagement of any sub-merchant in the trading process will disrupt the current model, built on the exclusiveness and shift the competition on client side, that will cause more customised and automated deal making and allow small and medium e-commerce websites to revive and compete with existing sole players.

Architecture

The consensus model of the network has two layers: first is the Proof of payment confirmations (deposit and registration fees) received by each e-commerce website, that determines the participating nodes in the trade, and second core layer of JP Morgan's developed open source project "Juno" for record keeping.

The system allows any merchant to participate in consensus while effectively preventing Sybil attack by using proof of trust (Proof of Payment/Guarantee). The consensus mechanism is deterministic in addition to a Turing-incomplete, single-assignment smart contract layer.

Shelf network features:



The weight of each node is determined by the sum of standard registration and deposit fees per lot, paid by the participants to a trading platform of their choice. All payments are verified via integrated API of bank accounts or payment services that process the fees. The transaction ledger is signed electronically by a payment entities and pushed in the protocol to authorise users and determine the weight of the active nodes for that particular auctioning lot. This rule is applied item by item, i.e. proof of trust has no history.

In the consensus, every log entry is individually committed and incrementally hashed against the previous entry. It takes approximately 5ms for a single log entry to go from

leader receiving the entry to full consensus being reached in the network. Consensus' job is to provide a perfect ordered replication.

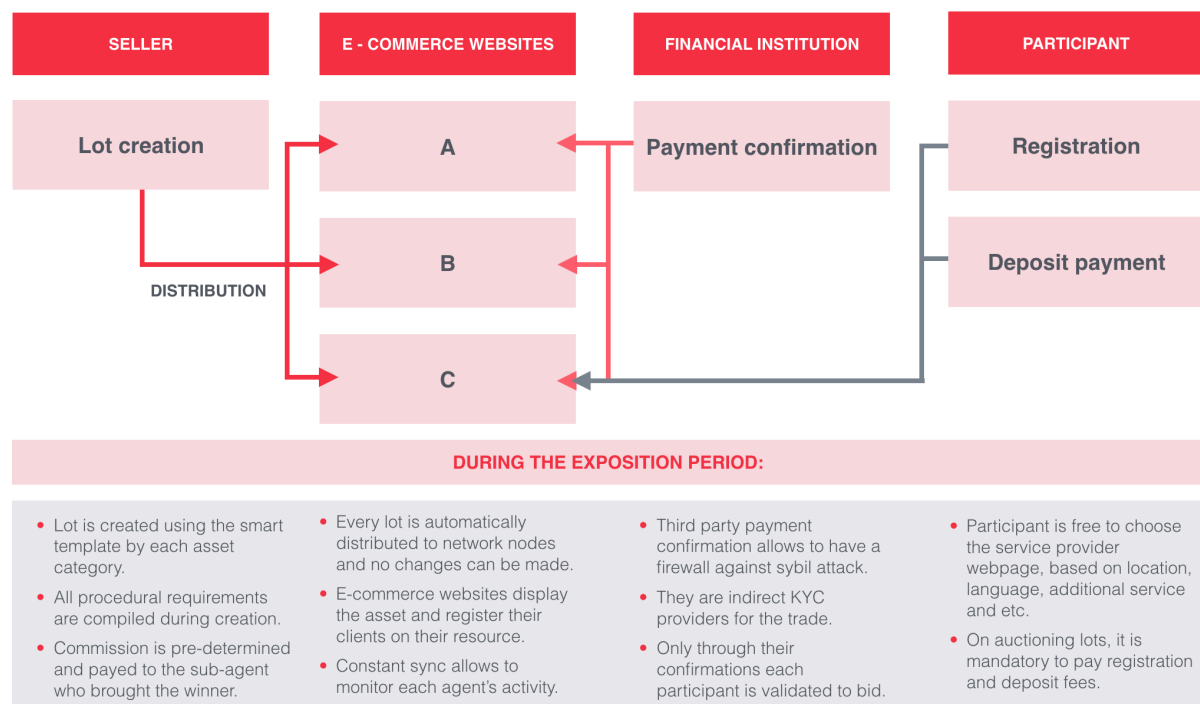
A node signs its last hash to prove that it has replicated the entirety of a log, and other servers can verify this quickly using the signature and the hash. Each node and client always sign before sending messages and reject messages that do not include a valid signature.

The leader of each trade periodically sends heartbeat messages (empty AE RPCs) to maintain its authority. If followers receive no communication, or during the network check the certain transactions (bids) are missing from the block created by the leader, the switch is triggered and a next weighted node becomes a leader.

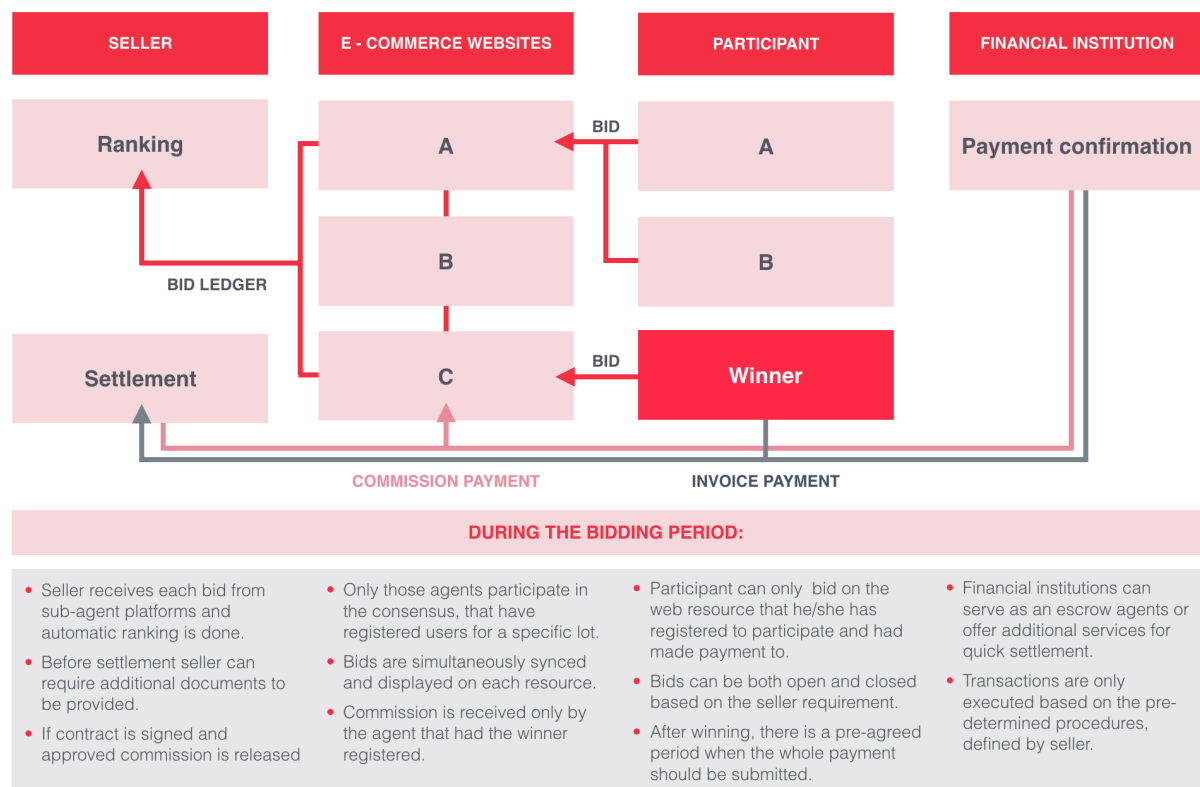
Such two layered approach is specifically modified for the auctioning and distributed trading principle. First, Proof of payment layer sorts and verifies the users who have paid the requested deposit fees and secures network from sybil attacks, second layer of consensus during the active bidding period guarantees that every bid (transaction) appears in the ledger and switching between the active leader nodes eliminates the purpose of blocking transactions from other counterparts.

Process

Merchants can offer a specialised organiser accounts to allow publishing assets for auction. Outsourcing model of lot creation though single organiser portal is especially attractive for enterprises, one time auctions and sellers that are not willing to store and sustain infrastructure.



As soon as time of bidding comes (after registration fees are paid or some other trigger strikes) platforms that are willing to participate in the auction create a new ledger among active ones, update their ITEM ledgers with corresponding hash of it and start trading process in a new one. Transactions that represent bids won't load nodes that don't participate in the trade, or belong to other channels.



Financial institutions such as banks, payment systems are the backbone of the ecosystem, as all transactions are solely processed and verified automatically by them. They also act as a third party KYC providers, as deposit payments are made through bank transfers.

The architecture allows to plug in with additional roles. Especially in governmental auctions-procurements: NGOs, Public investigators, Media can easily launch the monitoring node and act as a sole observer, gathering the data independently, analysing and tracing the violations.

Benefits

Using such distributed method for auctioning has many beneficial aspects, that transforms the current business processes and relationship between sellers, merchants and buyers.

Shelf system offers a revolutionary approach of outsourcing though asset distribution and tracking. Seller does not depend anymore on a single service provider and monopolistic nature of existing auction systems. Distributed auction opens up a market for private agents, who can pop up easily in any part of the world and perfect trades.

Such unification of private e-commerce merchants brings competitiveness in the re-marketing industry and can drive the value of assets in a way that governments or sole merchant platforms have never being able to do.

Sellers:	Users:
<ul style="list-style-type: none">• Access to multiple sub-agents• Cutting costs• Easy administration• Building trusted networks• Transparency	<ul style="list-style-type: none">• Diversity of choice• Improved services• User oriented approach• Low switching costs• Transparency

Merchant platforms:	Financial institutions:
<ul style="list-style-type: none">• Free Informational pools by asset type• Easy diversification• Commission based income• Focus on service and user• Building additional app. services• Cutting cost on infrastructure	<ul style="list-style-type: none">• Receipt confirmation commissions• Bank Guarantee service• Payments processing integrations• Building additional smart products• Holding Deposit funds• Gathering additional clients

Sellers have a universal tool that allows to distribute the asset based data to unlimited number of e-commerce merchants. The unique functionality of distributed auctioning allows for the revolutionary approach to track and trade same item on various online resources and have access to global audience through customised and targeted sub-agents.

State entities have a universal tool for monitoring and control. By validating and adopting a regulatory act that defines the standard of the protocol used for public auctions or procurements. This allows anyone interested as a merchant in any part of the world to plug in, re-market the assets and bring competition to state auctions.

Merchants (trading platforms), get access to the universal catalogue, informational pool of ledgers, asset by asset. They commercialise on registration fees. As well there is a capability through Shelf network to set a special commission fee for the sale of the particular assets, that brings additional initiative for sub-merchants to operate and compete on bringing winners from their trusted trading platforms.

Financial Institutions (Payment services) serve as a major infrastructure for processes and receive commissions from the transactions. Certain guarantee fees in some cases are maintained on the merchant side and banks get to allocate and hold those funds. through partnering with merchants financial entities build and offer additional services like: Bank ID, Online payment systems, Guarantees, Escrows and etc.

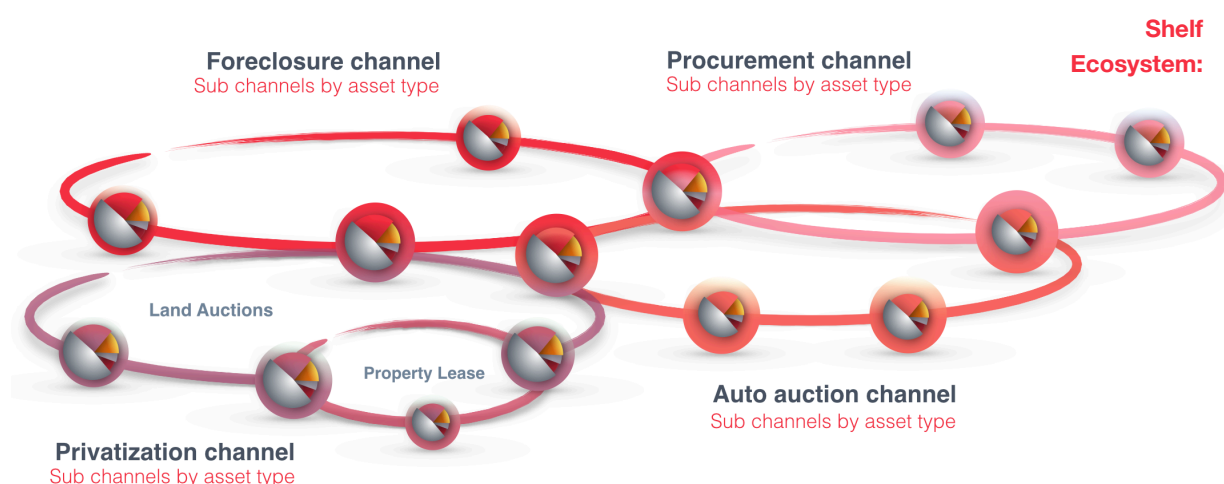
Users benefit from more tailored services, localised choice in terms of e-commerce merchants, and are not bound to a particular platform with exclusive rights. As the auctions and procurements become global with the distributed ledger, users and businesses can connect easily in foreign countries with the sellers and buyers.

Besides from direct participants there are vast number of businesses that will build an additional layers to the auction protocol and provide diverse services such as escrows, payment methods, exchanges, audits, due diligence, shippings, logistics, judicial services and etc.

The future

Shelf has the multi ledger architecture, that allows the creation of separate channels, where certain group of sub-agents, merchants operate without interfering or loading others with unnecessary data.

We envision that there will be a global directory with list of categories for a particular regions, countries such as real estate, land, cars, commodities etc. Trading platforms that want to participate in certain trades will select particular categories that suits their needs and then select particular items to be traded through their e-commerce webpage.



Bid type:							
Open pool	Reverse	Blind	Reserve	First sealed	Absolute	Multiunit	Penny

Shelf system will provide various distribution channels, that will be easy for integration and offer automated contracting through blockchain protocol with the seller. Whole process will be distributed and easily tracked though the network.

Shelf platform should scale into different sectors and end up as two type of application:

Enterprise - The platform will allow private entities (dealers, banks, funds, retailers) to customise and create trusted channels (ledgers) among sub-merchants and agents. They would be able to adjust the asset category standards, bidding methods, monitoring tools.

State - Perfect outsource tool, where state entities authorise the standard of data exchange and procedures based on the regulatory framework and allow private trading platforms as sub-agents to “plug” and participate. Such approach will bring a massive disruption and improvements to current model of centralised trades, by bringing competition and transparency.

The idea is to grow the distributed auction system into a universal tool through which any type of network auctions can be deployed through the core protocol and can be adjusted for particular asset or seller’s preferences.

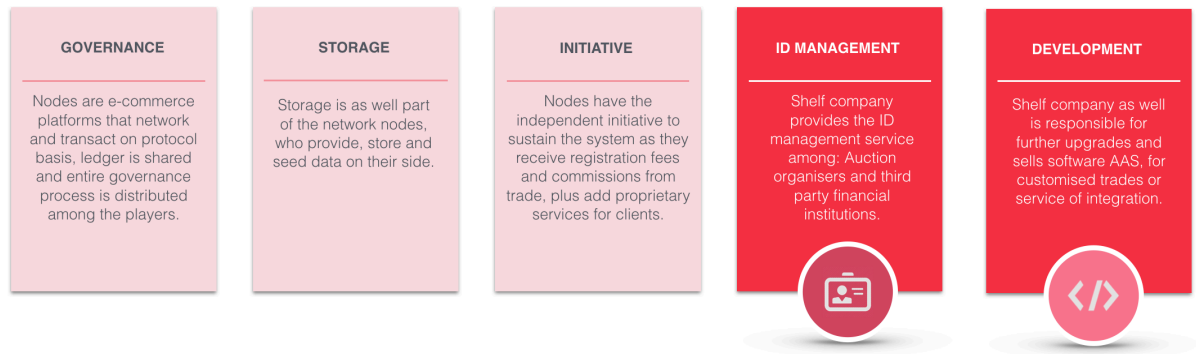
Asset categories:	Bidding types:
<ul style="list-style-type: none">• Foreclosure• Collectables• Derivative rights• Mortgages• Licences - titles• Procurements• Commodities• Bonds• Handmade items	<ul style="list-style-type: none">• English open pool• Reverse (Price lowering)• Anonymous• Blind• First price sealed• Multiunit• Penny• Reserve• Absolute auction

Itself the first layer of protocol consensus (Proof of payment) is currently adjusted for financial institutions, but with the growing pattern in cryptocurrencies and blockchain world, the Shelf protocol can easily integrate the payment verification input from digital money networks and provide additional in built escrow - smart contract based tools, allowing more efficient, peer to peer networking between buyers and the sellers.

Business model

The system is open source, and we provide not only the core protocol as a free tool for integration, but offer a basic merchant and seller UI for quick deployment and use. This type of openness and simplicity work effectively especially with state entities, and institutions that are willing to upgrade their current business process and outsource the asset trade management at larger scale.

So in order to make the Shelf commercially viable, several open source business models are applied:



Shelf as an ecosystem is decentralised, it makes each node (e-commerce website) autonomous on an operational level. Each merchant has a direct commercial initiative to sustain the network, and are completely independent in terms of fee policies as well.

What shelf offers as a service is a “KEY” management tool, where based on the specifications of customer, we can limit the lot creation to one entity on certain channel, or allow only certain group of sub-agents to “plug” based on the existing restrictions or accreditation requirements.

Shelf’s basic income is from managing financial service providers within the network (Banks, escrows, payment processors and etc.) As they receive and process all of the registration and deposit fees and charge commission from transactions. Based on the integration contract, we charge small portion from each transaction and provide them with **Master Keys** in the system for payment verifications.

So there is two type of commercialisation:

1. Selling professional services (development, customisation for certain sector or asset type, featured type of bidding, training, technical support, or consulting)
2. Transaction based fee for ID management of financial services and “key” validation.

Source code: Core protocol



GitLab

<https://gitlab.com/groups/eAuction>

Network test

<https://docs.google.com/document/d/10cHQingVUokyCqBMZLV09mA2UexCbvYr1QZuWU9c5p0/edit>

Source code: Front UI



GitLab

https://gitlab.com/max_nes/auction-front/tree/master

API - Guideline

<https://www.evernote.com/shard/s105/sh/085fb19a-9a85-4cce-a6df-a9e126ca6f1d/4d34c6a51f5e2671>

Payment receipt integration

POP/G consensus

<https://www.evernote.com/shard/s105/sh/5e550e1d-1cd2-4d1f-a9d5-1255f196bded/2e8c79298a8eb1bb>

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