

TODAY'S CAELUM
TOMORROW'S HERITAGE



MGL Caelum
DeFi for Commodities

BLUEPAPER

Audited by



Legal opinion





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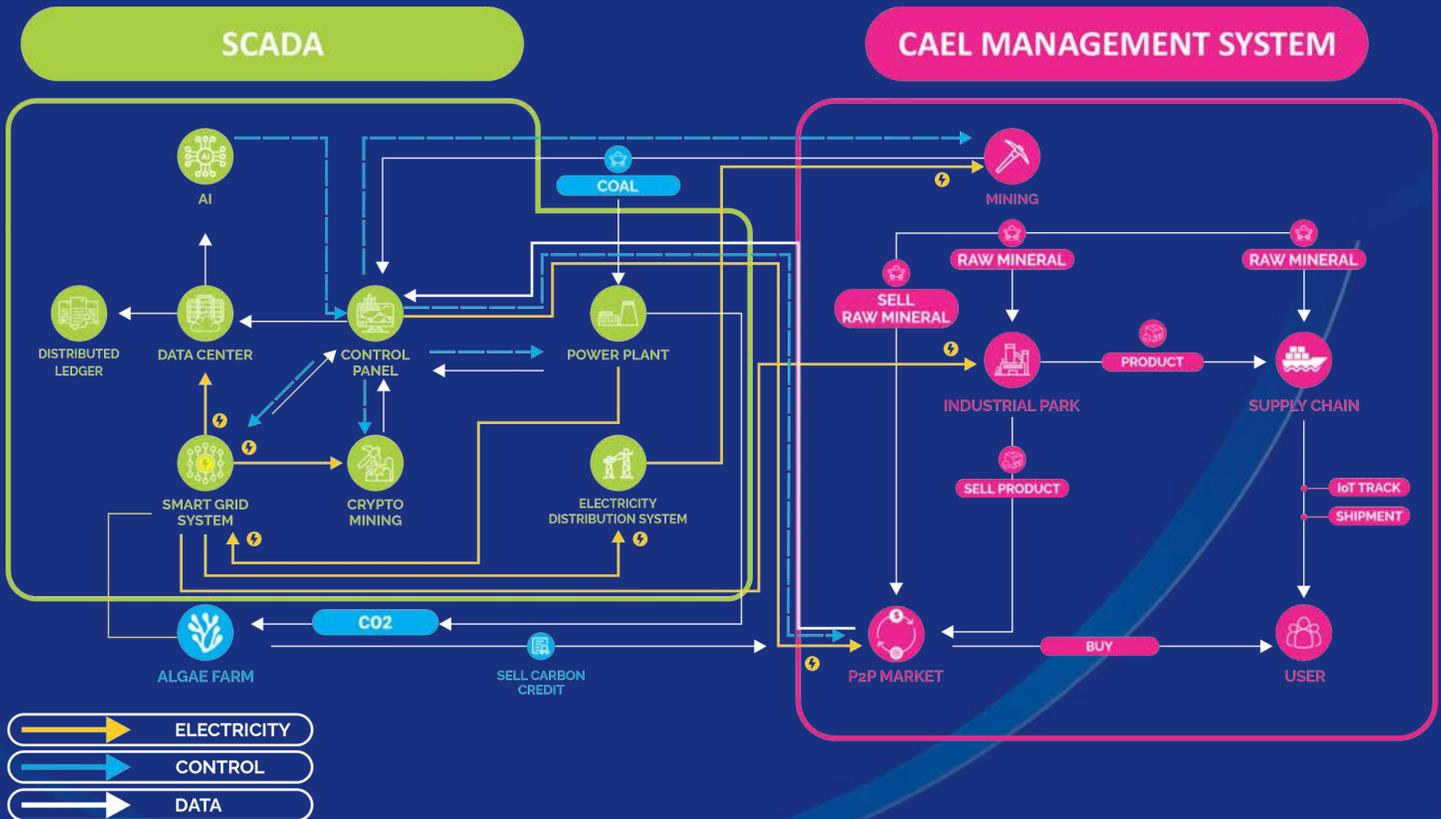


TECHNICAL DIAGRAMS

The MGL Caelum Eco-System is a complex system that includes mining, power, technology, software, economy, and ancillary sub-systems that all patch each other as necessary. For example, mining and industrial sectors are difficult to develop because Mongolia suffers from power shortages. On the other hand, we have licenses for coal deposits. Is it not incredible that we are capable of building a power plant and a coal mining operation, then power our mining by the generated electricity and then feed our power plant via the mined coal? We will then be able to grow algae via the generated CO2 and then process the algae produced in our algae farm. This way our CO2 footprint will be lower than

average, and means we will be able to purchase and trade carbon credits for additional funds. Also, it's compatible with Mongolia's and the world's target of reaching net-zero carbon emissions, which fights against excess greenhouse gas and climate change. In other words, we can't remove or replace subsystems from the entire system or can't create any subsystems without other subsystems; that's why we call it complex. We are proudly introducing this complex system to our supporters that can maximize our environmental contribution. The upper image shows our entire Eco-System. It might look complicated. Let's find out what it means from a technical perspective more closely.

THE GENERAL STRUCTURE OF THE WHOLE ECOSYSTEM

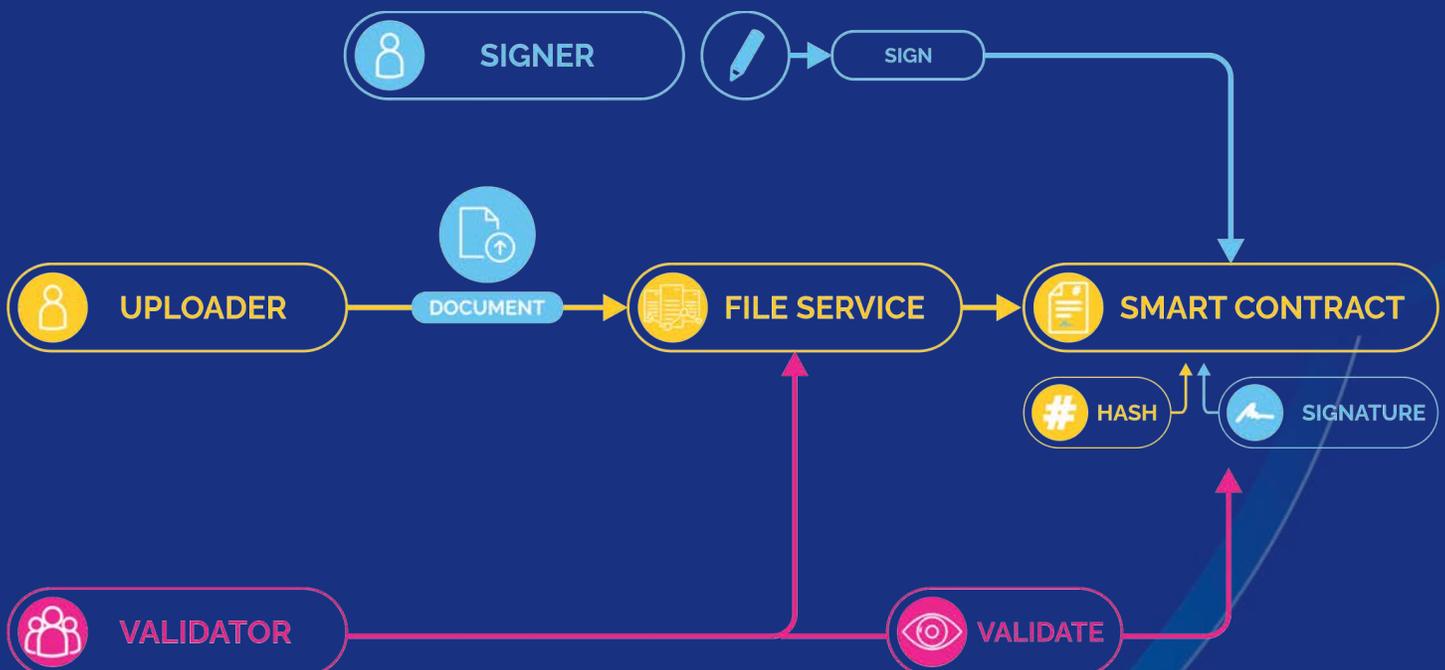




DOCUMENT SERVICE

The online document sharing service consists of three main parts: an accessible file sharing service, a hash to prove the originality of the document, and a blockchain-based digital signature file directory. With a file-sharing service, users can copy and paste documents and then set up access only to authorized users or access to everyone. The hash is extracted by inserting the document file into the hash function. The hash not only confirms that the copied document is in its original state or has not changed but also serves as a path to the file-sharing service. In other words, a file-sharing service can access a file by its hash. The file hash

is also stored on the blockchain for non-deletion, immutability, and verification. Use smart contracts to store on blockchain. This means that if someone signs the document, the signed signature will be stored in the smart contract, corresponding to the hash of the signed document. This allows you to easily view all file signatures in one place, in addition to making it impossible to return someone's signature. Even if a third party does not have access to the file, you can still see who signed the file. If the signed address has a certificate, it is possible to accredit who signed it and which organization.





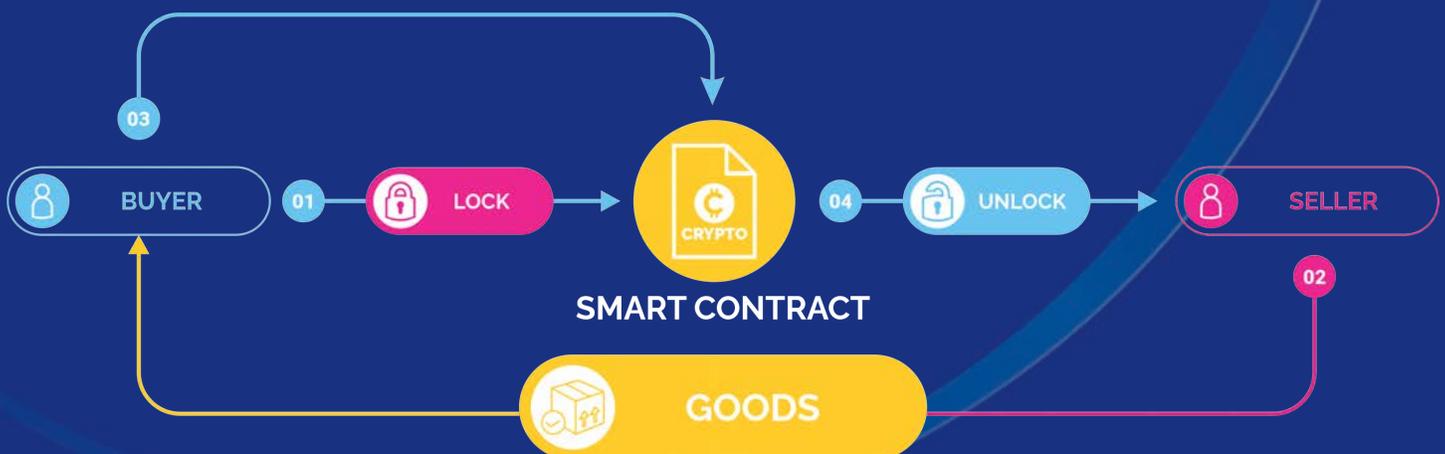
KYC AND CERTIFICATE AUTHORITY

Individuals or organizations with a successful KYC certificate have access to the sections where registration verification is required on the system. To do this, the system will verify and issue the certificate by providing the individual or organization with the documents and photographs required for the KYC service. There will be an online certificate authority service to verify the certificate. Anyone can view the certificate, and the purpose of the certificate is to verify that the address (public key) and its signature are the registered individuals or organizations.



P2P

P2P (peer to peer) allows two people to trade directly without intermediaries. Blockchain technology will be used to ensure mutual trust between the two parties. You can also use our other services such as documents, digital signatures, and certificates to authorize products and improve trust. By eliminating intermediaries, fees are reduced and payments and products are freer and more selective.





P2P ESCROW

An escrow account is an account that can be released under certain conditions, using blockchain and smart contracts to create a more flexible and programmable escrow account without intermediaries. You can use any cryptocurrency for payment through smart contracts. The principle of operation is based on three individuals: the seller of goods and services, the buyer, and the escrow. First, the buyer locks their cryptocurrency in an escrow account. In this case, neither party can release the locked assets. Therefore, the seller can safely transfer the goods and services to the buyer. Upon successful completion of the goods and services, the buyer will release the locked assets, at which point the locked assets will be released and transferred to the seller.

You can choose from two types of escrow accounts: traditional or Letter of Credit (LoC), or modern smart contract. As for our platform, we offer as many smart contracts as possible to reflect the P2P concept, but we will not miss it because it has the advantage of expanding our market and improving our liquidity by traders who have learned to trade traditional OTC. The main purpose of an escrow account is to lock assets and protect against any risks during bilateral trading.



P2P MARKET

Another important part of P2P trading is the market. On the one hand, there are orders to sell goods and services, and on the other hand, there are orders to buy goods and services. These ready-made orders are called liquidity, and the higher the liquidity, the better. When a buyer or seller searches for an order of interest, they need to enter the product or service they are selling/are interested in and choose a cryptocurrency. At this point, orders for the goods, services, and cryptocurrencies will be displayed, sorted by price, and filtered as by-products or services. For example, you can see the market price by filtering prices in ascending order. When filtering goods and services, it is possible to judge whether such documents are available or whether such individuals or organizations have digital signatures. You can view the details by clicking on the order, and by clicking the buy button, the escrow account will be activated, and the order will be locked and will not appear in the list. This eliminates the need for double spending on a single order.



TRADING PLATFORM

The Natural Minerals Trading Platform is a product based on blockchain technology for open participation. In addition to the traditional way of making a payment using a bank, two types of payments can be made more easily, quickly, and reliably, using modern, cryptocurrency, and smart contracts. Raw material sellers and buyers place their orders in the P2P market. As a buyer, you can include what audits, vendors and mines to accept when placing an order, and on the other hand, it is easy for sellers to filter and prioritize orders. As a reseller, when

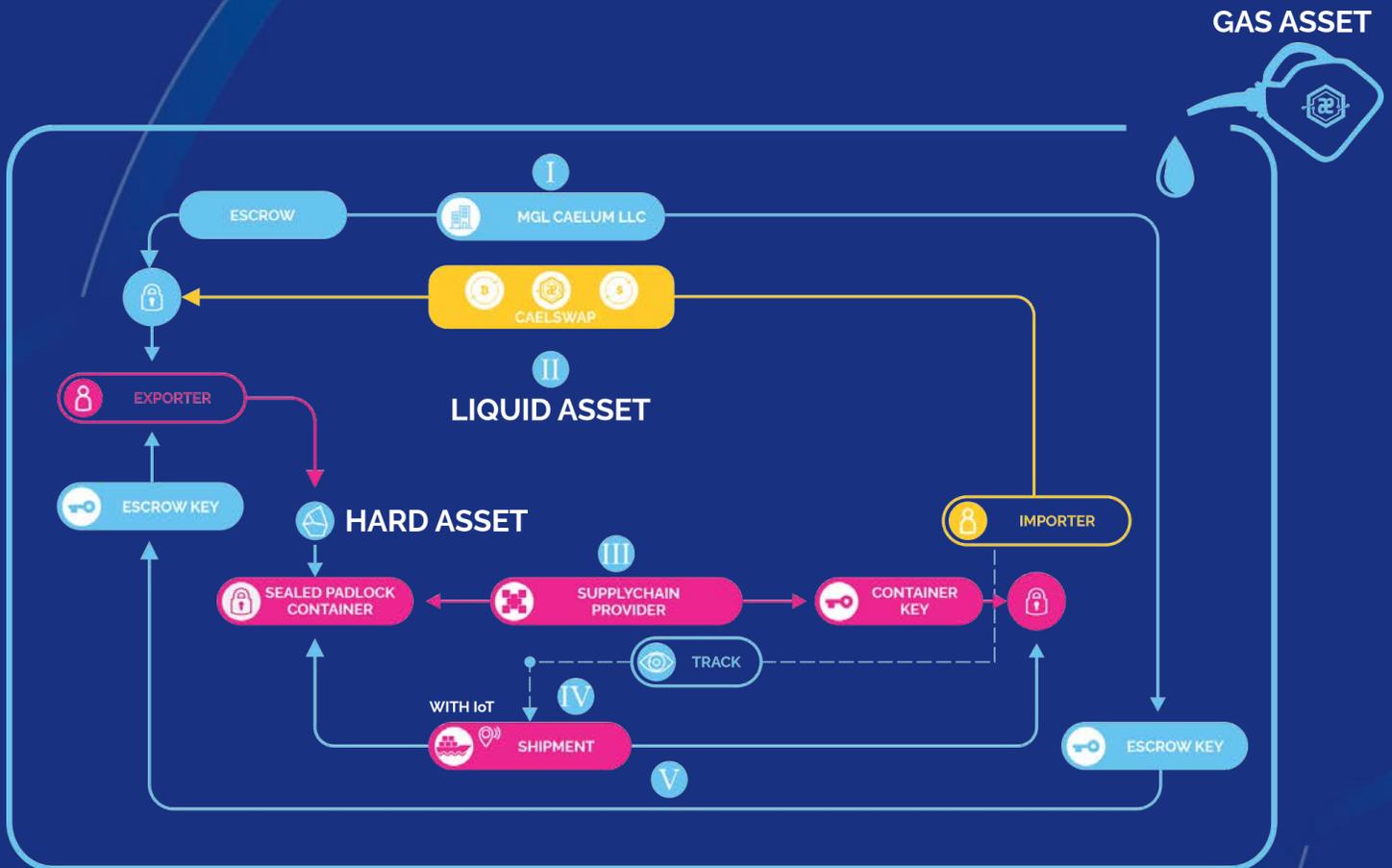
ordering, in addition to product information, audit and required documents should be attached to the P2P market using the Document Service. Buyers can filter and sort the goods according to their requirements, and the purchase process begins by depositing the required cryptocurrency in a smart contract escrow account or by locking it after issuing a letter of credit from the bank. All users participating in the system are required to provide registration verification, which will be the main way to authorize the participant to others in the future.



SELLERS, BUYERS, AND AUDITORS CAN PARTICIPATE IN P2P TRADING THROUGH KYC. IOT DEVICES ALSO NEED TO BE CERTIFIED.



The above diagram shows us how two parties exchange goods and payment in a safe way. Obertech is responsible for supply chain, shipment and IoT. MGL Caelum is responsible for escrow, swap, and platform. There are three types of assets used. Hard assets are a kind of good. For example, commodities, electricity, or carbon credit. Liquid assets are used for payment. Crypto tokens/coins and fiats are in this type. CAEL tokens are a named gas asset because it fuels our entire platform.





SUPPLY CHAIN

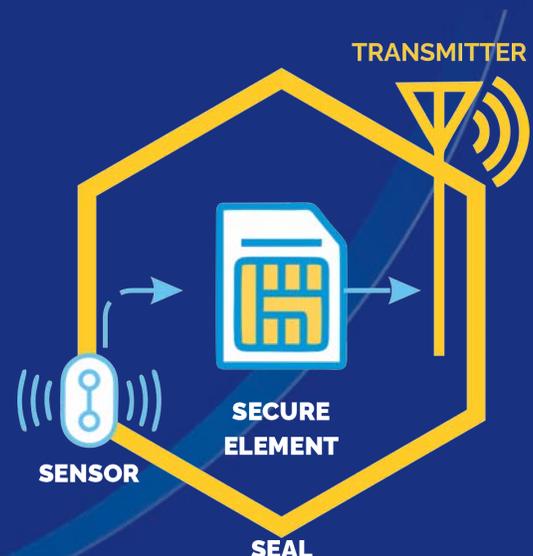
The buyer must be able to see directly where and at which stage the goods are delivered via the IoT device. Delivery can also be traded on the P2P market. To do this, you can order and trade goods, in what quantity, in what way, from where, or how to deliver.



IoT DEVICE

The IoT device is a key unit of basic services such as a smart grid for power distribution and supply chain. Our IoT device has advantages such as digital signature, hash function authentication, and seal control of the data coming from the sensor through the security element. The fact that the secure element cannot be printed or copied, and that it is inaccessible to memory, plays a vital role in keeping the digital signature secret key so that no one else knows about it. In this sense, the security element is used by mobile phone

operators on SIM cards, banks on VISA/master cards with EMV chips, and governments on e-IDs (gov) for the most secure areas. Secure elements need to be turned on at all times, and it is possible to authorize that the device is not turned off at all. If the device is interrupted or turned off, it will be recorded on the secure element and the network will be notified immediately. If the equipment is interrupted or switched off, it may be necessary to re-inspect the product's meter. It also has the added advantage of being able to control the seal of the device by being constantly turned on. When a device is unlocked or sealed, information is recorded on the secure element and then shared with the public through the network.





SMART GRID

Smart Grid is a power grid that can be connected to a grid and receive and sell electricity through a Smart Meter (SM). The received and delivered electricity is measured by smart meters, and the supply and demand of electricity are traded on the P2P market. All smart meters are controlled by the SCADA system through the required devices. It regulates who is not supplied with power through the SCADA system, which connects to P2P through blockchain technology, and controls and regulates who has how many kWh of power. On the other

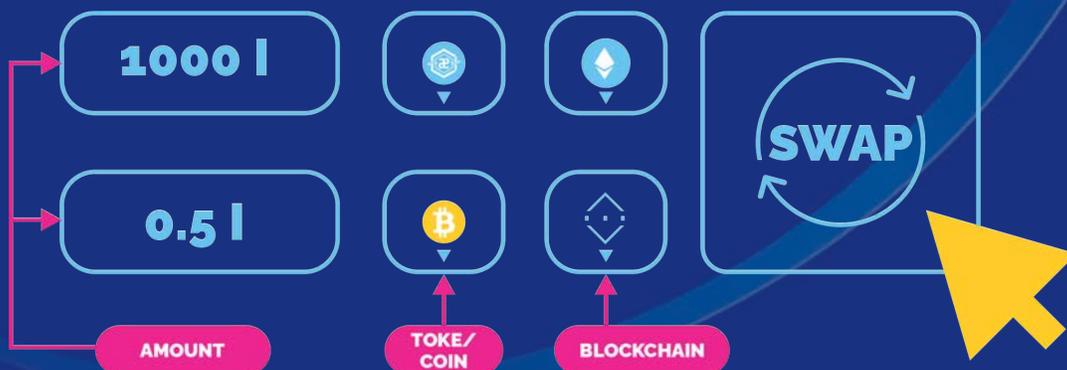
hand, manufacturers supply electricity through the SCADA system, which controls how many kilowatts they supply, and how much the supplied power is priced and traded through the P2P market. In the case of Mongolia, energy consumption and production are insufficient, making it impossible to maintain phase synchronization domestically. Therefore, it will be connected to the national line, and then to the large grid of Russia and Asia, from where it will receive phase synchronization and reduce reactive power.



SMART GRID

P2P PAYMENT SYSTEM

Caelum P2P payments system allows the users to send/receive payments with any currency, and Cael Bridge acts as a conversion method between currencies without any 3rd party influence.





Components

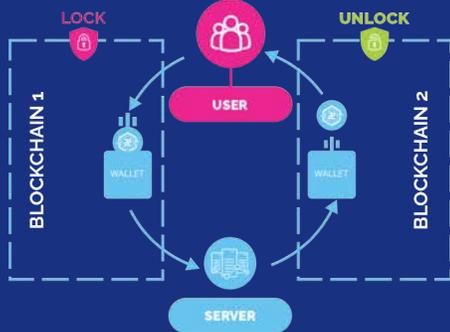
- Cael token
- Caelum liquidation pool
- Cael bridge
- Cael wallet



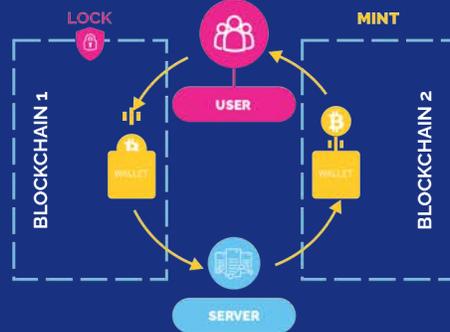
NOW CAEL SWAP AKA MULTIHOP



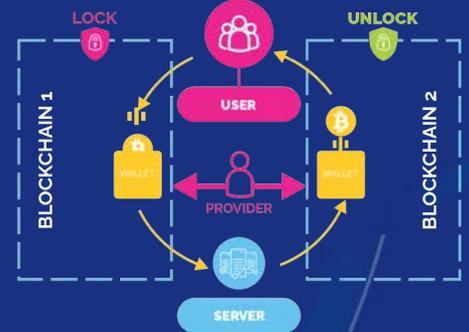
CAEL BRIDGE



WRAP BRIDGE



POOL BRIDGE



CaelSwap is a service for swapping between tokens and coins. For that, we use Liquidity Pool (aka AMM) and Bridge that transfers token/coins between blockchain networks (Ethereum and Binance Smart Chain for example). As we have Bridge and Liquidity Pool, CaelSwap swaps token/coins through blockchain networks.

All Liquidity Pools must pair with CAEL in CaelSwap. This is to make a more liquid market without separating. Swapping between two non-CAEL tokens/coins is easy when using CAEL between. For example, to swap between BTC and USDT, first we need to swap BTC to CAEL and then CAEL to USDT. This is called multihop..

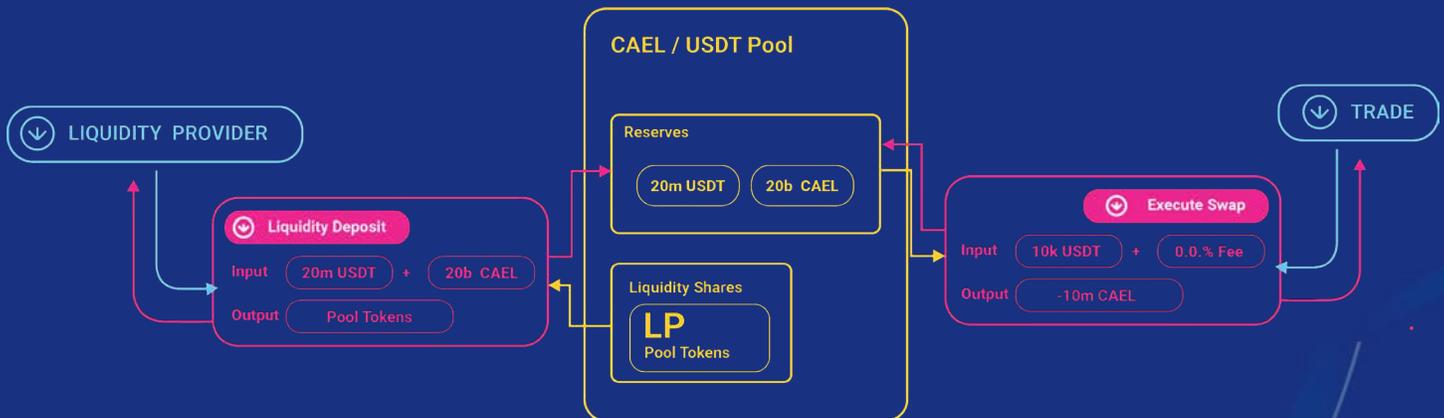


There is three types of bridges:

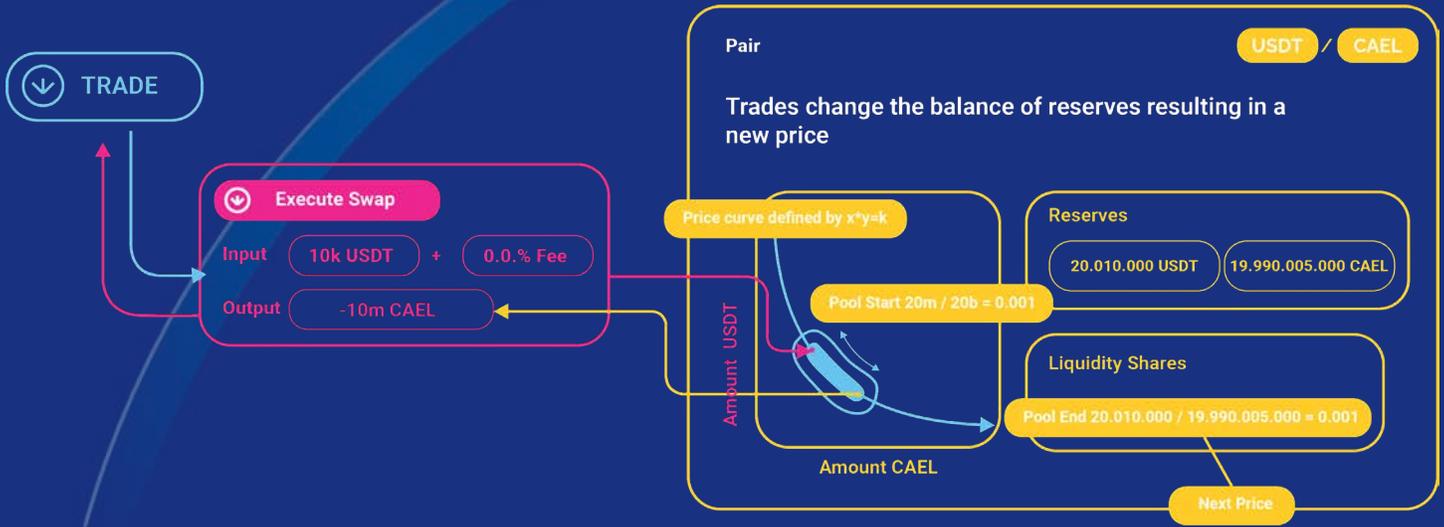
- CAEL Bridge: Only transfers CAEL between blockchain networks.
- Wrap Bridge: Transfers any tokens/coins between blockchain networks using mint.
- Pool Bridge: Sometimes some tokens/coins have already been wrapped. Then we use Pool that's providers lock their tokens/coins with 50:50 allocations in each blockchain network, and Pool Bridge uses it for transferring.

LIQUIDITY POOL

The Liquidity Pool (pool for short) is a model for the automated market making between two tokens. Two tokens must be deposited at an equal value. Let's take a CAEL/USDT pool for example. Let's imagine the price is 1 CAEL = 0.001 USDT or 1 USDT = 1000 CAEL, it means a pool needs to be created with two tokens at a 1:1000 ratio. When we deposit 20m USDT into the pool, we must deposit an equal value of CAEL; that's 20b CAEL. They are named Liquidity Providers (providers for short) who deposit tokens into the pool.

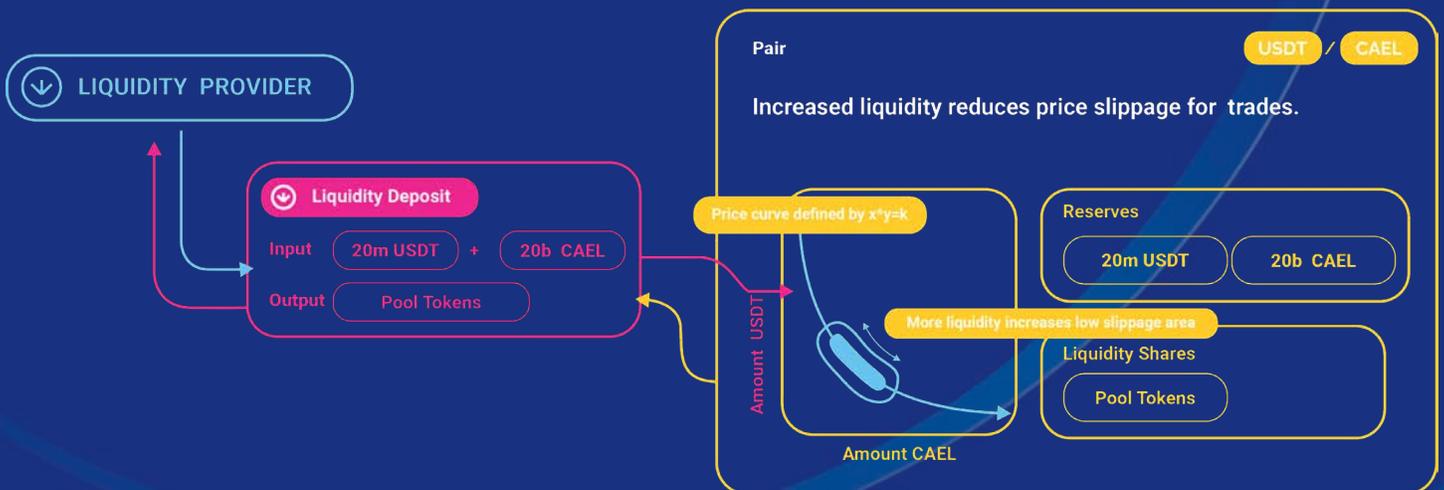


Let's imagine someone wants to buy CAEL for 10k USDT using our pool. First of all, they need to put 10k USDT into a pool and the pool gives back the corresponding amount of CAEL. Let's calculate how much CAEL is given. Automated market making's main principle is to keep k to be constant. k is a product of numbers of two tokens. For our example, $k = 20m \times 20b = 400q$, that's 400 quadrillion. When they put 10k USDT into the pool, the pool now has $20m + 10k = 20,010,000$ USDT. To keep k constant, $k \div \text{USDT}$ or $400q \div 20,010,000 = 19,990,005,000$, it means the pool needs to have 19,990,005,000 CAEL. The pool has 20b CAEL initially, then the difference is $20b - 19,990,005,000 = 9,995,000$ CAEL. This 9,995,000 CAEL is for a return of 10k USDT in our pool.



IMPERMANENT LOSS

The pool gets a 0.03% fee for each trade, meaning 0.03% of the whole volume of the pool is distributed to incentivise liquidity providers. But providers have a risk named impermanent loss. For short, impermanent loss is an exchange rate risk. For verification purposes, providers deposit their own tokens into the pool; LP (Liquidity Provider) tokens minted from pool to providers. The LP token is needed for providers to withdraw their tokens from the pool. But they withdraw tokens by current pool ratio. For example, let's imagine one has 100m CAEL initially. When they want to put their tokens into the CAEL/USDT pool, they need to insert CAEL and USDT of equal value. For that, they need to convert half of the CAEL to USDT. In this case it would be 50k USDT. Now they have 50m CAEL and 50k USDT and are ready to put it into the pool. Since they put their tokens into the pool, let's imagine the CAEL price rise doubled. It means the pool ratio becomes 1:500 from the initial 1:1000 ratio. Then when they withdraw their tokens with the LP tokens, they get 70k USDT and 35m CAEL. 30m CAEL is worth 70k USDT. It means the total token value is 70k + 70k = 140k USDT. This is good, because their initial 100k USDT valued token is now valued at 140k USDT. However, the initial 100m CAEL now has a value of 200k USDT. This 60k USDT value loss is named impermanent loss.



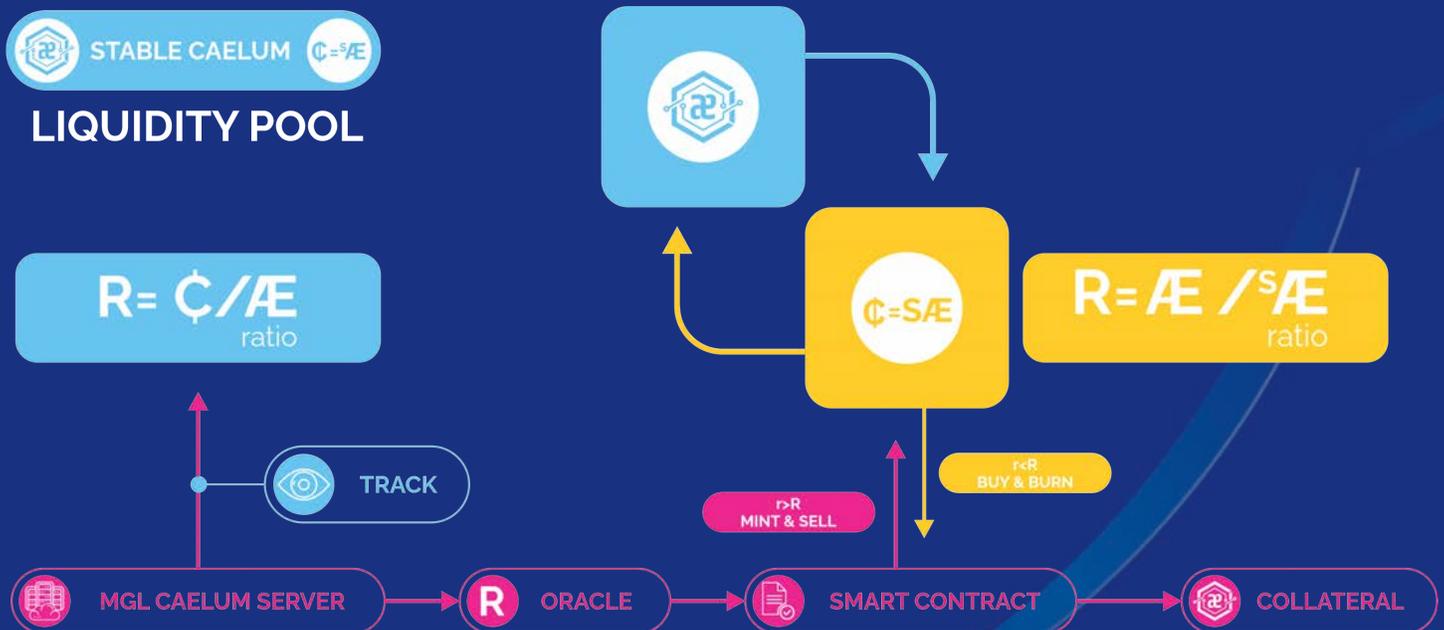


ILPO

We are happy to introduce a brand new DeFi product named Initial Liquidity Pool Offering. From one side, project supporters may deposit and lock 20m USDT, and from our side we can insert 20b CAEL to create a CAEL/USDT pool. A lock prevents rug-pulls, which will increase trust. Then we split LP tokens by 50:50. It is the same as the supporter depositing 10m USDT and 10b CAEL and us depositing 10m USDT and 10b CAEL into the pool separately. In this situation, we can share the risk of impermanent loss.

STABLE TOKEN

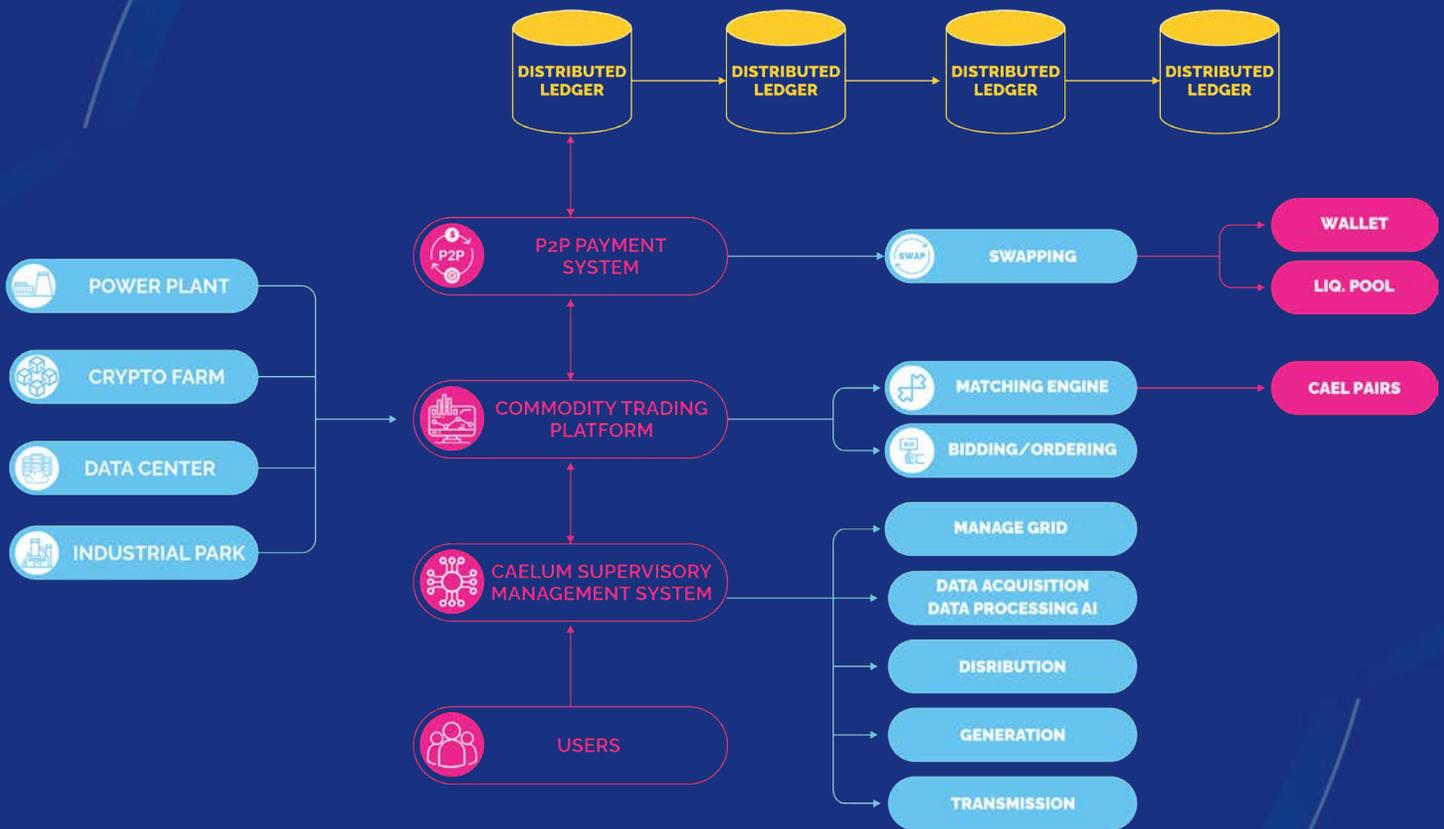
Stable Tokens are tied to USD at a 100:1 price ratio, collateralized by CAEL. Algorithmic stabilization gives us an opportunity to avoid the bottlenecks of banks, and it is more decentralized. We have a Liquidity Pool for CAEL/sCAEL. Collateral CAEL is locked in a smart contract, and we feed this via CAEL/USD price ratios from outside of the blockchain. A smart contract has permission to mint and burn sCAEL and can buy or sell from the CAEL/sCAEL pool. When the CAEL/sCAEL pool ratio is greater than the CAEL/USD price ratio, smart contract mints sCAEL and sells it to the CAEL/sCAEL pool. That will drop the heightened price to the actual price. When the CAEL/sCAEL pool ratio is lower than the CAEL/USD price ratio, the smart contract will buy sCAEL from the CAEL/sCAEL pool and burn it to increase the lowered price to the actual price.





CAEL UTILIZATION

CAEL token utilizes the products of the Caelum Industrial Park ecosystem. In other words, the CAEL token is the currency used for the Caelum trading platform that all products and services are listed on.





CONTROL PANEL

Caelum Supervisory, Control and Data Acquisition Management System (CSCADAM) will manage its own ecosystem

- Smart grid, energy generation, distribution to modules
- Mining projects' products and supply chain
- Crypto farm - usage
- Datacenter - usage
- Commodity trading and matching
- P2P payments
- CAEL token utilization

CSCADAM is MGL Caelum's own unique solution; it is a blockchain-based process control and monitoring system. It acts as a SCADA system and industrial process control management system that will fulfill the needs of sub projects of Caelum's ecosystem via its subsystems. The components:

- Caelum supervisory Control management system
- Generation module – industrial zones production process control and management
- Transmission module – smart grid control and monitoring system
- Distribution module – Control and monitoring system between industry to end-user
- P2P payment swap system – enable to users make payment that swap between currencies and assets
- Trading platform – ecosystem's products will be listed on for trading
- Supply chain management system
- Distributed ledger – blockchain and distributed system ledger digital asset

Caelum Supervisory Control and Management System (CSCMS)

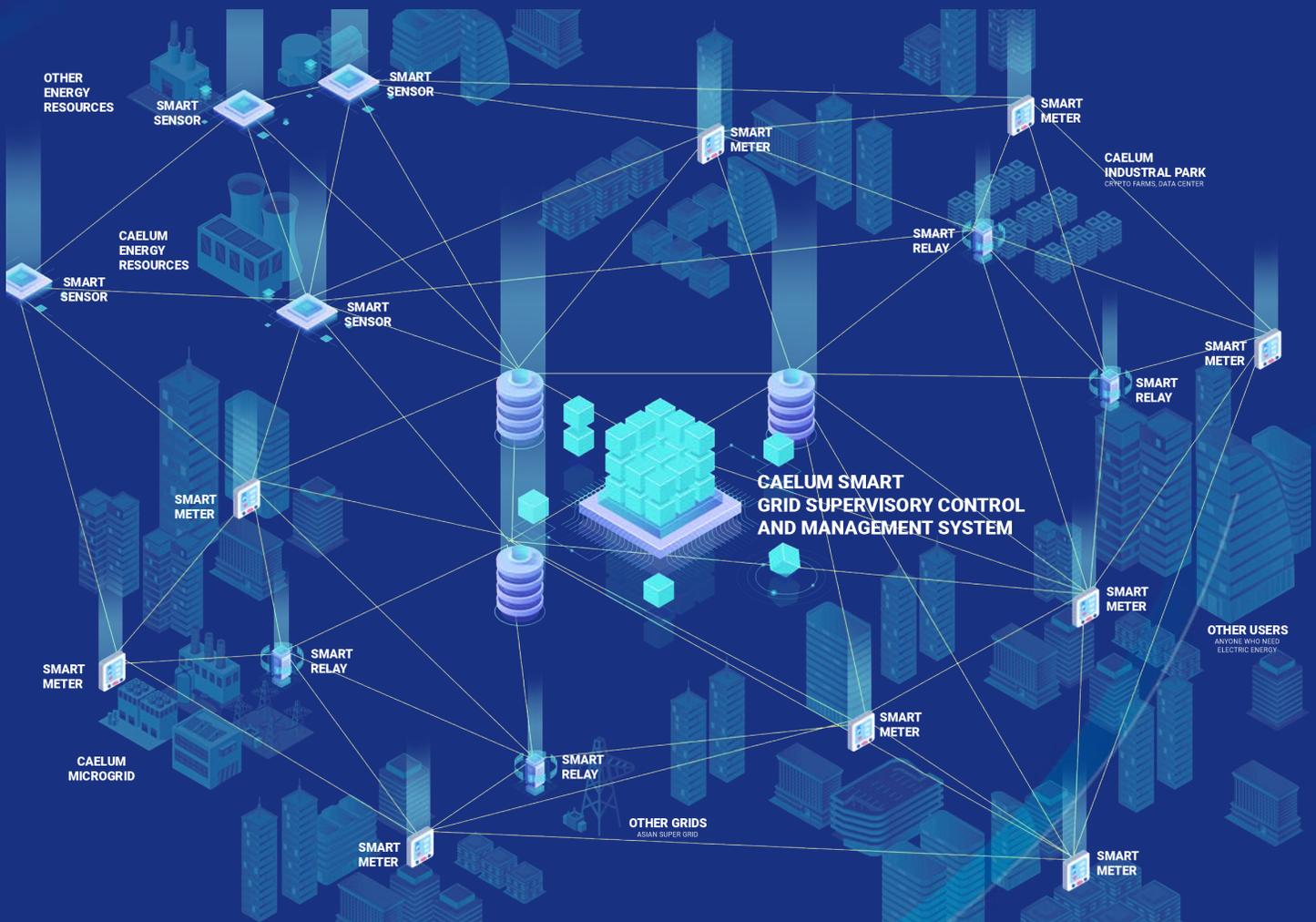
The CSCMS is an integrated solution system to be developed at MGL Caelum LLC. It will act as the main control panel for all participants in the ecosystem including smart grid. The system aims to meet the business objectives of both major and minor players of energy consuming production and consumer demand by offering a smart, cost-effective solution. Components of CSCMS

- Caelum Smart Meter (CSM) - An electronic device that measures the consumption of electric energy and communicates the information to a nearby control unit on a time-sensitive basis.
- Caelum Smart Relay Control Unit (CSR) - Microprocessor-based smart relays. CSR's main functions are to control connected smart meters and transfer information from/to control terminal units.
- Smart Control Terminal Units - Small control stations that collect and transfer data from relay control units to/from the SCADA station.



Caelum Smart Grid Supervisory Control and Management System (CSGSCMS). At the heart of our grid, a CSG-SCMS system monitors, controls, and manages the overall operation of the grid. CSG-SCMS is a system designed and developed by our own engineers with inter-operative software modules.

- SCADA (Supervisory Control and Data Acquisition) - Software for collecting and transmitting grid data and sending control signals to other components of the system.
- EMS (Energy Management System) - Receives data from SCADA and performs functions of forecasting, monitoring, measuring, and control of both energy generation and energy consumption of reliable and stable operation of the smart grid.
- BCIS (Billing and Customer Information System) - Software that controls and manages all billing and payment-related functions using CAEL PAY(P2P payment system)





CAEL SCADA SYSTEM

The Caelum SCADA system is a software application that will be used for process control from local and remote locations, information-gathering from multiple smart devices, and storage in appropriate databases.

Will have following feature:

- Smart meters and relay control units are compliant with the IEC 62056 standard (data exchange for meter reading, tariff and load control).
- On the grid, all software systems, including SCADA, follow the IEC 61850 standard
- SCADA can communicate with other devices that implement Modbus RTU, RP-570, Profibus, or Conitel protocols. These are popular vendor-specific SCADA protocols. Implementation of various communication protocols in SCADA along with IEC standards enables our CSG to integrate other energy grids without hassle
- At the core of the energy management system, a machine-learning algorithm works to levitate efficient forecasting of energy generation and consumption

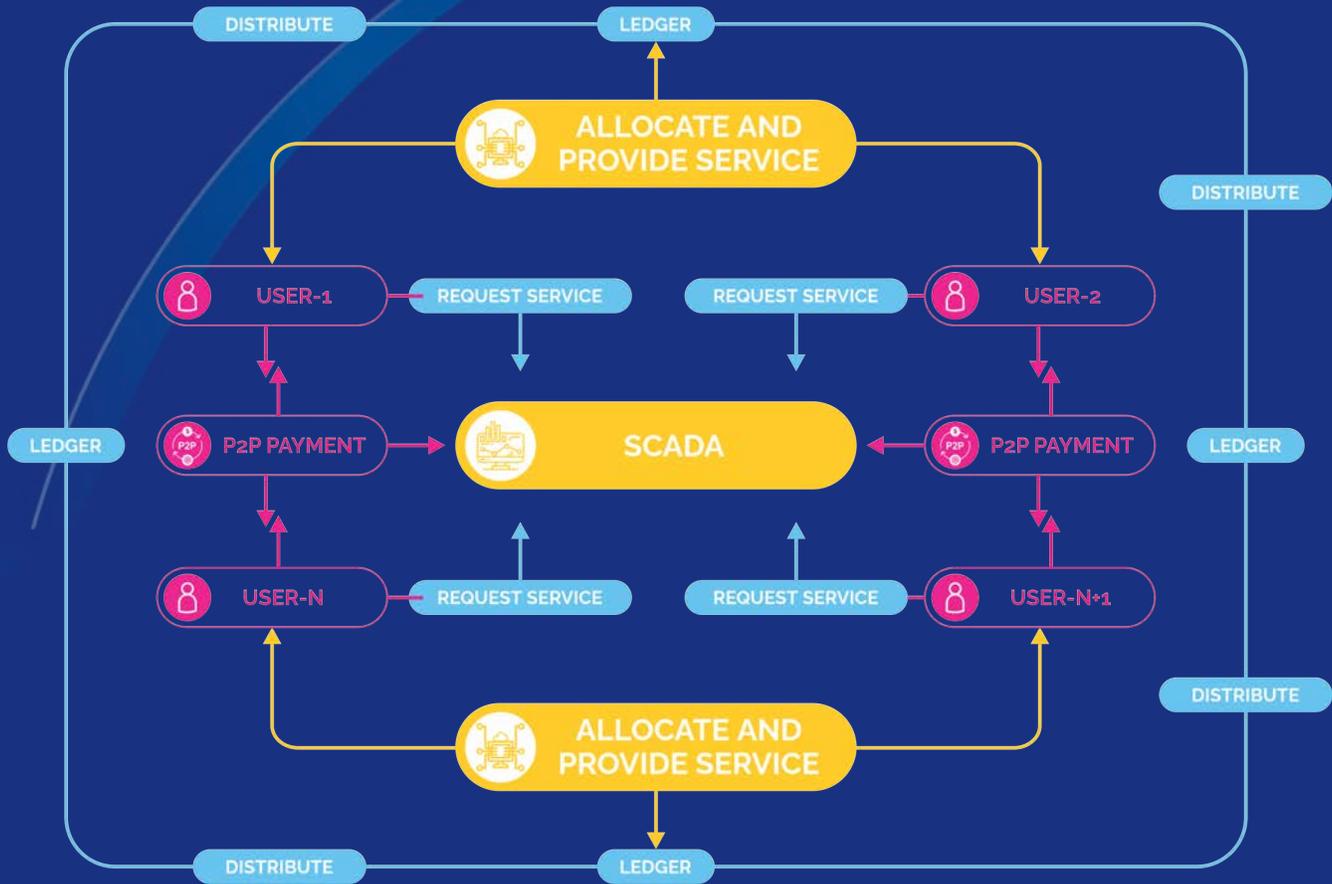
Distributed ledger asset/ blockchain

We are living in the era of shifting from centralized to decentralized/distributed technology and lifestyle. Therefore, to fill the needs, MGL Caelum is developing its own unique methodology and products of data acquisition and processing digital asset based on distributed system that connects to the Caelum ecosystem platform software.

In order to address the main issues with Caelum platform, a blockchain system will be implemented.

- Blockchain offers unified, secure payment solutions.
- With so many smart devices already connected to the CSG network, implementing blockchain technology on the existing CSG infrastructure comes at minimal cost.
- With blockchain, hacking of smart meters and other physical devices becomes impossible.

The solution allows us to design a secure blockchain environment with PBFT consensus, which provides the ability to reach an agreement on the current network state when multiple parties have the opportunity to take part in the consensus process.



CAELUM SUPERVISORY MANAGEMENT SYSTEM

MGL Caelum LLC is developing valuable, innovative services and products that provide full transparency of processes, cost reduction, and convenience.

Considering that Caelum ecosystem features energy, bandwidth, hash, and natural minerals resources production facilities, it is important to manage and monitor them in a real-time manner. For these needs, we are designing the Caelum Supervisory management system.

This system will supervise all the operation activities from production facilities such as:

- Energy production
- Mining sites
- Data center
- Crypto farm
- Carbon credit house

This will provide system operators and participants with real-time data for efficiency-leak prevention and quick reaction time on any production and supply chain issues.

TODAY'S CAELUM TOMORROW'S HERITAGE

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