



METALLIKA

WHITE PAPER

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metallika.io

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This document, hereinafter referred to as the White Paper, was prepared to present the Mettallika project to potential participants and those who are interested in contributing to its development. The information provided below may not be exhaustive. It also does not imply any contractual relationship.

It's sole purpose is to provide information about Metallika.

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The information contained in this White Paper and on the Mettallika.io website is exceptionally descriptive and does not form part of the METALLIKA terms and conditions (hereinafter referred to as the Terms). In particular, the interested party should be aware that the purchase of METALLIKA token from METALLIKA.io may involve high risks.

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SUMMARY

This document describes the structure and basic principles of functioning of a decentralized autonomous organization (DAO) based on a distributed ledger system (blockchain) for accounting of documents, contracts, acts and records, created and used during the mining cycle and exploration of minerals processes.

The **Mining Market Overview** section provides an overview of all stages of the mining life cycle. starting from exploration and ending with production.

The "**Company Overview**" section provides detailed information about METALLIKA.inc, its mission and set goals, and also describes the level that the company occupies in the field of exploration and production of minerals.

Company's existing projects are listed and described, as well as information about promising projects, in which the company intends to actively participate in the near future, is also provided.

Section 3 explains why METALLIKA.inc decided to create the DAO METALLIKA.io and the problems that the company is going to solve, using blockchain technology. The advantages of a distributed ledger over the standard tools used today in the workflow process are also listed.

The "**DAO METALLIKA.io**" section provides description of participants, infrastructure and basic principles of the DAO. The section also described the key elements of the DAO, including following important subsections:



The subsection “**DAO Metallika.io Business Model**” gives an idea of the business of the DAO Metallika.io, the source of income, and benefits for members of the organization. The business model describes how an organization creates, delivers to customers, and acquires value;



A complete description of all important infrastructure components, mechanisms for interaction between infrastructure components can be found in the “**Metallika.io DAO Model**” subsection. Each infrastructure component has a detailed diagram and description. The key elements of the DAO are;



Members of the **DAO METALLIKA.io** - categories of potential users of the service is described;



Application layer - contains information about the services that the DAO is going to provide, including a detailed description of the functionality of each service;

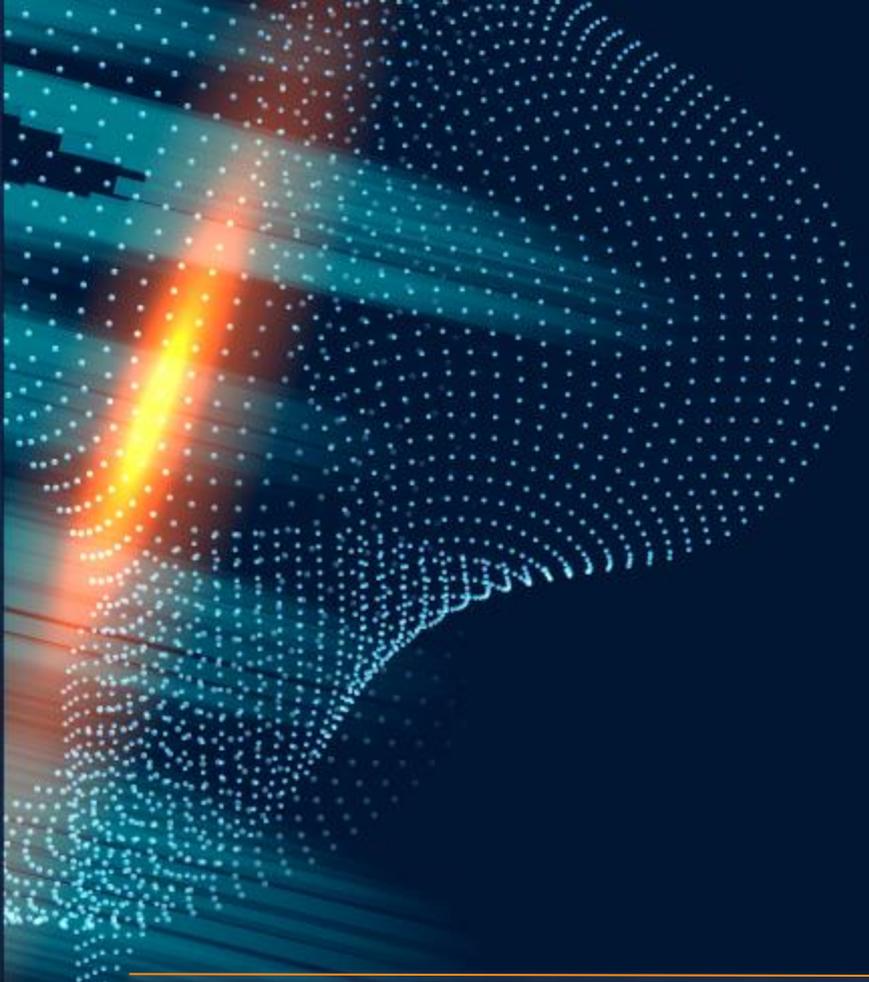


Protocol DAO Metallika.io - describes the basic principles of storing information within the DAO and the interaction of services and the blockchain. For each service, a detailed diagram and description of the principles of operation are provided.

Close attention was paid to the “**Token METALLIKA**” section, since the utility token METALLIKA is a key element for all services, provided by the DAO METALLIKA.io. Within the DAO by means of a private blockchain, the METLLIKA token serves as a fuel for the operation of services. In public blockchains, such as Ethereum, Binance Smart Chain, etc., the METALLIKA token serves as an investment instrument and can be used for trading at centralized and decentralized exchange platforms.

The “**Token METALLIKA**” section contains tokenomics, a description of the process of issuing a token in public blockchains, a mechanism for linking the METALLIKA token between public blockchains and the private DAO blockchain. The section also contains the technical description of the internal structure of the token.





1. Overview of the mining market

1.1 Mineral Resources Life-Cycle

1.1 Mineral Resources Life-Cycle

Mining is defined as the activity that seeks, develops and extracts mineral resources. This is one of the most important challenges in the primary sector of the world economy.

There are seven stages in the mining life cycle, each of which comes with certain risks and rewards. As the company proves that there are mineral deposits in the ground, the value of the initial shareholder investment rises.



Figure 1. Mineral Resources Development Cycle

Stage 1. Concept

At this stage, geologists prove the theory about the location of deposits of useful minerals. They explore the land using geochemical and sampling techniques to increase the validity of this theory, then move on to more extensive studies.

This stage carries the greatest risk, which accounts for its low value. At the beginning there is little knowledge about what actually lies beneath the Earth's surface.



Concept

Stage 2. Pre-Discovery



Pre-Discovery

While researching the area, geologists expand their knowledge of what is under the earth's crust in order to assess the potential amount of minerals.

Mineral exploration involves obtaining a cross section (drill core) of the earth's crust and then analyzing it for mineral content. A drill core containing a sufficient amount of useful minerals can stimulate further exploration, which may lead to the discovery of exploitable deposits.

There is still a lot of risk being involved, but this is where the speculative opportunities open for investors.

Stage 3. Discovery

Exploration proves that there is a significant amount of minerals to be mined, and further studies are needed to prove that mining is possible.

This reward stage is for early investors. Most speculators leave here as the next stage creates a new set of risks such as profitability, construction and financing.



Discovery

Stage 4. Feasibility



Feasibility

The studies carried out at this stage can demonstrate the potential of the deposit as a profitable mine. This is an important moment for the discovery of minerals.

Institutional and strategic investors can use these studies to evaluate whether they want to continue participating in this project or not. During this time, known as the "orphan period", uncertainty about the future of the project still persists.

Stage 5. Development

At this phase the company develops a production plan for a future mine. The plan should secure funding and involve a target working group.

If the company can provide funding at this stage, investors might see the potential income from mining. Nevertheless, some risks still persist in terms of construction, budget and timing.



Development

Stage 6. Startup / Production

At this stage, the company processes the ore and receives revenue. Usually, at this stage, investment analysts re-evaluate the explored deposit in order to attract more attention from institutional investors and the general public.

Meanwhile, existing investors may choose to exit here or wait for the potential increase in earnings and dividends.



Startup / Production

Stage 7. Closure / Exhaustion

Nothing lasts forever, especially natural resources. If there are no other deposits nearby, most mines will eventually become depleted. At the same time, the value of the company grows and investors shall look for an opportunity to exit the project as operations wind down.



Closure / Exhaustion

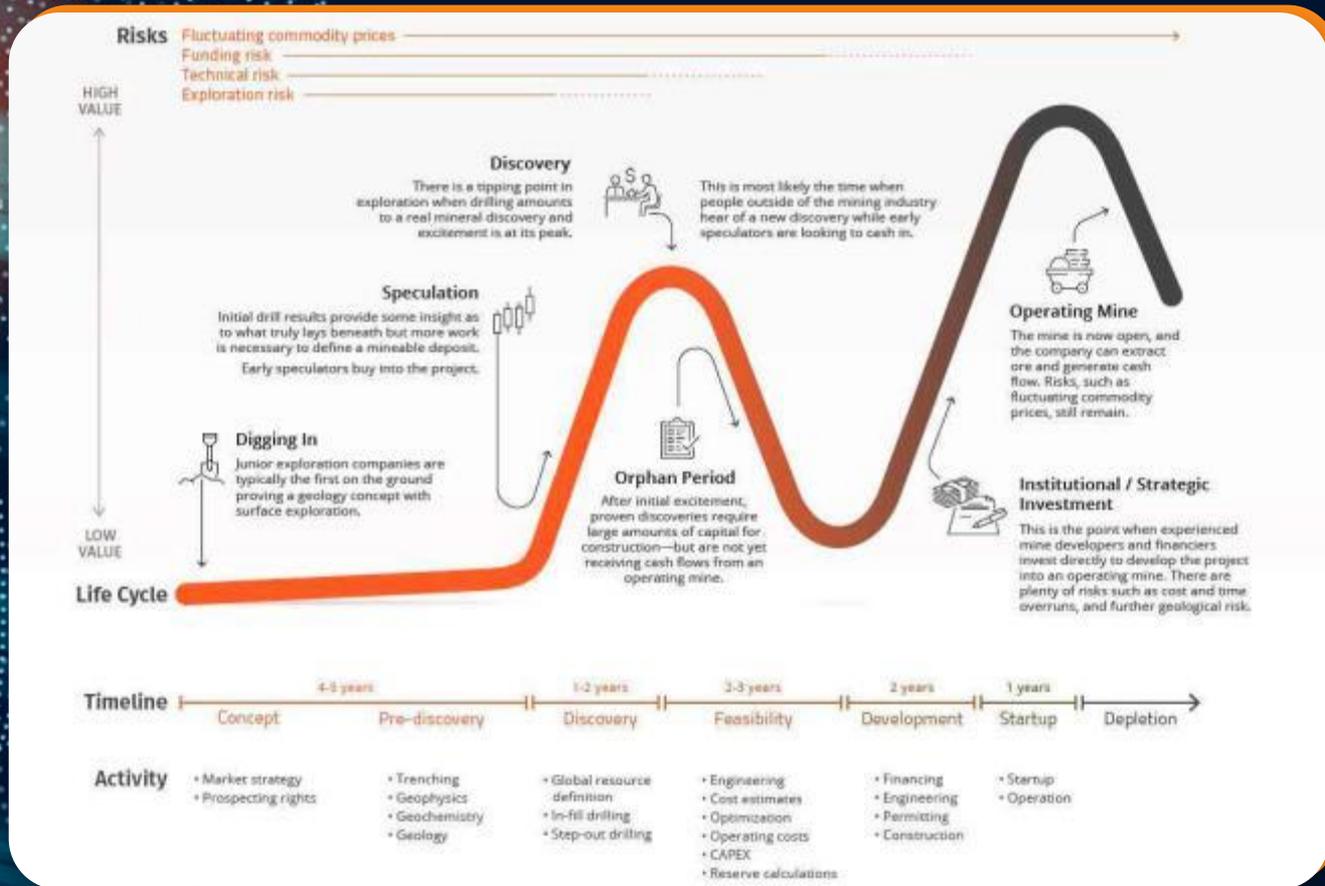


Figure 2. Mineral Resources Development Life-Cycle

1.2 Methods

Depending on the type of resources that mining is focused on, mining can be divided into following groups: mining of metals such as, lithium; non-metallic or quarrying mining, which extracts materials such as graphite; and energy extraction, which extracts fuel such as oil or natural gas. There is also so-called green mining, which aims to extract mineral resources with minimization of potential environmental risks.

Mining activities can be divided into open-pit mining and underground mining:



Open-pit Mining

These activities focus on mining by removing or destroying vegetation and uppermost surfaces. In other words, some of the soil is removed to find resources. This type of production includes open-pit mining, which includes mining at great depths; or overburden operation close to the surface.



Underground Mining

In contrast, underground mining is based on digging tunnels and galleries. Access to these galleries is carried out through the so-called adits. Underground mining is considered to be much more environmentally friendly than open-pit mining. Underground mining itself can be divided into drifting, the activity of which is carried out in horizontal adits; sloping mining operations, in which adits have a diagonal slope; or mine production, where the work is carried out vertically.

Ascend Minerals will only work where Open-pit mining is feasible



2. COMPANY OVERVIEW

2.1 METALLIKA.inc

2.1 METALLIKA.inc

METALLIKA.inc is a global company focused on decentralizing the entire mineral mining lifecycle. With a highly experienced board and management team, Metallika is committed to maximise value by acquiring, developing and operating a balanced portfolio of EV battery related mineral projects.

Metallika's innovative lean model, with its five directives, initiates the process that will help make the mineral sourcing sustainable, ethical, and economically reasonable. Their motive is to produce only when the customer generates the needs. In this way, they can save minerals, time, and energy and waste less material.

They train their workers to work effectively, which leads the company to save raw materials like 3TG and cobalt. They finish the product with no errors with their effective and efficient performance.

Metallika, in this best way, promotes responsible mineral sourcing as they only procure minerals when the customer demands a product. They are using a pull strategy to maintain responsible mineral sourcing as per the orders of the United Nations. Their supply chain only extracts and collects the natural minerals within the required amount. Metallika introduces practical innovations that benefit their own company, protect human rights laws, fulfill moral ethics, and protect environmental sustainability.

Having technically qualified, well experienced mining personnel who can :

- ✓ Conduct exploration activities, generate required data, and prepare Geological report
- ✓ Prepare Detailed Project Report
- ✓ Mining Plan
- ✓ Environmental Management Plan
- ✓ Hydro geology and water management

2.2 Projects on Hand

Our company successfully implemented the following projects:

» Granite project - at the Development Stage

» Beach Sand Minerals project - at the Feasibility Stage

» Chrome Mineral Trading

» Graphite Project - at the Discovery Stage



A background image of a mining site at dusk or dawn. In the foreground, a large yellow excavator is positioned on the left, and a yellow dump truck is on the right. The ground is dark and rocky. In the background, there are hills and a body of water. A decorative graphic of blue dots forming a wave pattern is on the right side. A thin yellow horizontal line is above the text.

All the mentioned projects have passed the first 4-5 stages of the mining life-cycle and can start production in 1-2 years; except the Granite Project, which has completed all pre-development stages and is almost ready to be launched.

Granite Project

Granite is one of the most popular natural stones in the construction industry nowadays. Such natural resources as granite are primarily used in various fields of human activities. Usually it is used in:

- production of architectural structures and sculptures;
- construction and repair;
- exterior and interior decoration.



Granite
Project



Figure 3. Granite as Construction Material

- ✓ 25% stake in Granite Mining is held in India;
- ✓ Mine under development and will be in production by April 2022;
- ✓ License obtained to mine 400 m³ per month for 10 years; can be renewed up to 30 years;
- ✓ Deposit contains G20 Grade high value granite;

- ✓ Mined granite blocks are primarily exported to Italy and Turkey;
- ✓ Selling price starts from 800-1000 USD per m³;
- ✓ Net anticipated revenue of ~5 Million USD/annum;
- ✓ Net expenses of ~1 Million USD/annum;



Beach Sands Minerals Project

A deposit with a high Titanium content.

Titanium is a light, durable metal with a silvery-white color. It is a unique metal in its properties. Titanium and its alloys have found application in metallurgy, military industry, electrical and radio engineering, chemical industry, shipbuilding and many other areas.

- ✓ 65% stake in Beach Sand Mining Licenses to be held in Madagascar;
- ✓ Obtained 40 Years Mining License starting from 2015;
- ✓ License covers 45 hectares area in NE Madagascar;
- ✓ Rich in heavy mineral sands which can produce Titanium;
- ✓ Preliminary work shows high grade resources. Existing Russian exploration reports also show high resource potential;
- ✓ Once production starts, with nowadays Titanium prices, Ascend revenue share is anticipated at approximately 70-100 Million USD/annum.



Figure 4. Beach Sands Deposits

Chrome Mineral Trading

Chrome (or Chromium) is a silvery-bluish metal, belongs to the category of refractory - its melting and boiling points are very high. The use of Chromium is based on its heat resistance, hardness and corrosion resistance.

- ✓ Chromium Suppliers are located in Zimbabwe, Zambia and Madagascar;
- ✓ Outgoing shoppers are located in China;
- ✓ Chinese existing buyers require more than 300,000 tons/annum;
- ✓ Expected revenue of 18 Million USD/annum with a profit of ~1-3 Million USD/annum;

Responsible sourcing from mining



Figure 5. Mineral Trading Scheme

Graphite Project

Graphite is a mineral consisting entirely of carbon, just like diamond; graphite is a natural semi-metallic mineral and an allotrope of carbon, while graphite and diamond are interesting minerals with a similar chemical composition.

Graphite has found wide application in various fields of human activity. In one form or another, it is used not only in manufacturing, but also in everyday life. In the foundry industry, graphite powder is used as a casting lubricant. The mineral is used in the manufacture of paints, refractory bricks, pencils, plastics and polishing pastes. Graphite is also needed for the production of electrodes and electrical wires.

- ✓ Exploration and Exploitation licenses in Tanzania and Central Madagascar spanning over 100K hectares
- ✓ Potential of 50+ million tonnes of 98% saleable graphite;
- ✓ Potential resource worth of Up to 100 Billion USD in money terms in the ground;
- ✓ Once proved, mining license generating 3+ billion USD revenue per annum will be obtained;
- ✓ Mining reserves suitable for 30+ years of mining.



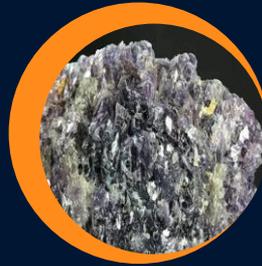
Figure 6. Raw Graphite

2.3 Promising projects



GRAPHITE PROJECT

at the Discovery
Stage



LITHIUM PROJECT

at the Discovery
Stage



DIAMOND PROJECT

at the Feasibility
Stage

2.4 Minerals as Investment

The demand for minerals is constantly growing. Graphite, metals and other minerals extracted from the earth are in demand by many industries. The images represent past price charts and future price projections for various minerals.

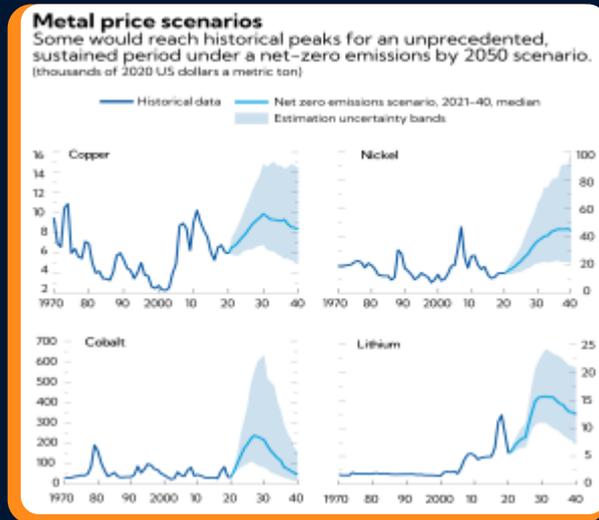


Figure 7. Metal Price Scenarios

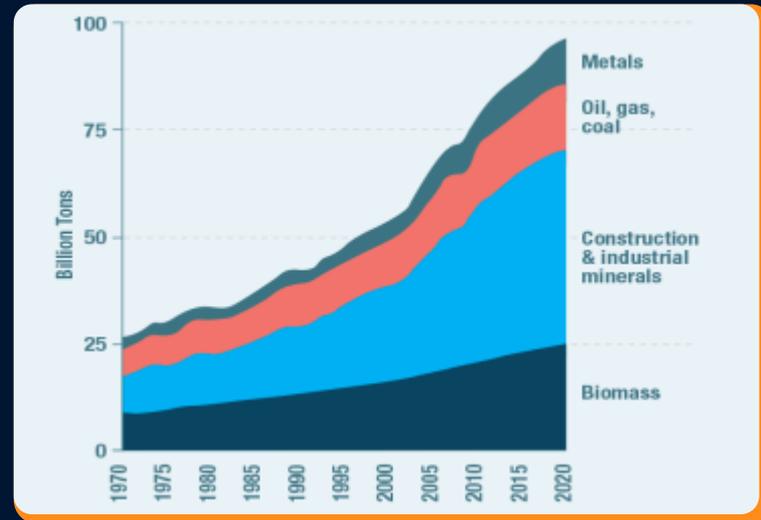


Figure 8. Global Use of Materials 1970-2020



3. How we came up with the **BLOCKCHAIN**

How we came up with the Blockchain

The life cycle of mining contains a large number of stages, which are accompanied by a large amount of data, on the basis of which the cost of a project for the exploration and development of a mineral deposit is determined and on which the growth of the initial investment of shareholders depends.

Our company is interested in making mining data available to all participants of the project in the exploration and production of minerals at every stage. All data must be accurate, timely and secure.

To achieve listed goals, a platform based on a distributed blockchain registry is suited in the best way. The very concept of blockchain guarantees the transparency and immutability of data within the network.

We plan to build a DAO, a blockchain-based decentralized autonomous organization to accompany the exploration and mining cycle.

What is a DAO (Decentralized Autonomous Organization)?

A decentralized autonomous organization (DAO) or a decentralized autonomous corporation is an organizational form in which the coordination of the activities of participants and the management of resources take place in compliance with a pre-agreed and formalized set of rules, the enforcement of which is performed automatically.

DAO rules are set in smart contracts. Records of DAO financial transactions and the software rules of such contracts are stored in the chain of transaction blocks on the blockchain.



Figure 9. DAO Scheme

4. DAO METALLIKA.io

4.1 What is DAO METALLIKA.io



4.1 What is DAO METALLIKA.io

The decentralized autonomous organization METALLIKA.io is a system that completely and autonomously operates in the blockchain protocol in compliance with the rules, encoded in the smart contracts. All records of DAO financial transactions and the software rules of such contracts are stored in the chain of transaction blocks. Transaction blockchain, secure timestamp and distributed database technologies make it possible to organize a secure digital ledger of contracts, deeds and records that fix ownership for the DAO METALLIKA.io participants

4.2 DAO METALLIKA Business Model

Key Partners

Public shared
Blockchains,
Centralized
exchanges,
Decentralized
exchanges (DEX)

Key Activities

Verification,
Documentation and
Audits,
Mint commodity
tokens, Trading

Key Resources

Blockchain,
IPFS

Value Propositions

Access Mineral
Development
Resource Cycle
products or services
with faster,
verifiable and less
expensive
transactions
(Smart Contracts)

Customer

Relationship
Transparency,
Self-service,
Automation,

Channels

Direct Channels
(no middleman),
WEB portals,
APIs, SDKs, etc.

Customer Segments

Governments,
Mining Lease holders,
Mining Investors,
Mining Companies,
Mineral traders,
Majority of product
manufacturing
companies worldwide,
All sectors involved
with the mining
industry

COST STRUCTURE

Greatly Reduced Costs (reduced negotiation costs, HR costs,
Infrastructure costs, etc.)

REVENUE STREAMS

Transactions Revenues,
Commissions

Product

The main product of DAO METALLIKA is cloud services that provide an opportunity for fast, convenient, reliable and transparent communication between various participants in the exploration and mining cycle. Forming partnerships and obtaining investments at each stage of the cycle.

The main services that DAO METALLIKA members can access:

- ✓ access to documentation stored in IPFS;
- ✓ the ability to manage approval processes for documentation generated during exploration, resource/reserve assessment, mine design, and planning processes;
- ✓ ability to track inventory estimates for stock exchange reporting, inventory traceability in ERP for resource/inventory inventory management;
- ✓ verification of workflow/audit of activities and results used in resource/reserve calculations;
- ✓ the ability to manipulate design, build and transfer (ECH) documentation generate complex spatial and engineering information in structured and unstructured formats;
- ✓ the ability to track transactions during complex rules and standards management processes;
- ✓ the ability to issue digital commodity backend tokens backed by minerals trading digital commodity backend tokens.

Consumer interaction

WEB portal is a SaaS solution for organizing convenient access to company services. It is planned to create WEB portals:

- Marketplace for Mineral lease holders, Junior miners and Investors
- Mineral trading platform
- Product Manufacturers Portal

Users have through registration in the DAO METALLIKA. After registration and verification, the user has access to all DAO services and can participate in the life cycle of exploration and mining.

All services are fully automated and do not require the participation of additional intermediaries and consultants.

An API and SDK will be created to integrate external services with DAO. This will expand the capabilities of DAO METALLIKA and attract new users interested in participating in the exploration and production of minerals.

Infrastructure

The main element of the infrastructure for building a distributed database of records of contracts, acts and records used at various stages of the mineral exploration and production cycle in the DAO METALLIKA is a private blockchain, based on the Ethereum Virtual Machine. METALLICA token is used as gas for blockchain operation. Gas is a denominated unit of ether METALLICA token, used to pay for transactions in the DAO METALLIKA.io blockchain.

All services can be accessed through WEB portals, which will be deployed in the cloud, such as the Amazon cloud or other cloud service. To create portals, it is supposed to use modern WEB technologies, for example, JAVA + SPRING for the backend part, React JS + CSS for the frontend. The final selection of technologies for development will be made later.

Documents that are involved in the exploration and mining cycle will be stored in the IPFS. IPFS is an open source decentralized peer-to-peer file sharing network and Web3 service designed to overcome centralized points of failure.

The registry of documents will be stored in No SQL database in the cloud storage. To speed up access to the database, it is supposed to use horizontal sharding of database servers either by functional or by geographic feature.

The registry of smart contracts of relevant documents is also in the No SQL database in the cloud storage. As for the register of documents, horizontal sharding is also supposed to be used to improve access speed. In the future, it is planned to develop an API and SDK to provide access to the DAO METALLIKA for third-party services.

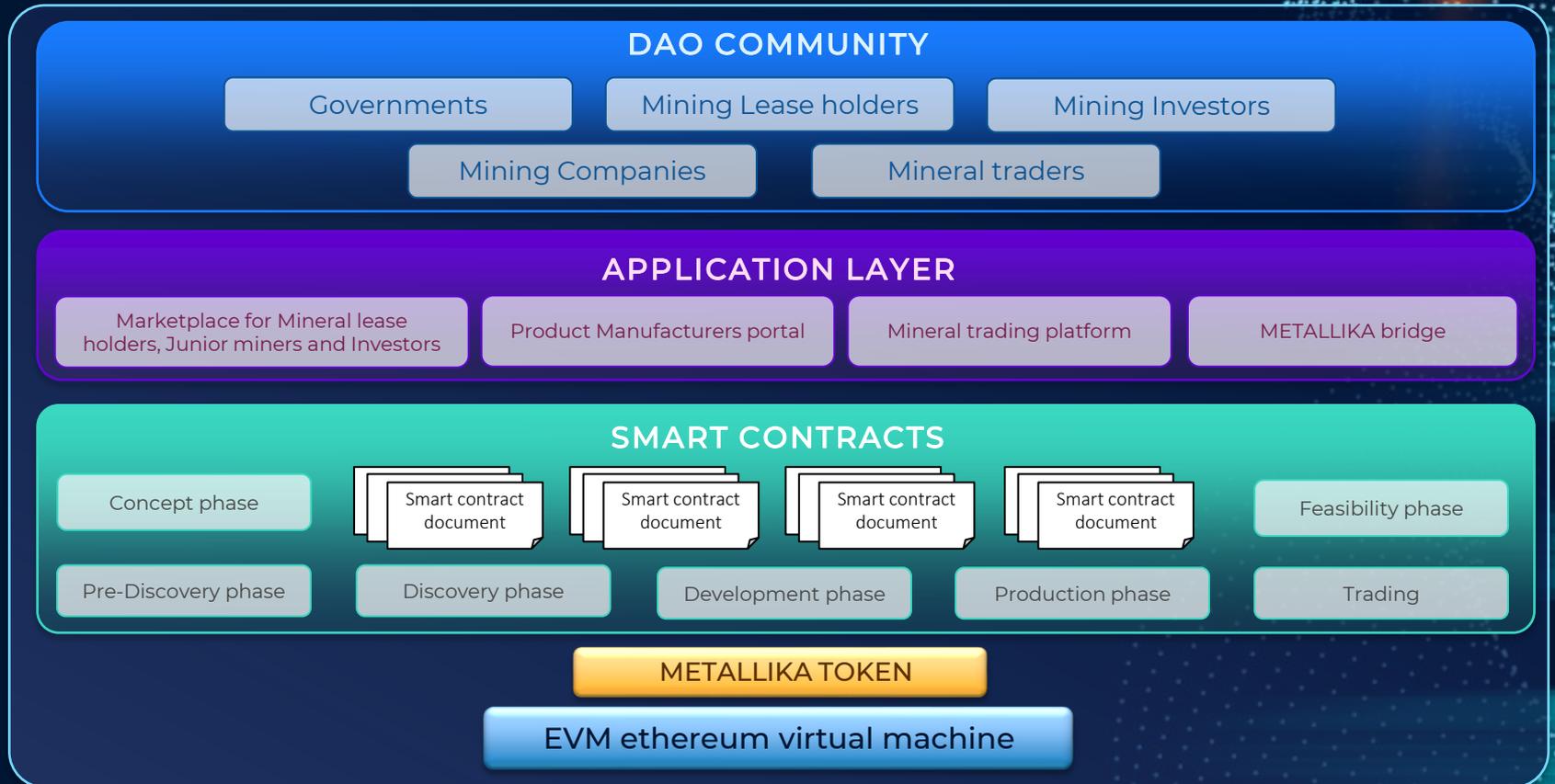
Financial efficiency

Since the basic element of the DAO METALLIKA.io is a distributed ledger document based on the EVM blockchain, a resource (gas) is needed to maintain the work, which will be involved in paying for the computing power that forms transactions in the block. The utility token METALLIKA acts as a fuel (gas) for the operations within the DAO blockchain.

The main source of profit is the commission that is transferred to the DAO from each blockchain transaction, since the METALLIKA token is involved in all transactions with electronic documents.

An additional source of income might also be in a various forms of fees and commissions, implemented in various DAO processes, the composition and size of which will be determined later in the DAO process.

4.3 DAO METALLIKA.io Model



The DAO METALLIKA.io model consists of the following main components:



The **EVM** virtual machine is a software platform for implementing blockchain technology, a secure timestamp and a distributed database and provides a smart contract execution environment in the DAO Metallika.io system.



METALLIKA token is an internal currency of the DAO METALLIKA, which is used as fuel (gas) for operations of the EVM virtual machine. If necessary, the token can be used in trading operations for the purchase and sale of minerals



Smart Contract is a set of programs within the DAO METALLIKA.io blockchain that track and enforce contracts, deeds and records that fix ownership, as well as the fulfillment of obligations for each stage of the exploration and production cycle of minerals. The functionality and number of smart contracts is determined for each stage separately, depending on the needs of DAO participants at this stage of the cycle.



Application Layer is a software for accessing the EVM of the Ethereum virtual machine, which is used for internal interactions between the DAO participants, using smart contract technology.



Community DAO - individuals and legal entities involved in the cycle of exploration, production, production and trading of minerals.

4.4 DAO METALLIKA.io Participants

- ✓ Companies consumers of minerals
- ✓ Mining and exploration companies
- ✓ Logistics and transport companies
- ✓ States and expert communities granting licenses and assessing deposits
- ✓ Private and corporate investors
- ✓ Mineral Traders

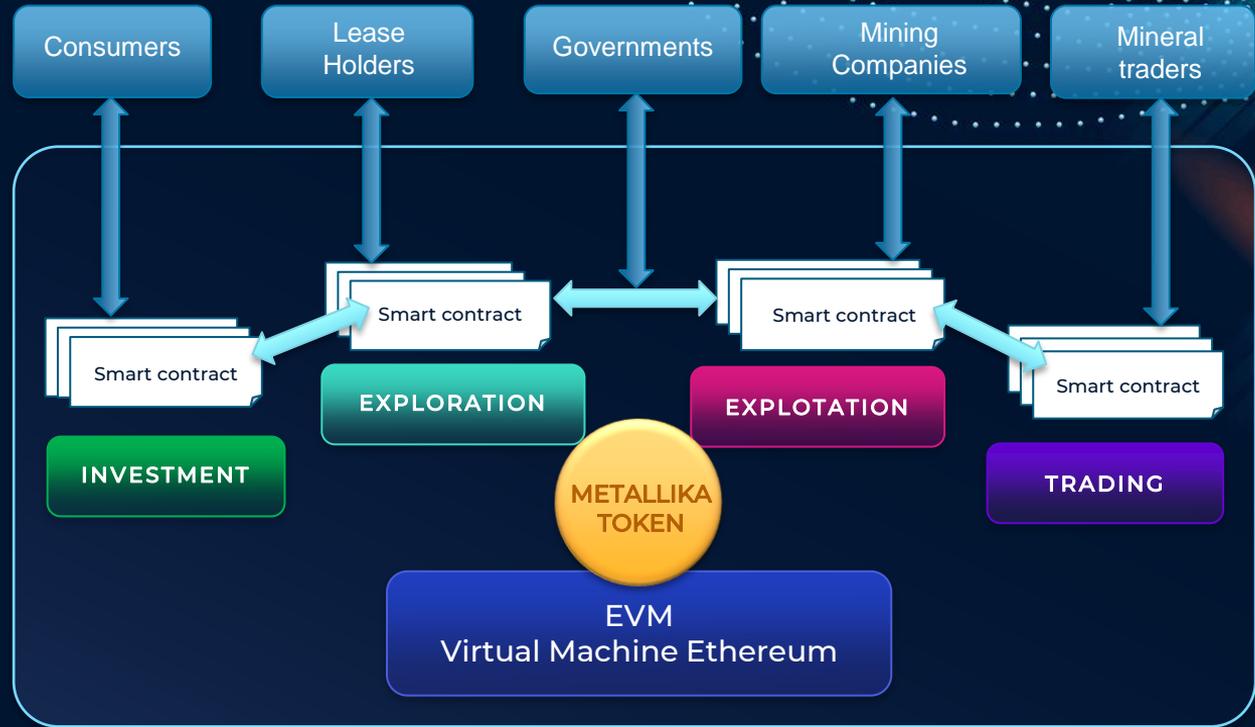


Figure 11. DAO METALLIKA.io Participants Interaction Scheme

4.5 Application Layer

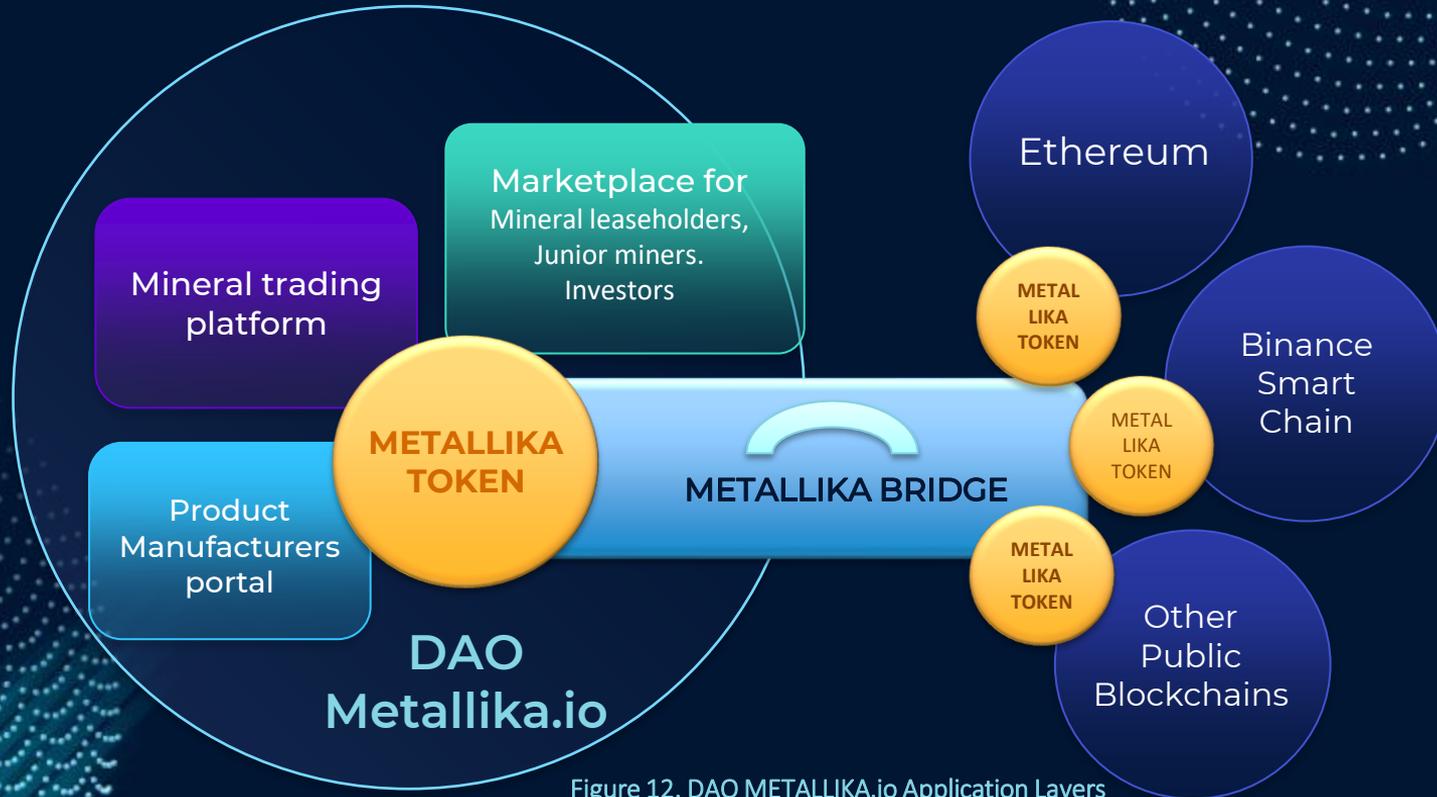


Figure 12. DAO METALLIKA.io Application Layers



Marketplace for Mineral lease holders, Junior miners and Investors is a SaaS solution that allows interactions between interested in geological exploration of mineral deposits participants. Receipt of initial investment and subsequent investment. **The main functions of the market place are the following:**

- approval of documentation, created in the exploration process;
- inventory tracking in ERP for resource/inventory inventory management;
- inventory valuation tracking for stock exchange reporting;
- verification of workflow/audit of activities and results used in resource/reserve calculations;
- transaction tracking during complex rules and standards management processes;



Product Manufacturers portal is a SaaS solution for manufacturers of various goods who are interested in obtaining accurate and reliable information. **The main functions of the Manufacturers portal are the following:**

- tracking materials in the mining value chain from blocks to concentrate to metal (e.g. gold bars, SW/EX copper plating, etc.);
- obtaining and registering ore quality certificates based on laboratory tests for confirmation;
- account reconciliation automation;
- trading minerals using digital tokens;

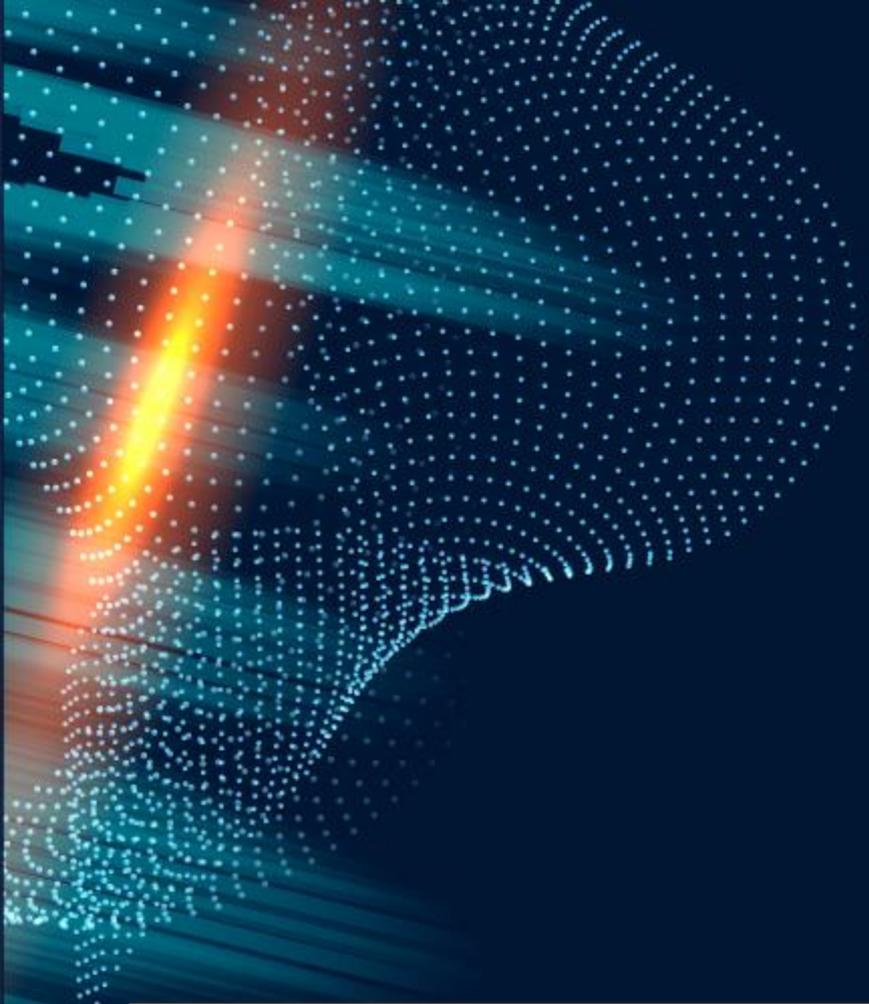


Mineral trading platform is a SaaS solution for the formation of crypto assets based on already mined or explored minerals. **The main functions of the Trading platform are the following:**

- it allows to create digital tokens that represent the amount of minerals and metals explored and confirmed by the geological community;
- it carries out trading operations for the purchase and sale of digital tokens;
- it allows to exchange tokens for actual mineral resource.



METALLIKA BRIDGE is a SaaS solution for the DAO METALLIKA members that provides the ability to exchange METALLIKA tokens from public blockchains to the DAO METALLIKA private blockchains and back in a one-to-one ratio.



4.6 METALLIKA.io PROTOCOL

The METALLIKA.io protocol is a set of rules and standards that define the number, functionality, and manner of communication between smart contracts within each subsystem, as well as between Metallika.io DAO subsystems.

The METALLIKE.io protocol uses a blockchain based on the Ethereum virtual machine and allows the use of the METALLIKA digital token as a fuel for executing functions of smart contracts of the life cycle subsystems of exploration, production, enrichment and trading of minerals.

METALLIKA.io Protocol

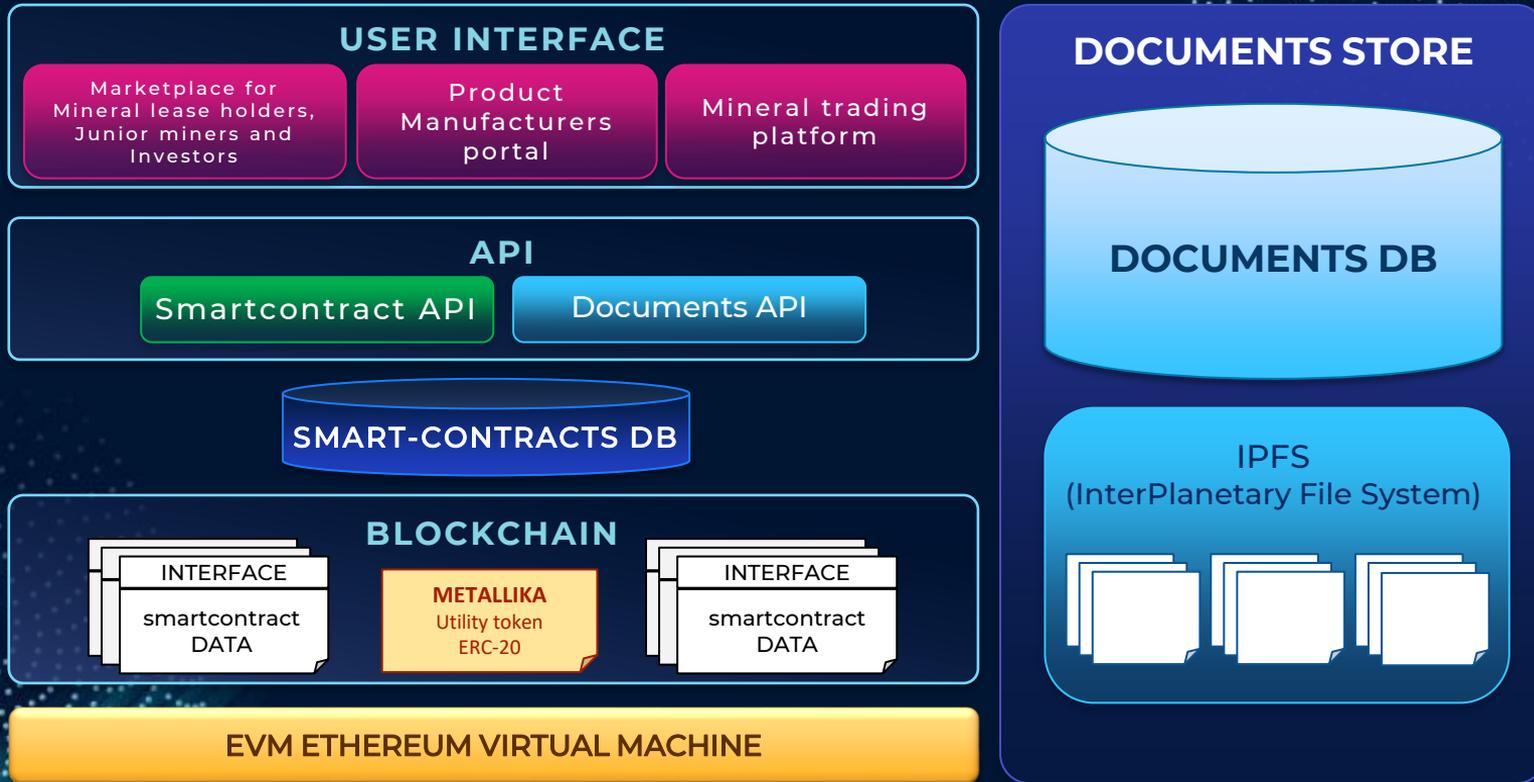


Figure 13. METALLIKA.io Protocol General Scheme

The interaction between all infrastructure elements is performed by means of the DAO METALLIKA.io protocol.

The main element of the protocol are electronic documents, with the help of which the DAO Metallika.io implements the workflow, necessary to ensure the accounting of contracts, acts and records that fix the ownership of the DAO participants.

Documents circulation is an activity of organizing the flow of documents in the system from the moment they are created or received to the completion of execution. It is an essential part of any stage of the mineral exploration and production cycle.

The DAO METALLIKA.io protocol uses electronic documents to share information between participants and individual elements of the DAO Metallika.io infrastructure.

The DAO METALLIKA.io protocol consists of the following elements, which are necessary to ensure the workflow of the documents circulation inside the DAO:

- **Documents API** - software that includes a set of functions for creating new electronic documents, uploading files to IPFS, as well as gaining access to already created electronic documents
- **Smartcontracts API** - software that includes a set of functions for creating smart contracts when creating new electronic documents, providing interactive interaction with the DAO Metallika.io blockchain
- **Smartcontracts Database** - a database for storing a registry of smart contracts, all smart contracts created and linked to electronic documents during the operation of the DAO
- **Documents Store** is a storage of electronic documents
- **Documents Database** is a database for storing a registry of electronic documents - all documents uploaded to a distributed registry by members of the DAO Metallika.io
- **Documents File Store** is distributed file system IPFS, which is used to store electronic document files

- ✓ Each document, created and used during the life cycle of exploration and production of minerals, corresponds to a separate electronic document, which is a representation of the original document in the blockchain.
- ✓ A general scheme of documents circulation process within the DAO METALLIKA.io infrastructure is presented below
- ✓ The key element of an electronic document is a smart contract that connects the blockchain with the document files using a set of identifiers and hashes.
- ✓ Electronic documents link smart contracts within the DAO METALLIKA.io blockchain and physical documents that are stored in the IPFS distributed file system.

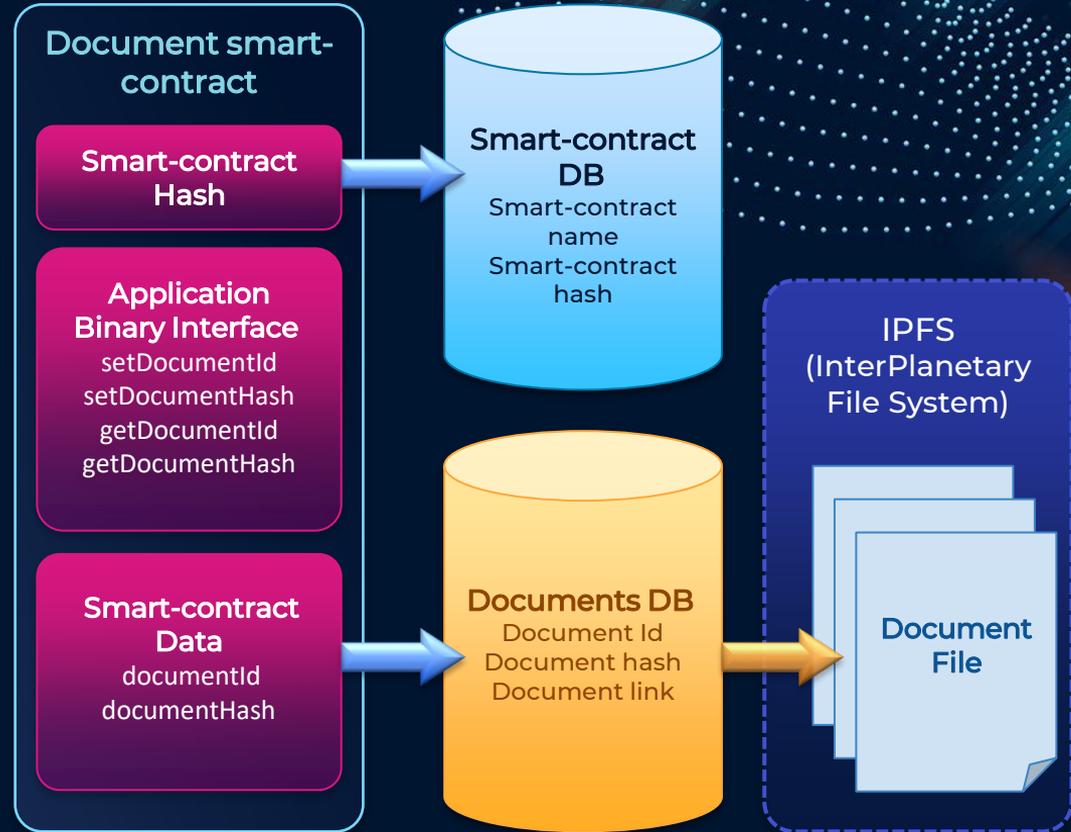


Figure 14. METALLIKA.io Documents Circulation General Scheme

To facilitate access through the API, special accounting registers are maintained in databases for electronic documents:

- list of smart contracts
- list of documents

General scheme for the document creation process if represented on figure 15.

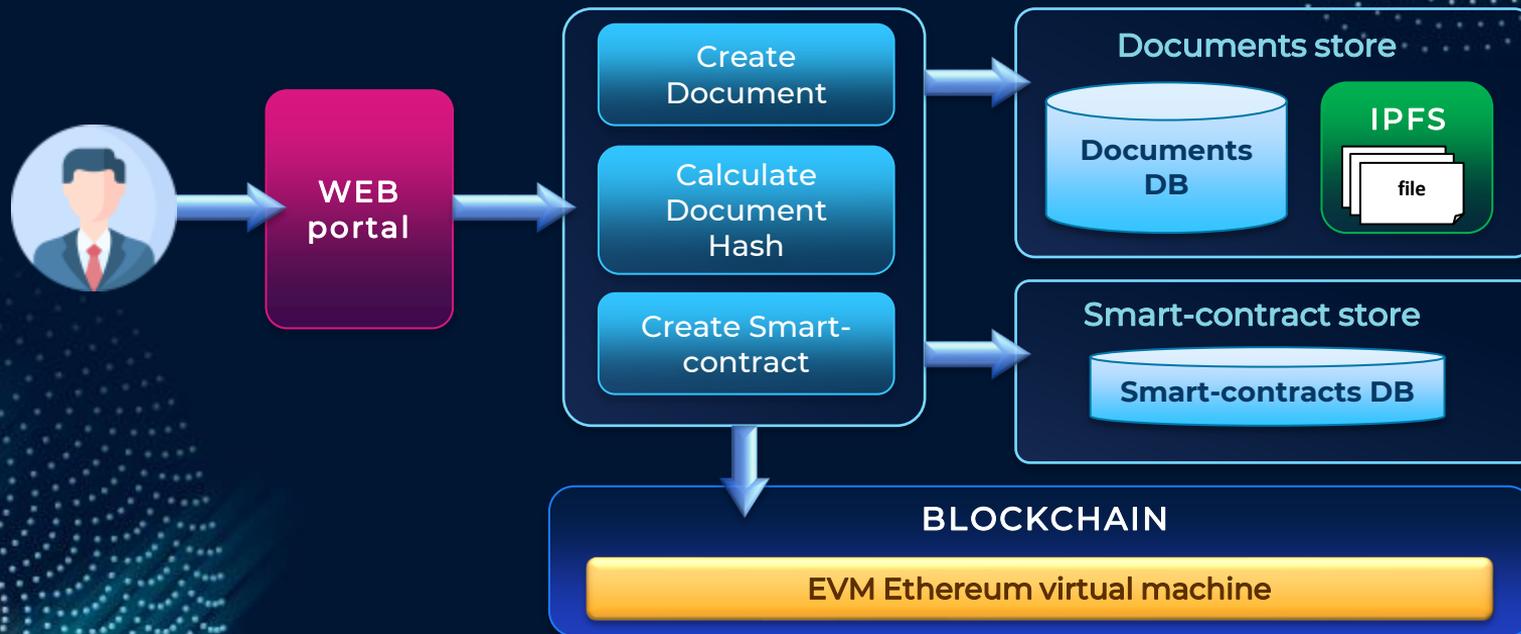


Figure 15. General Scheme of Documentation Creation Process

The sequence of creating and uploading electronic documentation consists of the following steps:

1. A user prepares an electronic representation of the physical document and uploads it to the DAO Metallika.io blockchain. It can be one or several scanned document pages, images or video files;
2. Files related to the electronic document are loaded into the distributed file system IPFS.
3. A record about the loaded document is created in the database where the register of electronic documents is stored, **which contains the following data:**
 - a) document ID inside the DAO;
 - b) the hash sum of the document calculated at the time of download, which will later be used to verify the authenticity of the document
 - c) sha128 multihash of the document in IPFS, acts as a pointer to the location of the document in the distributed file system
 - d) description and various service information necessary for the organization of workflow within the DAO METALLIKA.io.

4. A new smart contract linked to an electronic document uploaded to IPFS is created and uploaded to a distributed registry (blockchain) of the DAO METALLIKA.io
5. A record about the created smart contract is added to the database where the registry of smart contracts is stored.

Once all steps are completed, the new electronic document becomes available to DAO participants. The document is absolutely transparent and is not subject to fraudulent transactions by unscrupulous counterparties, all transactions with the document are subject to control by DAO participants.

Smartcontracts that describe electronic documents can be extended by implementing various additional features, such as electronic signature, personalized access and others.

The sequence of obtaining electronic documents from the distributed registry (blockchain) DAO METALLIKA.io consists of the following steps:

1. a user through the web interface gets access to the list of available electronic documents, selects the desired document and makes a request to obtain the contents of the document;
2. The requested smartcontract is searched based on the data from the registry of smart contracts;
3. IPFS searches for the necessary files of an electronic document, based on the register of documents and the multihash;
4. The checksum, received from IPFS, is calculated and verified with the data stored in the smart contract. If the checksums match, the document is considered valid and becomes available for the user;
5. The WEB interface generates a visual representation of an electronic document and an archive of files for download.

- ✓ In the process of accessing electronic documents, additional steps may be introduced depending on the properties and functionality of certain types of documents, such as checking confidentiality or access to only certain parts of the document.

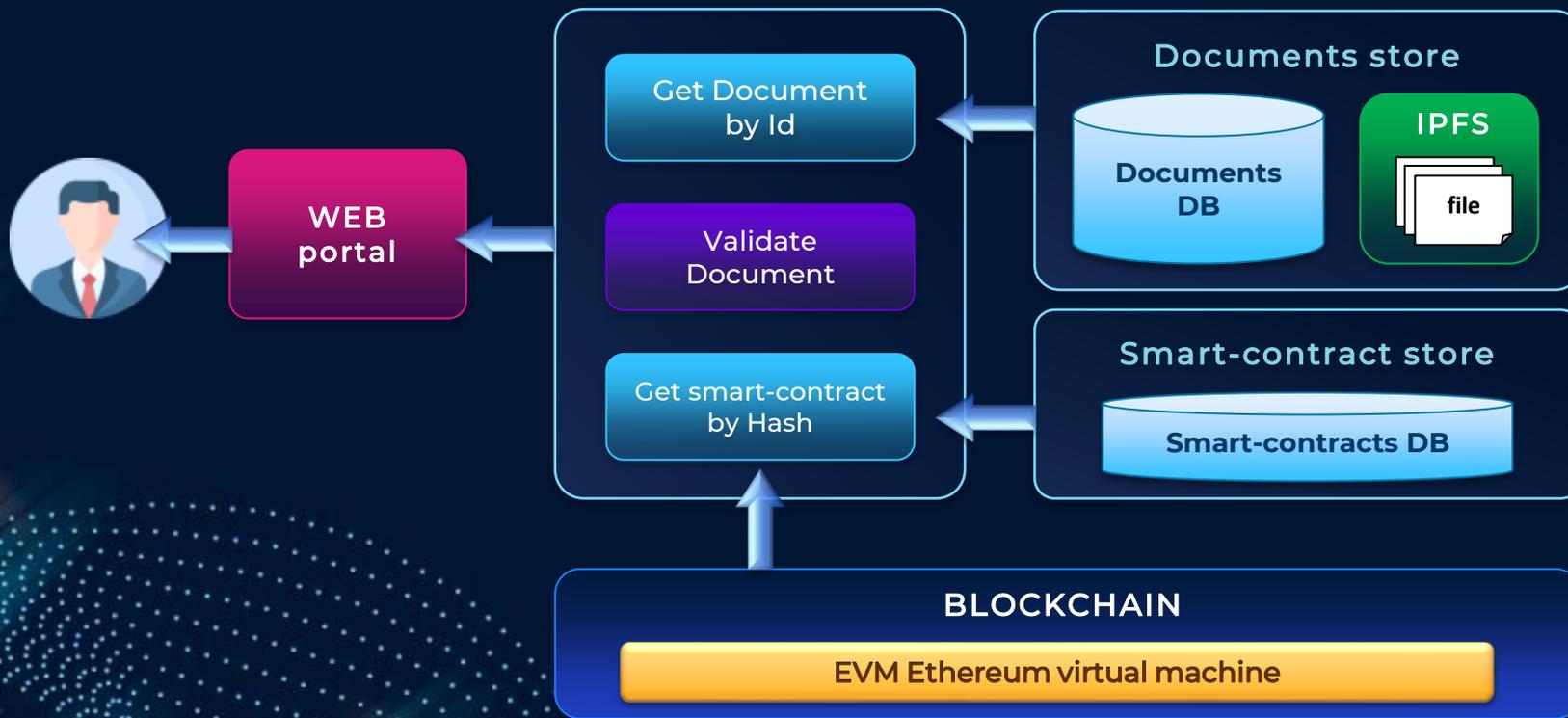


Figure 16. General Scheme of Showing the Document

Mineral Trading platform

The Mineral Trading platform allows DAO METALLIKA.io participants to conduct online trading operations for buying and selling minerals using digital commodity tokens.



Figure 17. General Scheme of Showing the Document

Key elements of the trading platform:

- **commodity token** is a token backed by physical minerals (commodity). The mineral that backs the commodity token is physically stored in a third-party storage. DAO Metallika.io members can purchase and sell commodity tokens, as well as reverse operations to exchange digital tokens for physical minerals;
- **depository** is a tool that provides services related to the storage of digital commodity tokens involved in purchase and sale operations on the trading platform and the accounting and transfer of rights to commodity tokens after a transaction is made between participants in the trading platform;
- **clearing center** is a service that allows automatic non-cash transactions between participants of the trading platform for digital tokens;
- **order book (order book)** is an electronic list, consisting of orders for buying and selling of tokens, which reflects the interests of buyers and sellers. The order book contains buy and sell orders grouped by price levels. In other words, the order book lists the number of tokens being bid on and displays different offers from both buyers and sellers for each price point for a particular token;
- **back office** is a set of services of electronic registration and support of market transactions for the purchase and sale of commodity tokens. It provides analytical information and reports to optimize and improve trading activities.



To start selling commodity tokens on a trading platform, DAO Metallika.io members should complete the **following steps**:

1. create and make publicly available commodity token linked to a specific mineral;
2. move certain amount of commodity tokens to the depository in order to be able to carry out trading operations;
3. create in the order book an order or multiple orders to sell certain amount of commodity tokens at a certain price.



Issuing the commodity token linked to a physical mineral resource

Commodity-backend token is a token backed by minerals. The mineral that supports the Commodity-backend token must be physically stored in a third-party storage.

A general scheme of commodity token issuing process is shown in Fig. 18:

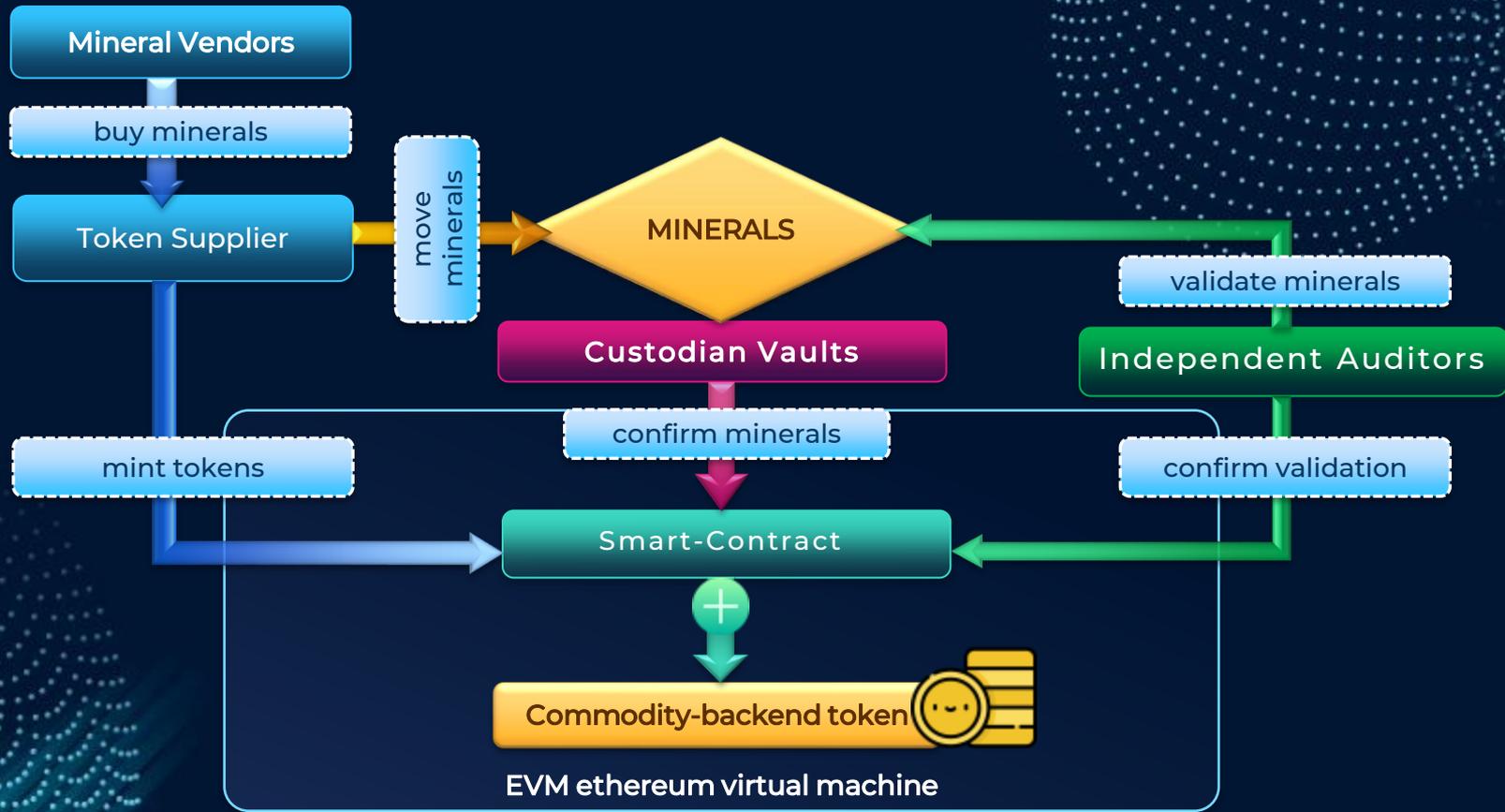


Figure 18. General Scheme of Token Issue

Token Supplier

A member of the DAO METALLIKA.o (an organization or individual), issuing the Commodity-backend token.

Mineral Vendors

Public companies or individuals who are suppliers of various mineral resources.

Custodian Vaults

Specialized mineral vaults owned by third-party services to provide secure storage of minerals to back issued commodity-backend tokens. All information about the chain of custody is fully controlled by the Ethereum blockchain.

Independent Auditors

Independent organizations certified and accredited to carry out systematic checks of the quality and quantity of minerals in the depository to ensure the maintenance of accounting records.

Token issue process

- A member of the DAO METALLIKA.io community uses the web portal to create a request for the issue of a commodity-backend token. The request specifies the following:
 - title;
 - symbol;
 - digits;
 - mineral;
 - the value of the token expressed in minerals, for example, 1 token is equal to 1 gram of the specific mineral;
 - and any other data necessary to create a token
 - A smart contract with zero commodity-backend token is created in the blockchain
 - To issue a certain amount of commodity-backend tokens, the future owner of the token must have underlying assets, for this it is necessary to purchase minerals from the **Mineral Vendor**.
 - Mineral resources are moved to independent Custodian Vaults, information about the amount of minerals and storage data is stored in the blockchain.
 - **Independent Auditors** check the quantity and quality of minerals placed in an independent storage and issue a conclusion, which is recorded in the blockchain, as confirmation of the value of the issued token. The checks are of a periodic nature, which is established by the internal regulatory documents of the DAO METALLIKA.io
 - After receiving all the necessary confirmations, tokens are issued in an amount equivalent to the amount of minerals in the storage
- ✓ A general scheme of commodity token exchange process is shown in Fig. 19:

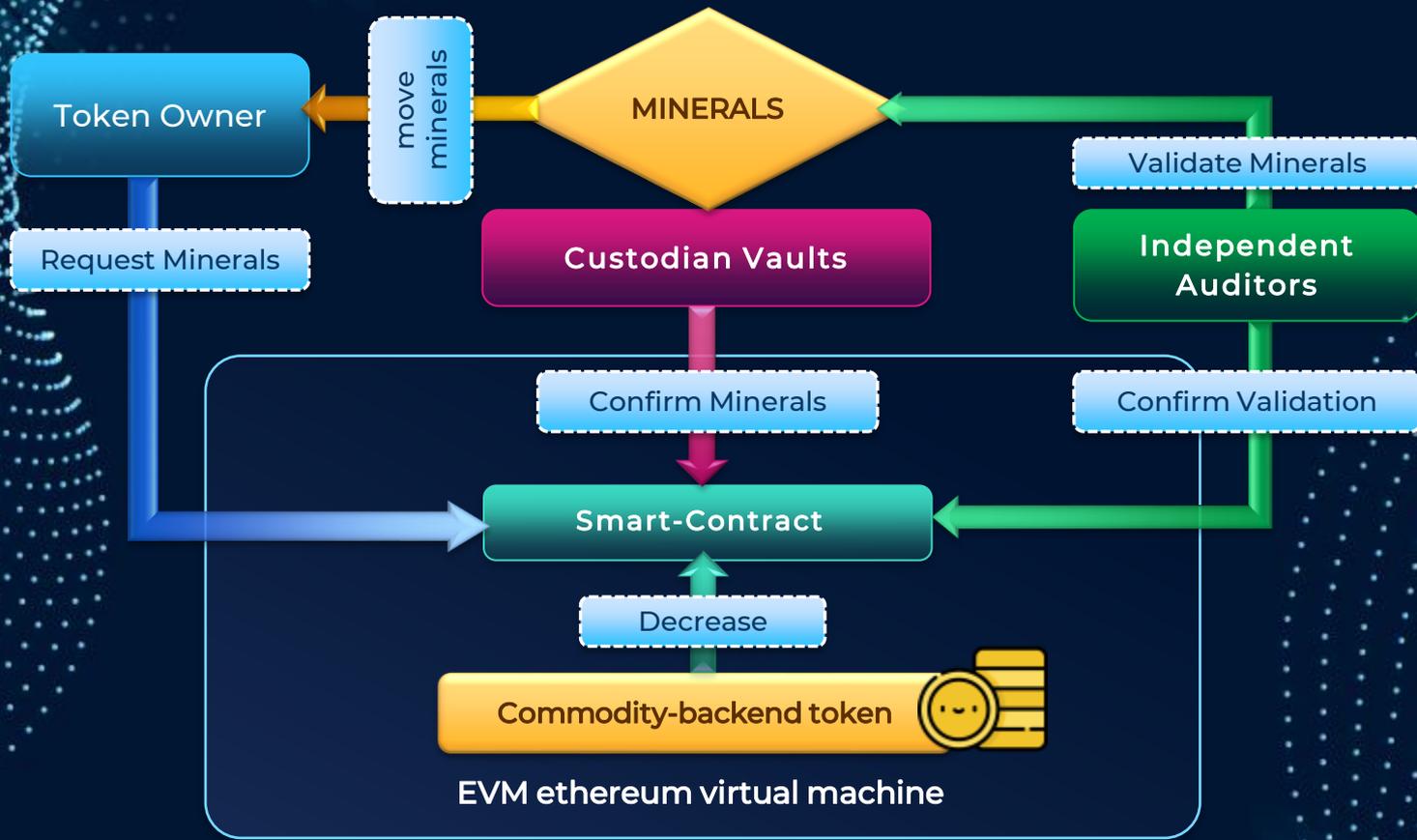


Figure 19. General Scheme of Token Exchange

Exchanging tokens for minerals

- **Token Owner**, using the Web portal, creates a request for the exchange of a commodity-backend token for minerals. Commodity-backend tokens are debited from the user's wallet and freeze until the operation is fully processed.
- The **smart-contract validates** whether the number of tokens the user has is sufficient to exchange for minerals.
- If there are enough tokens for the exchange, the commission is calculated in **METALLIKA tokens**.
- **Custodian Vaults** preparation for issuing minerals to the user, the amount to be issued is separated from the total amount.
- **Custodian Vaults**, information on the number of minerals is updated in the blockchain.
- **Independent Auditors** check the quantity and quality of minerals and the total quantity and quantity to be issued placed in an independent storage and issue a conclusion that is recorded in the blockchain.
- With a positive result, **Token Owner** receives the requested amount of minerals.
- The frozen amount of **Commodity-backend tokens** is burned afterwards.

Trading platform depository

Before starting trading operations with commodity tokens, the owner of the tokens should place them in the depository. This is necessary in order for the trading platform to be able to carry out operations of buying and selling commodity tokens between members of the **DAO Metallika.io**

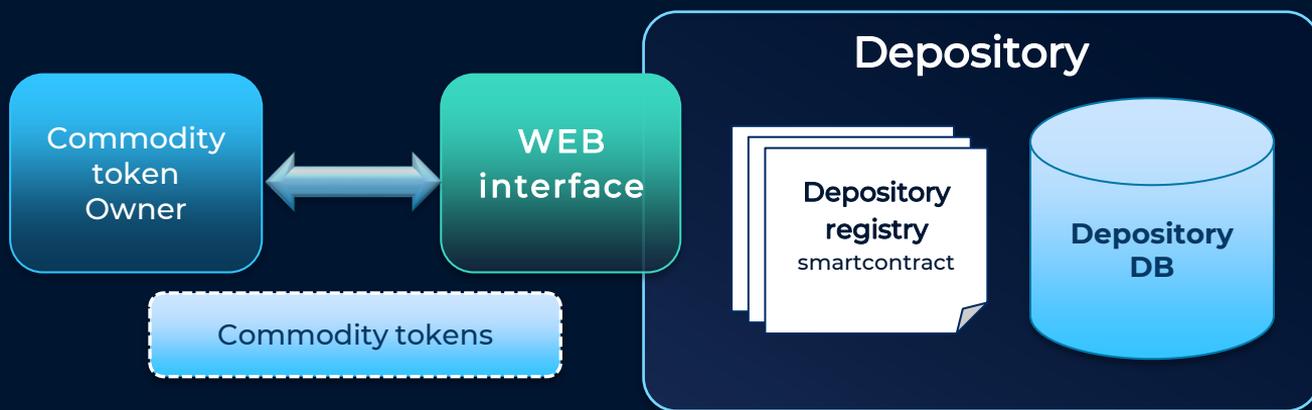


Figure 20. General Scheme of the Depository

The depository of the trading platform contains special accounts that store the commodity tokens of the DAO Metallika.io members who participate in trading operations on the Mineral Trading platform. The special account links to the DAO Metallika.io member's wallet address and is called a Depo account.

All trading operations are carried out only through the depository of the trading platform and are accounted on depo accounts. To receive commodity tokens to the wallet, the user initiates the procedure for transferring tokens from the depo account to the wallet address via the WEB interface.

The Depository uses the DAO Metallika.io blockchain for operating. All deposit and withdrawal operations to depo accounts are carried out by using smart contracts. This ensures the correctness and transparency of the work of the Depository.

In general, the flow of commodity tokens with the participation of the depository looks the following:

- A DAO Metallika.io member issues a commodity token and transfers some or all of the issued tokens to the depository;
- A trader or investor buys commodity tokens;
- The transaction is fixed by the depository;
- Based on the information about the transaction, the purchased tokens are transferred to the buyer's account;
- If desired, the buyer can withdraw commodity tokens from his depo account to his wallet

Clearing center

Clearing is regular non-cash payments for goods and services between legal entities and individuals. In clearing, instead of cash payments, the claims and liabilities are offset.

In case of the Mineral Trading platform, clearing is carried out between the participants of **DAO Metallika.io** when they buy or sell commodity tokens.



Figure 21. General Scheme

Clearing stages

- » a seller submits an order to sell the commodity to the order book;
- » a buyer submits an application for the purchase of a commodity in the order book;
- » if orders for sale and purchase are equal than a transaction is registered and information about the transaction is transmitted to the clearing center;
- » the clearing center transfers METALLIKA tokens from the buyer to the seller, and COMMODITY tokens are transferred from the seller's depository account to the buyer's depository account;

The Clearing Center uses the **DAO Metallika.io blockchain**. All operations are carried out using smart contracts. This ensures the correctness and transparency of the work of the Clearing Centre.

Order book

The order book is a service that shows volumes and prices that traders are willing and able to buy or sell for a commodity token.



Figure 22. General Scheme



5. METALLIKA TOKEN

METALLIKA Token

The METALLIKA token is a utility token necessary for the operation of the DAO METALLIKA, since it acts as a fuel for the operation of the blockchain, on which the DAO is based.

Utility Token is a digital asset that is used to fund a decentralized organization by providing DAO members guarantees that they can consume the organization's products and services. Utility Tokens do not promise any benefits, do not ensure rights to land, property, or other company assets, and are not analogs or substitutes for loan agreements. This is one of the types of tokens that is issued when the project is at the launch stage.

- The METALLIKA Utility token is a guarantee of future access to the DAO METALLIKA products or services, which estimates its value;
- The METALLIKA Utility token allows users to participate in all stages of the life cycle of exploration and production of minerals anywhere in the world;
- The METALLIKA Utility token can be freely purchased, exchanged or transferred with all ownership rights between individuals (P2P) or on the most popular public blockchain crypto exchange platforms.
 - Potential users:
 - participants of the DAO METALLIKA community;
 - Governments;
 - Mining Lease holders;
 - Mining Investors;
 - Mining Companies;
 - Mineral traders;
 - Majority of product manufacturing companies worldwide;
 - All sectors involved with the mining industry;
 - crypto-investors who see the potential of the token price raise in future;
 - crypto-traders on different decentralized crypto-exchange platforms.

One of the important properties of the METALLIKA token is that the token will be available not only on the private DAO METALLIKA blockchain, but also on major public blockchains such as BSC and Ethereum.

In the future, it is planned to expand the number of public blockchains that will be supported by the METALLIKA token.

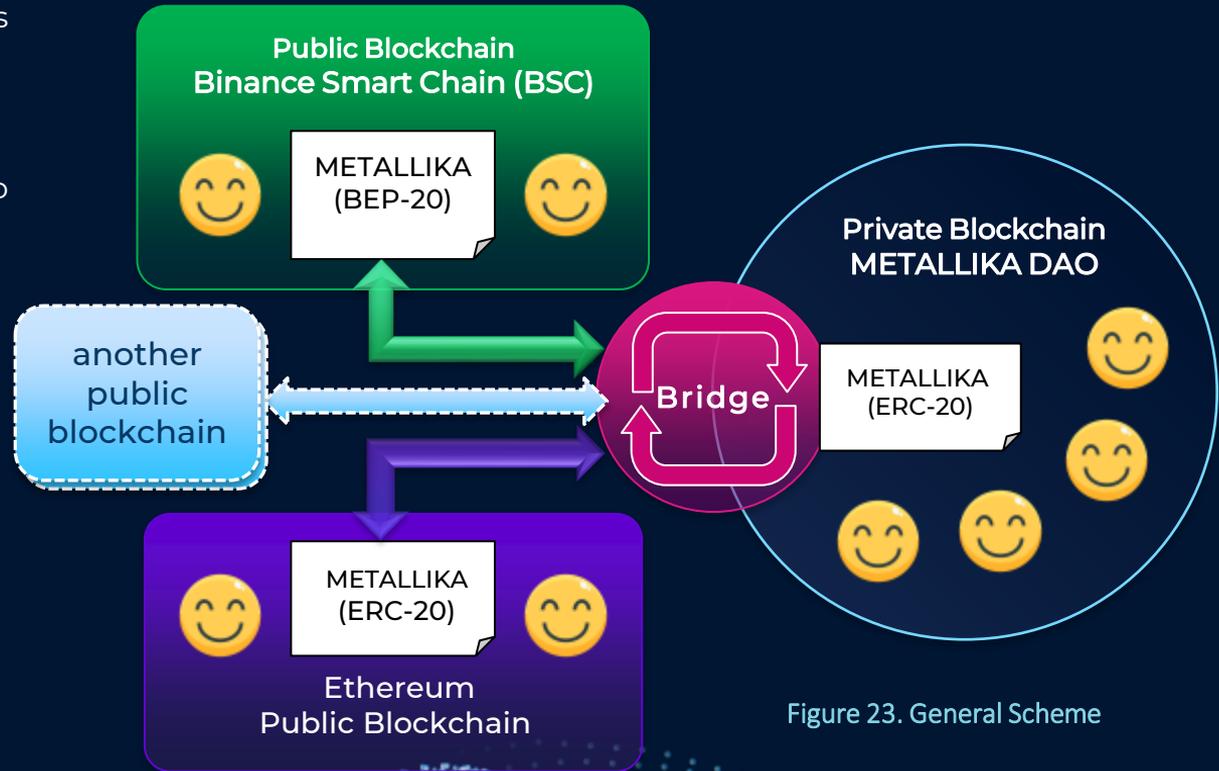


Figure 23. General Scheme

5.1 Token issue procedure

At the first stage, tokens, intended for circulation in public blockchains, will be issued. After the launch of the DAO METALLIKA private blockchain, a liquidity pool of METALLIKA tokens will be created inside the DAO equal to the total number of tokens issued in public blockchains. This will allow to link tokens in public networks to the DAO METALLIKA token in a one-to-one ratio.

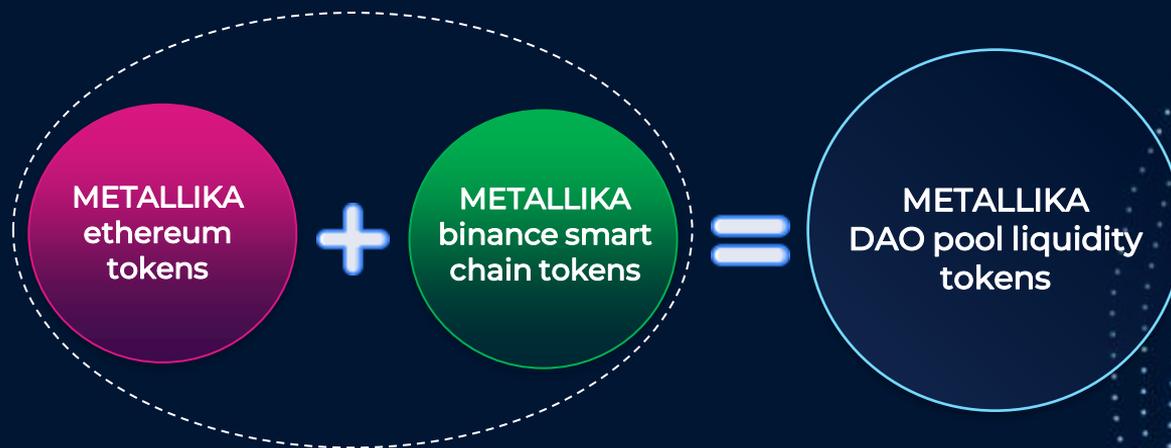


Figure 24. The DAO METALLIKA Pool Liquidity tokens

Choosing a public blockchain platform for the issue of the token

The following platforms are planned to be used as blockchain platforms for the initial issue of the METALLIKA utility token: Ethereum, Binance Smart Chain (BSC)

The most popular blockchain platforms currently are Ethereum and Binance Smart Chain (BSC). Both platforms support the most popular smart contract standards for creating Utility tokens (ERC-20, BEP-20), and are the most friendly and comfortable environments for creating and placing utility tokens on exchanges.

Ethereum and BSC have the greatest support among the community of investors and crypto enthusiasts, who develop decentralized applications.

Choosing a type of smart contract for public blockchain

The choice of the type of contract for the Ethereum network is determined by the following conditions:

- ✓ ERC-20 is the most widely used standard on the Ethereum network.
- ✓ ERC-20 tokens are compatible with all services and software, supporting this standard (software wallets, hardware wallets, exchanges, etc.).
- ✓ With an ERC-20 contract, you can request a general supply of tokens, check balances, transfer funds, and give permissions to other DApps to manage tokens.
- ✓ The main advantage of ERC-20 tokens is flexibility. By using ERC-20 contracts users can implement additional features and set certain parameters in compliance with the needs of specific projects.
- ✓ BEP-20 is a token standard on Binance Smart Chain that extends ERC-20, the most widely accepted Ethereum token standard. BEP-20 is a technical specification for Binance Smart Chain which aims to provide a flexible format for launching a range of different tokens. This standard is most suitable for implementing the necessary functions of the METALLIKA token.

5.2 The METALLIKA BRIDGE feature

The METALLIKA BRIDGE feature makes it possible to transfer METALLIKA token from public blockchains to the private DAO METALLIKA blockchain and vice versa. To transfer, the user must have in METALLIKA tokens issued for the public blockchain a wallet and a registered account in DAO Metallika.io system.



Figure 25. The METALLIKA BRIDGE

- The exchange of tokens is possible in both directions.
- The exchange of tokens is processed in a one-to-one ratio.
- To exchange tokens users need to pay for gas, using a public blockchain coin. There is no commission for using METALLIKA token.

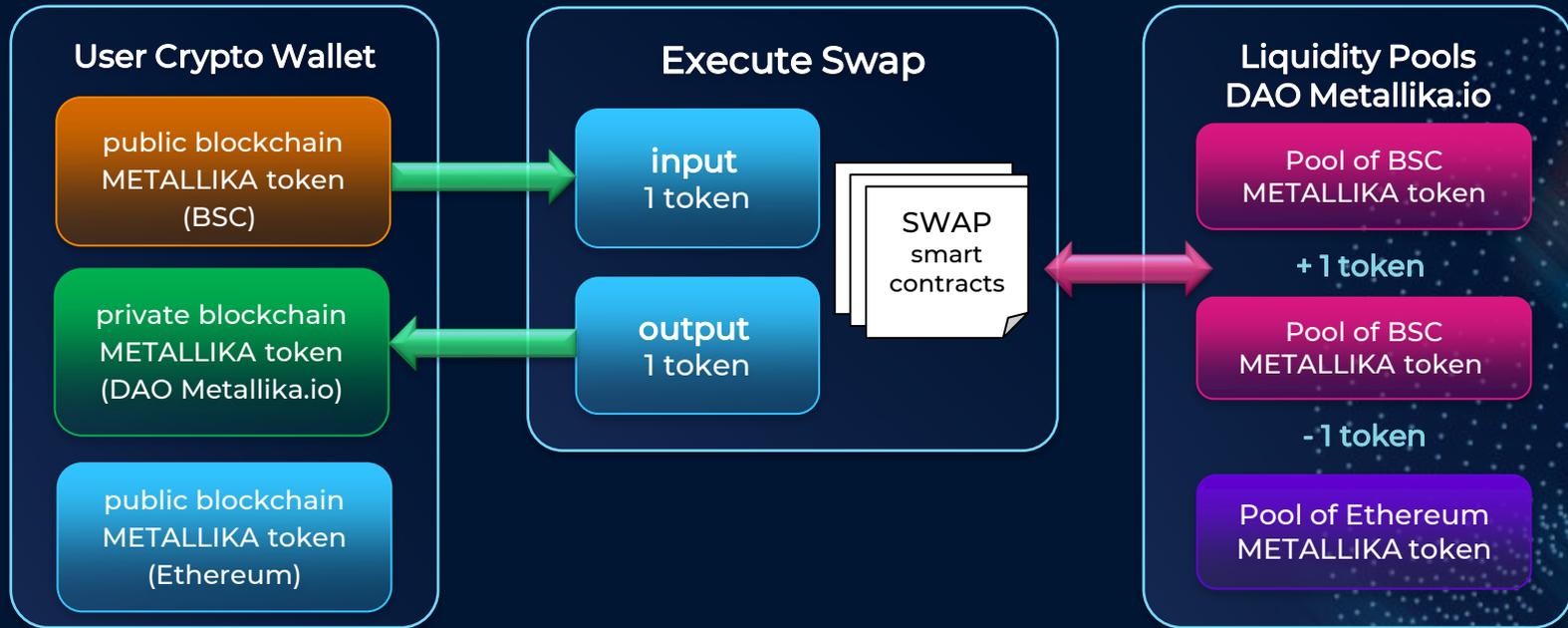


Figure 26. Scheme of the Token Exchange Process

The exchange of tokens between blockchains is processed, using the Atomic Swap technology and the smart contracts, specially designed for this purpose.

The technology is based on the Hashed Time-Locked Contract (HTLC) tool. This is a scheme for cryptographic confirmation of the legality of the actions of the participants, meanwhile the actions themselves are separated in time.

The tool combines two mechanisms for blocking the exit of a transaction by time (time lock) and by a secret number, the hash of which is recorded in the blockchain (hash lock).

Benefits of Atomic cross-chain swap:

- decentralized management;
- no intermediaries or cryptocurrency exchanges;
- high security indicators due to the transfer of tokens directly from one participant to another within a single transaction;
- minimum commission and low operating costs;
- the ability to carry out operations for the exchange of tokens in fast-time manner.

A scheme of exchanging METALLIKA tokens from the BSC public blockchain for METALLIKA tokens from the private DAO blockchain Metallika.io is present below:

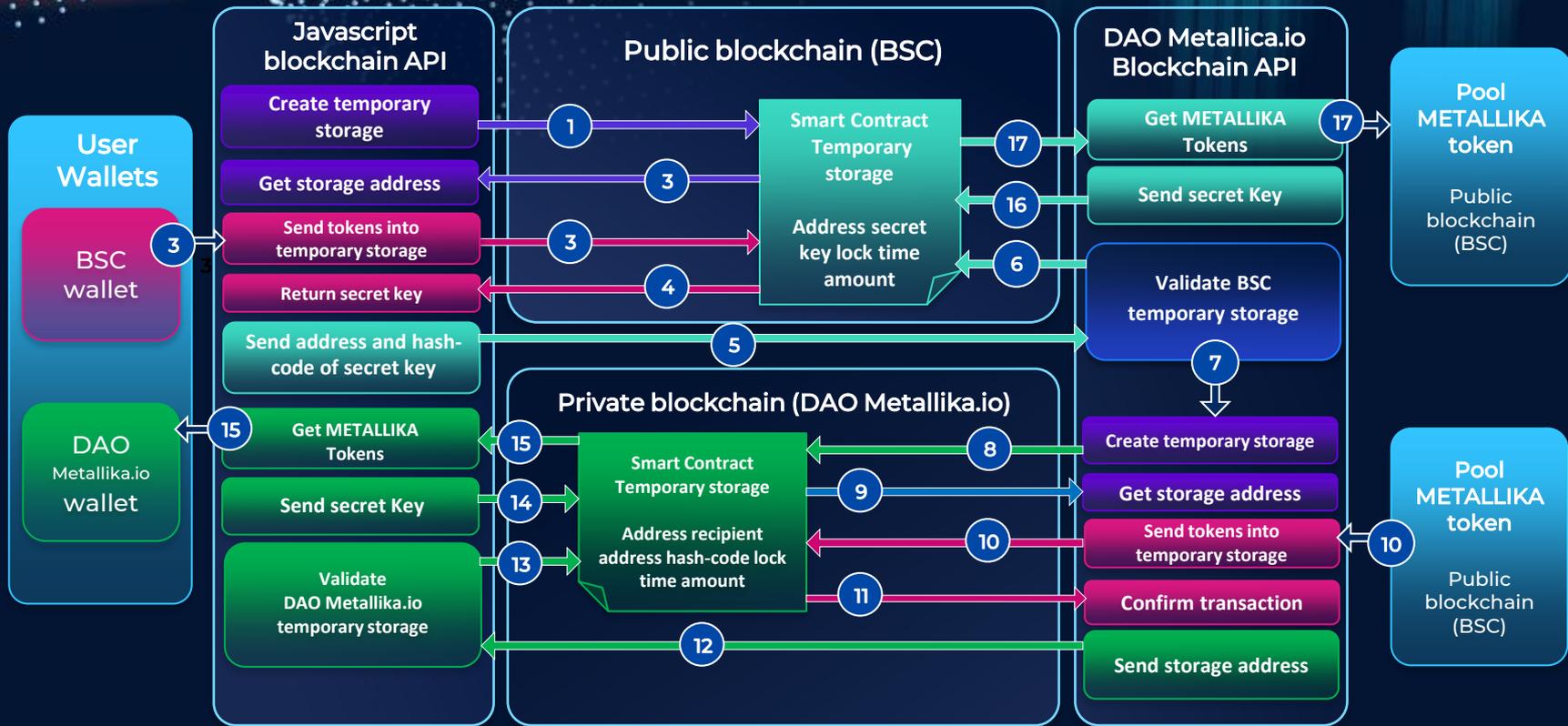


Figure 27. A Scheme of Exchanging Metallika tokens

5.3 Description of the token exchange protocol

The user, through the WEB interface, selects the BSC wallet, indicates the number of tokens and initiates the process of exchanging METALLIKA (BSC) tokens for METALLIKA (DAO) tokens in one-to-one ratio.

1. A temporary storage of tokens is created on the basis of the smart contract in the BSC blockchain. Temporary storage has a token storage time (lock time) set to no longer than 60 minutes. After the expiration of the storage time, if the tokens are in temporary storage, then they are sent back to the user, who initiated the exchange process. **Internal storage parameters:**

- storage address
- number of tokens
- lock time
- secret key of the current exchange operation

2. The storage address returns;
3. The specified number of METALLIKA tokens is transferred to the address from the user's wallet (BSC). The secret key of the current exchange operation is formed in the storage;
4. The secret key is returned to the user. Based on the secret key, a hash code is generated;
5. The storage address and hash code are sent to the DAO Metallika.io for further verification;
6. The DAO Metallika.io checks temporary storage - the storage time and the presence of tokens are checked;
7. In case of successful verification, the DAO Metallika.io creates temporary storage in the private DAO blockchain;

8. Creation of temporary storage in a private blockchain. Temporary storage has a token storage time (lock time) set to no longer than 60 minutes. After the expiration of the storage time, if the tokens are in temporary storage, then they are sent back to the DAO Metallika.io token pool. **Options when creating temporary storage:**
 - storage address;
 - lock time;
 - number of tokens;
 - address of the recipient;
 - hash-code of the current exchange operation;
 - secret key of the current exchange operation (in the beginning this field is empty, but it will be filled in when the user receives tokens);
9. Obtaining a temporary storage address for further use;
10. Transfer of METALLIKA (DAO Metallika.io) tokens from the liquidity pool to temporary storage;
11. Transfer confirmation is returned for further processing;
12. The address of the temporary storage of DAO Metallika.io tokens is sent to the user;
13. **The temporary storage is checked for compliance with the following parameters:**
 - lock time;
 - number of tokens;
 - address of the recipient;
 - hash-code of the current exchange operation;
14. After successful verification, the user can receive METALLIKA (DAO) tokens to his wallet. To do this, the user needs to send the secret key of the current exchange session to temporary storage. If the secret key matches the hash-code of the exchange session, then the key is stored in the storage. The transfer of tokens from temporary storage to the user's wallet would be allowed;
15. Transferring tokens from temporary storage to the user's wallet.
16. The DAO Metallika.io checks its temporary storage for the secret key. If the key is received, it is sent to the user's temporary storage. After verifying the secret key, the transfer of funds from temporary storage to the liquidity pool (BSC) of the DAO Metallika.io would be allowed.

5.4 METALLIKA Tokenomics

Total token supply: **300 000 000**

Ethereum: 150 000 000

Binance Smart Chain: 150 000 000

Price per METALLIKA Token: **\$0.10**

Max Supply: **300 000 000**

ERC-20 Smart Contract Address:

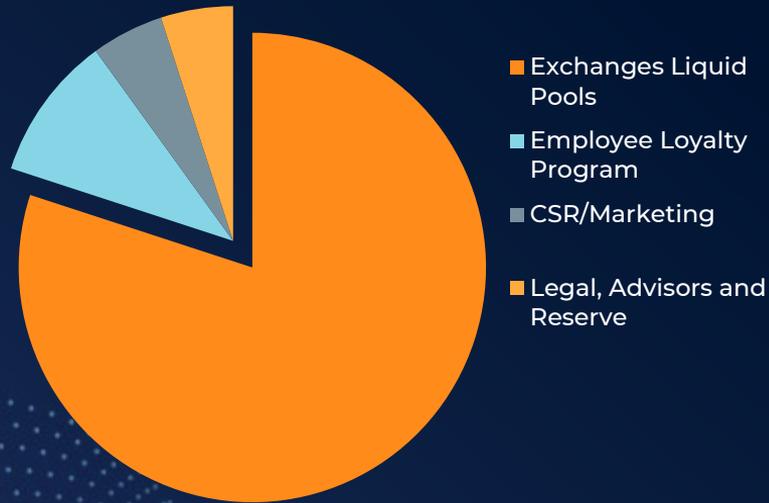
0x54Ae9eF5668f9D491a75a55F23373ec92CA6167e

BEP-20 Smart Contract Address:

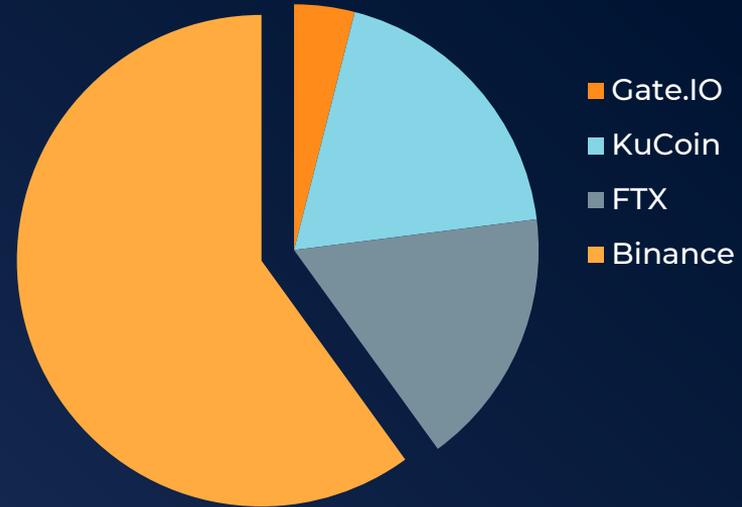
0xee3081B6Bb20FC28f77c179658E9ca5978d48170



Initial Token Allocations



Distribution of Liquidity Pool between exchange platforms



5.5 METALLIKA Utility Token Contract Interface

READ group (only read from the blockchain):

- **totalSupply()** - returns the total supply of the token
- **balanceOf(account)** - returns the balance of the account address
- **allowance(owner, spender)** - returns the number of tokens that the owner has allowed to be withdrawn from his spender account (see also approve)

WRITE group (change the blockchain state):

- **transfer(recipient, amount)** - transfers the amount of tokens from msg.sender to recipient
- **transferFrom(sender, recipient, amount)** – transfers amount of tokens from sender to recipient
- **approve(spender, amount)** – Gives permission to the spender to debit the amount of tokens from the balance of msg.sender. (see also allowance)

METALLIKA

6. ROAD MAP

PHASE I

Compliance and mining lease management

Mining companies need to manage approvals for documents, generated during exploration, resource/reserve evaluation, mine design, and planning processes. They seek to improve the control mechanism. Blockchain will improve inventory valuation traceability for stock exchange reporting and inventory traceability in ERP for resource/inventory stock management.

PHASE II

Engineering, construction and handover of the mine site

Design, build and transfer (ECH) business operations generate complex spatial and engineering information in structured and unstructured formats. Managing and maintaining the accuracy of this vast amount of information increases costs. If these additional costs are not taken into account in a timely and correct manner, they can slow down the speed of business execution and the achievement of enterprise goals. Blockchain allows transactions to be tracked during complex rules and standards management processes, providing trust and compliance with work requirements. Blockchain guarantees transparency and reliability of information for investors.

PHASE III

Supply chain

Blockchain can be used to track materials in the mining value chain from blocks to concentrate to metal (e.g. gold bars, SW/EX copper plating, etc.). This can be shown in steps from origin to end customer. Blockchain can also provide transparency for joint venture partners. Most mining companies have a fragmented value chain with transactions spread across multiple parties.

Blockchain could lead to the automation of account reconciliation. The ore is awarded a quality certificate, and the customer sends it to laboratory tests for confirmation. This whole process can use Blockchain technology with the participation of three parties - a miner, a client and an arbitrator.

PHASE IV

Green Mineral Trading

Investors buy digital tokens that represent the amount of minerals and metals explored and verified by the geological community. They consider this to be the "real" original "green gold" concept of capital monetization without mining.



7. CONCLUSION

7.1 Mineral assets supporting DAO METALLIKA.io

» A share in the large Beach Sand mineral deposit, which can bring in up to \$10 million per year (60%)

» A share in graphite exploration licenses. Potential unmined resources worth than 20 billion dollars (50%);

» A share in the mining company "Granit" (25%)
Mineral trading company (100%)

» Negotiations are underway with the holder of a diamond mining license for the development of mining of kimberlite.

7.2 Conclusion

The demand for minerals is increasing every year - new and already existing companies are increasing the volume of exploration and development of new deposits.

For all participants in the mineral exploration and production cycle, The DAO METALLIKA.io will provide an opportunity for fast, convenient, reliable and transparent communication using cloud services. This would lead to more effective partnerships and investments at each stage of the mining cycle.

Since all operations with documents, starting from the exploration and ending with production cycle, are performed in a distributed registry (blockchain), for the operation of which the METALLIKA token is used, with an increase in the number of DAO participants and an increase in the number of operations, the significance and value of the token will also increase.

Another important factor that ensures the increase in the value of the token is the direct participation of the METALLIKA token in trading operations with minerals on the Mineral Trading Platform. The growth in the value of the token will increase in proportion to the growth in the cost of minerals.

METALLIKA

8. CONTACTS



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