



# Modex - An ecosystem built on top of an enterprise-level blockchain - a network that guarantees interoperability and trust

Authors: **Alin Iftemi, Dragos Rautu, Laura Manescu, Vlad Luca, Cristian Barbuia**

Correspondence and communication: **contact@modex.tech**

M3 Holdings Limited, Wework 145 City Road, Hoxton, ECTV 1AZ, London, United Kingdom

Modex Limited, 57/63 Line Wall Road, GX11 1AA, Gibraltar, Gibraltar

Modex Group, 19A Baba Novac, Belvedere Building A, 031625, Bucharest, Romania

Modex Technologies LLC, 340 E Middlefield Rd, CA 94043, Mountain View, USA

Reviewed and edited by **Alex Butean**

Elaborated under the strategic guidance of **Mihai Ivascu**

## Abstract

The Modex Network is designed to offer a solid foundation for a multitude of applications that aim to experience interconnectivity with a stable and regulated financial ecosystem. All underlying components of Modex are developed in close collaboration with enterprise and international partners in order to match the modern rigors of security, scalability and interoperability.

Modex BCDB is a patented technology developed and improved in the past 5 years as an enterprise blockchain. With an already proven commercial maturity, the certified engine is now expanded as a core component of the Modex Network and responsible for the flexibility and interconnection of the entire Modex Ecosystem. A series of tools and frameworks were developed as satellites of the core technology, which allow Modex to address a variety of industry-specific needs in sectors like: banking, healthcare, logistics, government, etc.

Throughout the content of this paper, you will find complete technical details about Modex components, features, performance and integration mechanisms.

**Keywords:** blockchain; virtual assets; business ecosystem;

## **Directors' Responsibility Statement**

The Directors of Modex (Gibraltar) Limited have issued this White Paper and have taken all reasonable care to ensure that the facts stated in this document are true and accurate in all material respects, and that there are no other facts the omission of which would make misleading any statement in the document, whether of facts or of opinion. The Directors accept responsibility accordingly.

## **Summary of Legal Considerations, Risks and Disclaimers**

IMPORTANT NOTICE: Please read the entirety of this “Summary of Legal Considerations, Risks and Disclaimers” section carefully. We recommend you consult a legal, financial, tax or other professional advisor(s) or expert(s) for further guidance prior to participating in the Token Sales outlined in this White Paper. You are strongly advised to take independent legal advice in respect of the legality in your jurisdiction of your participation in the Token Sales. You should note that in the Token Sale Terms and Conditions that you will be acknowledging and accepting as part of the process to participate in the Token Sale, you will represent that you have indeed taken independent legal advice.

Please note that this is a summary of the “Legal Considerations, Risks and Disclaimers” document which can be accessed in the complete version at <https://modex.tech/legal-disclaimer/> and which you must read in full before: (i) making use of this White Paper and any and all information available on Modex (Gibraltar) Limited’s (the “Company” or “Modex”) website at <http://www.modex.tech> (the “Website”) and/or (ii) participating in the Company’s private sale outlined in this White Paper (the “Private Sale”). Any undefined capitalized terms below shall have the meaning set out in the “Legal Considerations, Risks and Disclaimer” paper. This summary should not be relied on in place of reading the “Legal Considerations, Risks and Disclaimers” paper in full. The information in this White Paper and all information available on the Website shall hereinafter be referred to as the “Available Information”.

The “Legal Considerations, Risks and Disclaimers” paper, the full version of which was mentioned above, applies to the Available Information. The contents of the “Legal Considerations, Risks and Disclaimers” paper outlines the terms and conditions applicable to you in connection with (i) your use of any and all Available Information; and/or (ii) your participation in the Token Sale, in each case in addition to any other terms and conditions that we may publish from time to time relating to the Token Sale (such terms hereinafter referred to as the “Terms”).

This White Paper states the current views of the Company concerning the Modex Network and related matters. The Company may from time to time revise this White Paper in any respect without notice. The information entered in this White Paper is indicative only and is not legally binding on the Company or any other party. This document is for informational purposes only and does not constitute and is not intended to be an offer to sell, a solicitation of an offer to buy, or a recommendation of: (i) the Company, (ii) an investment in the Modex Network or any project or property of the Company, or (iii) shares or other securities in the Company or any affiliated or associated company in any jurisdiction.

The information in the “Legal Considerations, Risks and Disclaimers” paper may not be exhaustive and does not imply any elements of a contractual relationship. While we make every reasonable effort to ensure that all Available Information is accurate and up to date, such material in no way constitutes professional advice. Individuals intending to participate in the Private Sale should seek independent professional advice prior to acting on any of the Available Information.

The Company does not recommend purchasing Tokens for speculative investment purposes. Tokens do not entitle you to any equity, governance, voting or similar right or entitlement in the Company or affiliated companies. Tokens are sold as digital assets, similar to downloadable software, digital music and the like. The Company does not recommend that you purchase Tokens unless you have prior experience with crypto tokens, blockchain-based software and distributed ledger technology and unless you have taken independent professional advice.

Citizens, nationals, residents (tax or others), green card holders and/or Restricted Persons of any Restricted Jurisdiction shall not process the Available Information and are prohibited from participating in the Token Generation or the purchase of Tokens or any similar activity. In no event shall the Company or any current or former Company Representatives be liable for the Excluded Liability Matters.

The Company does not make or purport to make, and hereby disclaims, any representation, warranty or undertaking in any form whatsoever to any entity or person, including any representation, warranty or undertaking in relation to the truth, accuracy and completeness of any of the information set out in the Available Information.

You should consider and evaluate each of the risk factors and all other information contained in the Terms before deciding to participate in the Private or Public Sale.

This White Paper may be translated to different languages but in the event of a conflict between documents, the English version of the White Paper will prevail.

## 1. Introduction

### Innovation through blockchain

The trend of decentralization [1] represents a wave of innovation that is reshaping society. Compared to our existing centralized society, this trend is an evolution, a paradigm shift that reflects a change in our collective consciousness. Although individuals and organizations worldwide are already using blockchain and the associated benefits, blockchain is by no means ever-present in our daily lives. Businesses are currently working to implement blockchain [2] into their operations and governments are trying to create boundaries to be able to control and regulate the field. Like all new technologies, blockchain must overcome challenges along the path towards widespread adoption. The present lack of usability and trust are correlated with the relative immaturity of this emergent technology. There is still a lot of work to be done in order to align the benefits of blockchain to the reality of modern enterprise business requirements [3] and we are here to make sure this is happening faster.

### Understanding the real context

We are currently living in the pen and paper state of the blockchain. There are no standardized guidelines on how to write, deploy and integrate a complex app, and there are fragmented tools available tailored only to a few very specific networks. It is like trying to write a web3 app today with the tools of 1995.

The blockchain and fintech industry have already evolved from the stage of Proof Of Concept into tangible business opportunities. However, those opportunities are being explored and built in isolation by large enterprises that have the resources to adapt and integrate the technology taking into account the data protection regulations. Furthermore, blockchain technology alone is not the perfect answer to current data protection and interoperability challenges, for the following reasons:

#### Missing key database features

- Blockchain itself is only a transactional ledger
- It does not store files and cannot act as a database
- It does not provide permission - based access to data or governance rights

#### Cumbersome implementation with legacy structures

- Transitioning to a blockchain infrastructure often entails building a new framework from scratch
- Transitioning to a blockchain infrastructure is a disruptive and large scale IT project at an organization level

### Interoperability challenges

- Current IT systems are often composed of a collection of technologies
- Blockchain and database compatibility across the Enterprise is a must have, yet requires significant investments in custom connectors

### Limited adoption of incumbent technologies

- Database and infrastructure incumbents have all developed their own blockchain solutions and infrastructure
- These solutions are costly and tailored to their ecosystem, limiting adoption at scale and hindering integration and interoperability

### Shortage of talent

- Very small expert pools are creating a fierce competition for intelligence and encouraging talent migration
- Limited training resources can't keep up with the market needs, trends, standards and adoption challenges

### ROI uncertainty

- Costly implementation
- Most market solutions are currently customized and expensive to implement
- Skilled developers are in short supply and in high market demand, and blockchain experts charge considerable fees for their services

### Regulatory framework

- The confusion and partial overlapping between blockchain and cryptocurrencies is hard to compile into a standard regulatory framework
- Serious businesses aim to benefit from regulations, but their actual contributions to the important work are limited

## **Fintech is expanding**

After centuries of monarchy and autocracy in traditional financial systems, due to the features offered by blockchain, decentralized finance has finally found a place in our everyday lives. The power of digital money has created a revolution that seems to be growing at a fast pace and these are the top reasons to believe the expansion has only just begun:

- Digital assets are becoming the new means of trade and many traditional banking features (loans, credits, exchanges, KYC, etc) are being migrated and available as fintech consumer-ready services
- The first regulatory frameworks are tailored to financial services [4], [5]
- Government resistance is slowly degrading because all stakeholders are starting to understand the benefits of decentralization

## 2. Modex Ecosystem

Modex BCDB (blockchain database) stays at the very core foundation of the entire ecosystem and controls the decentralized governance of all interconnected modules, tools and frameworks. The blockchain engine used by Modex BCDB is Tendermint [6], [7] core based with numerous additional changes and layers.

The Modex Network offers a series of benefits (traceability, scalability, integrity, security) and components (smart contracts, encryption engine, processing infrastructure). All these layers are tailored to offer the interoperability of 3 main subnetworks:

- Financial subnetwork : certified payments infrastructure and services
- Business subnetwork : flexible components for seamless integration
- Developer subnetwork : modules and connectors for the ecosystem

The Modex Network works like an API (Application Programming Interface) and addresses 3 different use-case clusters:

- Enterprise applications
- Fintech tools and services
- Token Utilities

The Modex Ecosystem (Fig. 1) is the umbrella that interconnects the technical components of the Modex Network with satellites and use-cases from areas like :

- |                     |                |                      |
|---------------------|----------------|----------------------|
| • Community         | • Banks        | • Developer tools    |
| • Stake Mechanisms  | • Shops        | • Software providers |
| • Asset Deposits    | • ATM's        | • Chain Explorer     |
| • Asset Transfers   | • Corporations | • Auditors           |
| • Public Blockchain | • NGO's        | • Government(s)      |

The Modex ecosystem of products and services continuously expands in order to create new synergies between assets, users, and organizations. The end goal is to create an environment where developers could easily interconnect components, business people could focus on creation of new models and the underlying infrastructure is flexible enough for a variety of use cases.

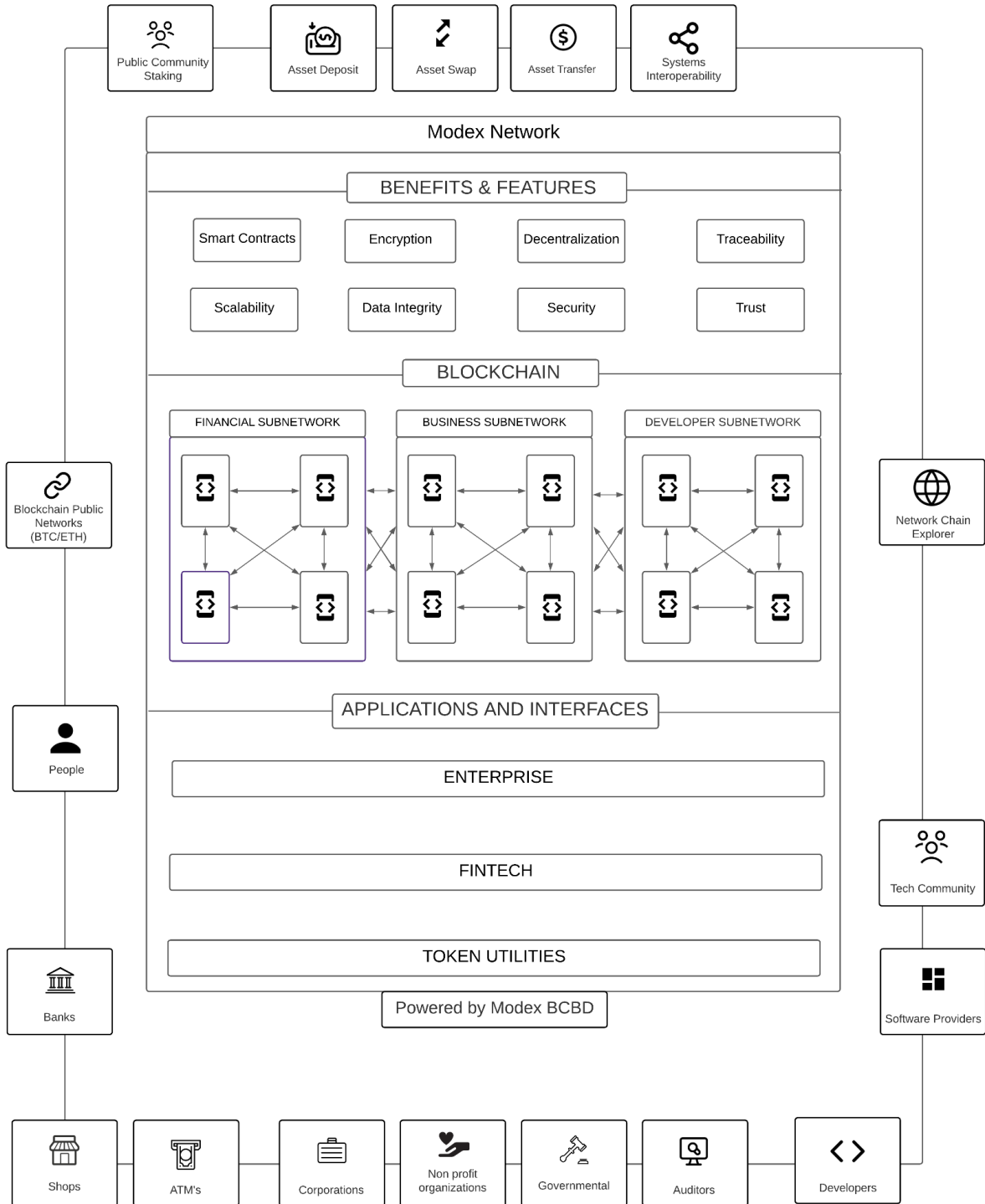


Fig. 1: The Modex Ecosystem

### 3. Modex Network

#### Patented Core Technology

A blockchain by its definition is a new way of storing information for transactions between two accounts and keeping them immutable [8]. The blockchain cannot keep up with a database data structure and size, which makes it very difficult to be used easily into an operational and data-intensive enterprise solution.

A traditional database, on the other hand, can store any type of data, allowing data altering like updates or deletes, which makes it very powerful in comparison with what a blockchain can do from a data storing perspective.

Our challenge was to find a way to bring these two technologies together and make them usable in an enterprise area. A solution with properties like update, delete, traceability, immutability, distribution, opens the door to many unsolvable problems.

In order to solve this, we had to bring a third component into play (Modex BCDB Engine), to coordinate the read and write operations, a component that will have to understand how to communicate with a blockchain and a database and to synchronise the database data with the other nodes. (Fig. 2)

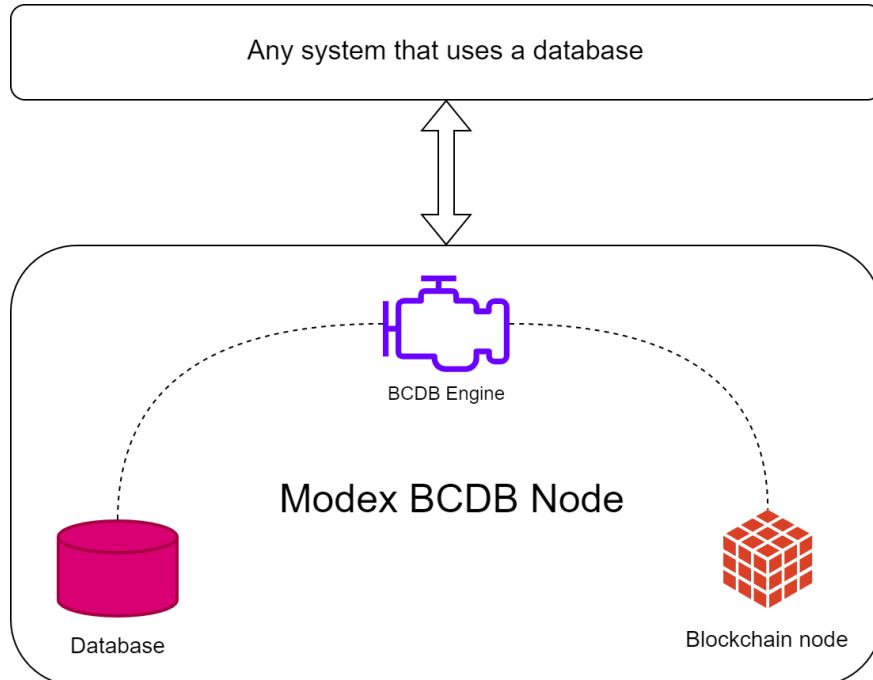


Fig. 2: The Modex BCDB Node Structure (Simplified)



Modex BCDB core is a fork of the Hyperfuse engine [9], a patented technology owned by Modex which connects a blockchain engine with a traditional database. By combining these two types of storing engines we are building a new concept called “Blockchain database”, a blockchain solution which inherits properties from both technologies:

- Data integrity
- Decentralization
- Records with any size and format
- Permissions
- Data Encryption, no matter what database is used

In order for the blockchain engine to understand a transaction that will keep track of a database record and also to notify when a transaction was confirmed into the blockchain, we defined two specific structures for transaction and response:

- MTS - Modex Transaction Structure
- CTS - Confirmed Transaction Structure

When we store data in a traditional database table, we always see the last modified version of that record (Fig. 3 and Fig. 4).

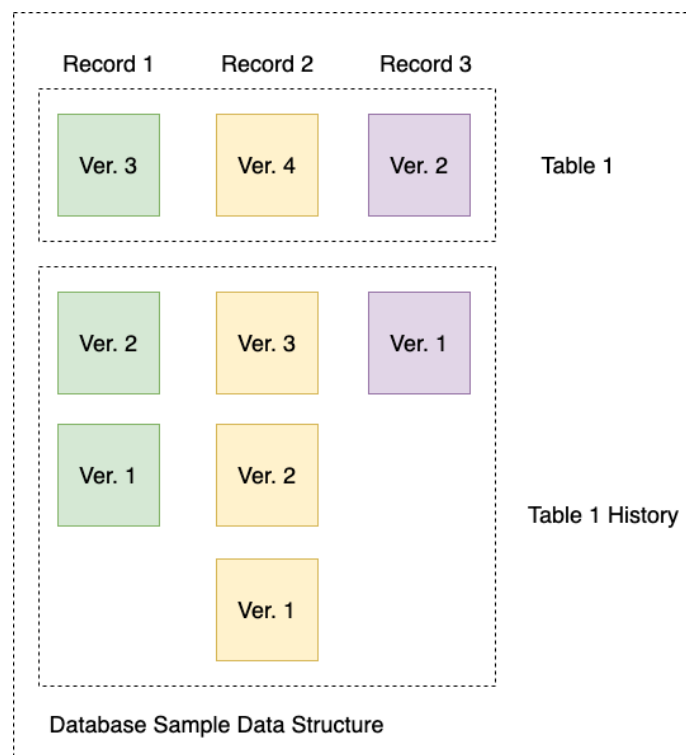


Fig. 3: Traditional database table record structure and history

There are options to keep track of changes, by activating audit or implementing your own tracking using some sort of database triggers if that database offers this feature. But there is no way to ensure that no one can alter that data.

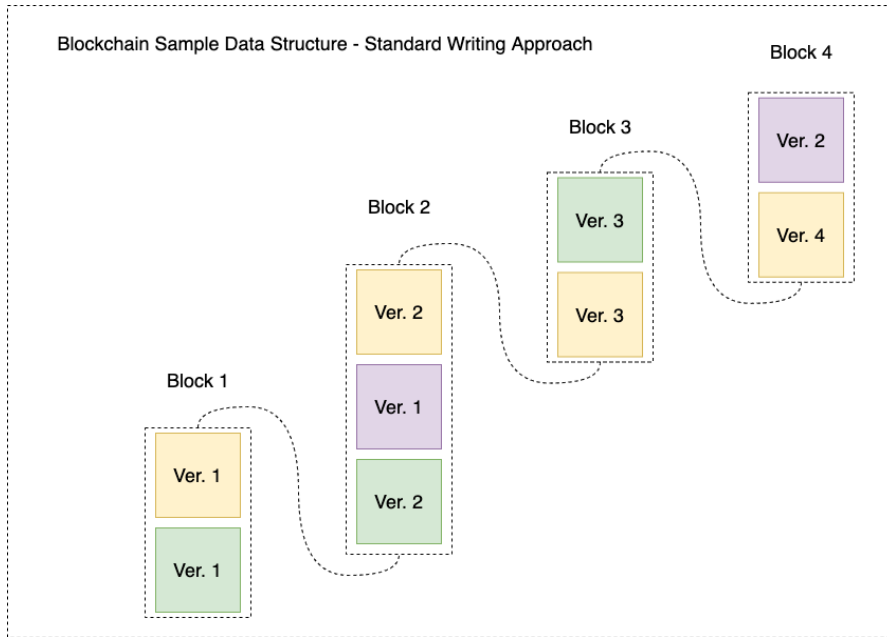


Fig. 4: Decentralized database - Standard Writing Approach

Our blockchain database solution keeps the same structure for the stored database records, and also brings an out-of-the-box record changes traceability. Since for every database record its data integrity has to be ensured, the system stores meta information into the blockchain component for each record.

In order to achieve performance and low storage overhead, the database record's metadata is batched into a single transaction, which speeds up the RPS rate even if a blockchain has low TPS values. Also, compared with a standard write approach, the enhanced version reduces the number of blocks, which brings a huge improvement at the storage level.

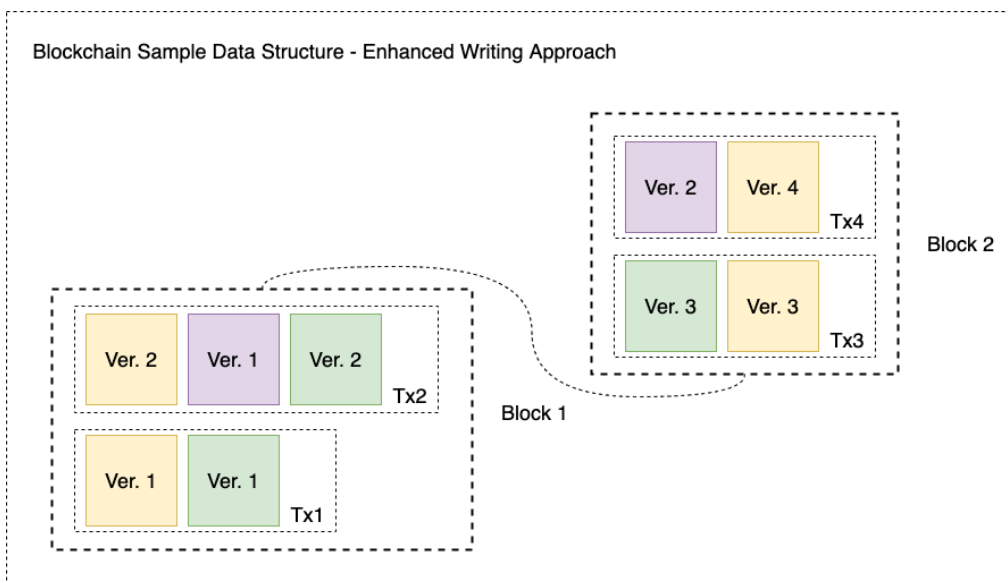


Fig. 5: Modex Blockchain Data Structure - Enhanced Writing Approach

## Network flexibility

Looking over the blockchain industry, in the past few years we've seen hundreds of projects that are promising unlimited technical performance and unmatched user experience. Many of these existing networks have evolved in a non-organic environment and very few of them understand the real implications and challenges of solving the blockchain scalability trilemma [10] [11].

The Modex Network is built for business flexibility (Fig. 6) and we understand that the blockchain scalability trilemma doesn't have a single and median solution for all our internal processes and external use-cases.

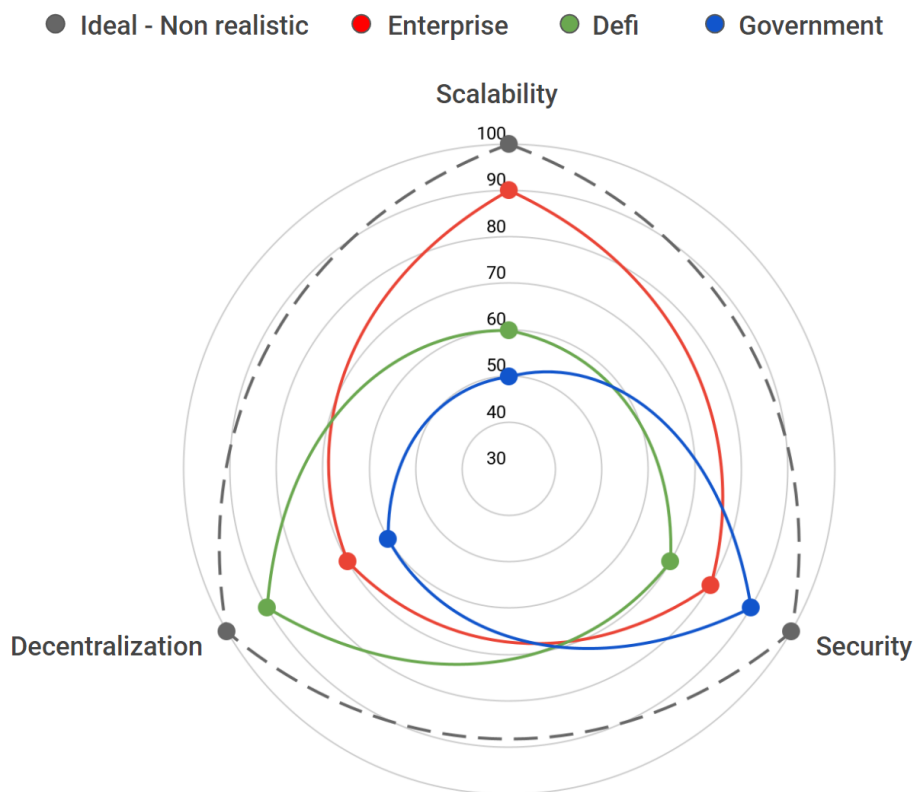


Fig. 6: The Modex Network approach to the blockchain scalability trilemma

In order to accommodate a large number of scenarios, we have built an architecture that is interoperable by design and adapts to the following 3 main sectors :

- Enterprise
- Fintech
- Government

Each one of these sectors has different business specifications, requires various technical modules and has to operate independently on the same Modex Network, but using different configurations and dedicated components.

## **4. Interoperability**

Data sharing between organizations, whether they are in the private or public sector, is still a difficult and impractical process. While most organizations are already engaged in a digitalization process, they do not use the same software applications and databases. This usually means that it is difficult for them to share data without significantly modifying existing software configurations.

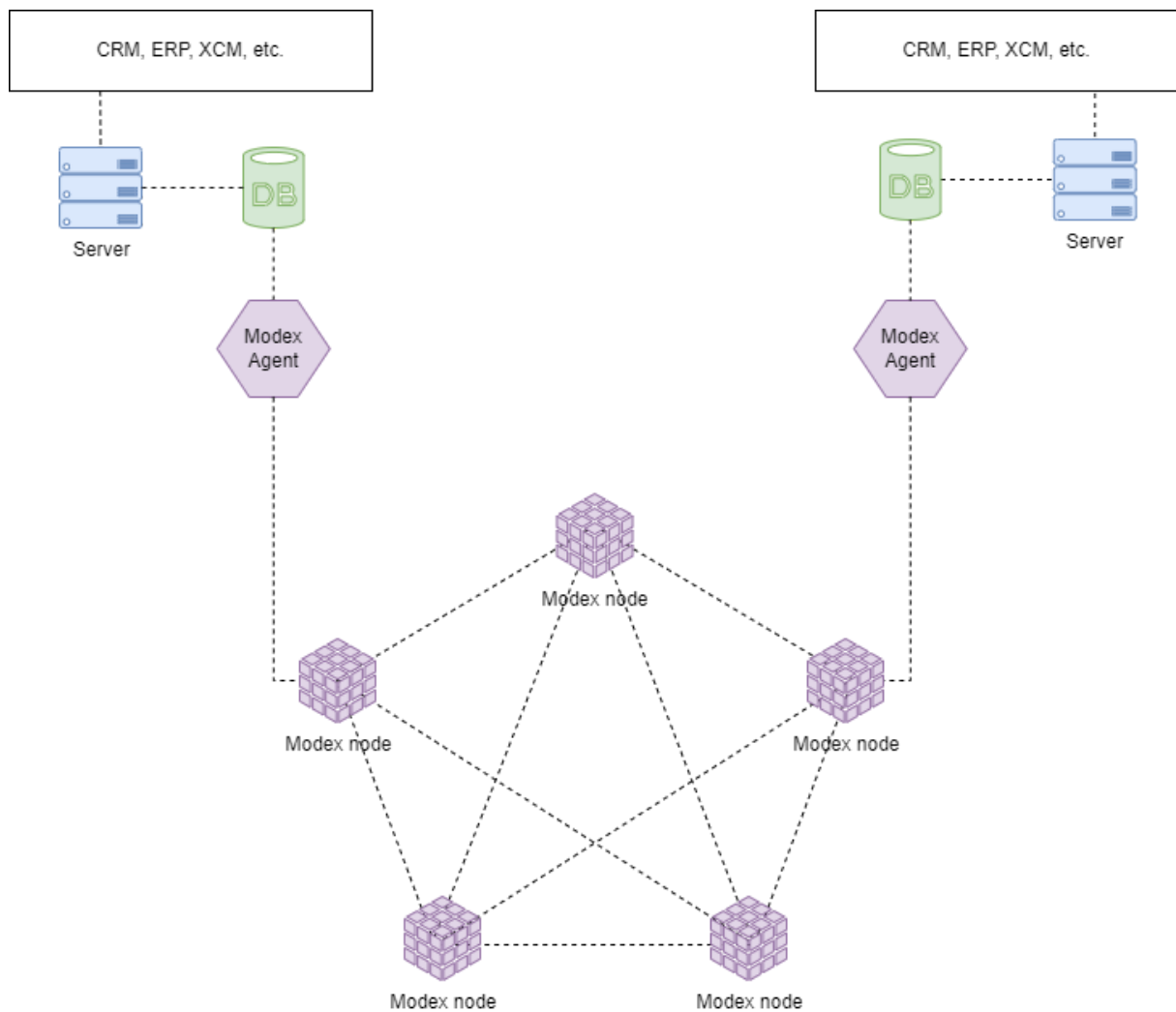
The Modex Ecosystem can build a data environment where data can be shared among entities efficiently, securely, and transparently, with the major benefit that system participants will not be required to make major changes to their infrastructure and will be able to continue to work with the same software applications and the same databases.

The Modex Network presents interoperability by design, enabling the creation of a network where data can be shared between organizations that use different data management systems, allowing a non-invasive integration of the Modex solution with the software solutions used by each party; since Modex presents an agnosticity property at the blockchain level and at the database level, the solution becomes an ally for the organizations wishing to onboard the interoperability trend, but fearing major changes (which are costly and/or taking too long) that can appear at the software applications level and databases level.

Interoperability must be looked at as a philosophy rather than a standards-based interaction between software systems (which is still a true statement). The philosophy of interoperability requires understanding the immediate impact such a technology brings to a business - interoperability at the user identity level, interoperability at the knowledge level, and interoperability at the business operations level (intra-organisational and inter-organisational), rather than looking at it as “just” interoperability at the data level.

### **Interconnection architecture**

The Modex’s solution for interoperability requires the use of Modex BCDB and of Modex Agent, both operating in parallel with the central systems of the participants. In this kind of scenario, the Modex Agent becomes the data listener in the organisation’s structure, and Modex BCDB is the underlying technology of the network that enables data sharing among participants, powering it with all the features Modex brings with the blockchain solution - permissions, encryptions, synchronisations, integrity, relevancy. When the data becomes interoperable on a granular level, the underlying business operations of each organisation are improved and even new business lines can be created.



*Fig. 7: The Modex Network Interoperability Diagram*

The Modex Agent is a data auditor, which collects the relevant information according to the agreed configurations and rules, and stores it to the Modex BCDB network, where data can be accessed by other ecosystem participants based on permissions given by the data owner.

Modex BCDB network acts like a data vault that gets data from each Modex Agent, according to pre-agreed sharing conditions. To access data in Modex BCDB, each user must receive specific permissions, which can be granted and retracted at any given time.

The above described mechanism (Modex BCDB - Modex Agent Node) is a secure method that was already validated in several enterprise interoperability scenarios and two government applications.

## **Benefits of interoperability**

### Immediate access

Using Modex BCDB as a common data vault by multiple entities can revolutionize the way they cooperate. The duration of the data exchange decreases significantly, because they are always available to participants, provided that the owner of the data grants access to other requesting participants.

### Accuracy

Modex Agent eliminates the need to manually enter data in a common register or exchange information through methods subjected to human error (email, fax, screen sharing) and eliminates difficulties of reading data generated by different entities in their own format.

### Security

Based on blockchain technology, Modex BCDB creates a secure environment for storing and sharing data thanks to its embedded encryption and data immutability - data cannot be manipulated retroactively by any of the participants.

### Efficiency

The integration of digital programs and applications facilitates a better flow of information, which leads to improved efficiency and faster results in combating fraud or inside data tampering.

### Complete data ownership

Organizations that store their relevant shareable data on the BCDB platform are the indisputable owners of the data they add to the platform and can decide how, when and with whom to share the encrypted data.

### Data integrity & immutability

Once recorded on the blockchain-enabled BCDB, the data entered by participating entities cannot be modified by any party without the others' knowledge, regardless of the permission levels they may have.

### Customized permissions

Each organization gets an authorized user account through which it stores data, configures its preferences, and requests access to the data owned by other participants in the system, which it can decrypt with the owner's permission, permanently or temporarily.

### Permanent monitoring

With each confirmed request for accessing another party's stored data, the data owner can track all the logs generated by the user to whom they granted access (download, upload, update).

## 5. Infrastructure

The most important component in the Modex Network is represented by the underlying infrastructure (Fig. 8). All Modex nodes are currently running and supporting certified infrastructure environments (Microsoft Azure) with all connections and endpoints hosted exclusively on secure cloud and on-premise servers that are location agnostic.

In order to match the requirements for scalability, all nodes are replicated using a proprietary decentralized database engine that helps with the load balancing, security, encryption, uptime and scalability of the solution. In order to match GDPR requirements, there are multiple blockchain node types, each with a specific role (master, replicator, KYC, personal data, backup, etc).

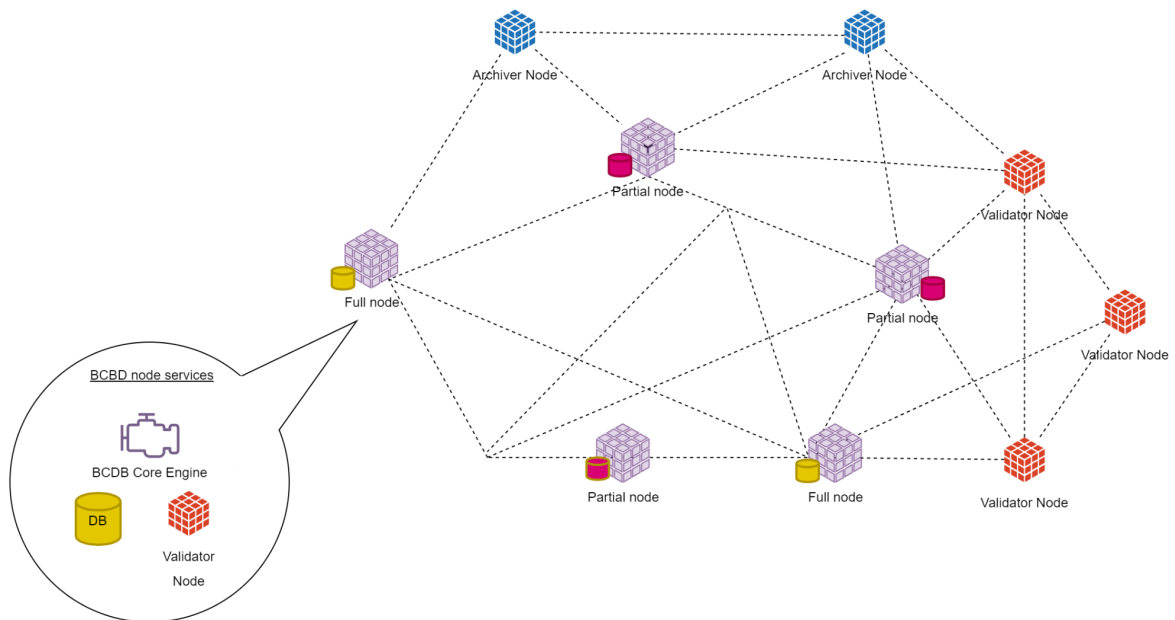


Fig. 8: Example of Modex Network Node Configuration

The infrastructure can be connected and integrated with external technologies, blockchain layers, other cloud or on-premise infrastructures only if they follow similar security and compliance standards.

From an integration perspective [12], each component is isolated and the overall framework is based on a microservice architecture. All components communicate internally, using proprietary protocols, and externally, using standardized, secure and encrypted API calls. We are currently working on several mechanisms for the implementation of the external Validator concept, to allow some of our trusted enterprise partners to contribute and become certified validators of the system.

## 6. Token

The Modex token is the decentralized asset [13] that lies in the middle of all technical and business operations and powers the ecosystem's economy. From a financial perspective, the token is considered a multi-purpose utility token [14] because its role is to create a macro-economy of micro-economies that are related, interconnected and interdependent. Looking carefully at the past and current instances of Modex, we have assembled a list of token utilities (collections) that are tested and reliable from an integration, business and usage perspective :

### Fintech collection

In the tokenized ecosystem powered by Modex, the most useful components are found in the fintech collection:

- wallet - for secure storing of the tokens
- asset management - for optimal administration and traceability of assets
- payment gateway - a token transfer mechanism between services

### Service collection

The services that can be acquired using Modex tokens are the core value of our utility scenarios. Up to this point, the following services are currently available or under development:

- cloud services (processing and storage resources)
- decentralized blockchain database
- data vault credits

### Modex Foundation collection

A portion of the ecosystem tokens will be allocated to the foundation which has been established to support the following actions:

- allocate grants for research and development in the field of decentralized ledger technology and blockchain
- organize public events, conferences and educational bootcamps about innovative technologies
- manage trademarks and other intellectual property rights or licenses
- build a community to engage with businesses, partners, banks, regulators, authorities to promote the growth and development of Modex projects
- cooperate with advisors to create incentive plans to support the growth and development of the Modex Project in correlation with community projects
- receive and distribute contributions to participate strategically in other projects with a view to direct and indirect benefit for Modex Projects;



### Interoperability collection

The interconnection between digital tools is considered a priority, that is why the Modex Token will be used in relation with API's to facilitate the following :

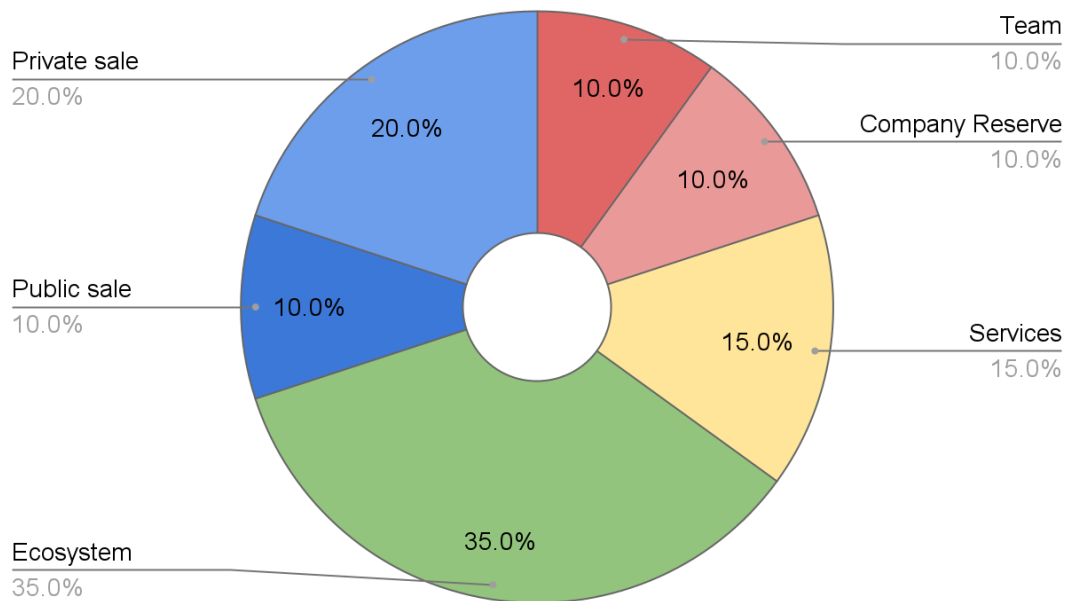
- earn tokens in return for running a node to verify transactions
- manage tokens and earn rewards for staking resources
- grant security access to interoperability modules and infrastructures

### Custom cases collection

Beside other grouped cases, Modex has developed token utility scenarios in areas like healthcare, cloud services, fast moving consumer goods, etc.

All token utility scenarios are part of a continuous development cycle of the token ecosystem. These cases, functionalities and tools are currently being created and would likely be subject to regulatory permissions. Modex is committed to deliver a quality and long term development of the token, while making sure the entire process complies with the legal framework and ethical guidelines.

The current instance of the token economy (Fig. 9) holds a total of 266M tokens and the current distribution can be seen in the picture below.



*Fig. 9: Token distribution chart*

It must be noted that our ICO was conducted in 2018 and since then our team has constantly invested time and effort to develop the entire technology stack. Since our commitments have been fulfilled, we are now aiming towards using the remaining tokens to target new opportunities [15] to extend the ecosystem.

Furthermore, currently we are working to finalize an open mechanism for rewards, staking and. , NFT generation, enterprise utility scenarios and other perks for token holders and investors.

## 7. Smart contracts

When one or multiple write operations are executed in the Modex Network, they are backed by at least one blockchain transaction, which ensures that the write operation is kept immutable. Not all business logic results could be ensured with a simple write operation. The smart contract concept [16] [17] was introduced in order to fill this gap.

The smart contract in the context of Modex Network is represented by a software program which encapsulates a business logic that could execute multiple read or/and write operations. The code is stored as an immutable record, into a specific BCDB entity, in order to provide an auditable way to track any changes which will be made. The best analogy (to oversimplify the explanation) for a BCDB smart contract is a database stored procedure, a code which could be invoked manually or automatically (triggered by a write operation event).

Based on the use case implementation, the execution of a smart contract can result in the exchange of money or digital assets, unlocking some protected digital content and so on. The usage of a BCDB smart contract enables a more complex business logic for data sharing, since a record owner could allow read access to a smart contract and any other owner could access his data only through an execution of a smart contract method.

Since the smart contract is stored as an immutable record, it inherits all properties that a BCDB record has. That means that a smart contract will have these properties:

- will have an owner
- will be synchronized across all full nodes in accordance with the existing synchronization policies
- will be accessed based on a configured permission model
- could be stored in two ways: encrypted or public

Besides the above mentioned inherited traditional properties, a smart contract has additional Modex specific properties:

- It acts as an owner, which means it can own records that only the smart contract can access
- It can receive read or/and write permissions for records owned by other owners (without being able to transfer those permissions)
- It can transfer or log interactions and requests in order to offer full auditability and transparency not only for the final and current results, but also for the the entire process
- It can create connections with blockchain oracles [18] in order to work with a bi-directional data stream that is part of another system

From a technical point of view, the smart contract concept is used in order to provide a developer with the possibility to extend the existing APIs. The smart contract code will be represented by a Java code initially, a code which must implement a specific interface in order to respect the deployment and execution processes.

The smart contract (Fig. 10) must implement the specific interface, so that the BCDB Smart Contract Engine can understand how to deploy or execute, and also how to enforce the specific constraints that are coded by the developer. The smart contract interface forces developers to implement methods like smart contract description, where the following properties must be detailed:

- The methods which are exposed by the contract
- The input and output of each exposed method
- The constraint of each method
- Private – only the smart contract owner can call this method
- Permissioned – only owners who have permission can call this method
- Public – any authenticated owner can call this method

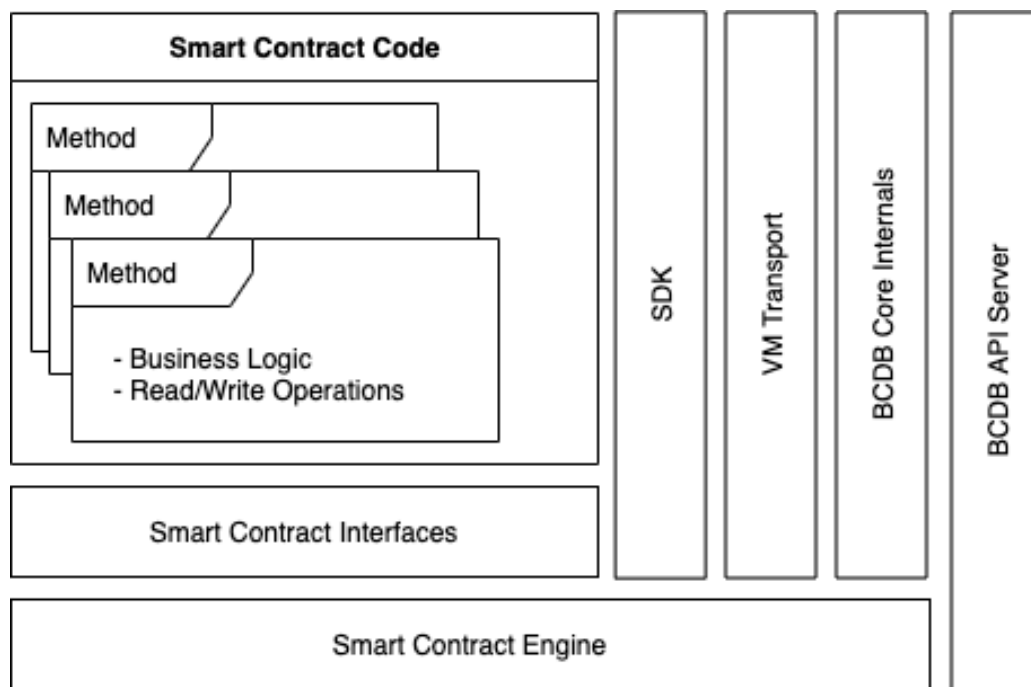


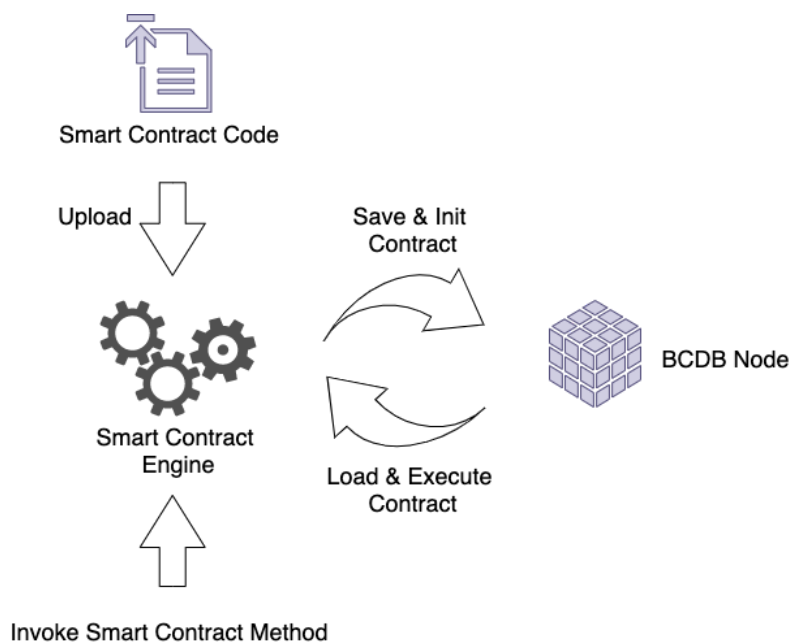
Fig. 10: Smart contract diagram (Simplified)

By following the previously mentioned logic, the BCDB Smart Contract Engine will be able to automatically expose the contract methods as a series of Open APIs.

The read and write operations will be available through the BCDB Java SDK, a library which will allow access to the smart contract at the runtime [19] to execute any exposed BCDB API, as long as the owner who invokes the contract has the rights to do so.

As specified above, the smart contract must implement the specific interface, so that the BCDB Smart Engine can also understand how to deploy the contract. In order to do so, an initialization method must be implemented which will run once at deploy time. The purpose of the initialization method is to specify what are the storage entities and their schema description.

The smart contract deployment could be done by using the Java Source code or directly the byte code.



*Fig. 11: Smart contract deployment procedure (Simplified)*

The deployment procedure will follow the indicated steps (Fig. 10) :

- Upload “smart contract” code (source or bytecode)
- Deploy validation
- Smart contract initialization
- Follow the execution path every time it is called

The old Ethereum Smart Contracts Marketplace financed in our ICO will become a BCDB SC Marketplace that stores a collection of easy to use contracts for basic and custom operations.

## 8. Conclusion

### Modex is ready

Modex innovates in order to prepare and integrate a mature decentralized network that is able to support a large number of use-cases and contribute to the last mile adoption problem: seamless integration with enterprise-level products and services. Our highly skilled core team of > 70 members with +100 years of cumulative experience at reputable global companies in banking, software, IT security & infrastructure, database engines, product development and international business is working round the clock to build the technology of the future. With a lean management approach and a dynamic structuring through a "team of teams", Modex migrated from a successful service oriented blockchain company towards a platform working as a service provider that incorporates and integrates a complete technology suite.

### The timing is right

Over the last few years, Modex has proven that it can build impressive products. The ecosystem is currently being built in a period that is very beneficial to the investors, partners and infrastructure providers. Modex has made tremendous efforts to comply with all the regulations in the field. Modex is continuously working on securing all legal licenses for virtual asset service providers, financial operations, crypto and data-storage imposed by the regulatory authorities in Gibraltar. The company has committed itself to following and adapting its business operations and technology to match the standards and regulations in the field, especially those imposed by the EU [20].

### Next version

The next version of this whitepaper will provide more details about the following topics : payment framework, performance, compliance with standards, additional tokenomics details, etc.

## References

- [1] Antal, C.; Cioara, T.; Anghel, I.; Antal, M.; Salomie, I. Distributed Ledger Technology Review and Decentralized Applications Development Guidelines. Future Internet 2021, 13, 62. <https://doi.org/10.3390/fi13030062>
- [2] Idrees, S.M.; Nowostawski, M.; Jameel, R.; Mourya, A.K. Security Aspects of Blockchain Technology Intended for Industrial Applications. Electronics 2021, 10, 951. <https://doi.org/10.3390/electronics10080951>

- [3] Butean A., Pournaras E., Tara A., Turesson H., Ivkushkin K. (2020) Dynamic Consensus: Increasing Blockchain Adaptability to Enterprise Applications. In: Silhavy R. (eds) Applied Informatics and Cybernetics in Intelligent Systems. CSOC 2020. Advances in Intelligent Systems and Computing, vol 1226. Springer, Cham. [https://doi.org/10.1007/978-3-030-51974-2\\_41](https://doi.org/10.1007/978-3-030-51974-2_41)
- [4] John Glen MP, Economic Secretary to the Treasury, UK regulatory approach to crypto assets and stablecoins: Consultation and call for evidence [PDF file available here](#)
- [5] James Holbein, Braumiller Law Group, PLLC, United States: Approaches To Regulation For Decentralized Finance [Documentation available here](#)
- [6] Lagaillardie N, Djari MA, Gürcan Ö. A Computational Study on Fairness of the Tendermint Blockchain Protocol. Information. 2019; 10(12):378. <https://doi.org/10.3390/info10120378>
- [7] Arora, S.K.; Kumar, G.; Kim, T.-h. Blockchain Based Trust Model Using Tendermint in Vehicular Adhoc Networks. Appl. Sci. 2021, 11, 1998. <https://doi.org/10.3390/app11051998>
- [8] E. Politou, F. Casino, E. Alepis and C. Patsakis, "Blockchain Mutability: Challenges and Proposed Solutions," in IEEE Transactions on Emerging Topics in Computing, vol. 9, no. 4, pp. 1972-1986, 1 Oct.-Dec. 2021. <http://dx.doi.org/10.1109/TETC.2019.2949510>
- [9] Blockchain Engine-Based Platform And Method Of Connection - Patent submitted at the Romanian State Office for Inventions and Trademarks
- [10] A. Hafid, A. S. Hafid and M. Samih, "Scaling Blockchains: A Comprehensive Survey," in IEEE Access, vol. 8, pp. 125244-125262, 2020, <https://doi.org/10.1109/ACCESS.2020.3007251>
- [11] Gianmaria Del Monte, Diego Pennino, and Maurizio Pizzonia. 2020. Scaling blockchains without giving up decentralization and security: a solution to the blockchain scalability trilemma. In Proceedings of the 3rd Workshop on Cryptocurrencies and Blockchains for Distributed Systems (CryBlock '20). Association for Computing Machinery, New York, NY, USA, 71–76. DOI:<https://doi.org/10.1145/3410699.3413800>
- [12] Ilham A. Qasse, Manar Abu Talib, and Qassim Nasir. 2019. Inter Blockchain Communication: A Survey. In Proceedings of the ArabWIC 6th Annual International Conference Research Track (ArabWIC 2019). Association for Computing Machinery, New York, NY, USA, Article 2, 1–6. DOI:<https://doi.org/10.1145/3333165.3333167>

- [13] Kyriazis, N.A. A Survey on Volatility Fluctuations in the Decentralized Cryptocurrency Financial Assets. *J. Risk Financial Manag.* 2021, 14, 293. <https://doi.org/10.3390/jrfm14070293>
- [14] Drasch, B.J., Fridgen, G., Manner-Romberg, T. et al. The token's secret: the two-faced financial incentive of the token economy. *Electron Markets* 30, 557–567 (2020). <https://doi.org/10.1007/s12525-020-00412-9>
- [15] Mohanty, D.; Anand, D.; Aljahdali, H.M.; Villar, S.G. Blockchain Interoperability: Towards a Sustainable Payment System. *Sustainability* 2022, 14, 913. <https://doi.org/10.3390/su14020913>
- [16] Khan, S.N., Loukil, F., Ghedira-Guegan, C. et al. Blockchain smart contracts: Applications, challenges, and future trends. *Peer-to-Peer Netw. Appl.* 14, 2901–2925 (2021). <https://doi.org/10.1007/s12083-021-01127-0>
- [17] Negara, E.S.; Hidayanto, A.N.; Andryani, R.; Syaputra, R. Survey of Smart Contract Framework and Its Application. *Information* 2021, 12, 257. <https://doi.org/10.3390/info12070257>
- [18] H. Al-Breiki, M. H. U. Rehman, K. Salah and D. Svetinovic, "Trustworthy Blockchain Oracles: Review, Comparison, and Open Research Challenges," in *IEEE Access*, vol. 8, pp. 85675-85685, 2020. <http://dx.doi.org/10.1109/ACCESS.2020.2992698>
- [19] Wei-Ting Lin, Shun-Wen Hsiao, and Fang Yu. 2020. Runtime Hook on Blockchain and Smart Contract Systems. In *Proceedings of the 8th International Workshop on Security in Blockchain and Cloud Computing (SBC '20)*. Association for Computing Machinery, New York, NY, USA, 21–27. DOI:<https://doi.org/10.1145/3384942.3406870>
- [20] European Commission, EU regulatory framework for crypto-assets  
[Documentation available here](#)