

A DLT Based Innovative Investment Platform

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Abstract. Digital transformation has affected many industries and has become a mega-trend in the information technology systems. However, the venture capital investment process is still rigid. The use of distributed ledger technology and artificial intelligence in the field of finance and investment requires a detailed framework and a rethinking of the interaction model of market participants. The article shows the DLT based approach with attached of F-BFT consensus to improve the efficiency of the investment process in the modern world.

Keywords: Blockchain · Fintech · Distributed ledger technology · Investment platform · F-BFT consensus

1 Introduction

Distributed and decentralized systems are being used with increasing frequency when applied to practical cases of the modern economy. The use of computational algorithms that are resistant to random or intentional distortions of information in the absence of trust between the parties to the information exchange can significantly raise the effectiveness of traditional financial processes. The article [1] describes a consensus search algorithm called F-BFT (Federated Byzantine error tolerance), which can be successfully applied to solve information exchange problems between the parties in the investment process.

Throughout the past five years, crowdfunding has practically transformed from a charity collection method into a purpose-driven vehicle, which allows to conduct investments with the goal of generating returns. Startups received the ability to test the market and attract their target audience, while avoiding due diligence barriers.

Meanwhile, the more "mature" venture capital has not used the market to the full degree. Externally, the absence of transparency and information in the typical 2-paged profiles is baffling. Internally, investors often lack the knowledge to properly evaluate the increasing complexity of truly breakthrough technological projects.

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Nevertheless, the industry will experience almost a threefold growth from 2018 – 2025, which necessitates a need for a solution [2] (Table 1).

Table 1. Investment statistic.

$65 bn added to global economy	6,455,080 campaigns in one year (2019)
15.98% CAGR in 2018–2025	33.77% rise of funding 2018–2019

1.1 Crowdfunding Trends

Crowdfunding (Crowdfunding Investment, CFI) is a method of attracting relatively small amount of funds from an unlimited number of representatives of the general public through the use of Internet platforms. Essentially, crowdfunding is a part of a more general crowdsourcing process, as well as a component of a common investment model.

The CFI is becoming an increasingly attractive vehicle due to the changes in the business environment as a whole. The barriers to investment are decreasing, as the Internet, mobile payments, fintech and other solutions are simplifying the global transfer of funds. The business models are changing, as globalization and digitization lead to startups becoming more attractive at the expense of non-technological businesses. This also has the effect of increasing the complexity of projects and thus venture capital risks, which complicates access to venture funds. At the same time, venture funds are experiencing pressure from new types of investment vehicles: digitally-focused banks, and venture capital arms of tech companies.

As a result, an increasing number of entrepreneurs seek funding through technological platforms that serve as mediators through algorithms and transparent procedures.

The number of crowdfunding models is increasing as well, with each being distinct in the size of attracted capital, control mechanisms, and investor motivation.

With these underlying needs there is a necessity to create a crowdfunding platform (CFP) of an adaptive type in which the tuning of specific algorithms and models is possible during operation without changing the core of the system.

As a process, CFI reflects not only investments in technology projects, but also into other categories, such as films, art works, social events and charity. According to a number of reports, the crowdfunding market is experiencing significant growth and may reach 25B USD by 2025[1].

CFI is an increasingly important component of the common investment model, which is typically illustrated by a bell curve, describing the size of funding per each successive life stage of a project seeking funds. The stages for an average project are as follows: (1) Idea/Offer, typically served by personal or angel funds; (2) Proof-of-Concept, served by angel capital and CFI Investment of less than $50,000 USD, (3) the Startup or the "window of financing" stage where projects typically collect CFI

[1] https://www.statista.com/statistics/1078273/global-crowdfunding-market-size/.

investments of over $1M USD; (4) Exponential Growth requiring venture capital of over $1M USD, and finally (5) Business Expansion and attraction of institutional investments.

According to the existing research[2], CFI is most effective in two significant areas of application:

- Early stages of a project: Proof-of-Concept (PoC);
- Bridge financing into existing project structures: startups with minimal viable products (MVP).

The biggest trends converge in the direction of one common reality. Crowdfunding should become more structured, transparent and integrative both for direct participants, regardless of their complexity, and for startups capital as a whole.

Funds raised through CFI reached $17 200 000 000 per year in North America alone. An increasing number of companies opt for crowdfunding due to it being more efficient than traditional fundraising, its ability to build traction and social validation, the generation of significant media exposure, consistent idea refinement, and an establishing of a customer base of early adopters.

1.2 The Problem in Economy Context

Leading platforms have changed very little in the past few years and have not responded to the industry's clear demand for integration and transparency.

Investors face an increasingly low information environment. Key information about founders and founder history is often missing, as is insight on the products beyond basic profiles. This elevates risk and decreases returns. The issue is exacerbated by the growing complexity of projects. Technological and scientific components of new projects are increasingly harder to valuate without experts, which leaves smaller crowdfunding and angel investors especially vulnerable.

The need for an ecosystem is becoming more apparent. This ecosystem would be integrative to value-building participants, such as experts who could tackle the complexities of projects and service organizations that could tackle investment transparency barriers, including lawyers and accountants.

Entrepreneurs that seek investments are also facing challenges due to a lack of information. Seeking crowdfunding investments at the seed stage places them in the investment shadow zone. It is difficult to gather information about active investors, their project evaluation criteria, and areas of expertise. It becomes a daunting task to attract not only the investors that could provide the most growth opportunities for a specific business, but any investors at all to a breakthrough project with low resources.

The modern platforms are passive and do not provide adequate services for evaluating or advancing the project. They do not curate it nor track its further fate. This makes success difficult for the investors, but also for entrepreneurs, who often repeat the same mistakes as their unsuccessful predecessors. A supportive infrastructure is

[2] Crowdfunding and Funding Gap Sources: World Bank (2013).

needed, yet there are no ecosystem approaches migrating from traditional investments into the crowdfunding models yet.

There is a well-known Venture Capital Power Curve heuristic, which states that only 6% of the funds invested drive 60% of the total revenues on a portfolio. There is a need for a solution that would enable VC Funds to be more informed when selecting projects and to gain access to a larger pool of crowdfunding opportunities at an acceptable risk level.

These changes can only come through technological enablement of a seamless data integration between many distinct business entities and omni-sourced information. Such technologies are in the fields of decentralization and deep analytics.

1.3 Existing Platforms Disadvantage

The most popular international investment platforms are based on the principles of crowdfunding. The core problem of their business-model is the bog of subpar projects. Due to the large component of marketing when advancing an investment idea or product, visibility is given to the product that invested the most money into being advanced on the platform, rather than the one that has the highest potential rate of return.

There are many large crowdsourcing campaigns, less crowdfunding, and almost no effective crowd-investing platforms currently in operation. The first two are defined by creative and charity projects, while the latter by investments into businesses.

While crowd-investing platforms do exist, their effectiveness is dampened by a set of serious limitations:

- Projects are often presented in the form of listings, where the only differentiator is the sum paid for visibility, rather than any intrinsic qualities. In fact, in the conditions of limited resources, the projects that generate the most investments are those that sacrificed real gains for visibility on a given platform.
- There is no developed system of expertise to judge the projects. Existing experts quickly turn into for-profit marketing tools.
- There is no mentorship component that would allow a startup to improve their idea or their presentation beyond an automated profile builder.
- There is no ability to follow the post-investment life of the project or the resulting reputation of its founders, ideas, decisions, or investors.

These problems cannot be resolved without the addition of entirely new components into the crowdfunding platform. Only four components are needed to address the quintessential problems of the modern CFI:

1. Matching. The core structure of the system should not be a listing, but a set of projects that is matched to the interest of the investor. The system must have vetting and use intelligence to create an ideal investor-project pair.
2. Crowd due diligence. The project that appears on the platform must go through a filter of an open decentralized community of experts. It is crucial to incentivize the experts to invest in their objective reputations, rather than to exchange positive reviews for money. A decentralized mechanism may ensure that the experts are rewarded for extensive and justified reviews and evaluations.

3. Mentorship. Startups must receive information about the interest level in their projects in order to adjust their quality, without paying their way upwards in the search results. Startups should know how much they are viewed and appear in searches, as well as what should be improved for the growth of these indicators.
4. Edge Computing. The system should be built using edge computing technology. This will allow it to maintain utmost confidentiality while still providing analytics for interested user groups.

2 Decentralized Investment Capital Crowdfunding Platform

2.1 The Approach of Integrated Crowdfunding

In order to implement the required changes, the approach to a Decentralized Investment Capital Crowdfunding Platform must hinge on two ideological pillars. The first is integration and the second one is data maximization.

In the context of CFI, integration is multi-faceted. The platform must create a decentralized cross-IT-environment and a cross-border marketplace that will be able to integrate with enterprise legacy systems and digital mesh technologies. This will enable the system to maximize its information sourcing and analytic capabilities. There must be a technological and business framework for investors, capacity builders, corporations, startups, and professional services to optimize their part of the sourcing process and provide the most synergetic value during the business development phase. The system must not only be decentralized, it must have hierarchal decentralization or federative topology. Instead of one rigid system, it will branch out into many subclusters adaptive to its own environment. That will ensure the systems are open, integrative, continuously transformative enough to overcome corporate and environmental borders, as well as economically sensible.

The second pillar is data. There is a necessity of creating an immutable continuous reputation trail that will take into account past information about projects, founders, and investors, as well as the future of these entities beyond the CFI platform. That requires obtaining and analyzing public data for all platform projects, with smart sourcing enabled through artificial intelligence, and decentralization allowing the capacity for such analysis. The aforementioned F-BFT Consensus is optimized for creating cross-organizational and cross-IT-environment data bridges.

In order to securely store the information across organizations a decentralized registry is also needed. A graph registry, such as the Directed Acyclic Graph (DAG) type registry would enable the storage of information to be both horizontally and vertically scalable. Meanwhile, Edge Artificial Intelligence (Edge AI) could provide real-time insight, uncover hidden patterns, and drive effective matching mechanisms. The F-BFT Consensus, the DAG registry, and Edge AI are three core technologies employed by the company DGT [4] in building a CFI platform with a deepened information field. By including publicly sourced data and proper motivation mechanisms for domain experts, DGT can help investors overcome project difficulty, heuristic decision-making, and information gaps.

Integrated Crowdfunding builds investment ecosystems using the hierarchal decentralized network, which contains F-BFT and DAG mechanisms. Projects are openly listed, screened by experts, and become part of a community that maximizes their growth. The platform features strong expert reviews: a network of domain-specific experts, who provide deep reviews and consultations to improve the project vetting process beyond marketing expenditures.

This crowdfunding model integrates Capacity Building Organizations: advisors, organizations and consultants that could maximize business development, utilization of a project's technologies, or provide other benefits at lower costs.

It has enables inter-portfolio synergies. Investors may build portfolios that compliment each other technologically, share data and form cross-product value offerings and also reduces investment friction by integrating legal, forensic accounting, and talent evaluation services for a due diligence process that can be shortened from months to eight (8) days.

2.2 Key Solution Components

A key value point missing from many digital ecosystems is the ability to integrate many data formats, permissions, sources, and uses. DGT uses its decentralized network and deep analytics to overcome such barriers.

It features an immutable ID for tracking reputations of investors, startups, and founders. Its internal economy has a loyalty mechanism that would hold participants within the CFI ecosystem, while also enabling flexible reward-enablement for its growth (such as the motivation of experts). The ecosystem of professional value-adding businesses decreases the friction of the investment process as a whole (Fig. 1).

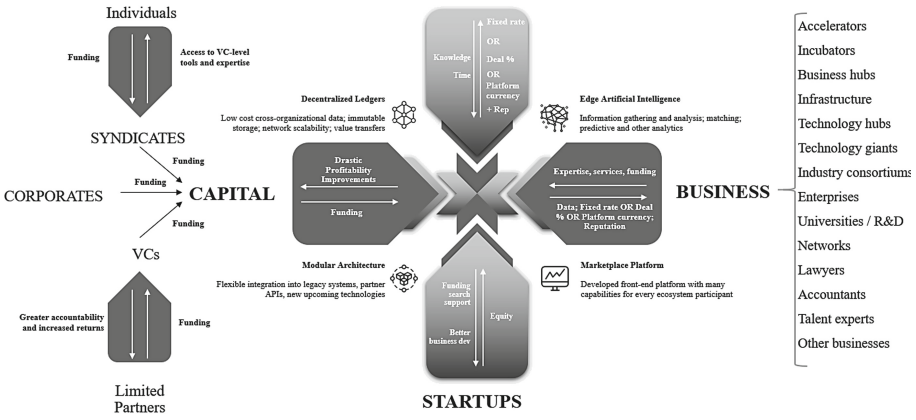


Fig. 1. Intended platform participants and interactions

DGT uses Edge AI that could analyze the Internet for traces of founder history, current industry data, and other information that makes investing less heuristically motivated and founders more committed to their ideas.

A shared network of domain experts decreases complexity-related risk for both small and large institutional investors.

2.3 Expert Reviews in Detail

The network of domain experts is only capable of creating value if expert reviews are objective and plentiful.

Experts are motivated through a variety of mechanisms, including an internal decentralized loyalty currency and/or shares in investments, depending on the structure. Expert reviews follow a unified format, which ensures their accessibility, while still allowing depth.

The unified format allows for an easy comparison of projects based on a single set of criteria:

1. the product, its potential to resolve the problems of the target audience;
2. the business model, its realism, consistency and potential;
3. the technology, the value of innovation and how realistic the claims are, as well as the depth of the work already done;
4. the team, the professional competencies of its participants;
5. the financial model, the accuracy and realism of the monetization, cost structures, ROI, etc.;
6. the risks, an evaluation of where the main risks reside for the company and its investors;
7. PR and marketing, target market quality and reach, communication channels and the spread of the project's information.

Input data is evaluated not only by experts in a specific domain, but also through Edge AI. Through an examination of founder reputation, current trends, competing products, and hidden interdependencies, the Edge AI may provide an estimate for the product's TRL – the Technical Readiness Level. As a result, investors can make decisions that are much more informed without taking on significant costs. Moreover, since this information is openly accessible, each investor does not have to conduct the due diligence work for a project that has already been vetted by others.

2.4 Venture Crowdfunding Ecosystems

The DGT Platform enables the construction of sub-ecosystems of data that brings about further synergetic value. Capital ecosystems share expert insight, AI analytics specialized to a particular domain, and a reduction in total risk. Portfolio ecosystems maximize value by creating data highways between products in themed portfolios, which enables cross-selling, the creation of new services, and an ongoing exchange of customers. Syndicate ecosystems enable angels to create flexible groups and access VC-like analytics and capabilities. Operating Growth Funds (OFGs) are a new investment class that could use the platform to identify top business models and then proceed to launch with or without outside founders from a VC-centric starting point.

DGT uses decentralization to provide valuable input from a greater number of participants without increasing costs, while Edge AI provides an omni-data approach to more successful investments. It is not just a platform – but an entirely new venture capital paradigm.

The platform provides strong data-driven support: fair and full evaluation of start-ups across technological, innovational, business, and financial metrics. The Edge AI module conducts its analysis of revenue drivers, hidden correlation patterns and founder experience at minimal costs. It supports every step of decision-making, taking a portfolio-wide view to improve the standing on the Venture Capital Power Curve. Instead of the reliance on outliers, a transformed investment curve presents a greater percentage of winners and makes the "average performance" one of greater profitability, all through a better selective process, integration of more participants into business development, and ongoing omni-data analytics.

DGT ensures that capital may remain smart despite increasing project specialization and subject matter complexity. The platform features domain experts that provide comprehensive, unbiased reviews on each project. Instead of seeking out several experts or relying on the internal analytics teams of venture capital funds that duplicate each other's work, the platform motivates external experts through reputation and economic incentives, while providing them and the investors with the data they need.

An AI-driven predictive optimization engine also solves a typical problem of venture capital: the allocation to underperformers. The AI engine calculates the optimal distribution for follow-on investments, identifies which portfolio companies need more help, and which are a sunk cost. The decentralized Edge AI is smarter and more capable than any non-decentralized artificial intelligence and it grows exponentially so with the platform.

The DGT Platform is highly competitive against any other CFI or VC platform, which are structurally unable to implement the changes necessary to involve as many participants, create cross-organizational value, and insight-driven investments.

2.5 Investment Cycle Advantages

DGT gives an edge on every part of the fund's and investment's life cycle:

1. Fundraising: stronger YoY (year-on-year) performance leading to increased fund reputation; AI-driven connections between funds and LPs;
2. Sourcing: targeted deal flow matched to objectives; ecosystem of vetted projects and cooperation with corporates, industry leaders, other investors;
3. Investing: omni-data driven decision making; deep expert support; identified portfolio synergies; immutable history of past project and founder success;
4. Developing: ecosystem of capability-building organizations with precise domain expertise; AI-driven prediction engine;
5. Exiting: greater number of successful exist; involvement of corporates and alliances early on (mergers & acquisitions – M&A); fully traceable and auditable history for ease of going to (initial public offering – IPO) or further VC (venture capital) investment rounds.

3 Technology and Algorithms

3.1 Conceptual System Framework

The main feature of the system implementation is the adaptation of the classical investment platform to the task of building an open ecosystem of participants who benefit from interaction:

1. under the classical "one-to-many" model, participants interact with one platform backer (e.g. an investment fund). The outlined approach combines these systems into a network with the "many-to-many" relationships. In fact, a data network is being created in which many investors and many projects participate;
2. the composition of participants is expanded by attracting experts, service companies and advertisers. This allows for greater transparency of transactions, elimination of problems of assessing the importance and prospects of projects;
3. unlike classical crowdfunding platforms aimed at collecting small amounts from a large number of participants, the system can be adapted to engage professional investors, and projects can work on more complex fundraising mechanisms (e.g., without restrictions, the kind of "all-or-nothing" specifically tailored to protect small-capital investors);
4. the possibility of implementing a phased payment based on expert assessments reduces the risk of one-time investments.

The Fig. 2 below shows the conceptual framework describing the main modules of the system.

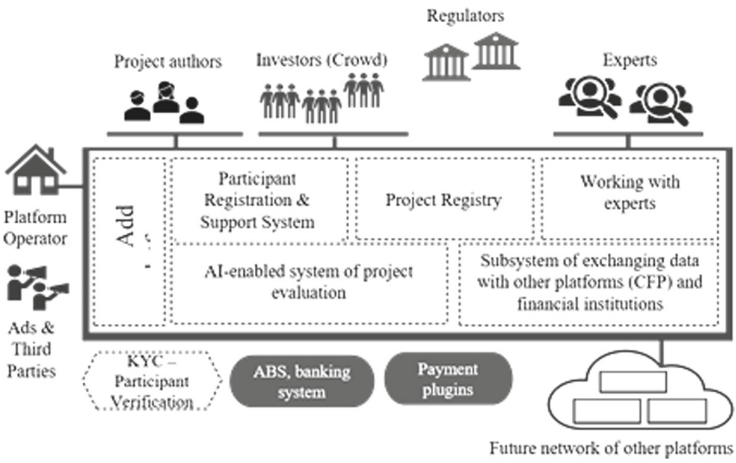


Fig. 2. Conceptual architecture of DGT-based CFI platform

Building a DGT-based investment platform is based on the following assumptions:

1. the solution is a consortium-based network of nodes that process information and participate in the storage of a general data registry. The network can exist even with a single site, but by attracting partners and creating a full-fledged investment network there is an increase in the capacity of investment flows. Nodes receive a commission on each transaction, as well as sell additional financial products (such as deposits of funds);
2. a blockchain-based solution involves decentralization, and the degree of decentralization may vary depending on the extent of the influence of the participants in the information exchange. Joining nodes and setting their topology (e.g., selecting specialized clusters to manage dedicated project portfolios) is based on an anchor mechanism representing a separate system that regulates the growth of the system;
3. each site will feel in checks of financial transactions and formation of ratings of participants. This uses a "reputation calculation" mechanism and project scoring.

Reputation Calculation
Reputation allows you to define projects based on the trust of the team behind the project by the set of rules [5]:

1. Taking into account the experience and fame of the main authors of the project on the Internet/social networks;
2. Overall team structure balance;
3. Technological expertise and formal organizational features (registration of a participant, availability of publications about a participant);
4. Portfolio. Past performance can be considered for teams with experience.

3.2 Security Challenges and Implementation

Attack Prevention
Any CFI system is potentially vulnerable to cyber threats. Some of these threats are addressed by the consensus mechanism, some through an intelligent subsystem. Below are the most widespread attacks specific to CFI:

1. Unfair rating attack:
   - Attempts of participants to change their rating artificially by creating fake profiles, quoting other people's works;
   - Violation of platform rules, use of methods of manipulation in social networks, distortion of delivered materials.
2. Conflict of interest or affiliation between experts and assessed teams;
3. Trying to present similar solutions with slightly different parameters (similar to a double-spending attack for payment systems);
4. White washing/Sybil Attack: identification breach, attempted site capture [7];
5. Creating fake projects to ruin the reputation of competitors.

Hidden Information Problems
In addition to distorting information, another problem is the placement of insufficient information [8]:

1. Screening problems. Checking participants requires third-party involvement and more information;
2. Dynamic behavior. Fundraising may be influenced by the choice of the investment template by the authors of the project. For example, the election model of attracting investments ("All-or-Nothing", "Keep-it-all") or the special qualities of first savers;
3. Herding problem. The behavior of the first investors, the influence of someone's authority or blogger may distort the rating of the project.

Such problems can only be solved with artificial intelligence functions directly embedded in the platform.

3.3 Artificial Intelligence

The investment process described in this article always occurs in an environment of uncertainty and missing information in regards to market conditions, application domain of investment projects, and project authors seeking investments. Despite the efforts of investors to ensure the safety of their investments, there is no procedure that could provide a certain guarantee of minimizing risks and maximizing returns. An environment of fuzziness, inaccuracy, uncertain situations, and free choice to make decisions indicates that this task falls in the realm of artificial intelligence. Hence the artificial intelligence subsystem has an important role on the platform being described.

The first important component of such a system is the domain knowledge base and adaptivity of the intelligence system. In this case, the knowledge base includes a set of rules that are formed both by the experts involved and by the analysis of past projects, including precedents of positive and negative situations, facts, and strategies of finding optimal solutions.

The second component of the system formalizes uncertainties with the goal of identifying the influence of fuzzy factors in making decisions. Factors of uncertainty include the fuzziness of the situation and source data, as well as the fuzziness of goals sought by investors, who don't always formulate their motivators accurately. The resolution of these issues involves fuzzy logic methods with quality and probabilistic uncertainties, inaccuracies and uncertainties in the description of outcomes and so on.

The third component of the system could have a generalized title of procedural. It includes modules based on statistical and machine learning methods. They form the base for the adaptive component and the functioning of the logical inference machine (modus ponens). An example of such a subsystem is one that evaluates the originality of applications and automatically assigns them to one topic or another. For these methods, a well-known comparative text mining mechanism is used [9, 10]. It works with topical collections based on borrowed data, as well as the accumulated documentation.

3.4 Technological Components

In addition to the core F-BFT Consensus, DAG Registry, and Edge AI technologies, the DGT Platform features several important components that differentiate it from the other platforms.

DGT has hierarchal topology, which each cluster of decentralized nodes – enterprises being adaptive to a particular business environment, while remaining part of the total Platform. DGT is a hybrid network, meaning that these clusters may have either public or consortium-based conditions for joining all within one platform. DGT is capable of processing any piece of digital value: financial transactions, IOT data, IDs, digital twins, smart contracts, digital goods and more.

DGT is modular and features flexible divergent architecture. Its network is anchored and secured by pre-existing large economic systems. Its powerful integrative layer features an array of API and other tools to bridge to legacy and digital mesh technologies.

The Architecture

The complex structure of information exchange in the described system is aimed at providing a single information space for different nodes, forming a single reliable copy of data, free from accidental and deliberate errors. Such tasks often arise when a system is functioning without a single center. The logic of checking each transaction, its extension to the entire system (synchronization of registries) is described by a system of rules called consensus. The main components of the system are below:

1. The subsystem is represented by an inherited library and is responsible both for interaction with other nodes and for interaction with other components of the site;
2. Encryption. Library of the formation of hash-functions and the formation of a digital signature. To generate private and public keys, the system use the ECDSA algorithm (elliptic curve) with parameters secp256k1;
3. State. Data Store, Ledger: DAG. Despite the arbitrary positioning of the storage to "keep" the registry, the system uses several data storage solutions at once;
4. Journal is a group of components working on the processing of transactions and their insertion into the registryж
5. Consensus. F-F-BFT Voting Verification and Validation Mechanism;
6. ORACLE. Intelligent component to get additional transaction conditions;
7. Transaction Processor. A module implemented as a separate service(TCP 4004)that supports certain transaction families;
8. REST API. A component that connects customers to the site's core through HTTP/JSON;
9. CLI. A command-line interface that allows you to process information inside a site through a standardized API. It is the primary means of administering the site;
10. DASHBOARD is a system component that reflects the state of the site and the network as a whole;
11. Mobile/Web Client - the end application for the user (Fig. 3).

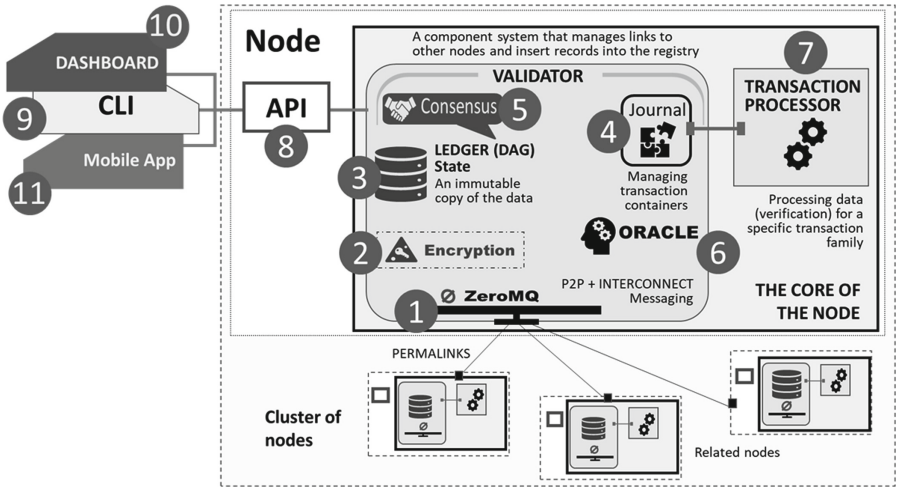


Fig. 3. Conceptual architecture of DGT-based CFI platform

The AI System

The artificial intelligence subsystem is implemented by Apache SystemML infrastructure and supports distributed training data sets. For these purposes, the system supports intelligent agents (Oracles) use two methods: Support Vectors Machines and random forests.

The API Layer

To be able to work with BIG DATA it is necessary to have a set of tools, that we call Ecosystem, out of which the most important is API:

API is a business capability delivered over the Internet to internal or external consumers

1. Network accessible function;
2. Available using standard web protocols;
3. With well-defined interfaces;
4. Designed for access by third-parties.

The key features of API are management tools that make it:

1. Actively advertised and subscribe-able;
2. Available with SLAs;
3. Secured, authenticated, authorized and protected;
4. Monitored and monetized with analytics.

An approach that uses Data API: Unified approach to data integration

1. Conventional APIs: Web, Web Services, REST API – not built for analytics;
2. Database paradigm: SQL, NoSQL, ODBS and JDBC connectors – familiar to analysts;

3. Database Metaphor + API = Data API;
4. Specific API for every type of big data (every "V" (Volume, Variety, Velocity, Veracity) and their combinations) – under a generic paradigm.

A lot of experiments have shown that the Data API is an essential part of the toolkit, as it is an important mechanism for both integration with other systems and access to data and the results of their processing. Therefore, it is necessary to determine the characteristics of data types to select the appropriate software stacks for their effective processing, to establish links between technologies, to develop an interface for convenient user work and to form an effective ecosystem for each data class.

The analysis of efforts in this direction led to the conclusion that the optimal Big Data solution should combine the following technical characteristics:

1. scalability;
2. fault tolerance;
3. high availability;
4. the ability to work securely with data in the public domain;
5. support of analytics, data science and content applications;
6. support for the automation of data processing workflows;
7. ability to integrate with a large number of popular solutions;
8. self - restoring ability.

In addition, during development, the ecosystem should include tools that ensure the following stages of data processing:

1. data collection;
2. data storage (including the possibility of organizing the storage of heterogeneous data), providing real-time access to data, data storage using distributed storages (including the organization of data lakes);
3. data analysis, the formation of a complete picture of the data, data collaboration;
4. data management, cataloging, access control, data quality control and the construction of information processing chains;
5. data production (including building of a data infrastructure, data delivery, integration issues)

Developing an API for a system is an extremely complex, unique process for big data processing systems. Until now, this has been a serious problem that has impeded the widespread use of big data, but the solution proposed by IBM allows us to start solving this problem.

Having a standard, simplified programming model that can simultaneously work on scalar, vector, matrix, and spatial architectures will give developers greater productivity by increasing code reuse and reducing development investment.

OneAPI framework proposed by Intel implements this model. It is based on standards and open specifications and includes the Data Parallel C ++ (DPC ++) language, as well as a set of libraries. This allows equipment suppliers across the industry to develop their own compatible implementations targeting their CPUs and accelerators. Thus, developers can code in only one language using a set of API libraries for different architectures and devices from different manufacturers.

4 Conclusion

The concept of the platform provided above allows for the formation of an integrated investment network that would be attractive both to professional financial institutions (banks and funds) as well as to the participants of the investment market:

1. The platform modernizes the process of collecting investments in the direction of data-driven solutions built with Big Data technologies in mind;
2. Early members of the system (e.g. the bank-owner of the genesis node) receive a tool to create a new financial product and their own ecosystem, allowing the promotion of traditional banking products;
3. The platform facilitates access to capital through direct assessments of the investment attractiveness of projects, allowing the author of projects to focus on the merits of their product, rather than marketing tricks on self-promotion;
4. Intra-VC Marketplace "forks" the decentralized system by allowing a VC to create its own permissioned ecosystem of business support and entrepreneurs. It is monetized through a subscription fee and provides immutable data storage, Edge AI analysis, and the possibility of creating open ecosystems.

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