PDX Blockchain

Whitepaper

A public blockchain ecosystem

Author: Jiangang Zhang(JZ)

Version： 0.4.4

Website： http://pdx.link/

Table of Contents

Abstract

The blockchain technology helps establish automated trust amongst untrusted parties, hence has tremendous potential to many real-world use cases. However, each blockchain platform and/or application can have its own unique requirements on security, privacy, performance and trustworthiness etc.; these requirements from different applications can be conflicting and difficult if not impossible to accommodate by the blockchain platform. However, a viable blockchain platform, needs to satisfy these different and even conflicting requirements imposed by the applications hosted. This dilemma has been plaguing all public and consortium blockchain platforms.

PDX blockchain, as a public blockchain IaaS, successfully solves this dilemma by separating business logic from trust realization and at the same time have them harmoniously coexist in one coherent ecosystem.

PDX blockchain, supports one-click creation of dedicated public or consortium blockchains of arbitrary size, arbitrary performance metrics preference with its trustworthiness endorsed by the whole ecosystem, as well as their coexistence in harmony within the ecosystem. This helps small to medium businesses, blockchain companies and technology geeks rapidly deploy blockchain platforms of their own.

PDX blockchain, supports one-click deployment of smart contract applications with different or even conflicting needs requirements on security, privacy throughput, latency, scale, data volume and trustworthiness etc., as well as their coexistence in harmony in one ecosystem. This helps small to medium businesses, blockchain companies and technical geeks rapidly deploy production-grade blockchain applications.

PDX blockchain realizes PDX consensus, an invention which dramatically improves a single blockchain's performance metrics by simultaneously supporting massive scale with low latency, high throughput, high concurrency and cluster elasticity.

PDX blockchain extends blockchain platform and smart contract support to smart devices, automatically supports multi-chain and cross-chain, and eliminates the entrance and evolution barrier of adopting blockchain technologies.

PDX blockchain employs virtual currency scheme to define charging, clearing and incentivization models to support the rapid and organic growth of the ecosystem. Each dedicated blockchain created can gave its own virtual currency and the PDX pubic blockchain can auto list it for trading in the digital asset exchange built in the ecosystem.

The goal of PDX blockchain is, as the infrastructure of trustworthy Internet, to make trustworthy e-society a reality.

Challenges & opportunities

One of the vital basics in human society, is to establish trust. The level of trust, decides the cost and depth of interaction. The essence of the blockchain, is to establish automated trust amongst untrusted parties, which makes it universally applicable in real-world use cases. Ethereum, for the first time, separates the blockchain as a platform and smart contracts as applications from architecture perspective; this opens the door of imagination for its adoption in real world applications. Hyperledger and other platforms afterwards, also tried to turn this imagination to reality.

However, the real world is complex and complicated. Most real-world applications, have its unique requirements on security, performance and trustworthiness, sometimes the requirements from different applications can be conflicting. From security and privacy perspective, besides fully public applications, there are fully private applications, i.e. the owner(s) has (have) fully control on the application's data, code and software/hardware environment. Different applications, their focus on scale, latency, concurrency and throughput can be different and requires different give-and take on the blockchain platform. From trustworthiness perspective, some applications may require chain-level endorsement, while some only need endorsement at a much smaller scale.

From security, performance, capabilities and adoption barrier perspectives, current blockchain platforms have the following problems and shortcomings that hinder its adoptions in real-world:

1) Due to its severe technical inabilities, it's not possible to serve as the infrastructure of trustworthy internet.

   Current single-stack public blockchains, due to its technical restrictions on architecture, consensus, ledger logic etc., cannot support applications with different or conflicting requirements on security, performance and trustworthiness. For example, from security and privacy perspective only public application are supported; from performance perspective, only high latency applications are supported.

   Simple composition of multi-chain architecture, its trustworthiness is limited to the strength of the residing child chain, not the whole ecosystem. Child chains with small number of nodes, have a much higher chance of collusion, which defeats the very purpose of adopting the blockchain technologies.

2) Difficult, if not impossible to support co-existence of applications with conflicting requirements on security, performance and trustworthiness.

   Supporting widest spectrum of applications with different even conflicting requirements on security and performance, is a must for the long-term success of a public blockchain aiming to be the infrastructure of trustworthy Internet.

   With Hyperledger fabric, all channels use the same platform architecture and implementation. Hence, applications with different performance requirements, if not compatible, cannot run within the same Hyperledger consortium blockchain, which significantly limits its adoption in real world.

   Ethereum and other single-stack blockchain platforms, have the same problem.

   All kinds of current side-chain or multi-chain mechanisms, are indeed different chains, the trustworthiness is limited by each side chain and child chain. Child chains and side chains with small number of nodes, can easily collude to defeat the trustworthiness of the chain and make adoption of the blockchain technologies meaningless.

   PDX public blockchain, introduces the concepts of dedicated business chain and universal trust chain and its coherent interconnect to realize the separation and collaboration of trust implementation and business implementations. This way, applications with different even conflicting security and performance requirements, or applications that are compatible but require larger scale, can be implemented in the dedicated (business) blockchains. All applications, regardless the number

of nodes in its hosting dedicated chain, equally have the trustworthiness strength of the whole ecosystem.

3) Difficult, if not impossible to implement fully private and fully secure applications

The blockchain is meant to establish trust amongst untrusted parties. Because of the lack of trust, imposing strict need-to-know to smart contracts becomes paramount. The owner(s) of a smart contract, must be able to have full control on its data, code and software and hardware operating environment; only this can effectively protect business secrets and individual privacy and satisfy cross-jurisdiction governance and compliance requirements.

Hyperledger fabric, via its channel mechanism, supports realization of private applications on a consortium blockchain. With Hyperledger fabric, each channel is in fact a separate blockchain. Because it's not endorsed by the "whole" chain, channels with small number of nodes can easily collude to destroy the trustworthiness supposedly provided by the blockchain, hence makes blockchain adoption meaningless.

All kinds of side-chain and multi-chain mechanism, have the same issue.

Ethereum and other single-chain platforms, requiring all data and code of a smart contract present on each and every node, do not support fully private and secure applications.

PDX BaaP blockchain, long before Hyperledger fabric introduced its channel mechanism, supports selective existence of a smart contract's data and code on the nodes of a blockchain (PCT patent applied). Further, the trustworthiness of the selectively deployed smart contracts,

are endorsed by the whole chain to realize non-repudiation and data integrity, hence make it possible to realize truly trustworthy and truly private and secure applications.

4) Difficult, if not impossible to support real-world application requirements e.g. smart devices (smart phone and IoT), massive data, integration with existing ecosystems etc.

   Smart phones and IoT devices are everywhere. Quite a few real-world applications require extending of blockchain and smart contract support to smart phones and IoT devices to realize end-to-end trustworthiness.

   Likewise, quite a few real-world applications require supporting massive data and integration with existing ecosystems, and the support should be preferably seamlessly and painlessly by the blockchain platform.

5) Super high development, testing, maintenance and upgrade barriers

   The blockchain technology is nascent, so sometimes radical upgrade and evolution is inevitable. A production system needs to support hot plug-n-play of blockchain stacks to enable seamless and painless upgrade and evolution (testing and changing the engines as the car is driving). A smart contract application, should be neutral to the underling blockchain stacks and not be locked to a specific blockchain stack.

   The maintenance and upgrade of blockchain nodes, should be production-grade straightforward, fast and seamless. Smart contracts must be real "smart", i.e. The restrictions on its feature set and technology stack selection should be kept to the minimum, if any.

Simply put, a viable public blockchain, should be a blockchain IaaS capable of being the infrastructure of trustworthiness Internet. With minimized entrance and maintenance barrier, this blockchain IaaS must support realization and harmonious co-existence of dedicated blockchains and smart contracts with different or even conflicting security and performance requirements with its trustworthiness endorsed by the whole ecosystem.

Design goals

The short-term goal of the PDX public blockchain is, as a public blockchain IaaS, focusing on small to medium businesses, blockchain application companies and technology geeks, to support, 1) one-click rapid creation and harmonious co-existence of public or consortium (full) dedicated blockchain instances of arbitrary size, arbitrary performance preference with its trustworthiness endorsed by the whole ecosystem; 2) one-click rapid deployment and harmonious co-existence of smart contracts of different or even conflicting requirements on security and performance preference, including fully secure and fully private commercial applications.

The ultimate goal of the PDX public blockchain is, to become an organically growing trustworthiness Internet infrastructure realizing trustworthiness e-society without boarders.

The major design goals of the PDX public blockchain is,

1) To architect a new generation of blockchain platform realizing the separation and collaboration of business and trust mechanism, supporting consensus reconstruction, mass data, cross-chain, multi-chain, hot plug-n-play of blockchain engines, as well as extending it to smart devices.

2) As a public blockchain IaaS, based on intuitive deployment descriptor, to support one-click creation of blockchain instances (public or consortium) with different or even incompatible security and performance requirements, and to enable its co-existence in harmony on the PDX blockchain ecosystem; all with true ecosystem level trustworthiness strength.

3) As a public blockchain IaaS, based on intuitive deployment descriptor, to support one-click deployment of smart contracts with different or even incompatible requirements on security and performance, as well as its co-existence in harmony on the PDX blockchain ecosystem.

4) Support truly secure, truly private applications, so that owner(s) of an application has(have) full control on its data, code and software/hardware operating environment, making sure data and code do not go through unrelated node. This makes blockchain truly applicable to real world use cases.

5) Fair and secure PDX consensus with simultaneous support on massive scale, low latency, high throughput, high concurrency and cluster elasticity.

6) Eliminates the entrance, maintenance, development & testing and upgrade barriers of the blockchain ecosystem, including the platform itself and the smart contracts running within, supporting painless, seamless and noninterrupted platform and smart contract evolution.

7) Build-in "App Store", supporting developers to develop free and paid blockchain components, such as blockchain engine, consensus algorithm, ledger implementation, P2P networking modules, as well as specific type of application and tools.

8) Build in ERC20 compliant virtual concurrency (PDX coin, aka PDX) as the incentivization, charging and payment basis. PDX incentivization model, based on PoA (Proof-of-Activeness) and PoC (Proof-of-Contribution) , motivates all participants of the ecosystem and all activities that help the ecosystem grow.

Target use cases

PDX public blockchain, as a public blockchain IaaS, supports one-click creation of public and consortium blockchain instances of arbitrary size, arbitrary security and performance preference and one-click deployment of applications running within, as well as the harmonious co-existence of them in the PDX public blockchain ecosystem, and at the same time satisfies unique or even conflicting requirements (security, privacy, throughput, latency, scale, massive data etc.) of each chain and each application.

PDX public blockchain, devotes itself to help small to medium companies, blockchain application companies and technology geeks, to rapidly on-board its own blockchain platform and blockchain applications.

One-click creation of dedicated blockchain instances

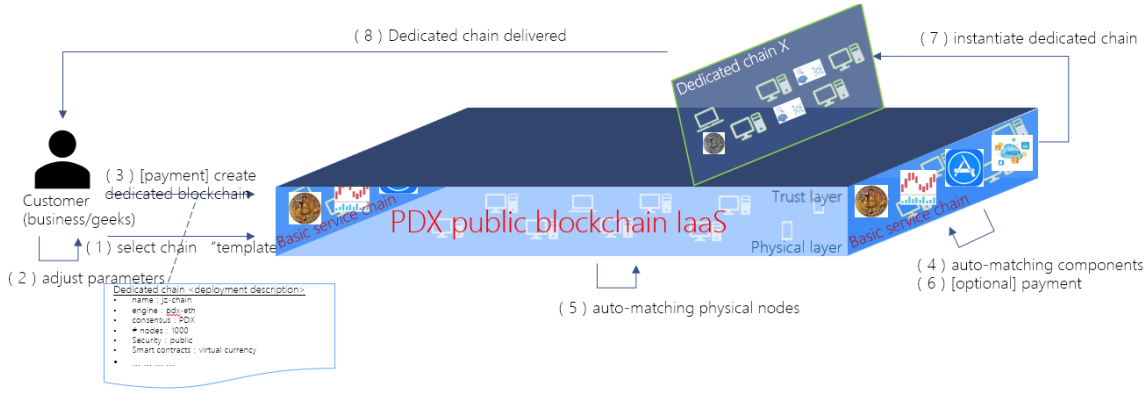

Fig 1) One-click creation of dedicated blockchain instance

Small to medium businesses, blockchain application companies and technology geeks, via the PDX public blockchain IaaS interface, based on web, can create its own dedicated blockchain instances with lowest cost and highest flexibility.

A customer, via the blockchain deployment template provided, instantly defines and submits deployment requirements (security, performance, component preference) of its own dedicated blockchain instance, then the PDX public blockchain platform auto-matches components and physical nodes and instantiates a dedicated blockchain instance satisfying these requirements.

One-click deployment of smart contracts

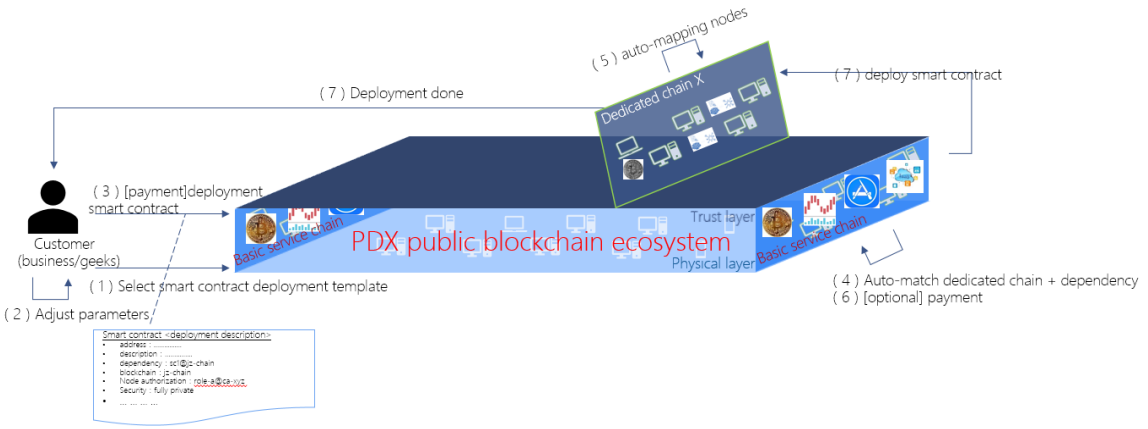

Fig 2) One-click deployment of smart contracts

Small to medium businesses, blockchain application companies and technology geeks, via the PDX public blockchain IaaS interface, based on web, can one-click deploy its own smart contracts with lowest cost and maximum flexibility.

Customers, via the smart contract deployment template provided, rapidly defines and submits the requirements (security, performance, component preference etc.) of its smart contract environment, the PDX public blockchain auto-deploys it to the dedicated blockchain satisfying these requirements.

Premium service: cross-chain interaction

For a public blockchain to grow with scale and viability, the number of active nodes, the strength of the trustworthiness and the number of users (and

applications) are crucial factors to its success (or failure). PDX public blockchain, via shared physical layer and shared trust layer, realizes across-the-ecosystem sharing of computing power and trustworthiness endorsed by the whole ecosystem. PDX public blockchain, via supporting cross-chain interaction to reduce user acquisition cost and help each chain in the ecosystem rapidly scale.

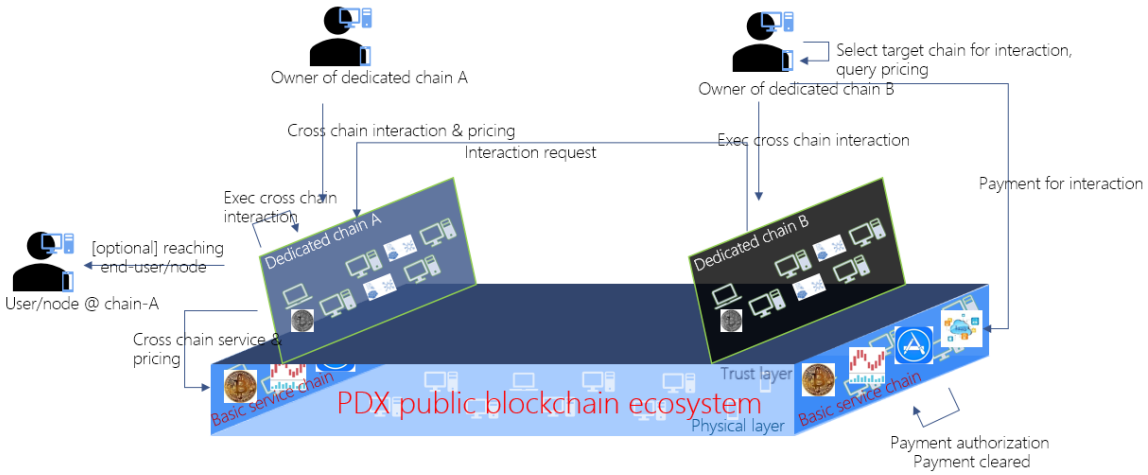

Fig 3) Premium service: cross-chain interaction

Here, the cross-chain interaction, can be for user acquisition, advertising, or cross-chain application integration etc.

Premium service: blockchain "app store"

For a public blockchain to grow with scale and viability, an active and organically growing developer community is a must. PDX public blockchain, via its build-in blockchain "app store", supports developers to develop free and paid blockchain components, supports testers and operators test and operate these blockchain components, as well as owners of dedicated blockchain instances to deploy them. The developers, testers and operators based on PDX to charge for products and services provided, and the owners of dedicated blockchain instances pay with PDX for the product and services leveraged.

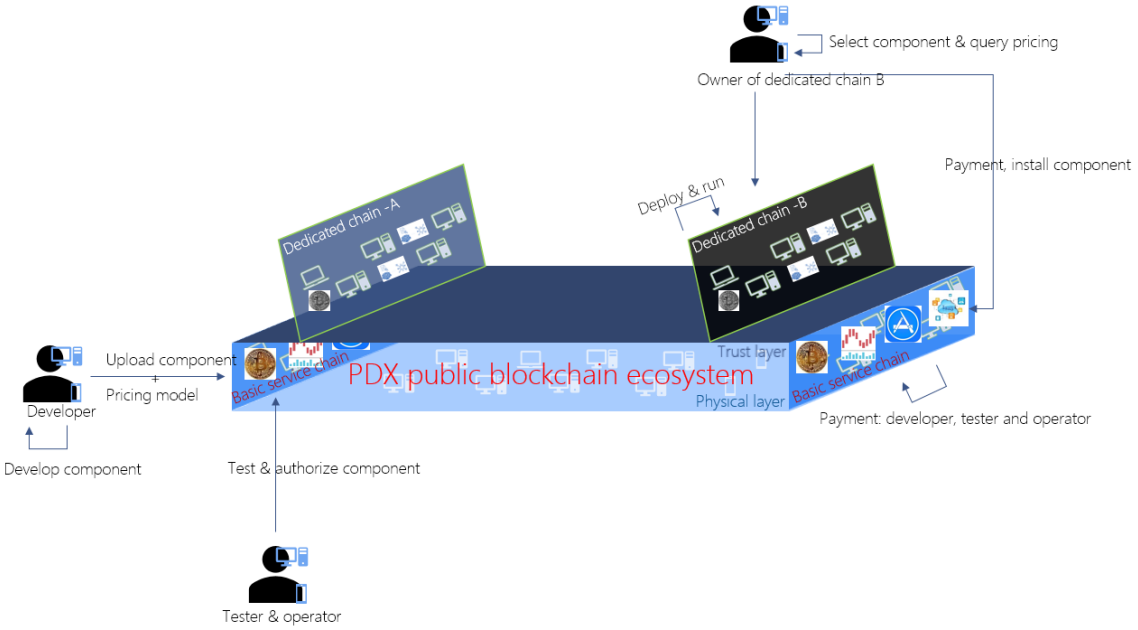

Fig 4) Premium service: blockchain "app" store

Premium service: digital asset exchange

Most if not all public blockchains incentivizes participants via cryptographic tokens. PDX public blockchain, has built-in decentralized trustworthy asset exchange. Cryptographic tokens issued by each dedicated chain within the ecosystem, can trade with very low listing and transaction fee; this effectively eliminates the evet-growing entrance barrier for exchange listing of cryptographic currencies.

Fig 5) Premium service: decentralized asset exchange

Killer applications & use cases

PDX BaaP, the base platform of PDX public blockchain, has already been the foundation of the trustworthy e-evidence system adopted by a supreme law enforcement agency and its branches. It has also been deployed in multiple banks. More collaborations with heavyweight partners are in the process right now.

When PDX public blockchain's main-net goes online, the following killer applications with be instantly available:

- Honeycomb: new generation self-motivated community chain
- Yongchunfang: IP and content distribution platform
- Littlebee: business value chain
- New generation blockchain game and gaming gear exchange

Meanwhile, PDX and its business partners will on board large scale business and consumer oriented applications to help PDX public blockchain grow rapidly as a sustainable ecosystem.

Operating model

PDX public blockchain, is a nonprofit platform. It introduces PDX coin (PDX) for incentivization, charging and payment, so that it can rapidly grow with long term sustainability.

The revenue generated (in the form of PDX) from its own products and services and from third party products and services belong to the nonprofit PDX Foundation LTD. Part of the revenue is removed from circulation to serve as virtual concurrency reserve so that the total PDX in circulation can be adjusted according to the ecosystem economics; part of them, is injected into the incentivization fund for ecosystem incentivization; the remainder of the revenue, is made available for trading to support sustainable and healthy evolution of the whole ecosystem.

The main revenue generating products and services that support the PDX blockchain ecosystem are:

Product & service	Charging model	Notes
Creating business blockchain	Paid service	Charge based on the number of nodes, number of users and number of smart contracts, special requirements etc., after payment to component owner(s) and physical node owner(s)
Deploying smart contracts	Paid service	Based on the number of nodes deployed on, resource (CPU, RAM, bandwidth, storage) consumption etc., after payment to component owner(s) and physical node owner(s)

Cross-chain interaction	Paid service	
Asset trading	Paid service	Onetime listing fee & TX fee
Advertisement	Paid service	Precious advertisement to subscribed end-users
Big data analytics	Paid service	User profiling and business profiling etc.
Virtual financing	Paid service	Loan, credit and other virtual financial products
Self-owned components	Paid product	PDX Foundation LTD owned, high value premium components, e.g. PDX consensus, PDX ledger etc.
Publishing paid component	TX fee	Publishing blockchain components (e.g. blockchain engine, consensus, ledger, smart contract applications and management and analytics tools)
Using paid component	Paid service	
Operating dedicated blockchain	Paid service	
Operating smart contracts	Paid service	

PDX public blockchain

Key highlights

PDX public blockchain, based on PDX BaaP (Blockchain-as-a-Platform), inherits its 20+ crucial innovations on blockchain and information security technologies, including multiple patent-applied inventions on distributed consensus algorithm, distributed blockchain ledger and smart contract architecture. PDX public blockchain has the following key technology strengths:

1) New generation blockchain architecture, realizing separation and collaboration of business and trust, serving as a public blockchain IaaS, supports one-click deployment of dedicated business blockchain platforms and smart contracts of different or even conflicting security and performance preferences and its harmonious co-existence in one ecosystem.

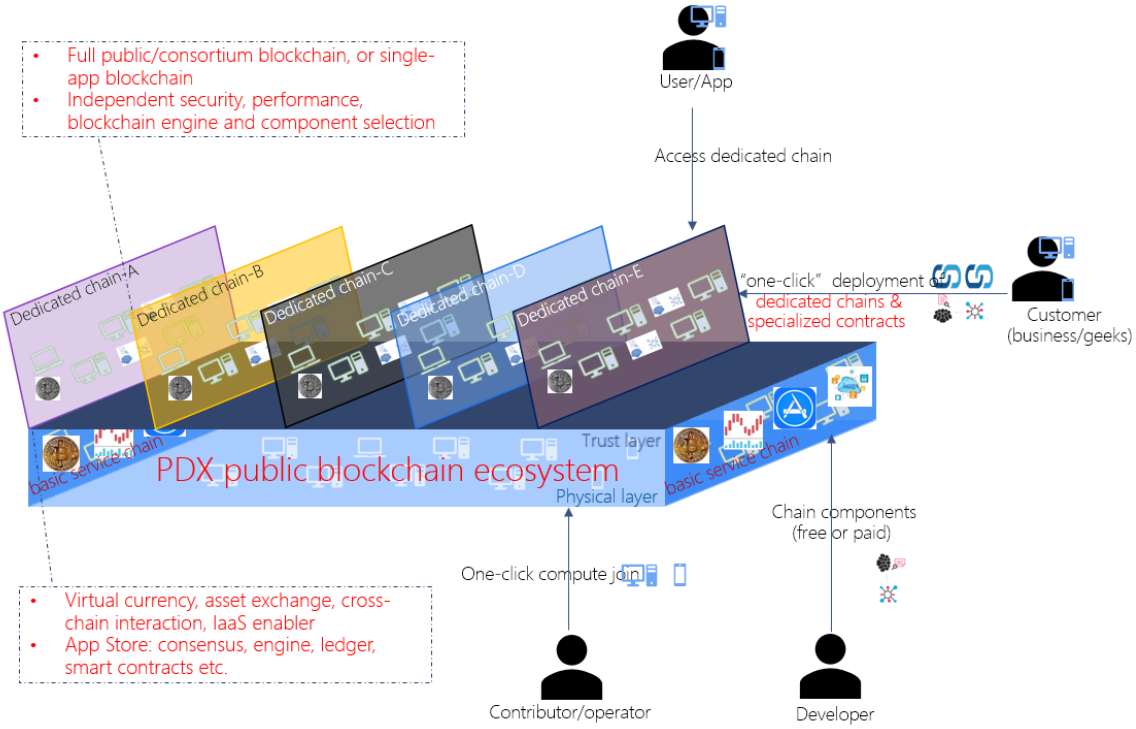

Fig 6) PDX blockchain overall architecture

2) Based on patent-applied smart contract architecture, supporting fully private and fully secure smart contracts, so that owner(s) of a smart contract application has/have full control of its data, code/logic and hardware/software operating environment. PDX blockchain has built-in resilience to platform failure and hostility, as well as production-grade security controls e.g. self-diagnosis and cross-verification of runtime environments to ensure platform security.

3) Based on patent-applied high performance distributed consensus algorithm, dramatically improve the performance metrics of the blockchain with simultaneous support of massive scale, low latency, high throughput, high concurrency, and cluster elasticity to satisfy the tough performance requirements from real-world applications.

4) Flexible multi-level consensus mechanisms to meet different consensus requirements: chain (cluster) level, app (smart contract) level and transaction (type) level.

5) Based on patent-applied blockchain ledger algorithm, support massive blockchain ledger to minimize scalability problem due to ledger increase over time.

6) Eliminate the barriers to blockchain and smart contract, supporting the platform's painless evolution, and painless provision/de-provision and upgrade of smart contracts via its innovative multi-chain/multi-version co-existence and seamless transition mechanisms.

7) Extend the blockchain and smart contract support to mobile devices and IoT to realize end-to-end automated trust.

8) Not only support PDX blockchain's native RESTful smart contracts, but also Hyperledger chaincode and Ethereum smart contract, which helps preserve current investment on blockchain and expedite the establishment of the PDX blockchain ecosystem.

9) Built-in transparent and deterministic incentivization model via Proof-of-Activeness (PoA) and Proof-of-Contribution (PoC) to incentivize all participants (e.g. blockchain miners as in Bitcoin) of the ecosystem via the built-in ERC20 compliant PDX coin.

10) Build-in platform charging model, payment and clearing mechanism, to help cultivate paid sharing ecosystem.

Overall architecture

Blockchain IaaS

To achieve its short-term and long-term goals, PDX blockchain introduces a novel architecture that separates business logic from trust establishment. This architecture makes PDX blockchain a public blockchain IaaS with tailorable security and performance support.

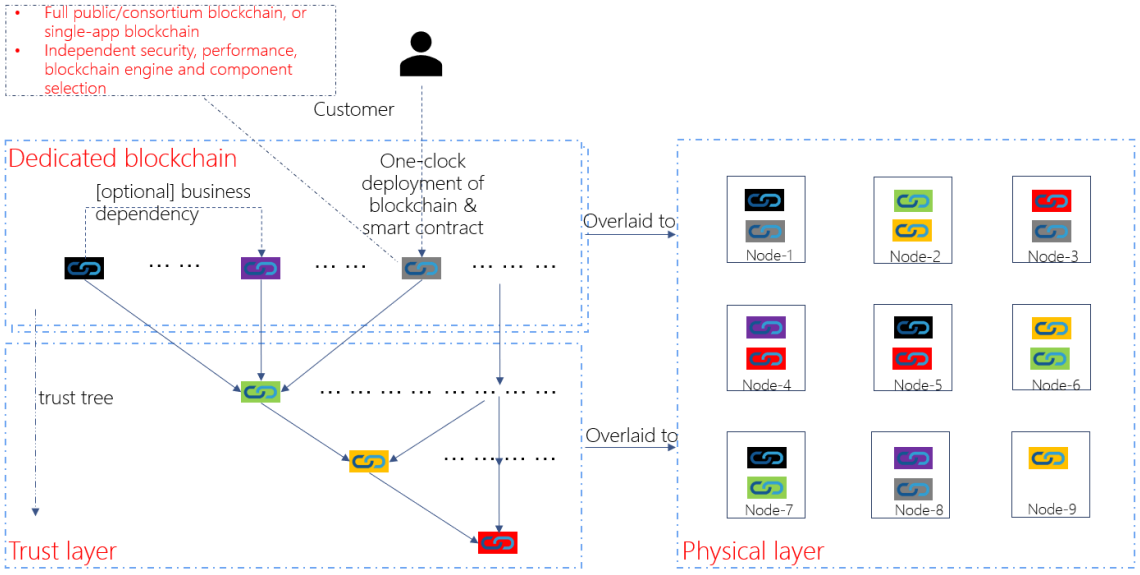

Fig 7) PDX blockchain IaaS architecture

PDX public blockchain, is composed of three layers of chains: a physical chain (physical layer) as the base, one or more trust chains as the trust layer in the middle and one or more dedicated business chains atop. The trusts layer is a tree structure of trust chains, which is the ultimate trust assurance of the PDX public blockchain. The trust layer and each layer of the trust chains forming it, is auto-organized, auto-adjusted by the PDX public blockchain platform to overlay atop the effective physical nodes in the physical layer in an auto-balanced manner. The root chain of the trust chain tree, is called root trust chain.

Each dedicated business blockchain, hosts one or more smart contracts. The security and performance requirements of smart contracts in the same dedicated business blockchain are compatible. A dedicated business blockchain, can be a "full" public blockchain or a "full "consortium blockchain, or a chain dedicated for a specific smart contract application. Cross-chain interaction is via authorization mechanism as defined by the PDX blockchain platform.

PDX public blockchain, supports one-click deployment of dedicated business blockchains and smart contracts of different security level, performance metrics and trust confidence. It supports harmonious co-existence of different or even conflicting blockchain platforms and smart contracts in the same PDX public blockchain ecosystem.

When deploying a dedicated business blockchain, PDX public blockchain IaaS based on the owner (customer) submitted blockchain deployment description (BDD) to automatically select the right number of nodes, the appropriate blockchain engine, the appropriate consensus algorithm and ledger implementation.

When deploying smart contracts, PDX public blockchain IaaS based on the owner(customer) submitted application deployment description (ADD) to automatically create (if not available) or select the compatible dedicated business blockchain(s) and deploy the smart contracts atop.

High performance whole-chain consensus

A trust chain, only accepts block hash and block-generation evidence coming from upper level trust chains or dedicated business chains, and at the same time forwards its own block hash and block-generation evidence to a lower

level trust chain. This architecture, with very high efficiency ensures all dedicated business blockchains and smart contracts in the PDX public blockchain ecosystem have trust strength endorsed by the whole ecosystem. Fig 2 demonstrates a two-level trust chain architecture:

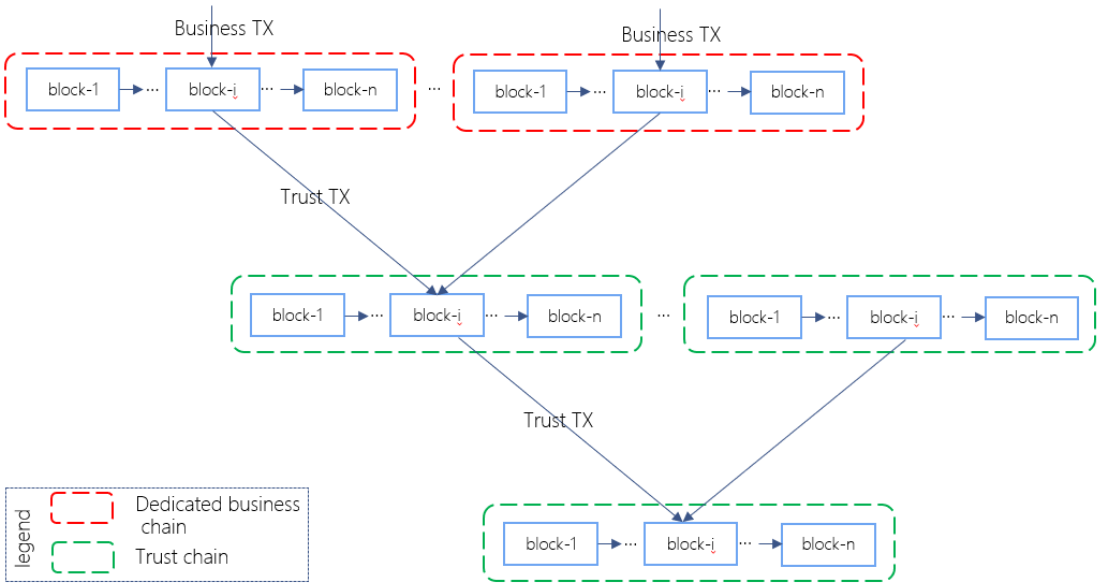

Fig 8) High performance ecosystem-level consensus

Every dedicated business blockchain, has trust endorsement not only from itself but also from the trust chain immediately below it (the first layer trust chain); the first layer trust chains, has trust endorsement not only from itself but also from the trust chain immediately blow it; this layered trust endorsement goes all the way until the bottom trust chain, aka the root trust chain. Via this multi-layer trust architecture, a dedicated business chain's trust strength is ensured by the whole blockchain ecosystem, regardless the number of nodes in the dedicated chain.

Chain architecture

PDX public blockchain, based on PDX BaaP, introduces the concept of multi-chain "engine" at the architecture level (Fig.9). An "engine" can be as small as a

distributed consensus algorithm, or as big as a full blockchain stack. For painless evolution, PDX blockchain simultaneously supports 4 categories of engines: "inactive" engine (0 to many), "transient" engine (0 or 1), "active" engine (1 or more) and "NexGen" engine (0 or 1). As PDX blockchain evolves, a new engine starts from "NexGen" status, then transitions to "active" engine after thorough in-field testing, then becomes "transient" waiting to be finally transited into "inactive". The lifecycle of a blockchain engine, including its provisioning and de-provisioning, is managed by the "engine service" module in PDX blockchain.

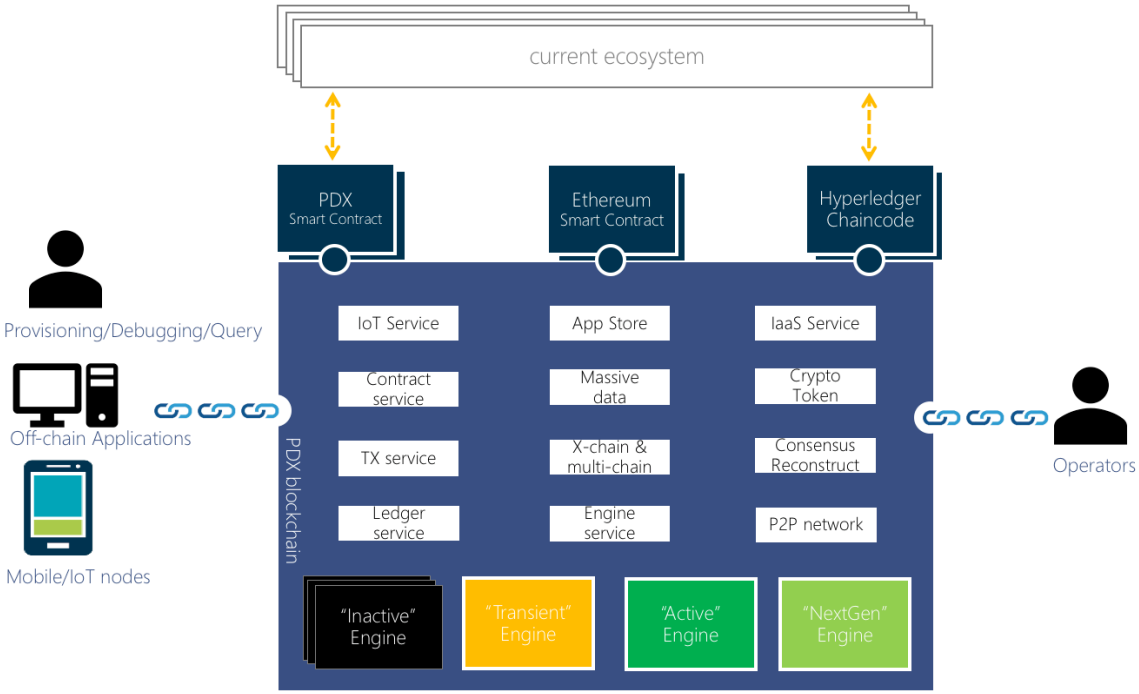

Fig 9) PDX blockchain node architecture

The "consensus reconstruct" module, supports three types of consensus: blockchain cluster level, application (smart contract) level and transaction (type) level. A blockchain engine and a smart contract can decide the type(s) of and specific implementation of the consensus mechanism it adopts.

"Smart contract service" manages the full lifecycle of all smart contracts, including its provisioning, de-provisioning, and cross- version status transition (NexGen, active, transient, inactive) etc.

"Transaction service" is responsible for transaction lifecycle management. "Multi-chain & cross-chain" is for future blockchain level inter-connectivity.

"IoT service" enables extension of blockchain and smart contract support to mobile devices or IoT smart devices, for example PDX wallet, PDX autonomous identity.

"Crypto Token", is the virtual currency, credit and payment implementation on PDX blockchain. PDX blockchain uses this to realize automated incentivization by the ecosystem. A smart contract or a PDX blockchain node, on deployment can provide its token-for-service model and the "Crypto Token" module will automate the clearing.

"App store", is for developers to publish free or paid components and tooling for the PDX public blockchain ecosystem, e.g. blockchain engine, consensus, ledger implementation, smart contracts etc.

"IaaS service" is responsible for the provisioning, de-provisioning and upgrade of business blockchains and smart contracts, as well as visualized blockchain platform administration and monitoring

PDX blockchain smart contracts, can be truly smart and easy (RESTful) and can integrate freely with the current ecosystem. PDX blockchain supports Hyperledger chaincode and Ethereum smart contracts to preserve customers' current investments on blockchain and at the same time help expedite the establishment of the PDX blockchain ecosystem. If so desired, PDX blockchain can help the smart contract to automate the determinism check on external

integration and react accordingly if external determinism is not satisfied, e.g. smart contract freeze, de-provisioning, or transaction failure etc.

PDX public blockchain supports plug-n-play of consensus implementation. To satisfy consensus requirements from all kinds of use case scenarios, PDX public blockchain supports three consensus types, chain-level, app-level and transaction type level. Not only each blockchain engine can set its own consensus mechanism, a smart contract can define its app-level and transaction (type) level consensus and failure mitigation measures (e.g. smart contract freeze, de-provisioning, or transaction noop).

Painless platform upgrade

PDX public blockchain, based on PDX BaaP, disruptively introduces the concept of blockchain engine. Along as the platform evolution, an "engine" starts from "next-gen"for in-fiend testing, becomes "active"once matured, transitions to "transient"to be replaced, all the way to "inactive"(decommissioned). The lifecycle of a blockchain engine, is managed by the "Engine Service" module and its status transaction is transitioned via embedded voting mechanism.

PDX public blockchain will support multiple P2P networking mechanism and blockchain engines within the ecosystem can freely decide which one to choose or via embedded voting mechanism to auto-decide.

PDX public blockchain, supports versioned ledger. Each versioned ledger, is bound to corresponding ledger mechanism and format. A blockchain "engine"within the ecosystem can freely decide which one to choose or via embedded voting mechanism to auto-decide.

The painless upgrade of the PDX public blockchain framework, engine(s) and other modules, is realized via embedded voting mechanism.

Painless application upgrade

PDX public blockchain, supports "upgrade" option on smart contract deployment; a smart contract can implement initialization method (init) and finalization method (fini) to realize seamless upgrade if needed.

PDX public blockchain, supports co-existence of multiple versions of the same smart contract. Each smart contract can have 0 or more "inactive" versions, 0 or more transitive versions, 1 active version and 0 or 1 NexGen version. The "Smart contract service" component, is responsible for versioned routing and the version transition itself. A transaction can designate an "active" version or "next-gen"version to support normal activities and in-field testing of new versions respectively.

Fully secure smart contracts

PDX blockchain, via creatively reconstructing the blockchain (not crippling its strength of trustworthiness), supports selective existence (deployment) of a smart contract's data and code on blockchain nodes. Further, a PDX blockchain node can decide at its discretion to host what types of smart contracts; a smart contract owner, likewise can decide at its discretion on which or what kind of PDX blockchain nodes his/her smart contract is deployed. At the same time, PDX blockchain supports secure and trustworthy out-of-band (OOB) data transmission.

This way, a smart contract can be fully secure and fully private. The owner(s) have full control of its data, code/logic and hardware/software operating environment, via only having its data and code/logic on stakeholders' node and using trustworthy out-of-band data transmission with end-to-end security.

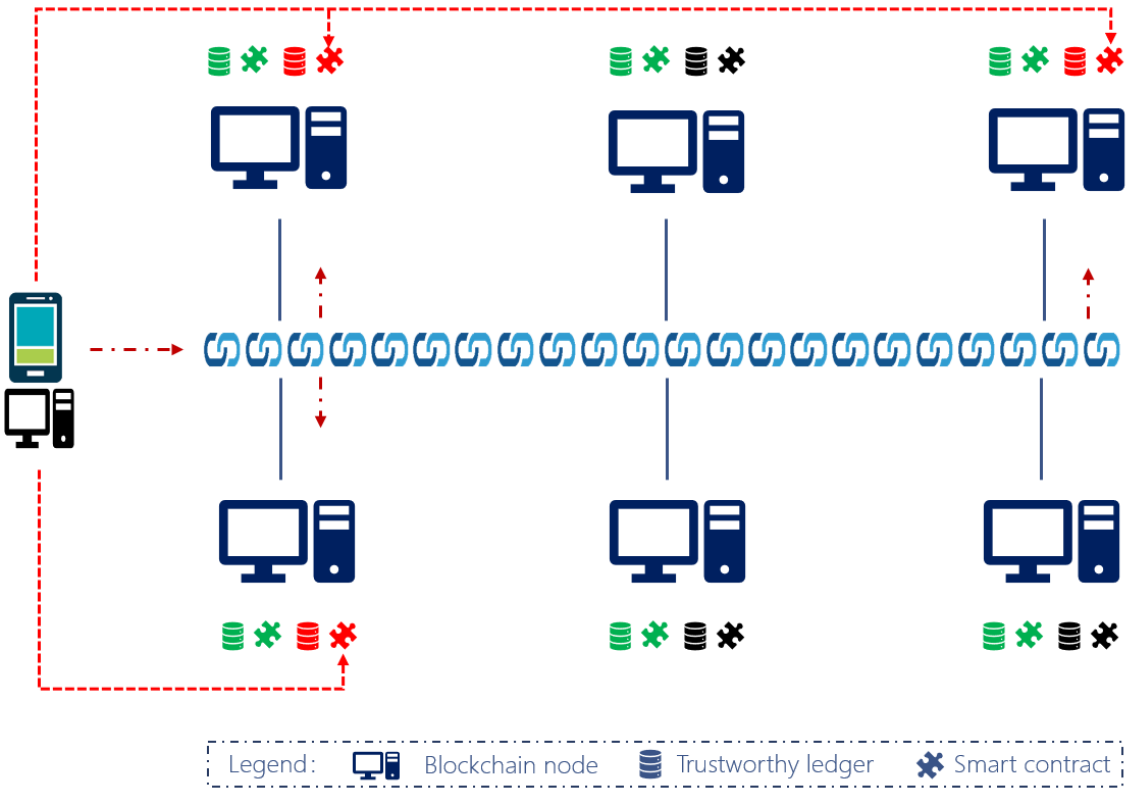

Fig 10) Truly secure and private trustworthy smart contracts

As Fig. 10 shows, the green-colored ledger and smart contract are public ones. The red and black-colored ones are private ledgers and smart contracts. The data and code of a "private" ledger and/or a "private" smart contract, do not exist in non-related and non-authorized nodes, nor do they pass through them, which enables ultimate protection to the business secrets and individual privacy of a smart contract.

Deploying encrypted data and obfuscated code of a smart contract to potentially hostile nodes or nodes of no control, is a grave violation of the basic "defense in depth" security principle, hence should not be the recommended approach to private applications. If the data or code/logic is valuable enough, someone(s) will try to compromise and one successful compromise can have serious consequences. The safest approach is, as what PDX blockchain

supports, that data and code do not exist at unrelated or unauthorized nodes, nor pass through them.

Supporting fully private and fully secure smart contract applications, is one of the most intriguing features that make PDX blockchain extremely vital and distinguishes PDX blockchain from other blockchain platforms.

High performance PDX consensus

The high performance PDX consensus algorithm, adopts a novel parallel consensus mechanism, assisted by Location-Awareness (LA), Proof-of-Activeness (PoA) and Proof-of-Contribution (PoC) assessment, to achieve massive scale, low latency, high throughput and high concurrency with cluster elasticity. This algorithm is PCT patent-applied.

PDX consensus will be open-sourced for public review as scheduled according to the open source plan.

Massively scalable ledger

The blockchain ledger increases over time. At some point in time, each blockchain node can have scalability problems with ledger storage and synchronization. PDX Massively Scalable Distributed Ledger (MSDL) algorithm, effectively solves the scalability issue through automatic sharding of the blocks and at the same time ensuring each block's redundant storage, availability and access efficiency. This algorithm is PCT patent-applied.

Each smart contract, can freely create its own private, trustworthy public or private ledger. PDX blockchain supports flexible ledger schema and enables

convenient query (single column, multiple columns or fuzzy query). PDX blockchain supports selective existence of ledger data on its blockchain nodes to strictly limit data exposure. PDX blockchain supports custom and flexible ledger access control, e.g. who can change the ledger format, who can read, write or delete records, and provides build-in OpenID token support. PDX blockchain supports owner of a ledger and blockchain node impose restrictions on ledger schema and quota.

Figure 11 illustrates the process to create and access a private (application) ledger. Here, the ledger only exists on node A and node Z, not node I. Assisted with out of band messaging (OOBM), the ledger data only exist on authorized nodes, hence a fully private blockchain application ledger.

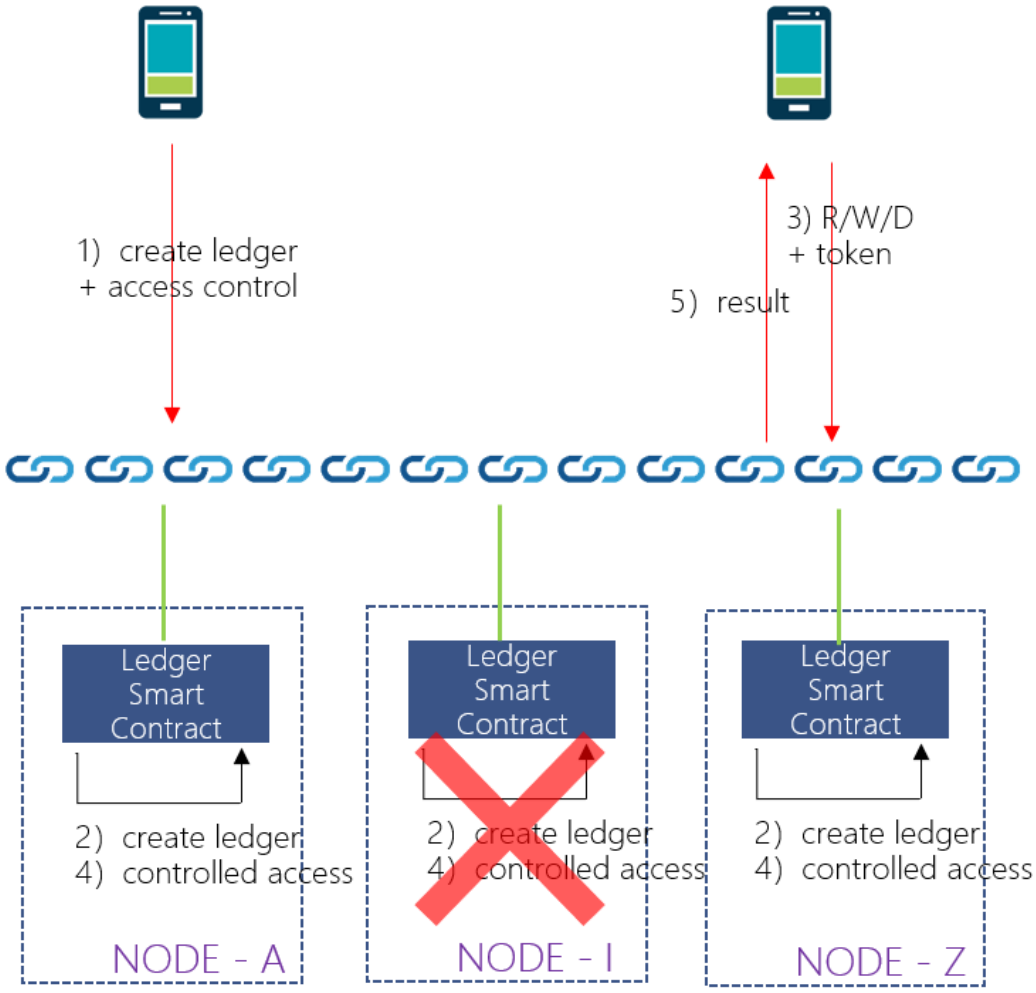

Fig 11) Private blockchain ledger

Flexible smart contract deployment

。

PDX Flexible Smart-Contract Deployment (FSCD) supports selective existence of a smart contract's code and data on blockchain nodes (Ref. Fig. 10) . As mentioned earlier, assisted with trustworthy out-of-band messaging with end-to-end security, PDX blockchain supports fully private and fully secure smart contract applications. This algorithm is PCT patent-applied.

PDX public blockchain, protects nodes against security threats and resource abuse via sand-boxing (docker, java policies etc.).

Simple yet smart RESTful interface

PDX blockchain natively supports RESTful smart contracts. As long as determinism is ensured, i.e. all instances of a smart contract start from the same initial state, fed with the same input, arrives at the same state, a PDX blockchain smart contract can implement any functionality and integrate with any system. PDX blockchain can help a smart contract monitor determinism of external integration and react accordingly when determinism is broken, e.g. smart contract freezing, de-provisioning, or transaction failure.

A smart contract only needs to implement basic transaction execution interface (exec method). A complex smart contract can also implement state query (query method), initialization on provisioning (init method) and de-provisioning (fini method) and transaction undo (undo method). The following is a sample smart contract on PDX blockchain:

```
@Path("/xyz.pdx/simple-contract")
@Consumes("application/pdx-baap")
@Produces(MediaType.APPLICATION_JSON)
public class SimpleContract implements IDaapDapp {
    @POST
    @Path("/exec")
    @Produces({MediaType.APPLICATION_JSON})
    @Consumes({"application/pdx-baap"})
    TransactionResp exec(@Context BaapContext ctx, Transaction tx){
        /* On execute a TX */
        //get state
        String name = BlockchainCtx.getState("name");
```



```
        TransactionResp tr = new TransactionResp();
        tr.setStatus(200);
        tr.setReason("");
        //set state
        tr.setState("name", "value");
        return tr;
    }
}
```

Supporting Hyperledger chaincode

PDX blockchain supports deploying Hyperledger 1.0 chaincode to enable seamless migration of Hyperledger chaincode to PDX blockchain, preserving users' investment and helping boost the PDX blockchain ecosystem. PDX blockchain supports fully private chaincode via selective existence on blockchain nodes and trustworthy out-of-band messaging with end-to-end security.

Supporting Ethereum smart contracts

PDX blockchain supports deploying Ethereum smart contracts to enable seamless migration from Ethereum, preserving users' investment and helping boost the PDX blockchain ecosystem.

Cryptographic currency

PDX public blockchain, via embedded cryptographic currency, called PDX coin (PDX), incentivizes all participants and at the same time serves as the charging and payment basis for products and services in the ecosystem. PDX is ERC20-compliant cryptographic currency (PDX coin) realized via the "Currency &

Payment" smart contract. PDX coin is the basis of incentivization, paid sharing and transaction charging on PDX blockchain.

In a healthy economic entity, the circulation of its currency adjusts according to its economy fluctuation. Since PDX public blockchain aims to be the infrastructure of trustworthy Internet for a trustworthy e-society, the total circulation amount of the PDX coins fluctuates according to the scale and activeness of the whole ecosystem.

PDX public blockchain simultaneously adopts incentivization and charging mechanisms. The incentivization and charging amount (in PDX coin) of the platform provided products and services decreases as the value of PDX increases (Fig 12). Initially, the incentivization amount is greater than the charging amount to help grow the platform ecosystem. After a balance point is reached sometime in the future, the charging amount becomes greater than the incentivization amount and hence revenue is generated. For non-platform provided products and services on the PDX public blockchain, its incentivization and charging models are determined solely by the respective owner(s).

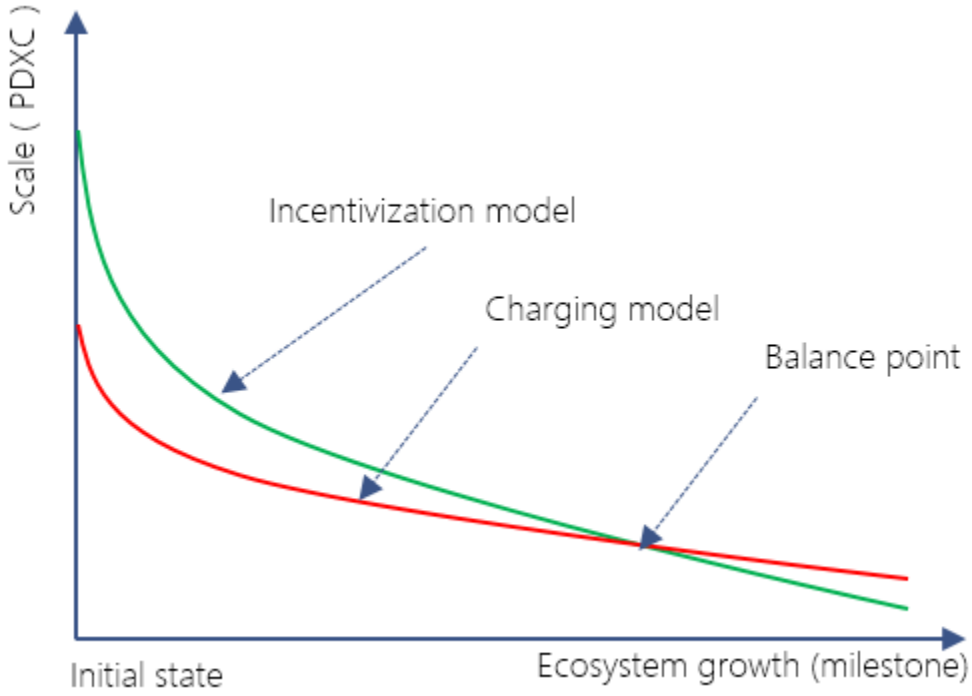

Fig 12) Incentivization vs. charging model

Circulation model

In a healthy economic entity, the currency circulation adjusts according to the scale of its economy. Aiming in the long term to be the infrastructure of trustworthy Internet for a trustworthy e-society, it's paramount for the PDX public blockchain to adopt a healthy virtual concurrency issuance and withdrawal policy.

The circulation amount of the PDX coins, includes initial offering and the gradually decreased new issuance for ecosystem incentivization. The root trust chain of the PDX public blockchain, evaluates the scale of the ecosystem and determines the amount of new issuance and withdrawal every 1,000,000 blocks.

The scale of the ecosystem is evaluated according to the number of physical nodes, the number of active users and active smart contracts. The scale index(SI) is defined as follows:

$$S = 100 * N + M/100 + \sum Ci$$

Here, N is the number of currently active physical nodes, M is the number of currently active users, and Ci is the number of deployed nodes for the ith smart contract.

PDX addition for incentivization

The addition of PDX for the ecosystem incentivization, decreases along with the growth of the ecosystem. The addition amount can be released from the withdrew pool, or generated by the platform. The addition is performed once every 1,000,000 new blocks generated by the root trust chain and the amount is calculated as such,

$$A = T * 0.05 * (1 - 0.05)^{\frac{blockNo}{1,000,000}} * MIN\{Snow/Sprev, 1\}$$

Here, T is the initial offering, blockNo is the current block number, Snow is the current scale index and Spre is he previous scale index.

PDX withdrawal & self-destruct

The PDX public blockchain generates revenue via charging of platform provided products and services and revenue sharing from products and services from 3rd parties. Part of the revenue temporarily withdrew from circulation or permanently withdraw from circulation via self-destruct, to realize circulation control under certain ecosystem economics. Werther to withdraw or not, and the amount to withdraw is decided every 1,000,000 blocks generated by the root trust chain.

The withdraw condition is that Snow/Spre <= 90%, i.e. withdrawal is triggered if/when the ecosystem shrinks 10% or more. The withdrawal amount is calculated as such:

$$A = T * 0.05 * (1 - 0.05)^{\frac{blockNo}{1,000,000}} * Snow/Sprev$$

Here, T is the initial offering, blockNo is the current block number, Snow is the current scale index and Sprev is the previous scale index.

Value of PDX

As the first public blockchain IaaS, PDX public blockchain enables everyone the capability to create his/her own dedicated blockchain platform and deploy blockchain applications. As the only cryptographic currency across the whole ecosystem, the value of PDX will definitely increase as the ecosystem, including but not limited to number of nodes, number and variety of applications, number of active users sustainably grow.

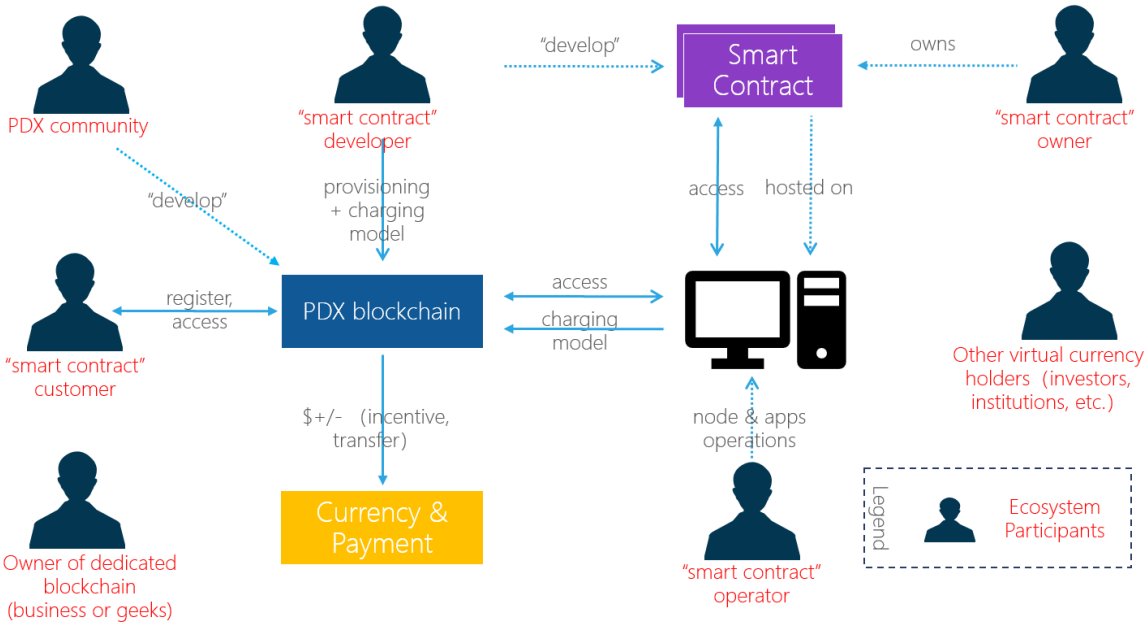

Fig 13) PDX blockchain ecosystem

As the basis for incentivization and charging and clearing on the ecosystem, PDX is valuable in but not limited to the following areas:

Incentivization

The PDX public blockchain, incentivizes all contributors of the ecosystem (Fig 13), including but not limited to end-users, developers (blockchain engine, consensus algorithm, smart contracts etc.) and operators of the platform. Note that the incentivization is to motivate contribution to the ecosystem, not the PDX token holders. The incentivization to is achieved automatically via the blockchain software system. PDX incentivization model, based on proof of activeness and proof of contribution, will be unambiguously defined in the genesis file of the platform. The scale of the incentivization decreases as the ecosystem grows and is realized on key milestones.

PDX public blockchain supports the developers/owners of a smart contract to pay extra incentivization to stakeholders of the platform (e.g. operators of the smart contract, block generation etc.).

Charging

PDX public blockchain meanwhile defines charging model. The charging model for dedicated business blockchains in the ecosystem, depends on the number of standard physical nodes, number of smart contracts etc. The charging model for smart contract applications, depends on the system resources (mainly CPU, RAM, storage and bandwidth) consumption and equally distributes the payment to the number of nodes hosting it.
PDX public blockchain favors transactions with higher incentivization and rejects transactions with lower than expected incentivization.

Payment

PDX public blockchain, supports smart contracts for automated payment and clearing via PDX. The owner(s)/operator(s) of blockchain nodes, and owner(s)/operators(s) of the smart contracts, can publish its charging model to the ecosystem and the platform performs automated payment and clearing in a transparent, traceable, no repudiated and non-altered manner. If so desired a smart contract can do its own payment and clearing.

PDX acquisition

To acquire PDX, one can go through one or more of the following means:

1) Contribute ETH to support the PDX public blockchain project and gets rewarded with PDX tokens in exchange
2) Participate in the construction of the ecosystem and gets PDX via incentivization and payment
3) Trade from PDX public blockchain or 3rd party asset exchanges

Patent-applied inventions

PDX applied three heavyweight PCT patents, they are: 1) massively scalable, low latency, high concurrency and high throughput decentralized consensus algorithm; 2) massively scalable blockchain ledger; and 3) flexible blockchain smart contract deployment. Two more patent applications are still in the preparation stage and will be filed upon completion.

Massively scalable and low latency consensus

Electronic Acknowledgement Receipt	
EFS ID:	30191773
Application Number:	
International Application Number:	PCT/US17/48731
Confirmation Number:	9197
Title of Invention:	Massively Scalable, Low Latency, High Concurrency and High Throughput Decentralized Consensus Algorithm
First Named Inventor/Applicant Name:	Jiangang Zhang
Customer Number:	23123

Fig 14) Receipt of patent application on high-performance consensus

Massively scalable blockchain ledger

Electronic Acknowledgement Receipt	
EFS ID:	30230764
Application Number:	
International Application Number:	PCT/US17/49423
Confirmation Number:	3018
Title of Invention:	Massively Scalable Blockchain Ledger
First Named Inventor/Applicant Name:	Jiangang Zhang
Customer Number:	23123

Fig 15) Receipt of patent application on scalable ledger

Flexible smart contract deployment

Electronic Acknowledgement Receipt	
EFS ID:	30257432
Application Number:	
International Application Number:	PCT/US17/49853
Confirmation Number:	7638
Title of Invention:	FLEXIBLE BLOCKCHAIN SMART-CONTRACT DEPLOYMENT
First Named Inventor/Applicant Name:	
Customer Number:	23123

Fig 16) Receipt of patent application on flexible smart contract deployment

Platform demonstration

The foundation of PDX blockchain, PDX BaaP, has been in production since 2016/06/30. Below are some screenshots from an internal testing chain.

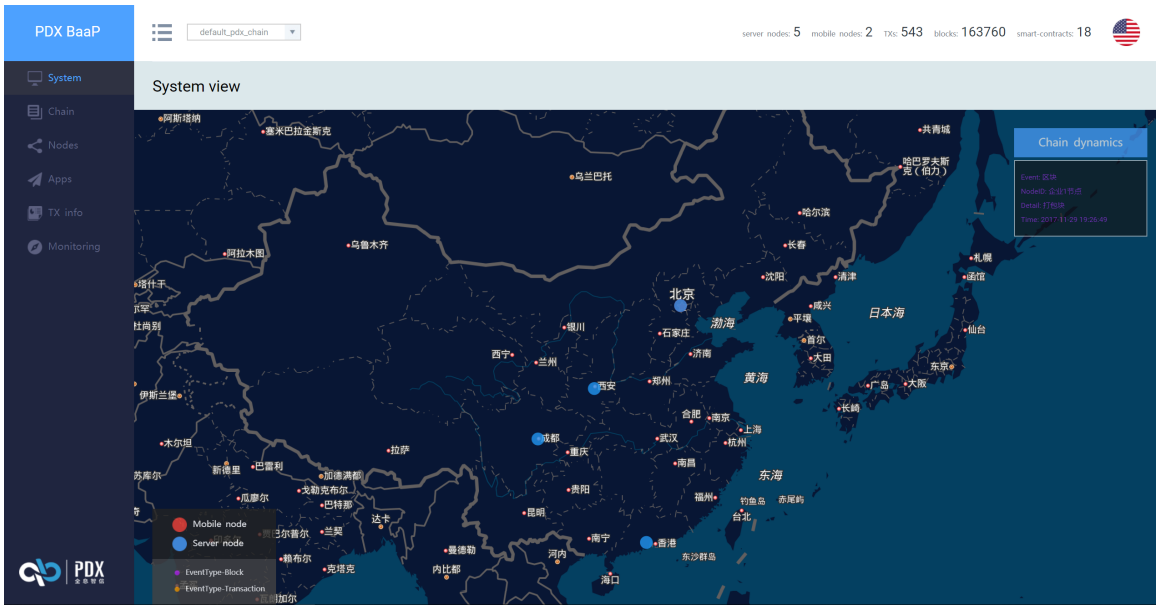

Fig 17) PDX BaaP platform overview

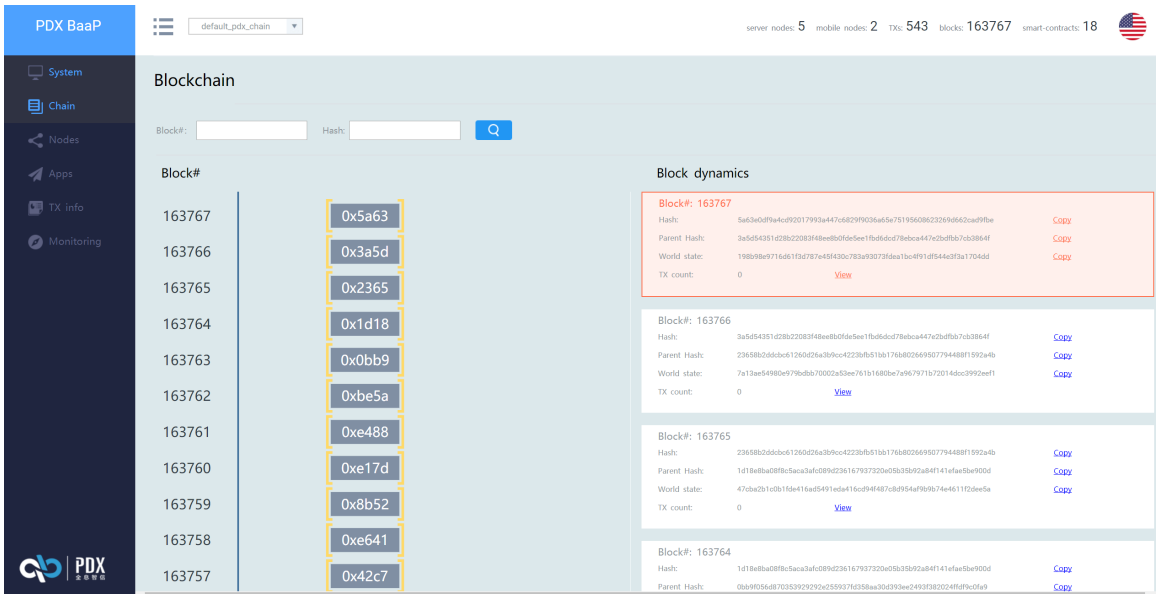

Fig 18) PDX BaaP blockchain browser

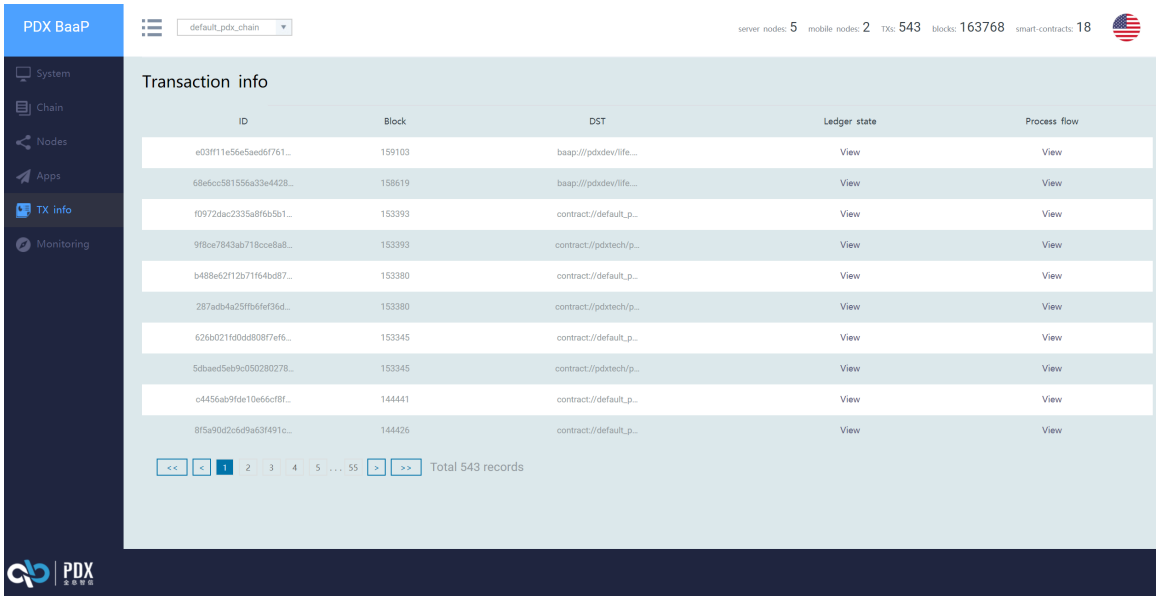

Fig 19) PDX BaaP transaction browser

Coin offering plan

The total initial offering of PDX coins is 10,000,000,000 PDX. The initial sale offers 20% of the total offering, i.e. 2,000,000,000 PDX, targeting only selected investors (specific qualified institutions and investors) in exchange of Ethereum (ETH) cryptocurrency. The soft and hard ceiling of the initial sale is 15,000 ETHs and 20,000 ETHs respectively.

Distribution

Ratio	Distribution details
20%	Initial sale
20%	Project team
20%	PDX Foundation
15%	Ecosystem incentivization
5%	Compliance & legal
20%	Business development & collaboration

Initial sale

The initial sale only targets qualified investment institutions and is divided into two phases, angel-investment phase and private-investment phase. The angel phase is capped at 2% of the total offering (i.e. 200,000,000 PDX), with 50% of the tokens issued locked with a period of 6 months. The private phase is capped at 18% of the total offering (i.e. 1,800,000,000 PDX), with 30% of the tokens issued locked with a period of 4 months.

Project team

20% (2,000,000,000 PDX) of the total initial offering is allocated to the project team with lock period of 36 months. 5% (500,000,000 PDX) will be unlocked when PDX TestNET goes online. Afterwards, 1.25% (125,000,000 PDX) is unlocked each quarter.

PDX Foundation

20% (2,000,000,000 PDX) is allocated to the PDX Foundation to help boost the organic growth of the community and the ecosystem, motivate top developers and teams and reward advisors that greatly helped the project etc. The wallet address will be published online when the project MainNET goes online. Each reward proposal will be open for community review and be voted by the Steering Committee of the PDX Foundation.

Incentivization

15% (1,500,000,000 PDX) is allocated for ecosystem incentivization. The PDX public blockchain ecosystem bases on the proof-of-activeness and proof-of-contribution to decide incentivization factor and incentivize participants accordingly.

Compliance & legal

5% (500,000,000 PDX) is allocated to reward for the professional service provided by top legal and compliance experts in the area of digital currency, blockchain, FinTech who helped the healthy growth of the project.

Business development

20% (2,000,000,000 PDX) is allocated for the business development and

operations of the project in the area of sales and marketing, user acquisition, and community operations etc.

Budget plan

The proceeds acquired, will be mainly for the following areas for the successful development and operations of the PDX public blockchain.

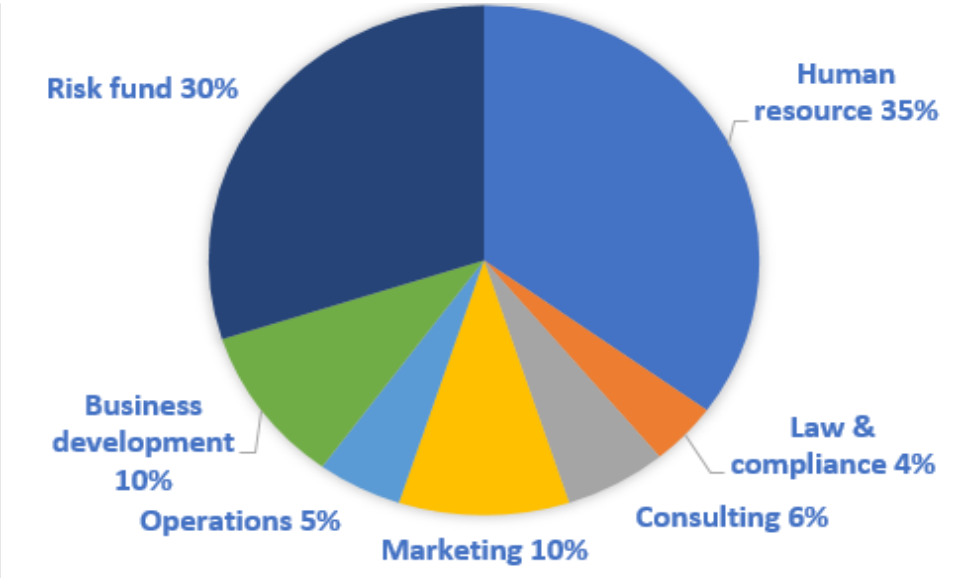

Fig 20) Budget plan

The budget plan details are as follows:

Item	Ratio	Detail
Talent acquisition	35%	Realization of the PDX public blockchain requires top talents on blockchain, security, privacy, clustering, big data and operations etc. The proceeds allocated is adequate for 2 years of talent cost.

Operations	5%	Via typical Internet company operations model. The proceeds allocated is adequate for 2 years of operations cost
Marketing	10%	Two years expenses on branding, advertisement, cross domain partnership after going online
Business development	10%	To discover and cultivate the business development of all kinds of applications to maximize the societal and commercial value of the PDX public blockchain.
Consulting	6 %	Blockchain technology is still nascent and in rapid development. This is to cover the cost to follow and innovate on related technologies.
Risk fund	30%	For unpredictable risks
Law and compliance	4%	To attract top lawyers and compliance experts in the field of digital currency, blockchain and FinTech etc.

Foundation & governance

The PDX public blockchain ecosystem is governed by the PDX Foundation. The PDX Foundation is registered in the Singapore; its sole responsibility is for the organic growth of the ecosystem, fair and transparent operation of the project and supporting the community at large.

To boost the growth of the PDX public blockchain ecosystem, to ensure the decentralized nature of the ecosystem and to encourage more institutions, corporations, organizations and individuals to join and contribute, the project adopts the following committee-based governance structure:

1. Steering Committee

The Steering Committee is the supreme governing body of the PDX public blockchain ecosystem. It decides the strategy and execution for all critical issues facing the ecosystem including but not limited to new partnership acceptance, adjustments of the MainNET, long-term strategic plan, annual execution plan and budgeting etc.

2. Executive Chairman

The Executive Chairman is elected by members of the Steering Committee and reports to the Steering Committee. The Executive Chairman is fully responsible for the daily execution of the PDX public blockchain ecosystem, and reports to the Steering Committee regularly. The Executive Chairman is fully empowered to establish necessary execution organizations and committees to assist him to do the job effectively.

3. Technical Committee

The Technical Committee is responsible for the development and review of the platform technologies, the daily operations of the PDX MainNET and other platform components, as well as following the latest trends on technology advances and market requirements. The Technical Committee is composed of technical development, technical consulting, product design and other organizations.

4. Operations Committee

The Operations Committee is responsible for the business execution of the PDX public blockchain ecosystem and the maintenance of the community. The goal is to unite the developers, users and other participants of the PDX ecosystem around the globe, drive the establishment of trustworthy Internet infrastructure to realize trustworthy society. The Operations Committee is composed of product operations, community operations and other organizations.

Development plan

The development of the PDX public blockchain ecosystem is divided into 5 stages: Preparation, Initiation, Germination, Production and Maturation. On the date publishing this whitepaper, the Preparation stage has already been completed and now it's in the Initiation stage.

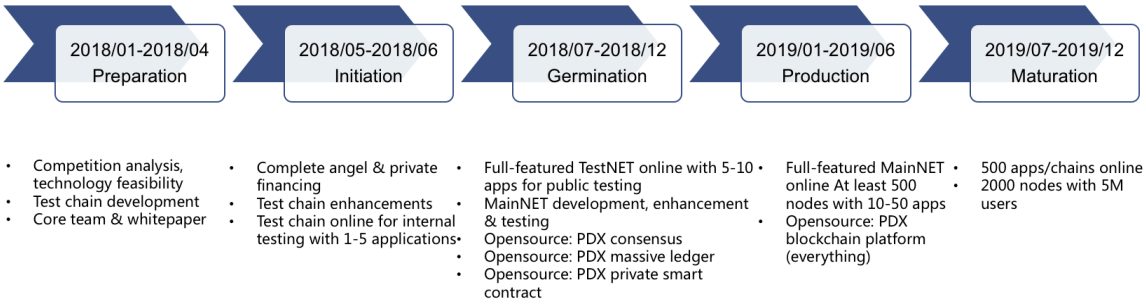

Fig 21) Development plan

Preparation

The main focus during the Preparation stage are, business model and collaboration, TestNET prototyping, establishment of the core team, whitepaper and PR and marketing initiatives.

Time period	2018/01 ~ 2018/04
Milestones	Establishing the global core team Business model and collaboration TestNET prototyping Whitepaper
Business model &	Competition and strength analysis

collaboration	Business model, incentivization model and its feasibility Initial selection of applications and business partners Communication with early-stage investors and decision on angel investors
TestNET prototyping	Architecture of the PDX public blockchain based on PDX BaaP Adaptation of PDX BaaP to prototype TestNET Offer TestNET to partners for their on-ecosystem application development
Core team establishment	Org structure of the governing foundation Core product and engineering team, including engineering partners and core team members Global business development team Global advisory team, including technology, business and legal.
Whitepaper & PR initiatives	Establish the community on Telegram, Twitter, Facebook, LinkedIn and Reddit etc. Keynote speeches to promote the Project

	Complete the project whitepaper

Initiation

The main focus during the Initiation stage are, angel and private financing, development of the TestNET, bringing internal TestNET online and hosting apps on internal TestNET, as well as continued PR and marketing initiatives.

Time period	2018/05 ~ 2018/06
Milestones	Angel and private financing Development of the TestNET Internal TestNET online Apps on internal TestNET
Angel and private financing	Complete angel and private financing Decide business partners on asset exchange
TestNET development	Support massive data Support private smart contract Support transaction dependency

	Support smart-phone/IoT devices Support cross-chain & multi-chain
Internal TestNET online	Bring online internal TestNET with 10 nodes Supporting apps to run and test on TestNET
Apps on internal TestNET	1-2 smart contracts on TestNET for test and trial run

Germination

The main focus during the Germination stage are, full-featured TestNET online, 5-10 apps on TestNET, development of MainNET and opensourcing major algorithms, as well as continued PR and marketing initiatives.

Time period	2018/07 ~ 2018/12
Milestones	Full-featured TestNET online 5-10 apps on TestNET MainNET development Opensource of major algorithms
Full-featured TestNET online	Full-featured as scoped in architecture One-click creation of a dedicated blockchain instance One-click deployment of a smart contract

	Tree of trust chains Cross-chain interaction
5-10 apps on TestNET	5-10 internal and partner apps on TestNET for trial access
MainNET development	PDX high-performance consensus PDX massive ledger Sharing of physical layer Blockchain "app" store Decentralized asset exchange
Opensourcing major algorithms	PDX high-performance consensus PDX massive ledger PDX secure & private smart contract

Production

The main focus during the Production stage are, full-featured MainNET online, establishment of the ecosystem and opensourcing of the whole PDX public blockchain platform, as well as continued PR and marketing initiatives.

Time period	2019/01 ~ 2019/06
Milestones	Full-featured MainNET online Ecosystem established Opensourcing of the whole platform
Full-featured MainNET online	Full-featured MainNET online
Ecosystem established	500 nodes with 10-50 apps on MainNET
Opensourcing the whole PDX blockchain platform	PDX public blockchain platform PDX blockchain engines PDX blockchain platform for smart-phone & IoT

Maturation

The main focus during the Maturation stage are to ensure the stable operation of the ecosystem and its rapid and organic growth, as well as continued PR and marketing initiatives.

Time period	2019/07 ~ 2019/12
Milestones	Stable operation of the ecosystem and its rapid organic growth
Stable operation & rapid growth	500+ apps and blockchain instances 2000+ nodes 5M users

Core Team

Jiangang Zhang（aka JZ），PDX blockchain founder，Bachelor's degree from Huazhong University of Science & Technology of China and Master's degree from Automation Research Institute of Ministry of Metallurgical Industry of China. As the chief architect of PDX blockchain and PDX BaaP, Mr. Zhang has 20+ years leadership experiences with multinational companies across the globe, responsible for strategic technical initiatives and its execution. Before founding PDX, Mr. Zhang held multiple high-profile positions in a wide spectrum of multinational companies, e.g. as a director-level Principal Engineer at Cisco in its enterprise SDN organization, as the Distinguished Security Architect at Yahoo, and expert member of Yahoo! TechCouncil, as a staff architect at PayPal and founder the PayPal Java Infrastructure team, as one of the highest ranking architects at Cingular Wireless (now AT&T) and member of the corporate Architecture Review Board (ARB). Mr. Zhang held one information security patent, three crucial blockchain patents applied on massively scalable and low latency consensus algorithm, massively scalable blockchain ledger and flexible smart contract deployment respectively. Mr. Zhang was invited by People's Bank of China & Payment and Clearing Association of China to conduct a research project on digital currency (topic: fundamental infrastructure of digital legal tender)

Dongmei Shang，director of business operations. Bachelor's in chemistry science from Jiangsu University with 10+ years leadership experiences in human resource and back office administrations.

William Huang， PDX blockchain senior architect and senior director of engineering，Computer Science Ph.D. from Florida State University. He has extensive technical architecture experiences, e.g. at PayPal as a principle architect and senior manager, at Reuters/Tibco as principle architect. He's very

experienced on massively scalable payment systems, big data and machine learning.

Tina Chen， PDX blockchain architect and director of engineering, Bachelor's degree in computer science from York University of Canada. She worked as senior engineer and architect from IIX（Verisk Analytics）、JP Morgan Chase、Shell Trading、BP America、MCI etc.

Nawien Sharma，PDX blockchain architect and major code contributor，Bachelor's degree in electrical engineering from University of Windsor in Canada. He has extensive technical leadership experiences on software engineering, e.g. as a principal engineer at Yahoo!, as a systems architect at CenturyLink, as software development engineer II at Microsoft etc.

Andy Zhang， PDX blockchain senior engineer and major code contributor. Majoring computer science at Cornell University, he was an intern at Stanford Research Institute (SRI) and got rewarded for the excellent work and co-authored a paper on deep learning. He's accepted by Google as an intern and has led or participated various AI/deep learning projects, e.g.
Modemo: political bias analyzer, baeML: personalized content platform, fmxnet: deep face analysis platform.

Advisors

- Weining Zhang，Dr. Zhang is currently associated professor at Cheung Kong Graduate School of Business (CKGSB) and holds Ph. D from University of Texas Dallas. Dr. Zhang Dr. Zhang was faculty at National University of Singapore.
- Jack Liang，Partner and co-founder of Kinzon Capital with 15+ years of investment and business operations experience. Jack holds an MBA from Yale University, an MA in computer and electrical engineering from Iowa State University and a BS in electrical engineering from Tsinghua University.
- Guang Zhao，Dr. Zhao held many high-profile positions during his 20+ years experiences, e.g. CEO of Haier Digital Technology Co. ltd，senior executive partner at Gartner, Adjunct Faculty at University of South Carolina, Assistant State Registrar/Bureau Chief/ CIO at the state of South Carolina. Dr. Zhao held a Ph.D degree from Michigan Technological University.

Investors

PDX is very grateful to have the trust and support from our investors. The following is an incomplete list of them:

Follow PDX

1) https://www.facebook.com/PDXbaap
2) https://twitter.com/PDXbaap
3) https://www.linkedin.com/company/PDXbaap
4) https://www.reddit.com/user/pdxbaap/
5) https://github.com/PDXbaap

