QUANT

Quant Overledger ®
Business Paper

Release V0.1 (alpha), 10 March 2018

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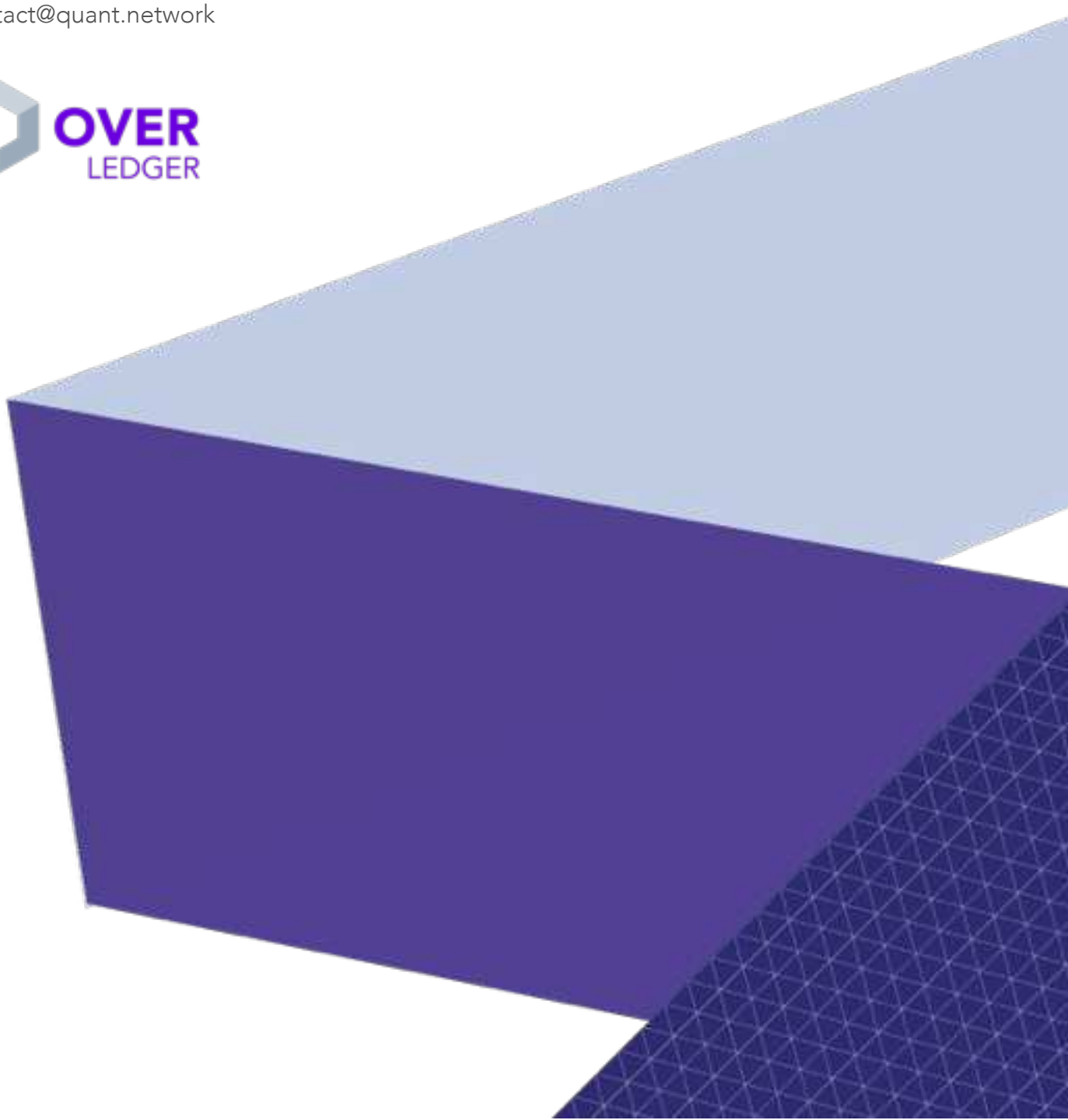
OVER LEDGER



1. Executive Summary

Overledger is the blockchain Operating System (OS) of the future. It empowers applications to function across multiple blockchains. Overledger securely removes barriers prohibiting communication across multiple blockchains, providing endless possibilities for data and applications.

The potential uses of blockchains are seemingly limitless. The world's smart cities, new industries 4.0 and tech startups are using blockchain for everything from global payments to music sharing. It's predicted in the next few years much of our digital consumption and footprint will be run via blockchain foundations without us even realising it. According to WEF, by 2027, 10% of global GDP value will be built on blockchain applications.[1] However, in order for blockchain technologies[2] to truly offer endless possibilities, we need to:

+ Enable applications to function across multiple blockchains (multi-chain applications);
+ Not be limited to any single vendor or technology; and
+ Allow for the exchange of data across multiple blockchains. This includes recognition of transactions related to changes of ownership (for off and on-chain assets) and obligations/rights, arising from smart contracts, across different blockchains.

Overledger is a blockchain operating system providing the ability to distribute value and applications across both current and future blockchains, without being limited to a single technology or method.

Overledger is an agnostic platform that connects the world's networks to current and future blockchains. Overledger sits on top of blockchains providing a meta-gateway for existing networks to connect to blockchains and vice-versa.

1.1 Vision

For the first time, we can honour the original vision of the Internet to create an open, interoperable and trusted network for people, machines and data to operate on, but without the original flaw of having to know everyone in the network.

We can trust the network without the need to know and trust each other. Overledger connects the world's networks to blockchains.

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[1] World Economic Forum (2015) "Deep shift technology tipping points and societal impact", available at: http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf (accessed 1st March, 2018).

[2] Although there is a significant ontological difference between blockchains and distributed ledger technology (DLT), in this document, unless stated differently, for the sake of simplicity, we use both terms interchangeably.

We sought inspiration from TCP/IP, introduced in 1972, and recognised it first gained traction in a single-use case: the basis for e-mail among the researchers on ARPAnet. The original vision of ARPAnet was a closed network where every member (node) knew exactly who the other party was. During the late 1980s and 1990s, companies such as Sun, NeXT, and Hewlett-Packard used TCP/IP, in part to create localized private networks within organisations. However, with the immense expansion of the Internet, more and more networks and people started connecting; naturally, that became more complex to achieve. The Internet became and remains untrusted to this day.

1.2 Our Goals

+ Enable interoperability between different DLT frameworks, as well as between DLT and existing networks and enterprise systems.
+ Create an ecosystem of community and enterprise driven multi-chain applications and users.
+ Connect the Internet to Blockchain through Overledger. Allowing direct routing of TCP/IP to Blockchain addresses.
+ Create Blockchain addresses in the form of Quant IP to establish the **Internet of Trust**.
+ Create foundational Internet applications on Overledger.
+ Create Quant IDs to overlay Quant IPs for people to transact.
+ Foster mass-adoption of blockchain technology through collaboration.

We're starting by focusing on three goals:

1. Develop an interface to connect the world's networks to multiple blockchains
2. Bridge existing networks (e.g. financial services) to new blockchains
3. Develop a new blockchain operating system with a protocol and a platform to allow developers to easily create next-generation, multi-chain applications.

2. The Problem of Single-chain DApps

Blockchains have traditionally been quite difficult to implement within enterprises and governments. Since the introduction of blockchain technology, organizations have been experimenting with the feasibility of blockchain to understand its capabilities. Proposing internal business use cases to implement a new

technology interfacing with an existing mature enterprise backend are difficult. A common question executives ask is "Why should I use blockchain?" Another key question raised by stakeholders will be whether blockchain technologies will be feasible considering implementation costs.

Blockchain promises to be very efficient in streamlining a number of processes, such as settlement, compliance, etc. However, the estimates of the benefits do not usually factor timeframe and unknown implementation costs and any short-term risks involved. The implementation costs will highly depend on the type of distributed ledger an enterprise chooses to apply, which can vary according to factors such as; scale, security, type of consensus mechanism, etc. The overall implementation costs are hard to estimate as indirect short-term costs will have an impact on other processes of a given business. Moreover, the costs depend on the type of industry and organisation, its size, maturity, etc.

Even in the absence of multi-party projects, requiring the coordination between different players, the visionaries within an enterprise face sizeable challenges. They're required to sell their ideas to multiple stakeholders, at the highest levels, in order to have their business cases involving DLTs approved. In addition, they also need to convince risk and security units that blockchain experiments, or pilot projects, will not put their environments at risk and potentially out of regulatory compliance.

There were some early adopters and visionaries of this technology in the financial services sector. At that time, some banks wanted to use distributed ledgers to gain efficiency, simplify processes and address business, technical and regulatory challenges.

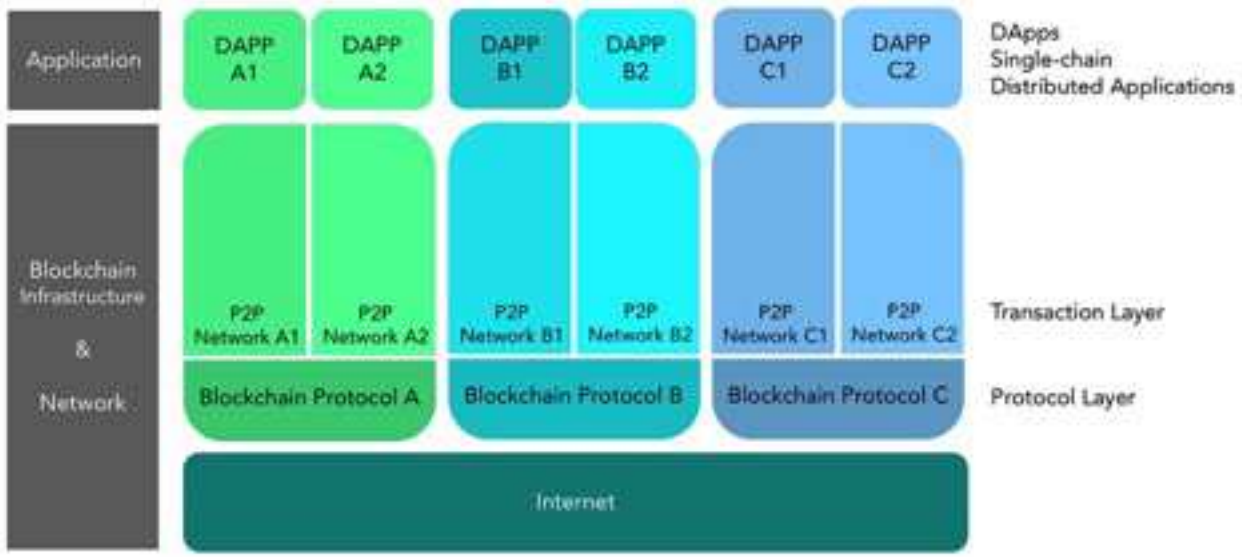


Figure 1: Representation of the current blockchain architecture.

After convincing the internal stakeholders, the problem becomes selection of the right technology and which experiment the company should pursue. This indeed, is a tricky choice, especially if the blockchain-based solution needs to be linked to other blockchains or integrated into complex business lines and

legacy systems. The challenge is whether these will be compatible. This technical issue arises from the fact that the current blockchain environment is fragmented, as there are several competing blockchain architectures, all of which are still evolving. The complexity and lack of interoperability[3] of which makes it almost impossible for a business to select and rely on one unique blockchain indefinitely.

From a practical point of view, this lack of compatibility makes decentralised applications (DApps) single-ledger dependent. Once a blockchain solution is chosen, the company will be locked-in. Under these circumstances, there is no appetite to invest a substantial amount of resources, time and effort to create technologies on a particular blockchain, only to then be forced to migrate to another platform or be locked into that particular version. The fact that DApps can only run on one blockchain network or one protocol at-a-time, also brings business and legal consequences. This means any legal consequence of business logic implemented and executed on a given network, or protocol, will only be effective within the community of peers taking part in that network. In a simplified example, this means the change of property of digitized asset X from user A to user B in the Bitcoin network will not be effective and recognised by the users of other networks, for example, Ripple. This example can be extended to a plethora of business cases.

To better understand the problem of having single-ledger DApps, Figure 1 represents the main buckets of a blockchain system: the protocol, the network and the application. The protocol is characterised by the software architecture defining the set of rules and codes to be followed in order to allow the system to work (e.g., consensus rules, data structure, cryptographic hash functions, etc.). The network is related instead to the peer-to-peer transaction layer which defines the set of nodes and connection rules the players must follow to run the protocol. The network can be open or permissioned, different read/writing rules apply. It is important to mention now, more than one blockchain network can sit on top of the same protocol. An example of this would be the Ethereum testnet and main net networks both running under the same Ethereum protocol. The final layer is the one that defines the business logic: the application layer. In the future, the users of a blockchain-based service will focus exclusively on this layer and will not need to care about the fact that the service runs on a blockchain system.

The problem of single-chain DApps, lack of interoperability between blockchains, as well as between blockchains and existing networks and enterprise systems is the major pain point of current blockchain development and adoption. While there has been tremendous progress in the blockchain ecosystem around use cases, pilot projects and new emerging platforms, interoperability across applications, platforms, and infrastructure still remains elusive. If interoperability between applications sitting on different networks, built on the same protocol (cross-application interoperability) is difficult to achieve, the interoperability between applications that sit on different protocols (cross-platform interoperability) still remains a mirage. In fact, leading open source platforms (like Bitcoin, Ripple, Ethereum, Quorum, Corda

[3] In the remainder, unless differently specified, with the term "interoperability" we include two major categories: 1) cross-chain interoperability which relates to the interoperability between different DLT-based systems; and 2) enterprise system interoperability which relates to the integration of DLT networks and applications to legacy enterprise systems.

or Hyperledger Fabric) on which most of applications are based, take a dramatically different approach to their building blocks. For example, consensus, transaction capabilities, tokenisation, extensibility, security and privacy, codebase, identity management, charging and rewarding systems.[4]

3. An OS for Multi-chain DApps (MApps)

One of the most relevant examples of foundational technology like blockchain is distributed computer networking technology, seen in the adoption of TCP/IP which laid the groundwork for development of the Internet. We see the adoption of this technology as the catalyst that accelerated the growth and possibilities of the internet we all know and love today. Our solution to the single-ledger dependency problem is called Overledger. It's inspired by the best of both OSI and TCP/IP layering models.

Overledger is a patent-pending[5] blockchain Operating System (OS) able to handle and process data from/ to any type of blockchain allowing DApps to exchange information stored in different DLTs and to mutually use the information that's been exchanged. In order to achieve a general level of interoperability and to provide horizontal and vertical scaling, Overledger decouples the blockchain architectures in the "transaction layer", "messaging layer", "filtering and ordering layer" and the "application layer". Our architecture follows similar principles that inspired the OSI and TCP/IP models for communication networks, by redistributing the tasks among four different layers built on the transport layer, since most blockchain technologies are built on the Internet. By doing so, Overledger enables developers to build, what we call, multi-chain applications (MApps): DApps that seamlessly run the same business logic across different blockchain networks and protocols. See Figure 2.

[4] Paolo Tasca,Thayabaran Thanabalasingham, Claudio J.Tessone. "Ontology of Blockchain Technologies. Principles of Identification and Classification." https://arxiv.org/abs/1708.04872

[5] "Blockchain Communications and Ordering" Patent number: 17425121.5-1217.

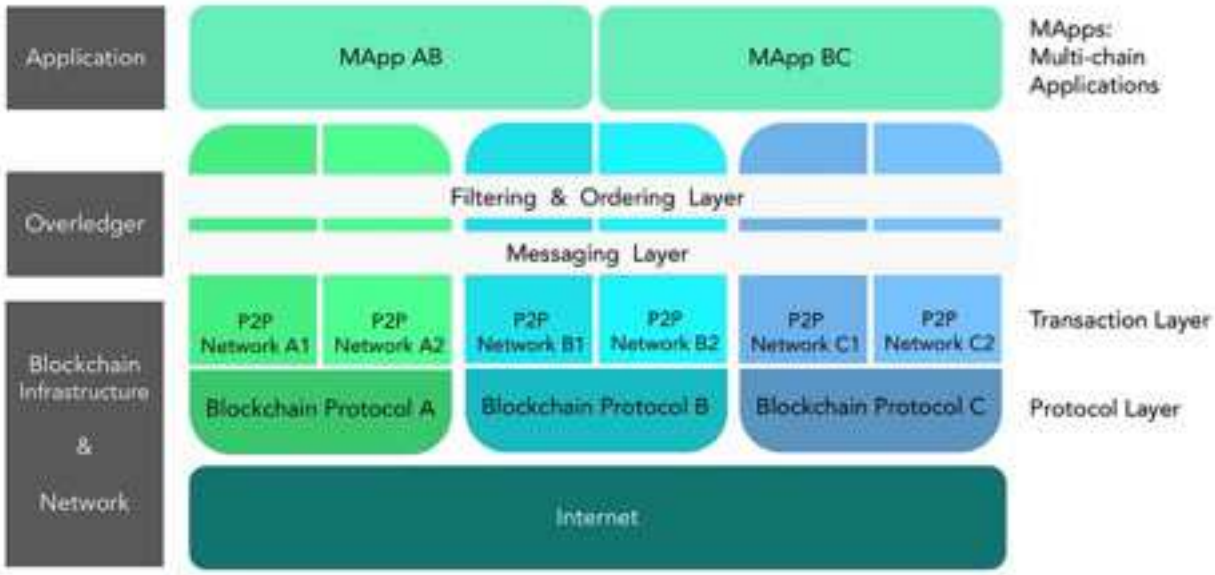


Figure 2: Representation of the current blockchain architecture and the role of Overledger in enabling MApps

Transaction Layer. This layer stores transactions that are appended, stored or queued on the ledgers. It includes all operations needed to reach consensus on different blockchain domains (in this representation, we simplified this by putting all those operations in one layer). However, all transactions executed in a specific blockchain have scope exclusively in that domain. Therefore, it is not possible to also make them valid on other ledgers. Therefore, this layer is represented by different and isolated ledgers.

Messaging Layer. This is a logical layer because all the relevant information is retrieved from the ledgers. Information can be transaction data, smart contract or metadata (if the underlying ledgers can add arbitrary strings on transactions). In the particular case of metadata, the added strings are typically the digest of out-of-chain messages that can be interpreted as the payload in this logical layer. This logical layer stores all transaction information and the message's digests of different applications in the same way a shared channel has packets of different applications. One of the main challenges of creating a truly scalable, interoperable DLT system, flexible enough to be adopted for different technological uses, is being able to handle such large amounts of data. To that end we have created an adaptable messaging system with the capability to handle large amounts of data across multiple nodes. The messaging system we've created utilises standard technologies which can be easily integrated into existing systems. This will standardise the back-end technology required to build truly internet scalable applications.

Filtering and Ordering Layer. This layer is responsible for creating connections among different messages built in the *Messaging Layer*. In this layer, messages are extracted and built from the transaction information. Only those messages referenced in the transaction through a hash, exchanged out of the chain, are filtered and ordered. In the case of metadata, this is the layer in charge of the validating out of chain messages. The validation checks the application schema and its requirements. Application requirements can be of any type and can also concern particular fields of transaction data. For example, an application may only accept transactions from/to a particular address or may need a certain amount of

coins to be moved. Therefore, applications can exist which only consider messages moving a certain amount of coins to a specific address as valid.

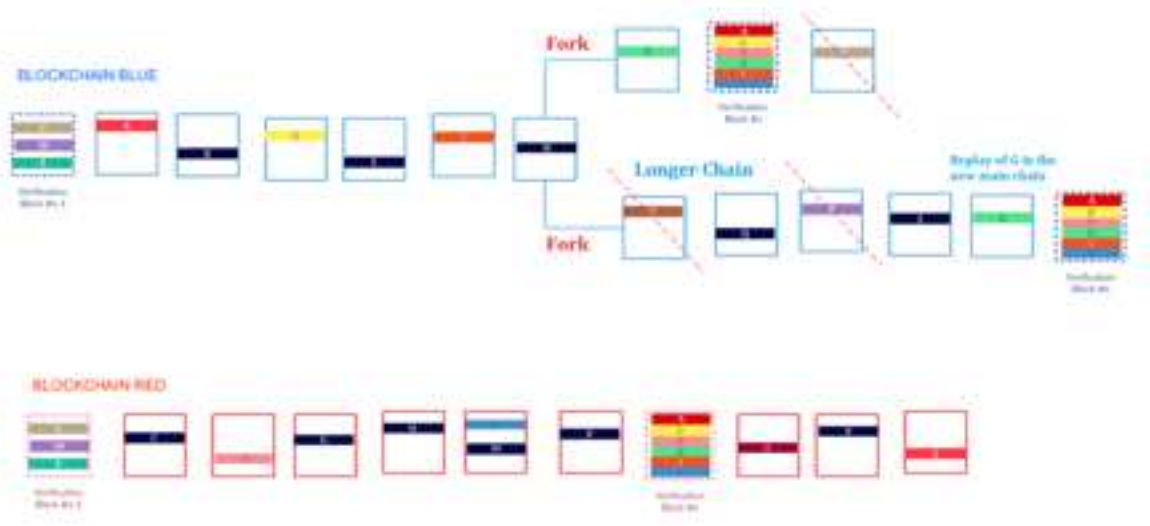


Figure 3: Scheme that represents the role of the Verification Block

To order the blockchain transactions which are of interest for an application, the application scans the ledgers involved and places transaction hashes compliant to the Applications Blockchain Programming Interface (BPI) into a Virtual Block, called the *Verification Block*: our cross-DLT ordering solution (see Figure 3). Our technology solves one of the key challenges of creating MApps, namely letting the application determine whether a block has been committed on another chain. For instance, if the application commits a block to the wrong side of a fork and that particular fork is not accepted as part of the consensus mechanism, our Verification Block can detect and prompt the application to take action.

Application Layer. Valid messages that respect the requested format, and have the requested signatures, from the list of the application's messages. Messages can update the state of their application. Different applications can share the same messages or can refer to messages of another application. The message references are the unique hash pointer to the transaction in the ledger that contains the digest of the messages. The hash pointer is basically a pointer to the place where some (cryptographic) hash of the information is stored. It is an identifier that can be used to uniquely select a transaction and to verify it hasn't changed.[6]

[6] More in-depth detail is provided about our technology in the technical White Paper located at: Quant Overledger - Release V0.1 (alpha), 31 January 2018

3.1 Novelty of Quant Overledger

Overledger differs from existing DLT Interoperability platforms by decoupling the message layer from the transactional layer of the DLT technology in question, providing:

+ **Flexibility** - The option and ability to move to different ledgers if the underlying DLT becomes obsolete or transaction fees are too high, ensuring availability and saving you money

+ **Backwards Compatibility** - The ability to connect your legacy data sources or external APIs to DLT technologies, taking advantage of key aspects of the technology

+ **Simplicity** - Easy to use development interfaces to produce both cross ledger and standard applications, reducing time to market and democratizing development.

The Overledger solution addresses four parameters of system interoperability (see Table 1):

1. Transport. This relates to the type of transport infrastructure adopted by DLT and legacy systems. If the transport facets do not align, then a protocol to convert and transfer the signals is needed.

2. Data Syntactic. This regards the similarity of data syntax between systems. If the syntactic facets do not align, then some form of data syntax conversion is needed.

3. Data Semantic. This characteristic relates to data structure and its meaning. If the semantic facets between systems don't align, a new data model would need to be implemented. This is generally very difficult to achieve.

4. Behavioural Semantic. This relates to how a system reacts when data is exchanged with another system.

	Aim	Object	Requirements
Transport	Data transfer between DLT systems	Signals	Protocols of data transfer
Syntactic	Receive data in an understandable format	Data	Standardized data exchange formats
Semantic	Receive data using an understood data model	Programmatic interface	Common interpretation of data model
Behavioral	Obtain expected outcomes to service requests	Information	Behavioral models for services

Table 1: The four facets of DLT interoperability addressed by Overledger.

We have used our know-how, having previously worked within enterprise and government, to build technology easily adoptable while providing the enormous benefits of scalability, resilience and flexibility working with blockchains.

For enterprises and developers, we've engineered our technology to be seamless to implement, comply with internal and external security and regulatory requirements, require minimal changes to existing systems and networks wishing to access the networks of blockchains through Overledger.

We're excited about the possibilities Overledger will bring to developers, enterprises, governments and users. We've Combined the ability to create truly interoperable applications, foundational Internet technologies, as well as the ability to integrate the Overledger SDK into legacy systems, networks or external API's. This provides a new platform to truly innovate and create the decentralised Internet of Trust. For all types of users, the benefits of using Overledger can be summarised as:

+ No technology or vendor lock-in mechanism;
+ Distribution of applications across multiple blockchains;
+ Improve resilience and eliminate/minimise redundancies;
+ Cross-blockchain value transfer without intermediaries;
+ Blockchain-to-Blockchain transfer and Machine-to-Machine transfer;
+ Technology agnostic – works with any existing and future blockchain technology; and
+ Independent of underlying blockchain technology and code.

We're developing a blockchain program interface (BPI): a set of routines, data structures, protocols, and tools for building MApps capable of communicating with different blockchains. Basically, our BPI will make it easier for developers to program applications that can run on any type of blockchain protocol and network. Developer support is available in the form of a software development kit, Overledger SDK, providing the documentation and tools needed to build software based on the Quant BPI and associated Overledger interfaces. In this way, Quant Network empowers enterprises to de-risk their blockchain investments, easily use multiple blockchains and focus their attention and energy on creating true MApps.

3.2 Quant SDK and BPI

To help democratise development of blockchain applications, our solution is to produce a Blockchain Programming Interface (BPI) and Overledger Software Development Kit (SDK): a set of software development tools that gives developers an easy and standard way to access the Overledger functionality.

These methods will give the opportunity to interface with other lower level functions of the ledgers without the need for detailed knowledge of the Op-codes or scripting methods of the ledgers in question.

They will also give the ability to interface with our architectural services. These services will supply a number of key components to enable delivery of scalable single DLT, cross DLT or legacy to DLT applications. These services currently include:

+ Blockchain Programming Interface (BPI);
+ Fingerprinting/verification technology;
+ Message handling;
+ Verification Block Function;
+ Op Code plugin;
+ Legacy Data Interfaces.

The use of the SDK will accelerate the DLT application development cycle, in a safe and predictable manner, setting DLT technologies free to deliver their promise as a paradigm-shifting technology.

The BPI acts as the key which helps any Overledger application to identify which blocks are part of the application being developed, the rules around using the application and how to interpret the data presented in the identified block.

Multi-ledger applications deciding to use Overledger need to define two sets of (mandatory and optional) rules. These rules determine a wire protocol to interact with the Overledger system and other users/ applications. A non-exhaustive list of rules includes:

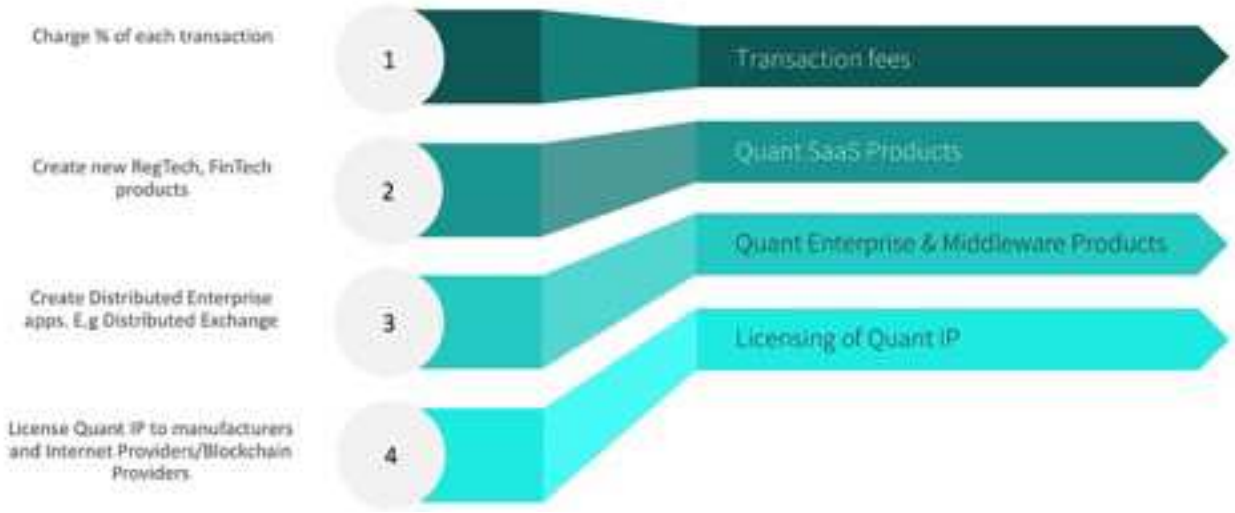
+ Accept messages that can be validated by specific schema;
+ Accept messages only if they respect certain pattern sequences (e.g. in a 2PC we should receive the "propose" message before the "ready" message);
+ Accept messages only if their fingerprint (hash) has been appended on a particular set of ledgers;
+ Accept messages only if their fingerprint has specific source and recipe addresses; and
+ Accept messages only if their fingerprint is spending at least a certain amount of cryptocurrency.

This approach means Overledger blocks will be readily identified within the DLT involved, allowing for multiple applications to be used on the same OR across other DLTs.

4. Business Model

Quant Network faces the challenge of creating the correct usage model for both Overledger technology and the QNT token (see Section 5). The outcome will be maximising market penetration through community adoption of the technology while taking away any incentive to copy the technology.

We've identified four main revenue streams that will be pursued by Quant Network. We're looking to generate revenue in the following manner:



4.1 Quant App Store

The optimal financial outcome Quant Networkd would be to release the QNT token and the Overledger technology, retaining full control. However, this would run counter to the creation of a development community and the Quant ecosystem, creating a limited uptake of the technology. This is not in line with our vision.

We plan to foster innovation by directly incentivising developers with an **App Store model**. By allowing the wide-use of Overledger through an open-source approach, we can encourage developers by sharing income within their applications. Two approaches can be created, akin to Apple and Google stores:

+ Developers can release free applications, able to set the usage charge to zero for transactions. However, it will be a prerequisite that the client utilising the application holds a minimum number of QNT tokens to access the platform.
+ For applications where developers intend to generate a revenue stream, a separate charge using a 3rd party payment processor can be set at the appropriate level, determined by the developers.

The Quant App Store launch is planned for Q1 2019 to provide developers the opportunity to create and publish MApps. We'll provide the option to charge a one-time fee per transaction, or usage of the application, or a subscription model for monthly recurring revenue. We leave the developers the choice of the best business model for their MApp, in line with the market's expectations.

We're allowing our customers to benefit from revenue models that incentivise developers to use our technology to build innovative MApps. We propose the following four revenue models:

+ **Freemium Model.** In this model, users don't pay to download or use the MApp. But they can pay to get access to additional sets of features.

+ **Paid Model.** In this model, users pay once to download the MApp and use all of its functionality. No additional charges will apply.
+ **Subscription Model.** In this model, users pay for a (daily/monthly/annual) subscription to use the MApp.
+ **In-App Model.** In this model, users are able to download the MApp for free (or at a cost) but are charged when they use in-app functionality.

Developers independently decide how much to charge users for their apps. A separate payment processor like PayPal can be used to facilitate payments. The QNT token will be used to access the network through the Quant App Store as well as being tied to identities.

Quant Network will provide the resources and guidelines to help developers publish their MApp in the Quant App Store. We'll review every MApp submitted based on a set of technical, content, and design criteria.

Technical Implications. The implication of the proposed Quant App Store model is that we need to set a mechanism to charge for data processed in an Overledger MApp. This would be in addition to the transaction fees required by the underlying blockchains on which the transaction is taking place. It's also suggested to further reduce the release of applications outside the Quant network. Certain libraries or functions are obfuscated in such a way that any application has to be submitted to Quant to finalise for release.

4.2 Quant SaaS Products

We're also planning to launch our own SaaS, Enterprise and Middleware applications based on the need and feedback from our clients, aligned to the business verticals detailed below.

Quant will produce sector-specific technological solutions unique to each sector and industry. We'll help organisations and Governments navigate the complexities of the new distributed hyper-connected economy. We'll facilitate understanding of the business benefits and potential returns on investment.

In particular we'll focus on:

1. **Financial Services –** We're exploring areas in capital markets, retail, stock exchanges, asset management and regulatory technology (RegTech) to help simplify complex processes and realise benefits.

2. **Healthcare -** Exploring opportunities in healthcare interoperability, clinical trials and counterfeit drugs.

3. **Supply chain -** Looking at providing interoperability between different suppliers across a complex supply chain, providence and tracking.

4. **Government -** Exploring the opportunities for Governments to realise benefits, identify savings and efficiencies, reduce errors and provide transparency.

SaaS products live and in production:

+ AI driven, fraud detection and pattern recognition (TrustTag). We've been working on developing a fingerprint verification technology. We've conceptualised, developed and patented a fingerprinting and verification technology, TrustTag™, allowing developers to assign digital fingerprints to real world IPs, documents, physical goods, etc. in a way that is secure and cannot be reputed. This technology fully meets our stringent requirements to create fingerprints to be used on underlying DLTs, as set out in our white paper. This technology will revolutionise the use of blockchain across sectors. It can assign a true identity to a physical item such as contracts, pharmaceutical products, designer goods or data assets that will lead to the wholesale adoption of DLT technologies, setting it on a path to realise its full potential. To that end, and to show our commitment to the community, we'll be releasing this technology first, along with the underlying framework, free to the community.

SaaS products in development:

+ Legacy Data Interfaces. It's our aim to provide interfaces for standard data structures starting with the simpler file interfaces, then moving on to cover most standard database standards. By producing these plugins for different data sources, we'll simplify the process of creating integrated DLT applications, opening up use cases for existing and legacy data assets.

+ Op Code Plugins. Op Codes are the low-level list of all Script words, also known as opcodes, commands, or functions used to interact with the DLTs in question. While some opcodes may be similar in nature, not all opcodes will be present across ledgers. It's our intention to map these opcodes and make methods available to developers to call (where applicable) in a standardised

fashion. We feel in doing this we'll simplify development across DLTs, freeing developers to use standard interfaces to multiple blockchains, reducing development time and costs.

SaaS products in the pipeline:

+ Transaction Monitoring;
+ Quant Risk Score (QRS).

4.3 Enterprise and Middleware Products

We'll deliver blockchain products and solutions focused on DLTs and smart contracts for clients who have either used or are considering blockchain technology and:

+ Have a business challenge that blockchain can solve; or
+ Have a business challenge but are unclear what the benefits of blockchain are or how the technology can support them.

Quant will deliver smart blockchain solutions that will improve transparency, efficiency, longevity and trust in business processes via the consulting arm of the company. Professional business blockchain frameworks hosted by the Quant platform will be provided to enterprises to help them apply multi-chain vendor-agnostic solutions.

Quant blockchain consultants will help organisations plan their blockchain strategy, to take advantage of opportunities and avoid being disrupted. Our team provides exceptional development services to build several robust Quant multi-chain applications.

We're currently developing use cases for truly decentralised enterprise applications, operating across multiple blockchains.

These are the areas we're exploring:

+ Decentralised exchange of value;
+ Electronic Health Records;
+ Decentralised Messaging System.

As Middleware products we're exploring:

+ Treaty Contracts;[7]
+ Identity Broker to authenticate and authorise users to access blockchains;
+ Fiat currency gateways.

4.4 Patent

Our business model will benefit from the originality of the Overledger OS in addressing interoperability issues between blockchains. In fact, existing technological solutions aiming to solve interoperability issues between blockchains and their governance model, are limited in scope and design. The uniqueness of the Overledger OS is that it does not superimpose a new blockchain to connect other blockchains or connect them to other legacy systems.[8]

In December we filed an EU Patent to protect the intellectual property rights of the company and inventions behind Overledger. We've been working with the Rogers and Withers LLP in London to create the patent and IP strategy to protect the inner core of our technology.

Our roadmap and strategy consist of expanding the scope of the patent to other jurisdictions to cover various aspects of our technology.

5. Tokenomics

Quant will be launching a number of revenue streams. We aim to strike a balance between providing the funds needed for further development and keeping an open platform where the whole community can benefit. We believe this business model will lead to the wholesale adoption of our framework (see Section 4).

To that aim, we will:

+ Produce a Quant token (ticker: QNT) which will give access to the Quant Overledger platform for both developers and users of the different MApps.
+ Create a transactional charging mechanism whereby a developer can choose to create free applications, but with the capability of introducing a transactional charge for each application.

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[7] Executing smart contracts across multiple blockchains is a complex challenge that requires an evolved form of "smart contracts" the Quant team refers to as "Treaty Contracts". Quant will not only create the framework of cross-chain Treaty Contracts to be part of Overledger but will empower blockchains with an algorithmic constitution which supports legal frameworks in contractual agreements. See "Quant Network announced new cross-chain treaty contracts partnership with HAW Hamburg University" Unlock 2018, Dubai. Available at https://www.unlock-bc.com/news/2018-01-22/

[8] Refer to the Quant Network White Paper for an explanation of the scientific breakthrough of our unique solution. See Quant Overledger - Release V0.1 (alpha), 31 January 2018

+ Give developers a market to showcase and market their applications.

To reach our goals, we've been working on the digital platform project for over a year. Some modules are already implemented (see Section 6).

The QNT token will be issued through a crowd sale campaign or Token Generation Event (TGE) constituted of three phases:

1. Pre-Sale is a private placement allowing purchasers to acquire QNT tokens at a discounted price;
2. Pre-TGE is a selected public placement (by reservation only) allowing purchasers to buy a maximum of 15,000,000 QNT tokens at a fixed price of $1.00 USD per QNT token;
3. TGE is the official open public token placement, allowing purchasers to buy a maximum of 16,000,000 QNT tokens at a fixed price of $1.60 USD per QNT token.

TOKEN INFO	
Type of token	Standard ERC20 Ethereum token
Ticker	QNT
Decimals	18
Issuer	Quant Network AG (Zug - CH)
PRE-SALES	
Period	Closed
Amount of QNT in Pre-Sales	Amount to be determined by TGE date
Price QNT tokens in Pre-Sales	1ETH=687QNT or agreed discounted rate
PRE TGE	
Pre-TGE Start Date	19/03/2018
Pre-TGE End Date	01/04/2018
Amount of QNT in Pre-TGE	15,000,000 tokens
Price QNT in Pre TGE	1ETH=687QNT (discounted rate)
TGE	
TGE Start Date	02/04/2018
TGE End Date	30/04/2018
Amount QNT tokens on sale	31,000,000 tokens
Amount QNT tokens for company reserve	14,467,000 tokens
Minimum Cap	5,000,000 USD. If this is not reached - the money will be refunded to the participants
Price QNT in TGE	1ETH=430QNT

Secured method for QNT tokens purchase	ETH
Additional Info	
Crowd sale mechanism	TGE will proceed through the native QNT application using Ethereum smart contract
Further tokens issues	No, a single token issue within the TGE
Participation Criteria	
Minimum investment	1 ETH
Whitelist / KYC	Yes. All participants must pass KYC/AML compliance to be added to the whitelist (*)
Allocation of QNT tokens to pre-TGE participants	Participants will be entitled to contribute to the pre-TGE at 1ETH=687QNT and the TGE at 1ETH=430QNT Allocation of QNT tokens: Max 15,000,000 QNT tokens (minus the number of QNT tokens sold in private-sale) allocated according to FIFO (first in first out)
Allocation of QNT tokens to TGE participants	Participants will be entitled to contribute to the TGE at 1ETH=430QNT tokens Allocation of QNT tokens: Max 31,000,000 QNT tokens (minus the number of QNT tokens sold in pre-TGE and private-sale) allocated according to FIFO (first in first out)
Allocation of QNT tokens to managers and staff	Managers and staff members will undergo a 12-month vesting period after the end of crowd sale
Allocation of QNT tokens to participants	QNT tokens transfer will be restricted for security reasons for 2 months after the end of crowd sale. All unredeemed tokens will be burned

(*) Due to regulatory restrictions around the world, Quant Network will not offer its TGE to or accept funds from Citizens of the United States of America, institutions with a registered address in the United States of America, Residents of China (Mainland), Institutions with a registered address in China (Mainland), FATF sanctioned countries: North Korea, Syria, Iran, Cuba and the Crimea Region

Table 2: Quant Network Token Generation Event. Overview of important dates parameters.

Other relevant information related to the TGE is summarised in Table 2. Our FAQ and information regarding the Quant Network TGE participation will be available on our web page (https://www.quant.network/) and in our Quant Network social media accounts.

5.1 Quant Token (QNT)

The Quant Token account is a core component of Quant. It's designed to ensure flexibility and control for continued evolution of the project. QNT tokens will be created during the crowd sale period. The total supply of QNT will be limited to the number of tokens created during the crowd sale period. No additional tokens will be created after the TGE.

QNT is an ERC20 token issued on the Ethereum blockchain. Its design follows widely adopted token implementation standards. This allows token holders to easily store and manage their QNT tokens using existing solutions, including ERC20-compatible Ethereum wallets.

The Quant project crowd sale and QNT token creation will take place using Ethereum smart contracts. Participants willing to support the Quant project development will send:

+ ETH to a specified TGE Ethereum address, creating QNT tokens by this transaction at the specified QNT/ETH exchange rate; or
+ XBT to a specified TGE Bitcoin address. The XBT will then be sent to the TGE Ethereum address, creating QNT tokens by this transaction at the specified QNT/ETH/XBT exchange rate.

The tokens will be **dual-purposed**, initially used for the token offering, later as an access token to access the Quant network. We envisage the token keys will be embedded in specific applications, using the Quant network to authenticate the user and authorise the use of particular aspects of the network and underlying blockchains. We're excited to see the possibilities of this approach and what people can create.

5.2 Token Sale Terms

ETH can be sent to the QNT crowd sale Ethereum address only after the start of the crowd sale period (specified as the Ethereum block number). Crowdfunding will finish when the specified end block is created *or* when the ICO hard cap is reached. We set three levels of caps and we link them to three different milestones of business development (see Figure 4) which the company commits to achieve if the corresponding cap will be reached:

+ Soft Cap. 23.467 Million QNT tokens (16 Million for sale and 7.467 Million not for sale). Overledger platform plus connectors to different DLTs (apart from Ethereum and Bitcoin);
+ Mid Cap. 35.750 Million QNT tokens (24.375 Million for sale and 11.375 Million not for sale). Quant App Store plus Middleware and SaaS MApps;
+ Hard Cap. 45.467 Million QNT tokens (31 Million for sale and 14.467 Million not for sale). Enterprise MApps plus Treaty contracts.

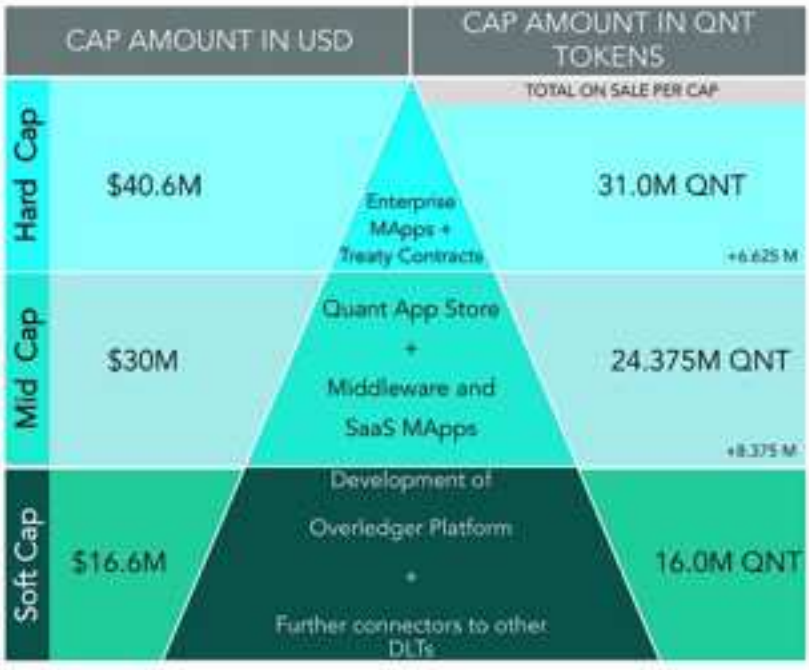

Figure 4: Representation of the Quant Network TGE per level of caps and corresponding milestones.

The rules governing the terms of the Quant TGE:

+ TGE will proceed through the native QNT application using an Ethereum smart contract;
+ No token creation, minting or mining will be available after the crowd sale period (the termination date is 30 April 2018). At the end of the TGE, QNT token creation will be closed permanently;
+ QNT token transfers will be restricted for security reasons for 2 months after the end of the crowd sale. All unredeemed tokens will be burned;
+ In case the maximum funding cap of 31 Million tokens is not reached, tokens distribution (e.g., bounty, Quant team, ecosystem reserve) is proportional to the number of QNT generated during the TGE;
+ The cut-off for funds gathered during TGE is 5 Million USD, if this is not reached, the money will be refunded to the participants.

5.3 QNT Token Allocation

From the total amount of QNT issued, the 68.19 % will be sold in the market and the remaining 31.81% will be kept by Quant Network, these will be vested for 12 months from the end of the TGE.

As shown in Figure 6, the 13.67% (43% of the 31.81%) of the total tokens issued by Quant Network will be redistributed between the founders, partners, staff members, advisors and service fees for third party providers subject to a **twelve-month holding period**. The 18.13% (57% of the 31.81%) of the total tokens issued will be a reserve over the years for operational costs and development of the Quant ecosystem.

With respect to cost centres, the funds will be allocated as indicated in Figure 7. Of course, these figures represent an estimation that can be subject to variations according to the blockchain sector and general market conditions.

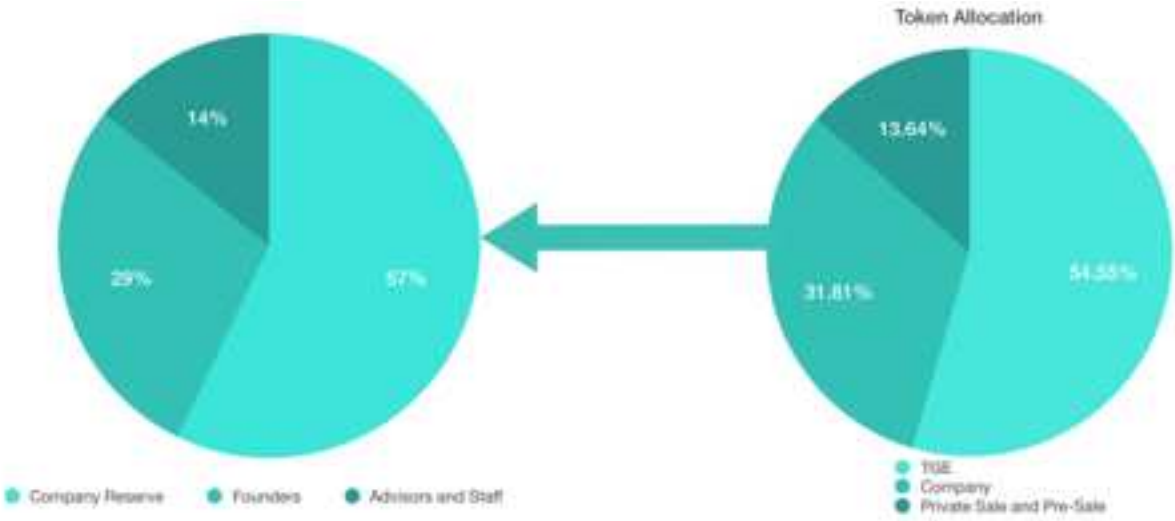

Figure 6: Representation of the QNT tokens allocation.

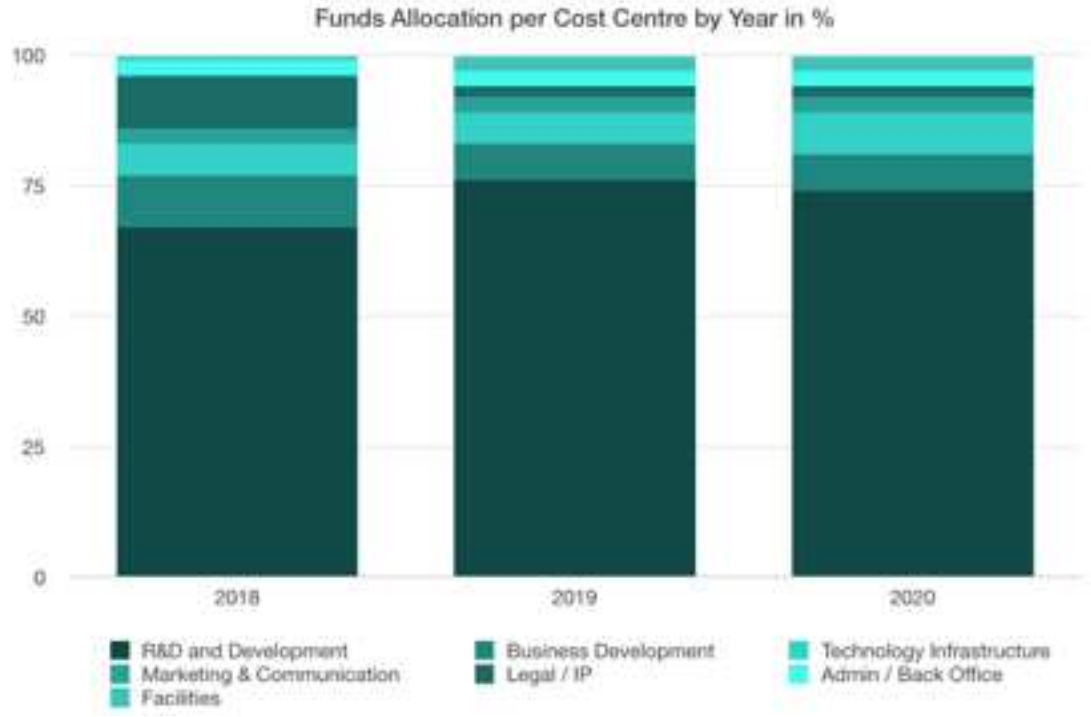

Figure 7: Allocation of funds by Year.

6. Roadmap

We are staging our approach initially with the following milestones:

Date	Roadmap Description
July 2015	+ Inception of Overledger idea inspired from real-world case studies in industry and government
April 2016 **October 2016**	+ Developed the proposal (ISO/TS/P 258) to create Blockchain Standards based on the original Overledger idea + Approval received by ISO to establish Blockchain ISO Standard TC307
December 2016	+ TrustTag™ technology has been developed and a patent filed 1621807.5
March 2017	+ Since March 2017 research has been conducted to address the lack of blockchain interoperability. Overledger operating system has been conceptualised. See Quant Network White Paper
October 2017	+ Research into Overledger concept and design is completed + Quant Network AG is incorporated in Zug (Switzerland)
November 2017	+ Prototype development
December 2017	+ Patent filing. Filing of an EU Patent "Blockchain Communications and Ordering" Patent number: 17425121.5-1217
December 2017 - March 2018	+ Pre-Sale open to institutional investors
March - April 2018	+ Pre-TGE and Public TGE
Q2 2018	+ TrustTag™ first version release + Open Source SDK - Released v.01a
Q3 2018	+ Quant SaaS Product release + Continue patent filing roadmap. File 3 supporting EU patents. + File the 4 total patents in other jurisdictions
Q1 2019	+ Quant App Store + Open Source SDK - Released v.01b
Q3 2019	+ Quant Enterprise MApps + Treaty Contracts developed

Appendix - Terms and Conditions

The Terms and Conditions apply to the buyer of the QNT Token (hereinafter the "QNT" or the "QNT Token") and user of the Quant Network platform (the "User"). PLEASE READ THESE TERMS CAREFULLY BEFORE PARTICIPATING IN THE TOKEN SALE. THE T&C AFFECT YOUR OBLIGATIONS AND LEGAL RIGHTS, INCLUDING, BUT NOT LIMITED TO, WAIVERS OF RIGHTS AND LIMITATION OF LIABILITY. IF YOU DO NOT AGREE TO THESE TERMS OF SALE, DO NOT PURCHASE TOKENS.
By purchasing the QNT Token during the token sale (sometimes referred to as the "token generation event" or "TGE" or "crowd sale") period (hereinafter the "Token Sale"), in the jurisdiction of Switzerland, you will be bound by these T&C, and all terms incorporated by reference. Your purchase of QNT Tokens is subject to these T&C.

Applicability

1. The following T&C constitute the agreement between Quant Network AG (in constitution; hereinafter "Quant Network" or the "Company"), a Swiss Company Limited by Shares incorporated in Zug, and you, with respect to the purchase of the QNT Token and the use of the services offered through the Quant Network platform. By using our services, you are agreeing to be bound by the T&C in its latest version. Quant Network may change this T&C at any time at its sole discretion. Your continued use of the Quant Network Platform or your continued hold of the QNT Tokens, means you accept any new or modified terms.

Services

2. Quant Network empowers applications to function across multiple blockchains. Quant Network securely removes the barriers that prohibit communication across multiple blockchains.

3. In particular, Quant Network runs an agnostic platform connecting the world's networks to current and future blockchains. Quant Network has created an Overledger that sits on top of current and future blockchains providing a meta-gateway to existing networks to connect to blockchains and vice-versa. Through the Overledger, Internet gets connected with the Blockchain.
4. Quant Network has released a token (QNT), which gives access to the Overledger framework for both developers and Users of the application. The QNT is used also to connect the User to the Quant network.

5. For the service mentioned above, Quant Network charges the Users with a fee/generates revenue:

i for each transaction in Quant;
ii for creating new RegTech, FinTech products (Quant Software as a Service);
iii for creating distributed enterprise products;
iv for licensing Quant IP to manufacturers and Internet Providers/Blockchain providers.

6. Quant Network does not allow the deposit, withdrawal or direct exchange of assets between Users of the service. Quant Network is not a market-maker. All purchase and disposal of crypto assets by Quant Network take place through its platform.

The QNT Token

7. QNT Token functions as a utility token on the Quant Network platform, which will allow Users the access of the Quant Network platform. Through the Token Sale, the Users acquire the rights to use the Quant Network platform.

8. QNT Token does not have the legal qualifications of a security, since it does not give any rights to dividends or interest. QNT Token does not have the legal qualification as a payment token, since it is not intended to be used as a means of payment to acquire goods or services outside Quant Network's services, or a means of money or value transfer. QNT Token is final and non-refundable. QNT Token is not a share and does not give any right to participate in the general meetings of the Company. QNT Token cannot have a performance or a particular value outside the Quant Network platform. The purchase and use of QNT Token shall therefore not be done for speculative usage.

9. QNT Token can be purchased during the Token Sale directly from the Company or after the Token Sale at the Company.

10. Any User purchasing QNT Token expressly acknowledges and represents that she/he has carefully reviewed the T&C and fully understands the risks, costs

and benefits associated with the purchase of this token as indicated in the T&C.

Knowledge required

11. The User purchasing QNT Token should ensure that she/he understands and has significant experience of cryptocurrencies, blockchain systems and services, and that she/he fully understands the risks associated with the Token Sale as well as the mechanism related to the use and custody of cryptocurrencies.

12. Quant Network shall not be responsible for any loss of QNT Tokens or situations making it impossible to access QNT Tokens, which may result in any actions or omissions of the User or any person undertaking to acquire QNT Tokens.

Voluntary Know-your customer (KYC)

13. There will be a KYC procedure that Users will have to perform within the Quant Network platform in order to contribute to the token sale and to accept that Quant Network can refuse any payment which is not compliant with the internal due diligence.

14. Where the User acts on behalf of a group of token buyers then the User assumes full responsibility of identifying and verifying the token buyers in the group and ensured that none of the byers are sanctioned by any jurisdiction or authority. The User further acknowledges that any politically exposed persons are identified, and appropriate due diligence performed. Quant will accept no responsibility in this regard.

Risks

15. Acquiring and storing QNT Token involves various risks, in particular that Quant Network may not be able to further develop its platform. Therefore, and prior to acquiring QNT Token, any User should carefully consider the risks, costs, and benefits of acquiring QNT Token within the Token Sale, and, if necessary, obtain independent advice in this regard. Any interested person who is not in the position to accept nor to understand the risks associated with the activity Quant Network or any other risks as indicated in the T&C, should not acquire QNT Token, at this stage or later.

Important Disclaimer

16. The T&C shall not and cannot be considered as an invitation to enter into an investment. They do not constitute or relate in any way nor should they be considered as an offering of securities in any jurisdiction. The T&C do not include or contain any information or indication that might be considered as a recommendation or that might be used to base any investment decision. This document does not constitute an offer or an invitation to sell shares, securities or rights belonging to Quant Network or any related or associated company. QNT Token will be used as a utility token and is not intended to be used as an investment.

17. Any information in the T&C is given for general information purpose only and is relevant to the day it has been written and Quant Network does not provide any warranty as to the accuracy and completeness of this information now or in the future.

18. The offering of QNT Token on a trading platform is done in order to access the Quant Network platform, purchase services related exclusively to the latter and not for speculative purposes.

19. Quant Network is an operative entity managing the Quant Network platform. Quant Network is not a financial intermediary according to Swiss Law and is not required to obtain any authorisation for Anti Money Laundering purposes.

20. Regulatory authorities are carefully scrutinising businesses and operations associated to cryptocurrencies in the world. In that respect, regulatory measures, investigations or actions may affect Quant Network's business and even limit or prevent it from developing future operations. Any person undertaking to acquire QNT Token must be aware that the Quant Network business model and the T&C may change or need to be modified because of new regulatory and compliance requirements from any applicable laws in any jurisdictions. In such case, any person undertaking to acquire QNT Token acknowledges and understands that neither Quant Network nor any of its affiliates shall be held liable for any direct or indirect losses or damages caused by such changes.

21. Quant Network will do its best to launch all of its operations and further develop the Quant Network platform. Any person undertaking to acquire QNT Token acknowledges and understands that Quant Network platform will function and provide access and services as at the launching of the crowd sale. Depending on further potential developments of the Quant Network platform, other services may be released and offered to the Users.

22. Acquiring QNT Token shall not grant any right or influence over Quant Network's organisation and governance to the Users. These tokens will be issued by a technical process referred to as a "Blockchain". This is an open source IT protocol over which the Company has no rights or liability in terms of its development and operation. The token distribution mechanism will be controlled by a Smart Contract; this involves a computer program that can be executed on the Ethereum network or on another blockchain network that is compatible with the Smart Contract programming language. User acknowledge and understand therefore that Quant Network (incl. its bodies and employees) assumes no liability or responsibility for any loss or damage that would result from or relate to the incapacity to use the QNT Token, except in case of intentional misconduct or gross negligence.

23. QNT Token is based on the Ethereum protocol. Therefore, any malfunction, unplanned function or unexpected operation of the Ethereum protocol may cause the QNT Token network to malfunction or operate in a way not expected.

24. Employees of Quant Network are allowed to operate with QNT Token at market price if they don't have knowledge of information that may modify the price of the QNT Token.

Representation and Warranties

25. By participating in the Token Sale, the User agrees to the T&C and in particular, they represent and warrant that they:

i are authorised and have full power to purchase QNT Token according to the laws that apply in their jurisdiction of domicile;

ii are not a U.S. citizen, resident or entity (a "U.S. Person") nor are they purchasing QNT Token or signing on behalf of a U.S. Person;

iii are not a Chinese resident or entity nor are they purchasing QNT Token or signing on behalf of a Chinese resident;

iv are familiar with all related regulations in the specific jurisdiction in which they are based and that purchasing cryptographic tokens in that jurisdiction is not prohibited, restricted or subject to additional conditions of any kind;

v are not acting for the purpose of speculative investment;

vi live in a jurisdiction which allows Quant Network to sell the QNT Token through a crowd sale without requiring any local authorization;

vii does not live in a jurisdiction which qualifies tokens issued through a crowd sale as securities;

viii will not use the Token Sale for any illegal activity, including but not limited to money laundering and the financing of terrorism;

ix will ensure all buyers in a group are identified and verified and ensure none of the byers are sanctioned by any jurisdiction or authority, and that any politically exposed persons are identified, and appropriate due diligence performed;

x are solely responsible for determining whether the acquisition of QNT Token is appropriate for them;

xi are acquiring QNT Token exclusively for use of the Quant Network platform;

xii understand the risks associated with the Token Sale (incl. the risks related to the non-development of Quant Network platform and operations) and

xiii understand the use of cryptocurrencies and its associated risks.

xiv acknowledges and accepts that the QNT Token crowd sale is taking place within a Swiss legal environment that is still under development.

Intellectual Property Rights

26. To the extent that copyright trademark or any other intellectual property rights exist in the Quant Network platform, such as software, know-how, analysis or

programs, those existing and future copyrights and other intellectual and industrial rights (hereinafter "IP rights') belong solely to Quant Network and its affiliated companies and you as a buyer do not and will not have any related rights in such IP Rights.

Limitation of Liability

27. Quant Network, as well as its officers, directors, agents, joint ventures, employees, suppliers and advisors and anyone on its behalf, assumes no liability or responsibility for any loss raised from the Token sale, arising out of or related to the use of the Quant Network platform or any technical, interruption or malfunction of the Quant Network platform.

28. The limitation of liability set out above shall not be applicable in the event that Quant Network, or a Quant Network-employee, has caused the damage by intentional misconduct or by gross negligence.

29. If any of the provisions of the T&C or of the Agreement are deemed to be invalid, void or unenforceable, the remaining provisions shall continue in full force and effect.

Applicable Law and Jurisdiction

30. The T&C are subject to and governed by Swiss Law to the exclusion of Swiss International Private Law and any International Treaties. Any User and Quant Network agree to seek an amicable settlement prior to bringing any legal action. All disputes arising from or under these T&C shall be resolved by arbitration in accordance with the Swiss Rules of International Arbitration of the Swiss Chambers of Commerce in force on the date when the Notice of Arbitration is submitted in accordance with these Rules. The arbitration panel shall consist of one arbitrator only. The seat of the arbitration shall be Zug, Switzerland. The arbitral proceedings shall be conducted in English.