QUADRANT

A blueprint for mapping decentralised data

WHITEPAPER

Version 1.1

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QUADRANT

Table of Contents

QUADRANT

Executive Summary

Vast amounts of authentic data are needed to power today's algorithms, however the current data economy is fraught with problems. There is an ever-widening gap between those with the resources to collect and store their own data and those that do not. The data these have-nots do have access to is often fragmented and of questionable authenticity—the kind of data that produces poor results when fed to algorithms. Part of the reason why the data lacks authenticity is because the suppliers of it are not properly incentivized. Fair revenue distribution does not exist for both data producers and vendors. Without a healthy and transparent data economy, the increasing demand for authentic data will not be met.

Quadrant aims to solve these problems by providing a blueprint for mapping disparate data sources. It will support proof of data authenticity and provenance via data stamping, the creation of "Constellations" (data smart contracts) for disparate data sources, and fair remuneration and incentive sharing. Data Consumers can trust the authenticity of the data they purchase, "Nurseries" (Data Producers) are compensated fairly every time their data is used, and "Pioneers" (Data Vendors) have the incentive to create innovative Constellations. This new transparent ecosystem ensures that companies get the authentic data they need.

Where Quadrant has major potential for impact is the ability it provides "Elons" (the brightest data minds) to find linkages between different constellations and, in turn, create mega Constellations that can be used by Data Consumers to solve real-world problems. This is where Quadrant differentiates itself from its competitors.

Quadrant is designed to work with both centralised and decentralised services. The architecture consists of the core Quadrant blockchain, clients (Data Producer, Data Consumer and Anchor), and Guardian Nodes. Quadrant will operate on a Proof of Authority consensus mechanism so that it can handle more transactions, operate at a lower gas price, achieve faster transactions, and restrict malicious nodes from entering data into the network. An external Proof of Work chain will be used as an anchor for security purposes. For the time being, the Ethereum blockchain will be used for anchoring but it can be replaced by any public chain in the future if needed.

Quadrant will utilise two different currencies for its network: eQuad and QUAD. QUAD, a utility token, is designed to be used solely on the network. It will be used to stamp data, support simple and complex access structures, simple and complex subscription payments, and for staking by Elons. eQuad is an ERC-20-compliant token that will be sold during the Token Generation Event (TGE). It may be converted into QUAD via a gateway when the Quadrant mainnet is launched.

The TGE will have a hard cap of $20,000,000 USD. If the TGE raises over $7,000,000 USD, the contributions garnered will be locked initially and made transferrable over the course of 4 years, with 40% becoming available upon the close of the eQuad token sale and the remaining 60%
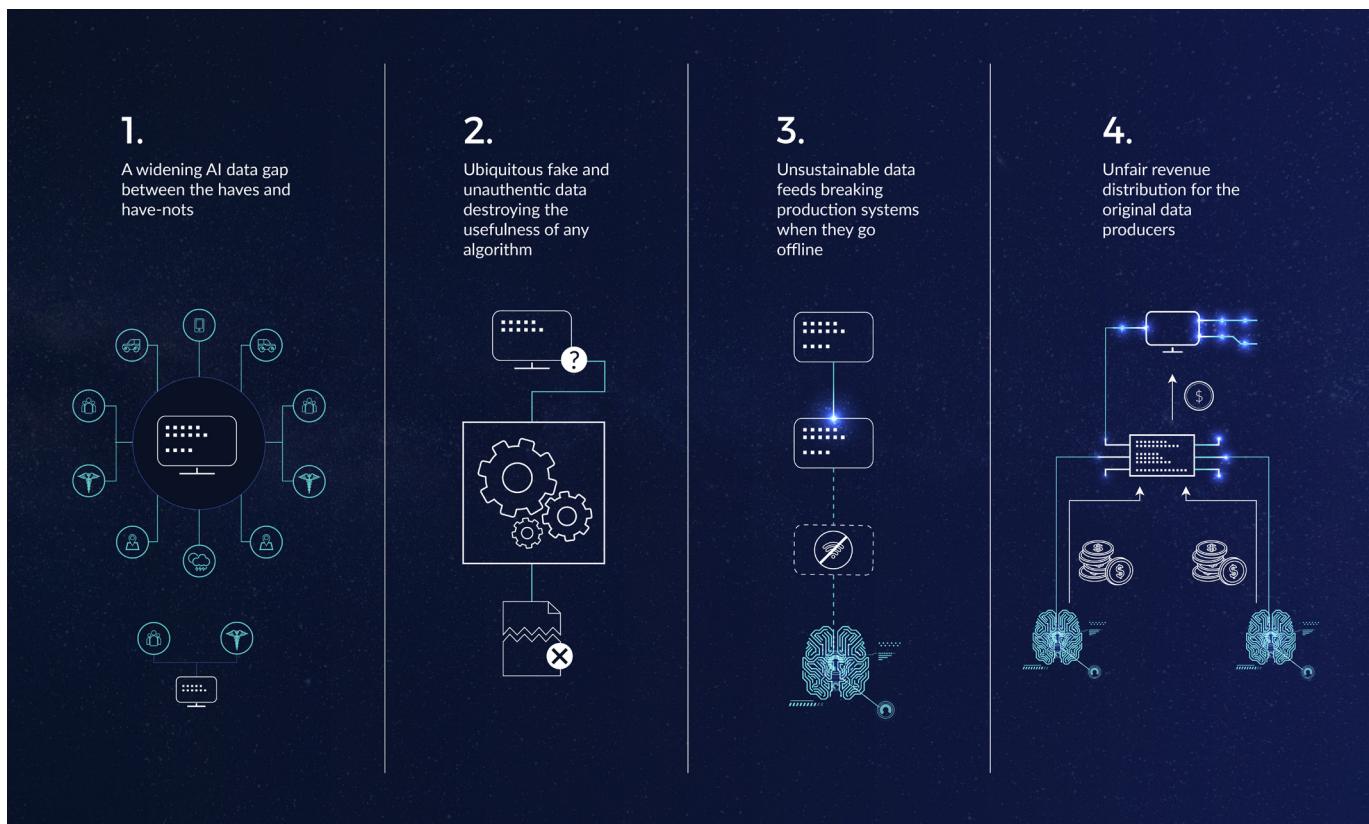
QUADRANT

released annually to be applied towards the Company's objects at a fixed rate of 15%. This is intended to ensure the long-term success of Quadrant while instilling practicality to ensure no over-spending in the initial years.

1,000,000,000 eQuad will be created during the TGE. The tokens will be distributed as follows: 40% to the crowd-sale, 20% to be held by Company, 20% to the Stakeholders, 10% to the Reserve, and 10% to the Team.

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The Problems Facing the Data Economy

There are four major problems facing the data economy:

1. A widening AI data gap between the haves and have-nots

2. Ubiquitous fake and unauthentic data destroying the usefulness of any algorithm

3. Unsustainable data feeds breaking production systems when they go offline

4. Unfair revenue distribution for the original data producers

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A widening AI data gap between the haves and have-nots

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Unsustainable data feeds breaking production systems when they go offline

4.
Unfair revenue distribution for the original data producers

AI Data Gap between Haves and Have-nots

AI requires vast volumes of data that not every company has access to. The data exists but is often scattered throughout various industries and made up of different types. This makes it difficult for small companies to procure the volumes of diverse data that they need.

Large companies are far more immune to this problem because they have the resources to collect and store the volumes of data necessary for their AI activities. Google, for example, has access to vast amounts of data via its own products: conversation and purchase history from Gmail, location history from Google Maps and mobile activity from the Android OS. It is able to take a much more

holistic view as a result of having so many users. Companies like this are the ones producing AI innovation at a much larger scale, solving bigger problems and producing better products.

Where the problem lies is in the ability for everyone else to gain access to the data that they need to compete. It is either prohibitively expensive or not available for purchase in the volumes required. In some cases, the data exists in small fragments that are contained by entities that do not know what to do with them.

The reality, however, is that there is a ton of data out there. Devices, sensors, people, businesses and any other technology that one can think of are producing vast amounts of data every second. However, unless one has the resources to harness it, the data remains out of reach.

What is missing is a solution to organise and make this data available to everyone. Everyone should be able to achieve the best results from his/ her algorithms and, therefore, produce better solutions for the world.

Fake and Unauthentic Data

It is a universal truth that where there is money to be made, people will try to game the system. This is no different in the data economy. Data is easy to fake, copy and misrepresent. This makes it difficult for Data Consumers to properly vet data when purchasing it from third parties.

When purchasing data, Data Consumers want to follow applicable laws and regulations. They do not want to be unethical in their business practices. There is too much at stake if they should be found engaging in unethical practices. Hence from a business perspective, they do not want to pay for data that is not authentic. From a regulatory perspective, they need to know where their data comes from.

Data Vendors are not always so scrupulous. Some are happy as long as they make their money. Data Consumers, therefore, are not always getting the authentic data that their systems depend on. Unauthentic data input equals a poor resulting output. It is the case for data-driven business decisions, algorithmic trading, AI/ Machine Learning applications and oracles for smart contracts. If the data is false, the consequences can be dire.

Unsustainable Data Ecosystem

Free data is not sustainable. No entity can continually produce data over the long-haul if they are not being compensated fairly for it, either directly or indirectly.

Regarding data that is exchanged for monetary compensation—without proper revenue sharing, individuals and businesses would not be able to keep their doors open and continue to provide data if they are not compensated fairly. This is critical for keeping data streams diverse and authentic; things like IoT sensors properly maintained. Ultimately, it is the small Data Consumers

that suffer the most because they lose access to these data streams and may not have ready access to alternatives.

What is needed is a sustainable ecosystem where producers are incentivised to provide authentic data and buyers are willing to pay for it.

Fair Revenue Distribution

Producers of the original data sources have it the worst with respect to revenue distribution. They need to be incentivised to continue producing data, yet more often than not they are paid just once for the data that they provide. It is the Data Vendors that have the ability to resell the same data again and again. There is no way for the producers to find out what happens to the data downstream, where it goes and for what purpose. What this does is cast an opaque layer over the data, so that the producers have no idea of how much money they are owed.

Stakeholders
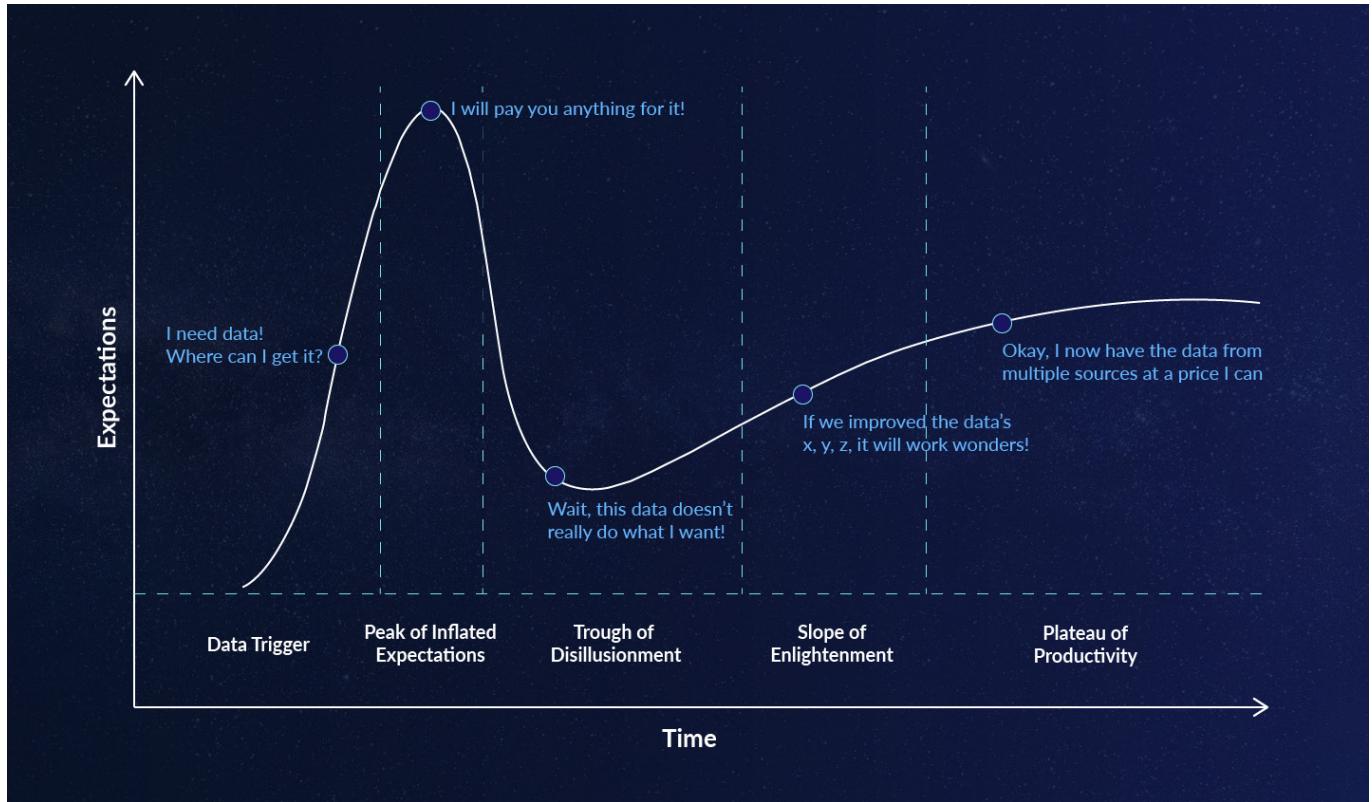
What each of the above problems does is plague the stakeholders of the data economy: the consumers, the vendors and the entities producing the data.

Data Consumers

Organisations are embracing data analytics, data science, machine learning and AI in more sophisticated ways than ever before. They are either using their own in-house capacity or looking to firms specialising in data.

In either case, organisations are likely to go through a data adoption cycle similar to the Gartner Hype Cycle:

1. **Data Trigger –** "I need data! Where can I get it?"

2. **Peak of Inflated Expectations –** "I will pay you anything for it!"

3. **Trough of Disillusionment –** "Wait, this data doesn't really do what I want!"

4. **Slope of Enlightenment –** "If we improved the data's x, y, z, it will work wonders!"

5. **Plateau of Productivity –** "Okay, I now have the data from multiple sources at a price I can afford."

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Depending on the current state of an individual market segment, companies might find themselves in multiple stages at once. It is not always a perfectly linear progression.

For example, in the Mobile Location Intelligence data segment, it can be seen that most participants are currently in stage 3 or 4. Conversely, in the broader data economy, many companies are only starting to learn about the challenges that exist with their current data sources and find themselves transitioning from stage 2 to stage 3.

Stage 3 is the most critical, as it can make or break a company and its solution. If they are unable to obtain authentic data, they will be forever chasing the dream of using data to solve a real problem.

Once companies reach stage 5, provenance becomes the highest priority. They need to be sure that they are paying for authentic data that will support the business.

Data Vendors

For many Data Vendors, the path to data monetisation is a journey rather than a set of linear steps. Initially, Data Vendors struggle to find a proper product-market fit for their data. They create multiple products over time until one proves successful to a consumer group. When this happens, they then seek to maximise revenue from the product.

QUADRANT

While the replication and distribution of data is relatively cheap, production costs can be high. It is essential that Data Vendors are able to cover the capital and input costs incurred during the creation and productising of their data assets because once the data leaves their walls, it can be duplicated at almost no cost.

Data Vendors have no desire to incur significant costs to create a data product, only to have it duplicated and made available by competitors at a lower cost. They want to receive fair pay for the products that they produce and want their products to be used in ways that even they could not think of in order to maximise their revenue. They would also like to know who is utilising their data because it helps them to understand the different ways in which their data can be used; it can even motivate them to enrich their data further.

Atomic Data Producers (ADPs)
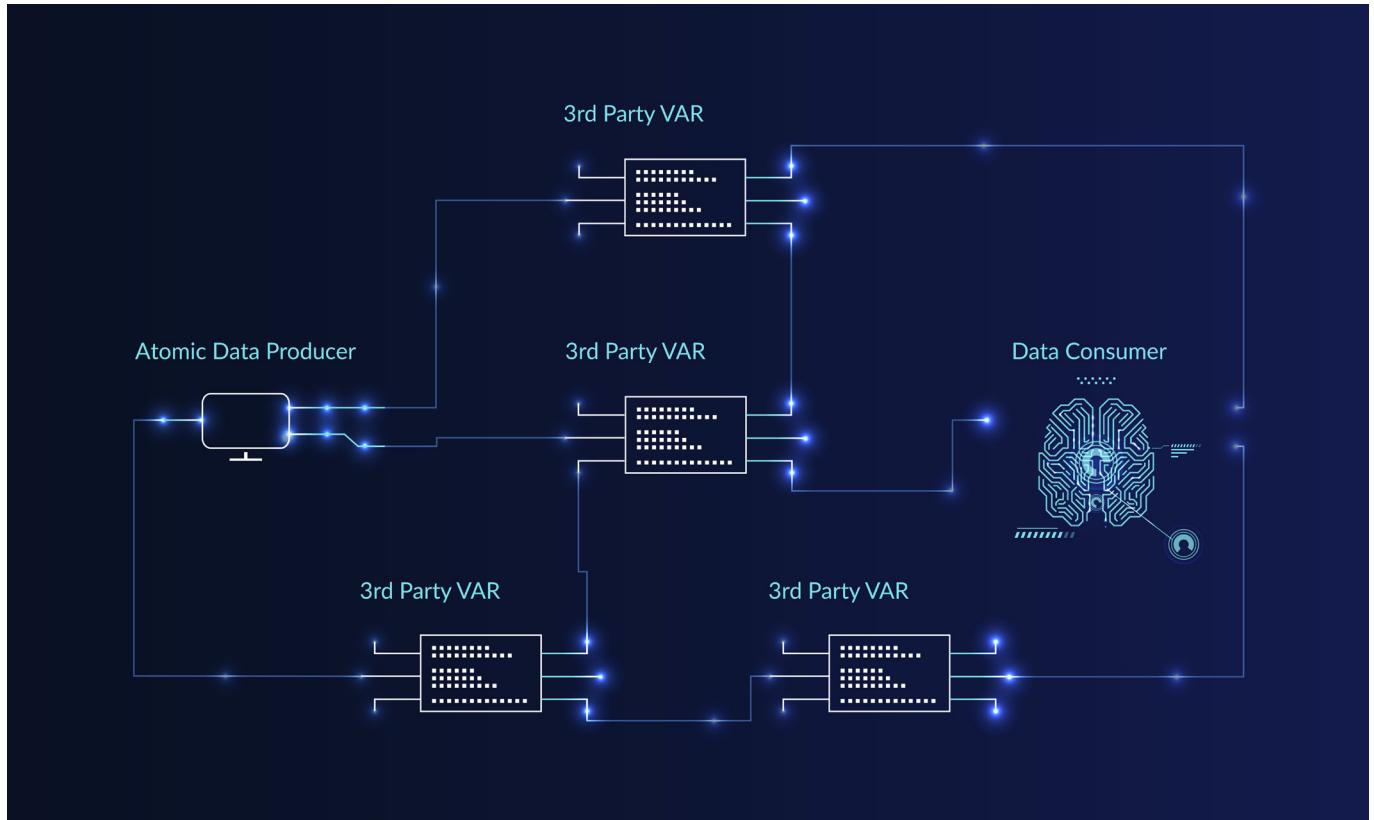
At this level of the data value chain, the biggest problem is that the ADPs are not paid their fair share of the revenue made by the data that they produce. Individual data has little value on its own. Its real value is derived when it is combined with other data sets. As a result, most data producers will sell their data up the value chain to aggregators and resellers who can sell interesting data sets alongside one another to multiply the impact of the insights.

The problem for ADPs is that they receive payment only once, no matter how many times the data is resold via the resellers and aggregators. Each additional sale beyond the initial transaction (between the ADP and the reseller) does not translate into revenue for the ADP.

That is not the only thing working against ADPs. With existing data transaction architectures, there are prohibitive costs incurred in compensating ADPs for the data that they provide. Take a CSV file that has thousands of medical prescriptions sourced from multiple ADPs as an example. Figuring out the exact percentage of revenue to share amongst the contributing ADPs is inherently cumbersome and expensive.

Cross Pollination

It is rare for data to be transmitted directly from producer to end-user. No one producer has all the data, so data needs to be aggregated from different sources to be of value. Consider Bloomberg and Yahoo Weather: Bloomberg does not create all of the information available through its terminals, while Yahoo does not have weather stations in every country. For these services to work, they need to aggregate data from a variety of sources.

QUADRANT

In almost all data transactions, there is a long value chain that starts with the ADP producing data in its rawest form. This data is then collected by a data value-added reseller (dVAR) who collects, aggregates and processes the data to produce a data product. The final product may end up being aggregated by another dVAR or being the data product sold to the end Data Consumer.

The problems start when even the aggregators do not have all the required data. The Data Consumers will buy from multiple aggregators. Hence when these aggregators have similar sources, the Data Consumer ends up buying duplicate data resulting in a waste of money and time.

Aggregation on its own is not a bad thing. It is essential to the data economy because it fulfils market needs. But when the data sources are hidden, cross pollination limits the effectiveness of the aggregated data.

One sees many examples of this across industries and it is very prevalent in the areas of adtech and location analytics.

Cross Pollination Example

The value chain for location data starts with the individual app user. Apps, also known as publishers, will install an SDK from a dVAR who will aggregate this data and provide it as a data product to location analytics companies. As a lucrative business model, some publishers will install multiple SDKs or provide their server data to multiple dVARs. These dVARs then aggregate this data from multiple publishers and sell their feeds to data analytics companies like Placed or Ninth Decimal. Since no dVAR has 100% coverage in any given market, location analytics companies must source from multiple dVARs. This increases the possibility that the original data from the ADP is supplied multiple times to the end Data Consumer.

Areas of Opportunity

A perfect storm of supply and demand is brewing within the data economy. As more companies develop in-house data science and analytics capabilities (including machine learning and AI), the demand for data will accelerate exponentially. On the supply side, smartphone penetration, the deployment of big data capturing solutions and the advent of IoT have resulted in an ever-increasing amount of raw data. When taken together, the data economy pie gets larger each day.

However, it will be the demand for 100% authentic data that will grow the fastest. Without it, companies will not be able to achieve the results that they need to succeed in this new, data-driven world.

Until now, the supply side has not been able to meet these demands. The nature of these new data sources is that they are disparate. There is nothing connecting them together in a way that they can be easily accessed and then used to power innovation. Data Vendors have not been able to do it—they continue to provide data that cannot always be trusted, while data producers lack the proper incentives.

The Quadrant Protocol and network is envisaged as the solution to this problem.
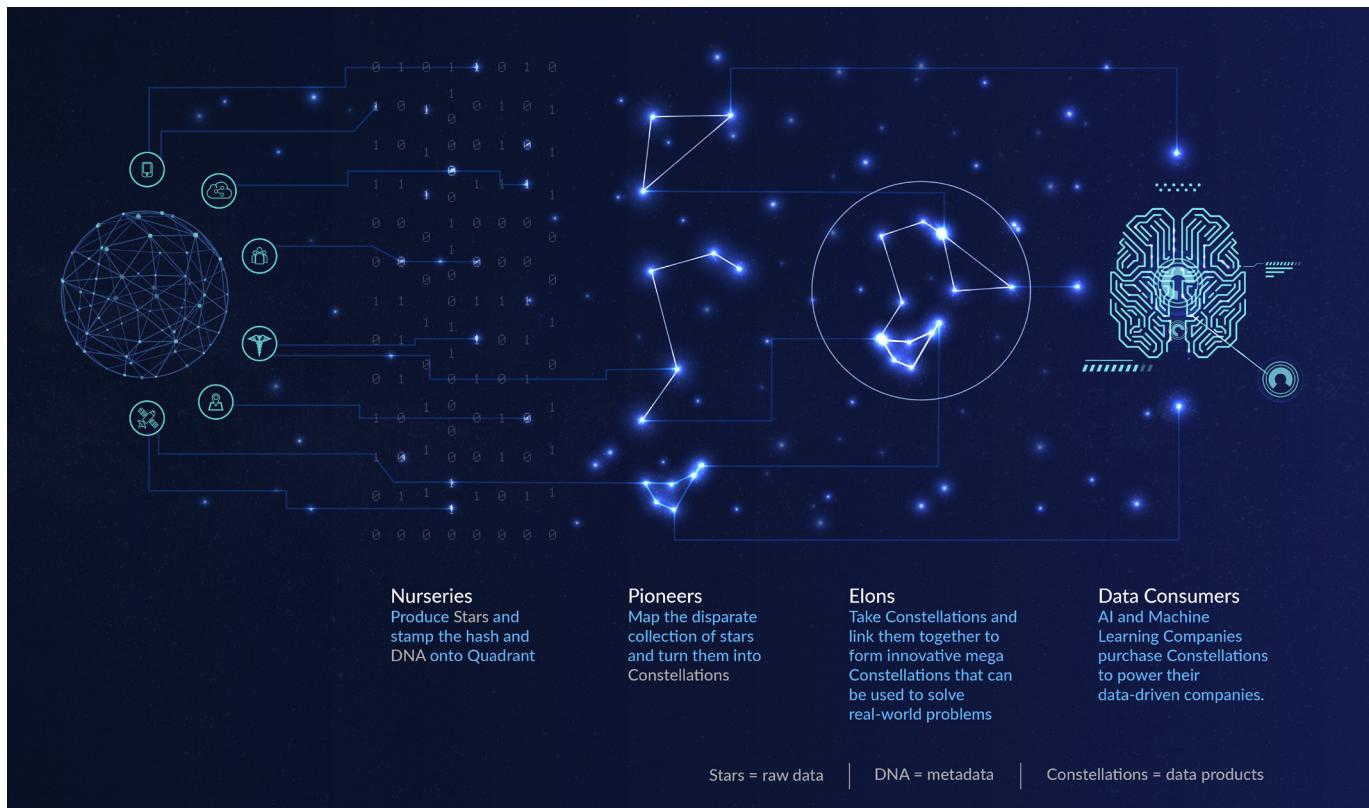
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The Quadrant Protocol

The Quadrant Protocol is envisaged as a blockchain-based network protocol that enables the access to, creation and distribution of data products and services with authenticity and provenance at its core. It is envisioned to act as a blueprint that provides an organised system for the utilisation of decentralised data.

Quadrant maps disparate data sources so that new, innovative data products can potentially be created to help companies meet their data needs.

This is intended to be made possible through the participation of the following stakeholders:

- **Nurseries—** the Atomic Data Producers (ADPs) that create the original data records. They create Stars (raw data), which can then be grouped into Constellations.

- **Pioneers—** the Data Vendors that create data products with the smart contracts on Quadrant.

- **Elons—** the visionaries that utilise the created data products and with them, build new and unique products and services. They rely on Constellations and Constellation blueprints to make sense of the data space, which they will travel through.

- **Guardians—** the master nodes that protect the integrity of the chain, ensuring that it is not compromised. The Guardians ensure that the Constellations created by the Pioneers are not compromised and provide the services of stamping, authenticating and verifying data.

Nurseries
Produce Stars and stamp the hash and DNA onto Quadrant

Pioneers
Map the disparate collection of stars and turn them into Constellations

Elons
Take Constellations and link them together to form innovative mega Constellations that can be used to solve real-world problems

Data Consumers
AI and Machine Learning Companies purchase Constellations to power their data-driven companies.

Stars = raw data | DNA = metadata | Constellations = data products

QUADRANT

Features

Quadrant is intended to have the following features that are aimed at helping to solve the problems in the data economy:

- Proof of Data Authenticity and Provenance
- Constellations for Disparate Data Sources
- Fair Remuneration and Incentive Sharing

Proof of Data Authenticity and Provenance

The foundations of the data economy must be built on trust. Blockchain is the perfect candidate to facilitate this trust because it offers an immutable record of historical activity. Quadrant will require that all data is publicly stamped so that its origin will always be known. Any stakeholder can learn the provenance of a data feed at any time.

It cannot be overstated how important trust is to the data economy. Without it, the current problems will continue to persist. People will still transact data in a way that is opaque and fraught with risk. All the technology in the world will not be able to provide authentic data from disparate sources to the companies that need it.

To give an example of how data stamping works, consider a Pioneer creating a daily push of data to a Data Consumer. The Pioneer will hash the data of the day and push the DNA stamp of the data to

QUADRANT

Quadrant. When the Data Consumer receives the data, it hashes it to verify that the data that has been received is the same as the data that was produced. If the data matches, the Data Consumer has proof of acquisition. If the data does not match, the two parties may contact each other to sort out the problem.

Client software will be provided to stamp and verify data. Updates can be tracked via GitHub.

Constellations for Disparate Data Sources

Constellations are envisioned to be the key to bringing together disparate data sources in such a way that they can be used by Pioneers, Elons and other Data Consumers to compete with big firms. Constellations are intended to level the playing field so that everyone has access to the data that they need when they need it, which is projected to inspire a new generation of data scientists to discover revolutionary insights; enable new businesses to form; allow people to build upon data from others instead of recreating the same; give smart people a chance to receive remuneration through combining data sets into valuable data products.

Fair Remuneration and Incentive Sharing

Potentially, Pioneers will no longer have to worry about the manual process of figuring out how much incentive each Nursery deserves when an aggregated data product is sold on the Quadrant network. Through the Constellations of the Quadrant protocol, Pioneers will know exactly which Nurseries contributed what and how much each deserves. These will all be done automatically without the need for intervention by any party.

For example, a mobile data Pioneer aggregates data from Singtel, StarHub and M1 and creates a product from it. When an Elon buys the product on the Quadrant network, the Constellation will automatically share the payment for the product between the parties.

There are cases in which millions of individuals, devices, or sensors contribute data to an aggregated product. Each piece of data on its own is worth fractions of a penny, making incentive sharing impossible. The Constellations of the Quadrant protocol are intended to handle the distribution of these micro-payments through the use of the QUAD token.

Stakeholder Benefits

Data Consumers, Pioneers, Nurseries and Elons are all projected to benefit from Quadrant.

Data Consumers

First and foremost, Data Consumers (AI, Machine Learning and other data-hungry companies) are intended to have access to authentic data feeds. This will help them to achieve the best results

from their data-driven solutions. Quadrant also helps them with regulatory compliance because they can be sure of data provenance.

Pioneers

Pioneers will be able to prove the ownership of their data products and ensure that they transact only what they stamp. Quadrant will potentially help them to be seen as a transparent and trusted supplier. They are intended to be able to ensure proper incentive sharing with other entities using their feed, as well as having the incentive sharing process automated.

Nurseries

Nurseries are intended to be rightfully remunerated for any data that they provide, regardless of how many times it is sold by Pioneers on the Quadrant network. They will be able to see how far up the chain that their data is used, and they can provide their data to multiple Constellations that solve different problems.

Elons

Elons potentially have the power to change the world using the Constellations mapped onto the Quadrant network. These are intended to be some of the smartest people and companies on the planet that can do incredible things with data. They should be able to create linkages between disparate data sources to develop new data products that will help everyone from individuals and SMEs to Fortune 500 companies. There is no question that the world needs this if it is going to meet the challenges of the future.

Cross Pollination
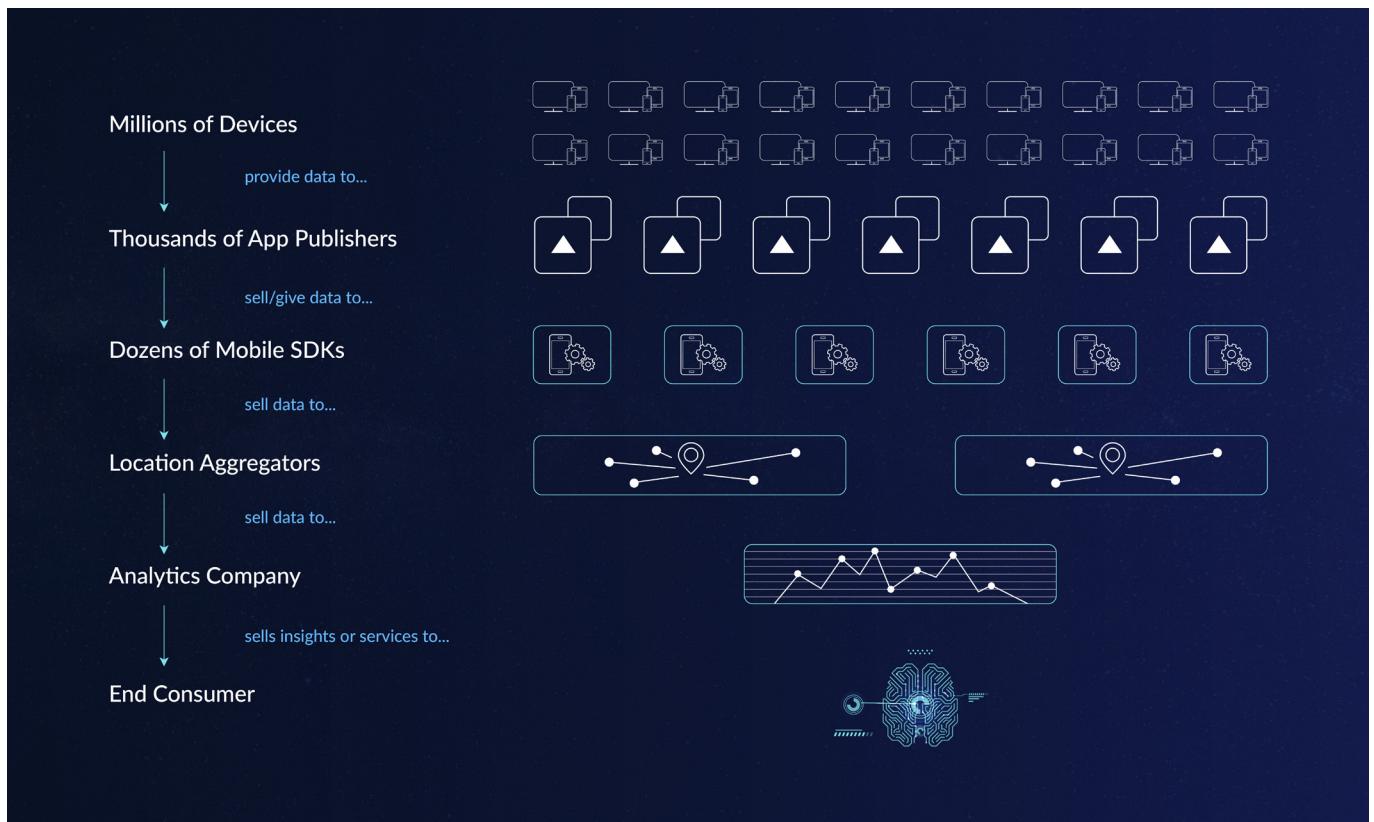
Cross pollination is projected to be reduced because the data will be stamped on the Quadrant network at the source. Data Consumers will hence be assured that they are getting the data in the same state as when it was created. If there are any doubts about authenticity, Data Consumers can prove that they received the data as intended from the Pioneers. The liability, therefore, shifts to the Pioneers to prove that they owned everything that they sent to the Data Consumers.

As combining data sources is encouraged, Data Consumers who purchase from different participants in the network will be able to see if the same data exists in multiple contracts. This allows them to avoid purchasing duplicate data from the Quadrant network.

Use Case for Quadrant and Constellations

Let one consider a real example of a data value chain for Mobile Location Intelligence data: a government body is doing a project in which it wants to understand the most crowded roadways in the morning and understand where everyone comes from. To execute this study, the government

QUADRANT

will enlist a Mobile Location Intelligence company to do this work. This intelligence company will gather data from multiple Location Aggregators who source the data from the many SDK providers that produce this data. These SDK providers install their libraries in thousands of Apps from publishers who in turn have their Apps installed in millions of mobile devices. It is quite complex for such a simple use case.

By making Constellations available on Quadrant, they can be aggregated to form new Constellations at each level along the data value chain. It will never be the case in which the top Data Consumer sources directly from the millions of devices. What the Quadrant protocol can enable is that when the top layer Constellation is purchased, then all the corresponding Constellations are also triggered, hence enabling the release and remuneration of each party from the Location Aggregators, to the SDKs and Publishers.

Widespread Token Distribution

New use cases are projected to emerge in which individual devices and sensors are remunerated for their data contributions. Applications that source from IoT or mobile devices require millions of individual endpoints to produce useful data products. Each of these endpoints will require remuneration in the form of micro-payments. These payments will be made using the QUAD token of the Quadrant network.

QUADRANT

DataStreamX – The Creator and First User of the Quadrant Network

DataStreamX (DSX) has operated its data marketplace and data brokerage business since 2015. Its mission is to unleash the power of the data from the world by facilitating the transacting of data between buyers and sellers on its platform. The Quadrant Protocol is a separate project which aims to continue this mission.

DSX would provide development services for the Quadrant Protocol. It would support the Quadrant network in building the protocol to help users solve real-world problems and to create foundations of transparency and authenticity in the data economy.

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The Quadrant Protocol Team & Advisors

Quadrant Protocol Team

Mike Davie

CEO and Founder

An industry veteran leading the commercialisation of disruptive mobile technology and ICT infrastructure, Mike Davie has a long history working with some of the biggest players of technology in Asia, the Middle East and North America. Currently, the technologist is working to solve the problem of trust that is at the root of the data industry. Powered by blockchain technology, Mike has founded the Quadrant Protocol– a blueprint for mapping decentralised data.

Barkha Jasani

Head of Research & Technical Development

With over 8 years of experience in software development, Barkha leads the end-to-end development of the platform for the Quadrant Protocol. Currently, she is leading the development of the architecture for the blockchain of the Quadrant Protocol and its stamping protocol.

Sharique Azam

Big Data Architect & Blockchain Engineer

A big data expert, Sharique has mastered the various processes, methods and technologies involved in the collection, transformation and management of big data. Sharique is now leading the core development of the private blockchain for the Quadrant Protocol and its distributed applications.

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Roger Ganga

Data Scientist & Blockchain Developer

As the in-house data science guru of DataStreamX, Roger is responsible for the machine learning and data science operations of the company and is part of the blockchain development for the Quadrant Protocol as he develops the Data Smart Contracts. Prior to DataStreamX, Roger was working on decision science projects at Mu Sigma Inc.

Marlina Farhin

Front-end Developer

The core strengths of Marlina are her technical and design abilities. Her impressive design skills and creative taste make her a top-notch front-end design developer. She is responsible for revamping, designing and developing the responsive sites for DataSteamX; she spearheads the creation of front-end standards.

Navas Khan

Head of Marketing

Navas possesses marketing savvy that enables him to contribute to the growth and expansion of both the companies and the clients that he works with. His knowledge of the big data industry, along with the trends and advancements in it, make him a key contributor to the efforts of DataStreamX in educating people about the data economy and the opportunities within it.

Nikos Kostopoulos

EU Community Manager

Nikolas is the strategist to organize a vivid community around Quadrant Protocol in Europe. With many years of experience working as an independent consultant for cryptocurrency and blockchain businesses, he has brought priceless insights from the industry to our team. He is a strong believer in the advantages blockchain can deliver to businesses in various industries.

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Advisors

Dorjee Sun

COO, Santiment.net

Dorjee is the COO of Santiment.net, the cryptocurrency big data industry leader that launched in July 2017. Previously, Dorjee was a social entrepreneur who has co-founded 20 companies with 2 acquisitions and 4 exit and asset sales. He is helping Quadrant to build its community.

Benedict Chan

CTO, BitGo

Benedict is the CTO at BitGo and has been developing blockchain platforms and wallet applications since 2012. He founded Ether.li, the first multi-signature web wallet for Ethereum in the world. Ben advises the team on wallets, smart contracts, scalability solutions and other technical aspects. He is the blockchain security and smart contract guru for Quadrant.

Hari Krishnan

CEO, PropertyGuru

Krishnan is a seasoned business leader and an entrepreneurship expert. He has led the growth of various technological companies and in 2016, he joined the PropertyGuru Group as its CEO and as a member of its Board of Directors. He manages the strategy of the company and its corporate direction focusing on consumers, innovation and leadership. Krishnan is advising the Quadrant Protocol team with regards to long-term organisational growth.

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Everett Leonidas

Venture, Aviva

Everett is a professional investor and business development specialist in both large enterprises and start-ups with 6 years of experience in corporate finance, 5 years in technological companies and 3 years in corporate ventures. He is an expert in corporate strategy, business design, new product go-to-market and ecosystem development. He serves as a board advisor or mentor to several disruptive B2B start-ups worldwide. Everett is advising the Quadrant Protocol team with regards to corporate development and partnerships.

Jeremy Seow

Partner, ChainRock

Jeremy is a Partner at ChainRock. Before ChainRock, Jeremy worked as a Senior Product Manager at Zendesk where he built and shipped the Zendesk Message product. Jeremy joined Zendesk as a result of their acquisition of the chat startup Zopim, where he was the Director of Sales and oversaw all of its sales and marketing as the startup grew from 50,000 users to 200,000 users. He is advising the Quadrant Protocol team on ICO planning, strategy and delivery.
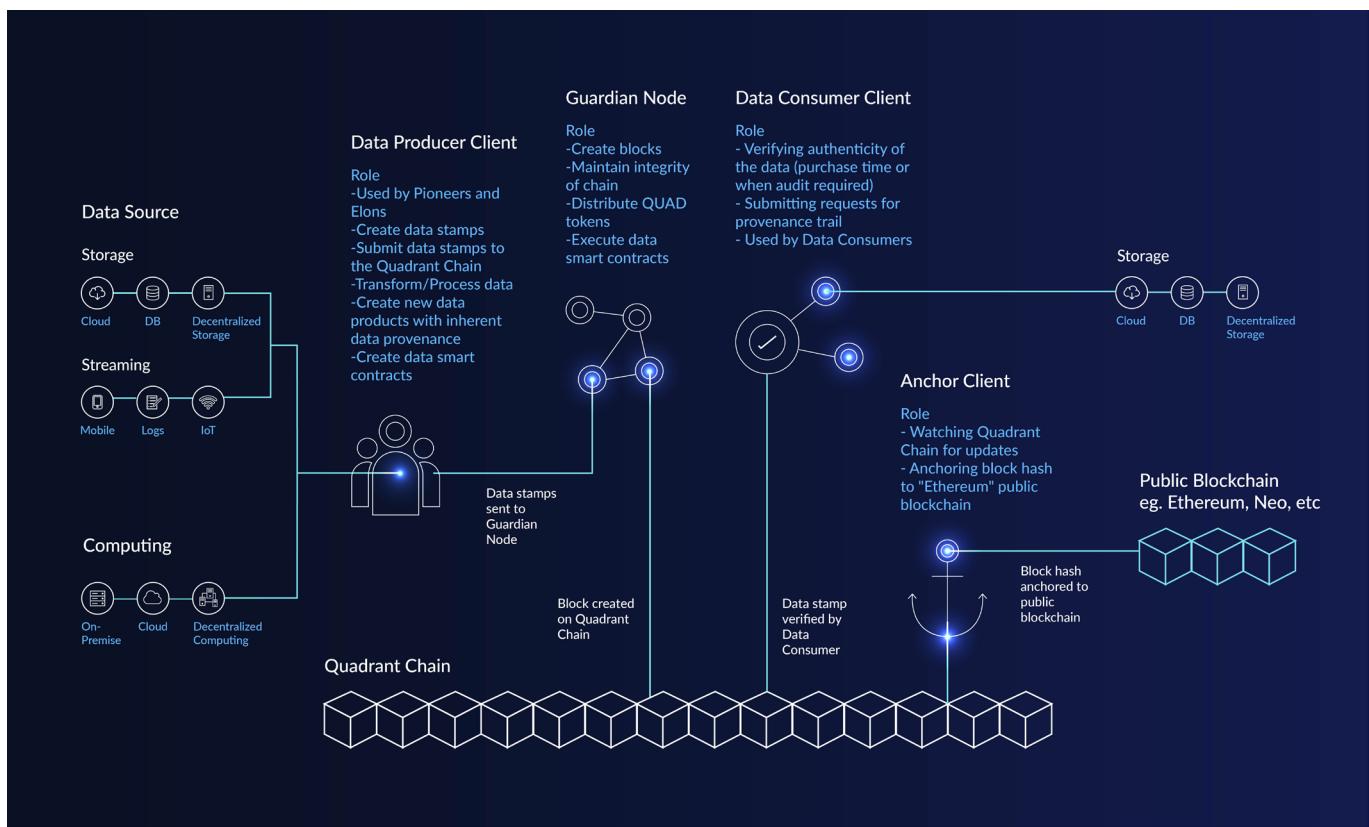
Whit Walker

Growth Strategy, Fiverr

Whit is a seasoned technology strategist, investor, entrepreneur and business development professional who brings extensive marketplace management expereince to the team. His career spans ten years handling strategy development and execution at technology firms, five years solving profitability issues at media companies and three years growing and managing two-sided marketplaces. He is an expert in product development, strategic planning and implementation, POC testing and go-to-market strategy development. Whit is advising Quadrant Protocol on ICO market planning, strategy and execution.

The Technology for the Quadrant Protocol

The Quadrant Protocol is a decentralised data blueprint. It is ingestion, processing and storage agnostic. It is designed to work with both centralised and decentralised services. The architecture consists of the core Quadrant blockchain, clients (Data Producer, Data Consumer and Anchor) and Guardian Nodes. Quadrant will operate on a Proof of Authority consensus mechanism so that it can handle more transactions, operate at a lower gas price, achieve faster transactions and restrict malicious nodes from entering data into the network. An external Proof of Work chain will be used as an anchor for security purposes. For the time being, the Ethereum blockchain will be used for anchoring but it can be replaced by any public chain in the future if needed.

Technical Details

Quadrant will have the following initial features and services:

- Data Stamping Protocol
- Stamp Verification
- Open Constellations
- Network Nodes and Clients
- Data Enhancement by Elons
- Public Chain Anchors

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Data Stamping Protocol

The role of the Data Producer Client is for Pioneers and Nurseries to lay claim to a produced piece of data by stamping it in the Quadrant network, thereby providing the DNA fingerprint of the data. This enables the data for inclusion in Constellations and for consumption. This mechanism can also be used to ensure complete delivery of the referenced data feed. This simple yet overlooked aspect of all data transactions is critical for transaction integrity.

Data Stamping Protocol Structure	
Hash	Consists of a hash value of the data (hex string between 40 and 128 characters) and a hash_type value (example: SHA256)
created_by	The wallet ID that a Nursery uses to stamp the data. This enables Nurseries to remain anonymous except within their private circles. Meanwhile, this enables public traceability of data production to a single source ID
feed_id	As most data products are ongoing feeds, the feed_id will be used to link individual stamps to a single feed. The created_by and the feed_id combined will act as a unique identifier for a single/ unique product or data feed. Multiple created_bys can utilise a single feed_id value but the data will be considered an independent data feed for usage when transacting
sequence_ number	An auto-incrementing number maintained for ongoing feeds/ stamps under Nursery unique IDs (created_by)
scheduling_by	Represents the configuration parameter for the Data Producer Client to know how the data should be stamped (e.g. as a file or as a directory)
file_name	Represents the name of the file if the scheduling_by parameter is "file"
directory	Represents the name of the file if the scheduling_by parameter is "directory"
timestamp	The timestamp will reference the hash creation time in the Quadrant Network
version	This will include the version number, a list of changes, any previous hashes from which the current hash is derived (format: previous wallet ID|previous hash)

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Stamp Verification

Upon entering a contract for the consumption of data, the Data Consumer will want to ensure ongoing authenticity of the data. In the "Verification time period" set by the Nurseries, the Data Consumer will be able to reference the delivered data against the data stamped in the Quadrant network. This is designed to ensure full delivery of large data feeds along with creating a paper-trail for legal compliance. At any point, a Data Consumer will be able to prove the data received was indeed the data intended to be delivered from the Pioneer.

Open Constellations

Quadrant will enable two-way Constellation creation, in which either the supply side or the demand side can initiate the contracts. With this important feature, Pioneers will be able to offer their data on set terms. Elons and Data Consumers will also be able to create Constellations on their own terms and offer them to the Pioneers. This dynamic contract creation enables more liquidity in the data marketplace on the Quadrant network. A user interface provided by the Guardian Node will be enabled for data schema and contract creation.

Constellations created on the Quadrant network will also allow for nesting of contractual revenue sharing. This will enable automatic payments to the Nurseries and Pioneers without the cost-prohibitive administration and transaction costs.

Network Nodes and Clients

The network is made up of the following nodes and clients:

Data Producer Client

The Data Producer Client is used by Nurseries and Pioneers to submit data stamps into the network, provide wallet features for sending and receiving QUAD and create the Constellations that map disparate data sources for the usage of Pioneers, Elons and other Data Consumers. This is intended to be the first step in creating new and exciting data products that power data-driven companies.

Guardian Node (Full Node)

The Guardian Node hosts and builds transactions into the Quadrant network (creates blocks on the Quadrant Network Chain), anchors to a public blockchain like Ethereum, executes Constellations; handles data provisioning and delivery.

Data Consumer Client

The Data Consumer Client verifies data stamps and data provenance audit requests, while also creating Constellations. It will also contain a wallet feature to pay for data from purchased Constellations.

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Anchor Client

The Anchor Client watches the Quadrant network for updates and anchors block hashes to a public blockchain, like Ethereum.


Data Enhancement by Elons
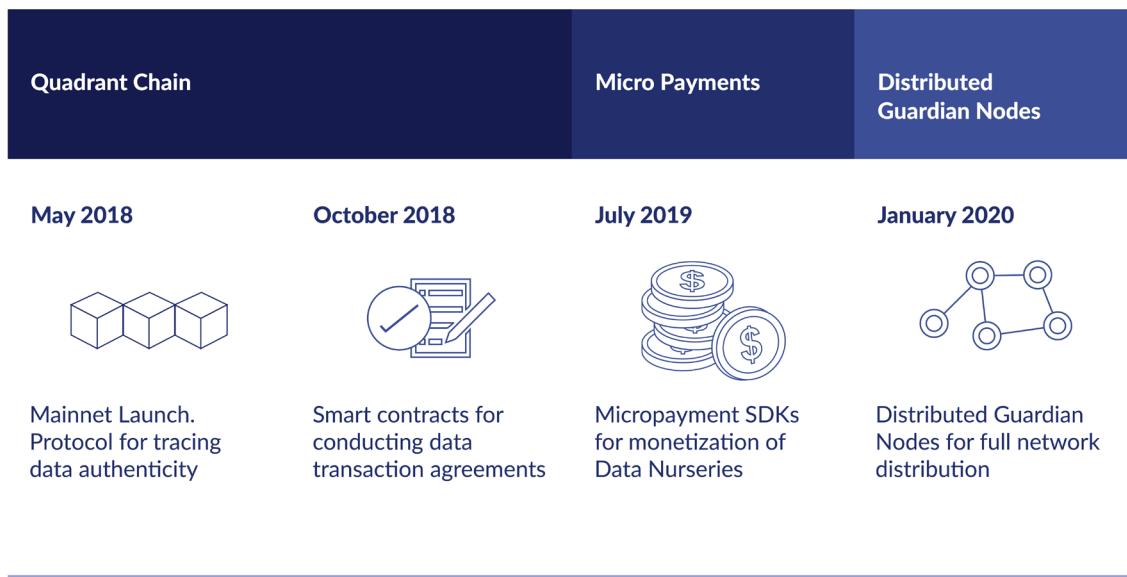
The data economy relies on Elons to increase the value and usability of raw data feeds. Within Quadrant, Elons will be able to stake QUAD to get access to third-party feeds, perform operations on the data and offer new contracts. These contracts can be with respect to aggregation, transformation and the enhancement of source data. Elons will take a percentage of the payments for their work and provide the network with new data feeds. Nurseries can choose to either participate via standard contracts, incentive sharing, or a combination of the two.

Anyone, from a startup to individual data scientists, can be an Elon. All that is required is a desire to innovate around the data within the network to create products that the world can benefit from. This is envisioned to be a massive improvement over large, walled data hoarders like Google, for which no one outside the walls can benefit from the data.

Public Chain Anchor

Quadrant will use a Proof of Authority (PoA) consensus algorithm. To ensure the security of the Quadrant network, block hashes will be anchored to the Ethereum blockchain at first but can be anchored to any public chain in the future. Any bad actor would need to attack both chains in order to rewrite the history of the Quadrant network. The two-chain technique is intended to enable fast and cost-efficient transactions within the Quadrant network, while taking advantage of the security of a largely distributed PoW network.

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Quadrant Network Technology Roadmap

Quadrant Chain		Micro Payments	Distributed Guardian Nodes
May 2018	**October 2018**	**July 2019**	**January 2020**
Mainnet Launch. Protocol for tracing data authenticity	Smart contracts for conducting data transaction agreements	Micropayment SDKs for monetization of Data Nurseries	Distributed Guardian Nodes for full network distribution

Data Authenticity– May 2018

The first phase of development will be to launch the mainnet for the Quadrant network and the first feature, data stamping, which is designed to provide data authenticity from the data source to the Data Consumer. By putting the data signature on the block at the source, the Quadrant protocol will be able to track the movements of the data and understand where there have been manipulations. This is designed to ensure data authenticity and help track provenance for compliance applications.

Constellations– October 2018

For the first phase of Constellations on the Quadrant network, it will enable Pioneers to set their minimum criteria for pre-built data Constellations and for Elons to create their own custom Constellations stating data quality and price for decentralised data sources.

For the second phase of Constellation creation on the Quadrant network, it will enable micro-payments and revenue sharing throughout the complete data supply chain. This is intended to enable Data Consumers to be rightfully compensated for provision of data down to the individual, device or IoT endpoint (as outlined below).

Enabling Micro-Payment Down to an Individual Producer– July 2019

There is a prevailing misconception that an individual data point has a lot of value. In reality, with any individual atomic source, e.g. the mobile device of an individual, the data is only worth fractions of a penny per month. This make it impossible for the individual to be compensated by an individual Data Consumer because a bank transfer of a fraction of a penny just does not make sense.

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With the Quadrant protocol, transfers of fractions of a penny is intended to be possible now. Although a fraction of a penny in a single transaction is not an interesting usage case for the individual, the monthly accumulation of hundreds or thousands of fractions makes it much more lucrative to share data. This can help to enable not only data sharing from mobile devices but can also be applied to other micro data producers like sensors in IoT networks. Contracting and administrating these contracts manually is impossible and not viable but this may be automated with the Constellations of the Quadrant network.

Distributed Guardian Nodes– January 2020

The goal for the Quadrant Network is to find a way— provided it suits the best interests of its community and users—to create a fully distributed and open Guardian Node system that will power the data economy.

Market Details and Strategy

Market Size and Customer Profiles

The International Data Corporation (IDC) put the value of global big data and business analytics revenue at USD 130.1 billion annually in 2016— a number that is expected to grow to over USD 200 billion by 2020. Companies, especially those working with AI, have proven to have an insatiable appetite for data from an ever-increasing variety of sources. Dresner Advisory Services estimates that some 53% of companies utilised big data for analytics purposes in 2017— an increase of 36% from 2015. These companies are using the data to solve complex problems, detect trends and create new products that they will introduce to the market.

The Quadrant Network will be targeted towards these data-hungry companies, starting with a focus on the location intelligence industry. That entire sub-section of big data needs to be cleaned up. Next, Quadrant will be focused on being the alternative data space where companies can access large amounts of compliant data. In the future, the Quadrant Protocol team will seek to expand into IoT and medical data. These are two areas in which compliant and authentic data is critical.

Differentiation Strategy

Data marketplaces and middlemen are already accessible to everyone. Often, however, these entities hide their sources and intentionally make the waters murky. Their reasoning is understandable: they need to ensure a competitive edge by not giving what they have to others. Nothing about this approach makes the world a better place. There are other ways to compete.

Quadrant, by virtue of its decentralised model, is aimed at differentiating itself by providing the framework for authentic and trustworthy data; compliant data as well, so that when the government knocks on the door of Data Consumers asking where they obtain their data, they can answer with confidence. Companies are projected to see the value added by this approach and will hence opt to move away from opaque marketplaces.

Where Quadrant is designed to really stand out from competitors like Ocean, Streamr, Synapse. ai and IOTA is the opportunity it provides Elons to innovate using a diverse array of mapped data sources. Pioneers are intended to create data products based on data provided by Nurseries. Elons can then take those products, find linkages and then create mega Constellations that can be used by companies to effect real change in the world, all while being fairly remunerated. This is envisioned as the exciting future of the Quadrant network.

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Payment Model

Quadrant will be run similar to a not-for-profit system. It will use the Ethereum gas model to ensure the sustainability of the network without charging excessive fees to derive profit. When Nurseries stamp, they pay a small amount of QUAD which goes to the Guardians as the incentive for maintaining nodes within the network. Users will pay QUAD to create Constellations but the total payment for the data within the Constellations will go to their owner(s).

[1] https://www.idc.com/getdoc.jsp?containerId=prUS41826116
[2] https://www.forbes.com/sites/louiscolumbus/2017/12/24/53-of-companies-are-adopting-big-data-analytics/#-2c22294a39a1

QUAD and eQuad Token Details

The Quadrant Network will utilise two different currencies for its protocol: eQuad and QUAD. The native digital cryptographically-secured utility token of the Quadrant Network (QUAD) is a major component of the ecosystem on the Quadrant Network, and is designed to be used solely on the network. eQuad is an ERC-20 standard compliant placeholder digital tokens on the Ethereum blockchain which would be sold, and which may be converted into QUAD via a gateway when the Quadrant Network mainnet is eventually launched. In this whitepaper, "eQuad" shall refer to the placeholder token prior to mainnet launch, and shall refer to QUAD after the mainnet launch.

QUAD is a non-refundable functional utility token which will be used as the unit of exchange between participants on the Quadrant network. The goal of introducing QUAD is to provide a convenient and secure mode of payment and settlement between participants who interact within the Quadrant network. Further, QUAD is required as virtual crypto "fuel" for using certain designed functions on the Quadrant network, providing the economic incentives which will be consumed to encourage participants to contribute and maintain Quadrant. Users of Quadrant and/or holders of QUAD which did not actively participate will not receive any QUAD incentives.

QUAD is an integral and indispensable part of the Quadrant network, because without QUAD, there would be no incentive for users to expend resources to participate in activities or provide services for the benefit of the entire ecosystem on the Quadrant network.

QUAD does not in any way represent any shareholding, participation, right, title, or interest in the Company, its affiliates, or any other company, enterprise or undertaking, nor will QUAD entitle token holders to any promise of fees, dividends, revenue, profits or investment returns, and are not intended to constitute securities in Singapore or any relevant jurisdiction. QUAD may only be utilised on the Quadrant network, and ownership of QUAD carries no rights, express or implied, other than the right to use QUAD as a means to enable usage of and interaction with Quadrant.

eQuad and QUAD Economics

The eQuad and QUAD tokens are designed to complement each other to keep the network running.

Purchasing QUAD

Committing activities to the Quadrant network requires QUAD. Users can procure eQuad through the initial crowd-sale. They can then convert their eQuad to QUAD for use on the Quadrant network. The gateway conversion will be 1:1 from eQuad to QUAD. Further token acquisition channels will be announced at a future date.

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Enabling Simple and Complex Access Structures

QUAD will be used as the medium of exchange for services and the settlement of transactions on the Quadrant network. Both the stamping and verification processes for authenticating data and the execution of Constellations require QUAD to process. QUAD will be used to purchase data, while Pioneers will receive QUAD as remuneration. At first, fiat currency can also be used to settle transactions, however this will be phased out as the ecosystem develops. Elons will stake QUAD for access to datasets for experimentation and trials. Pioneers will enable multiple tiers at different staking levels. Additional services that also require QUAD for settlement may be added to the Quadrant Network over time.

Stamping and Verifying Data

QUAD will be used to submit stamps to the network. These payments will be paid to the Guardian Nodes as incentives for verifying the transactions and submitting proof to the Quadrant network. Data Consumers and Elons will be able to verify the data in the Quadrant network via open-source clients.

Simple Subscription Payments

QUAD is required for executing Constellations. Payments will go to the Guardian Nodes. The value in QUAD of the data being transacted will be set by the Pioneer (the entity that created the Constellation) and received from the Data Consumer. For standardised data products, Pioneers can price their data in QUAD, either by pegging or floating it to a fiat currency.

Complex Subscription Payments

Making payments through a single data value chain involves high administrative costs. This means cross-board transactions are prohibitively expensive and, thus, giving the rightful ADP its fair share is next to impossible. Wiring someone $25 costs about $25 and that does not include any loss on currency swaps. QUAD is intended to solve this problem. Minimum transaction fees are established in the Constellations, so when an aggregated data product is purchased, the entire value chain can be remunerated. This is done instantaneously and without the need for burdensome administration.

Staking for Access

To foster innovation within the Quadrant network, Elons will be granted access different datasets and services by staking QUAD. Multiple tiers of service will be created that will enable everyone from individual data scientists to large innovation labs at Fortune 500 companies. Staking ensures good behaviour by the parties because bad actors can lose their stake. Conditions will be placed on the staking party within each tier to ensure fair use and to incentivize Pioneers to enable access.

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Future Services

As Quadrant develops, new premium features and services can be added that will require QUAD, while others may be sunset. Quadrant is setup to be a self-sufficient network, so ongoing updates and innovation can be expected.

eQuad Token Sale
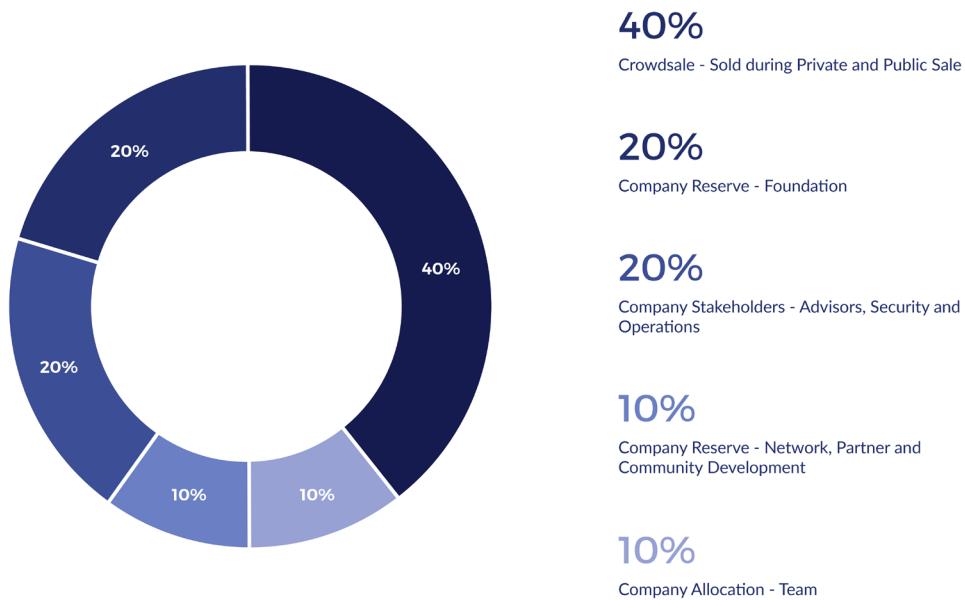
Token Sale Details	
Public Sale Start Date	TBA
Public Sale End Date	TBA
Soft Cap/Hard Cap	$20 million USD hard cap (May be updated to peg to ETH), $3 million USD soft cap
Currencies for Buying eQuad	ETH
Price	$0.05 USD = 1 eQuad (ETH will be pegged the day before sale)
Who Can Participate	Whitelisting process. No citizens of United States of America, Canada, New Zealand, People's Republic of China and the Republic of Korea, or participants who fail to successfully pass KYC/AML checks
Unsold eQuad	Unsold eQuad will be held in a reserve for a future token sale to be held no sooner than 2 years after the close of the Public Sale.
eQuad Supply	1,000,000,000 eQuad
eQuad Distribution	40% Crowd-sale, 20% to be held by Company, 20% Stakeholders, 10% Reserve, 10% Team
Type of Token	ERC-20

In particular, you understand and accept that eQuad:

(a) is non-refundable and cannot be exchanged for cash (or its equivalent value in any other virtual currency) or any payment obligation by the Company or any affiliate;

(b) does not represent or confer on the token holder any right of any form with respect to the Company (or any of its affiliates) or its revenues or assets, including without limitation any right to receive future dividends, revenue, shares, ownership right or stake, share or security, any voting, distribution, redemption, liquidation, proprietary (including all forms of intellectual property), or other financial or legal rights or equivalent rights, or intellectual property rights or any other form of participation in or relating to the Quadrant Network, the Company, the Distributor and/or their service providers;

QUADRANT

(c) is not intended to represent any rights under a contract for differences or under any other contract the purpose or pretended purpose of which is to secure a profit or avoid a loss;

(d) is not intended to be a representation of money (including electronic money), security, commodity, bond, debt instrument or any other kind of financial instrument or investment;

(e) is not a loan to the Company or any of its affiliates, is not intended to represent a debt owed by the Company or any of its affiliates, and there is no expectation of profit; and

(f) does not provide the token holder with any ownership or other interest in the Company or any of its affiliates.

Distribution

40%
Crowdsale - Sold during Private and Public Sale

20%
Company Reserve - Foundation

20%
Company Stakeholders - Advisors, Security and Operations

10%
Company Reserve - Network, Partner and Community Development

10%
Company Allocation - Team

The 1,000,000,000 eQuad tokens will be distributed as follows:

Pool A– Crowd-sale
40% will be allocated for sale (Private Sale and Public Sale phases). Unsold eQuad will be held in a reserve for a future token sale to be held no sooner than 2 years after the close of the Public Sale.

Pool B— Company
20% will be held by the Company as reserves.

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Pool C— Company Operations
20% will be allocated towards advisory, security and operational purposes.

Pool D— Company Reserve
10% will be allocated towards partner and community development to incentivise participation (these will be locked initially and made transferrable monthly with annual rates of 40%, 30%, 15%, 10% and 5%).

Pool E— Team
10% will be allocated to the Quadrant Protocol team (these will be locked initially and made transferrable monthly over 5 years).

To the extent a secondary market or exchange for trading eQuad does develop, it would be run and operated wholly independently of the Company, the Distributor, the sale of eQuad and the Quadrant Network. Neither the Company nor the Distributor will create such secondary markets nor will either entity act as an exchange for eQuad.

Token Governance

Treasury Usage

eQuad held by the Company in the reserve will be used to support the growth of the Company. This eQuad reserve will complement the 5% of crow-sale proceeds allocated to the Treasury to ensure no platform usage disruption due to volatility in supply and demand of tokens.

Unsold eQuad Lock-up

All eQuad not sold during the Private Sale and Public Sale will be held in the reserve of the Company for a minimum of two (2) years from the close of the initial Public Sale. These will be used for future token sales in order to support the expansion of the network and its technology.

Token Management

The Quadrant Protocol team would apply the amount allocated to the Treasury to ensure the smooth running of the system and that no one is shut out and cannot use the services due to unavailability of tokens.

Transferability of eQuad

In order to incentivise the recipients, all unsold eQuad, including those in the reserve of the Company as well as for allocation to the Quadrant Protocol team will be locked initially and made

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transferrable over time. Pool D eQuad will be made transferrable over 5 years, with a greater proportion distributed in the early phases as incentives to promote usage and strong early adoption of Quadrant. eQuad allocation to the Quadrant Protocol team will be locked initially and made transferrable over 5 years. All eQuad not sold during the Private Sale and Public Sale will be locked in a reserve for a minimum of two (2) years and used for future token sales.

Reporting
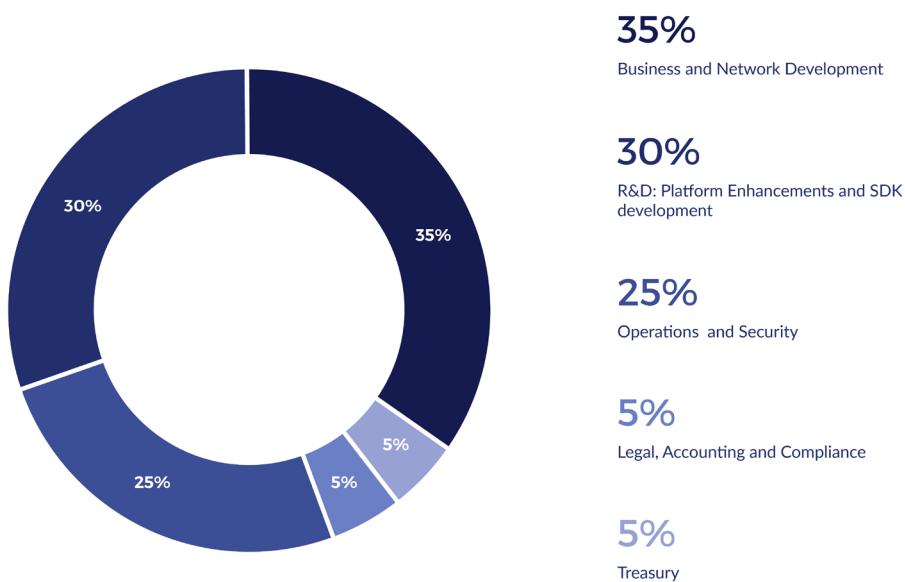
To ensure transparency, semi-annual reports will be made available to the public on the usage and distribution programmes of eQuad in Pool D.

Community

The contributions in the token sale will be held by the Distributor (or its affiliate) after the token sale, and contributors will have no economic or legal right over or beneficial interest in these contributions or the assets of that entity after the token sale. To ensure transparency in the technology and business timeline for the Quadrant Protocol, eQuad holders will be invited to quarterly town hall meetings to meet the Quadrant Protocol team to discuss the vision, milestones and next steps forward. Open Slack and Telegram channels will be available to ensure ongoing dialogue. For the avoidance of doubt, the views of eQuad holders will be considered but the application of the assets of the Company (including without limitation all eQuad held) remain under the full control of the Board of Directors of the Company.

Allocation of Contributions

The Token Generation Event (TGE) will have a hard cap of $20,000,000 USD. If the TGE raises over $7,000,000 USD, the contributions garnered will be locked initially and made transferrable over the course of 4 years, with 40% becoming available upon the close of the eQuad token sale and the remaining 60% released annually to be applied towards the Company's objects at a fixed rate of 15%. This is intended to ensure the long-term success of Quadrant while instilling practicality to ensure no over-spending in the initial years.

35%
Business and Network Development

30%
R&D: Platform Enhancements and SDK development

25%
Operations and Security

5%
Legal, Accounting and Compliance

5%
Treasury

Details of the allocation are as follows:

R&D

30% will be allocated for the building of the network, building SDKs for different applications (including mobile and IoT), creating front-end interfaces for the creation of Constellations, creating a portal interface for purchasing data products and creating clients for accessing and reading the chain.

Business & Network Development

35% will be allocated for creating programs to encourage high-quality data being brought to the network. This includes a special program for the development of Elons. Based on the years of experience that the Quadrant Protocol team possesses, it will prioritise filling the missing data gaps in the market. The Quadrant Protocol team will also foster innovative usage cases and solutions based on the data available in the network. This is intended to help more sellers in bringing high-quality data to the network.

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Operations & Security

25% will be allocated for daily operations, running of nodes, network security and the security of Constellations on the network.

Legal, Accounting & Compliance

5% will be allocated for ensuring that frameworks are in place for data licensing and that all accounting and compliance is done correctly.

Treasury

5% will be allocated to ensure the smooth running of the system and that no one is shut out and cannot use the services due to unavailability of tokens.

Milestones

The Quadrant Protocol is aimed at delivering according to the following milestones. These milestones are subject to change.

Q3 2017

Product
- Problem Identified
- Solution Architecture Kick-off

Q4 2017

Product
- Whitepaper Drafted

Q1 2018

Token Generation Event
- Sale Contract Creation
- Token Contract Creation

Product
- Testnet Release
- Data Stamping Contract Testing
- Initial Client Testing

Q2 2018

Token Generation Event
- Whitelisting
- Security Audits
- Token Generation Event
- Tokens Distributed

Product
- Mainnet Release
- Data Stamping Protocol Release
- Onboard selected DataStreamX users onto protocol

Q3 2018

Product
- Constellation Protocol Release
- Constellation Explorer Release

Q3 2019

Product
- Enable Micro Payments for Nurseries

Q1 2020

Product
- Distributed Guardian Nodes

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Risks

You acknowledge and agree that there are numerous risks associated with purchasing eQuad, holding eQuad, and using eQuad for participation in the Quadrant network. In the worst scenario, this could lead to the loss of all or part of the eQuad which had been purchased.

1. Uncertain Regulations and Enforcement Actions

The regulatory status of eQuad and distributed ledger technology is unclear or unsettled in many jurisdictions. The regulation of virtual currencies has become a primary target of regulation in all major countries in the world. It is impossible to predict how, when or whether regulatory agencies may apply existing regulations or create new regulations with respect to such technology and its applications, including eQuad and/or the Quadrant network. Regulatory actions could negatively impact eQuad and/or the Quadrant network in various ways. The Company (or its affiliates) may cease operations in a jurisdiction in the event that regulatory actions, or changes to law or regulation, make it illegal to operate in such jurisdiction, or commercially undesirable to obtain the necessary regulatory approval(s) to operate in such jurisdiction. After consulting with a wide range of legal advisors and continuous analysis of the development and legal structure of virtual currencies, the Company will apply a cautious approach towards the sale of eQuad. Therefore, for the token sale, the Company may constantly adjust the sale strategy in order to avoid relevant legal risks as much as possible.

2. Inadequate disclosure of information

As at the date hereof, the Quadrant network is still under development and its design concepts, consensus mechanisms, algorithms, codes, and other technical details and parameters may be constantly and frequently updated and changed. Although this white paper contains the most current information relating to the Quadrant network, it is not absolutely complete and may still be adjusted and updated by the Quadrant Protocol team from time to time. The Quadrant Protocol team has no ability and obligation to keep holders of eQuad informed of every detail (including development progress and expected milestones) regarding the project to develop the Quadrant network, hence insufficient information disclosure is inevitable and reasonable.

3. Competitors

Various types of decentralised applications are emerging at a rapid rate, and the industry is increasingly competitive. It is possible that alternative networks could be established that utilise the same or similar code and protocol underlying eQuad and/or the Quadrant network and attempt to re-create similar facilities. Quadrant may be required to compete with these alternative networks, which could negatively impact eQuad and/or the Quadrant network.

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4. Failure to develop

There is the risk that the development of Quadrant will not be executed or implemented as planned, for a variety of reasons, including without limitation the event of a decline in the prices of any digital asset, virtual currency or eQuad, unforeseen technical difficulties, and shortage of development funds for activities.

5. Security weaknesses

Hackers or other malicious groups or organisations may attempt to interfere with eQuad and/or the Quadrant network in a variety of ways, including, but not limited to, malware attacks, denial of service attacks, consensus-based attacks, Sybil attacks, smurfing and spoofing. Furthermore, there is a risk that a third party or a member of the Company or its affiliates may intentionally or unintentionally introduce weaknesses into the core infrastructure of eQuad and/or the Quadrant network, which could negatively affect eQuad and/or the Quadrant network.

Further, the future of cryptography and security innovations are highly unpredictable and advances in cryptography, or technical advances (including without limitation development of quantum computing), could present unknown risks to eQuad and/or the Quadrant network by rendering ineffective the cryptographic consensus mechanism that underpins that blockchain protocol.

6. Other risks

In addition, the potential risks briefly mentioned above are not exhaustive and there are other risks (as more particularly set out in the Terms and Conditions) associated with your purchase, holding and use of eQuad, including those that the Company cannot anticipate. Such risks may further materialise as unanticipated variations or combinations of the aforementioned risks. You should conduct full due diligence on the Company, its affiliates and the Quadrant Protocol team, as well as understand the overall framework, mission and vision for the Quadrant network prior to purchasing eQuad.

QUADRANT