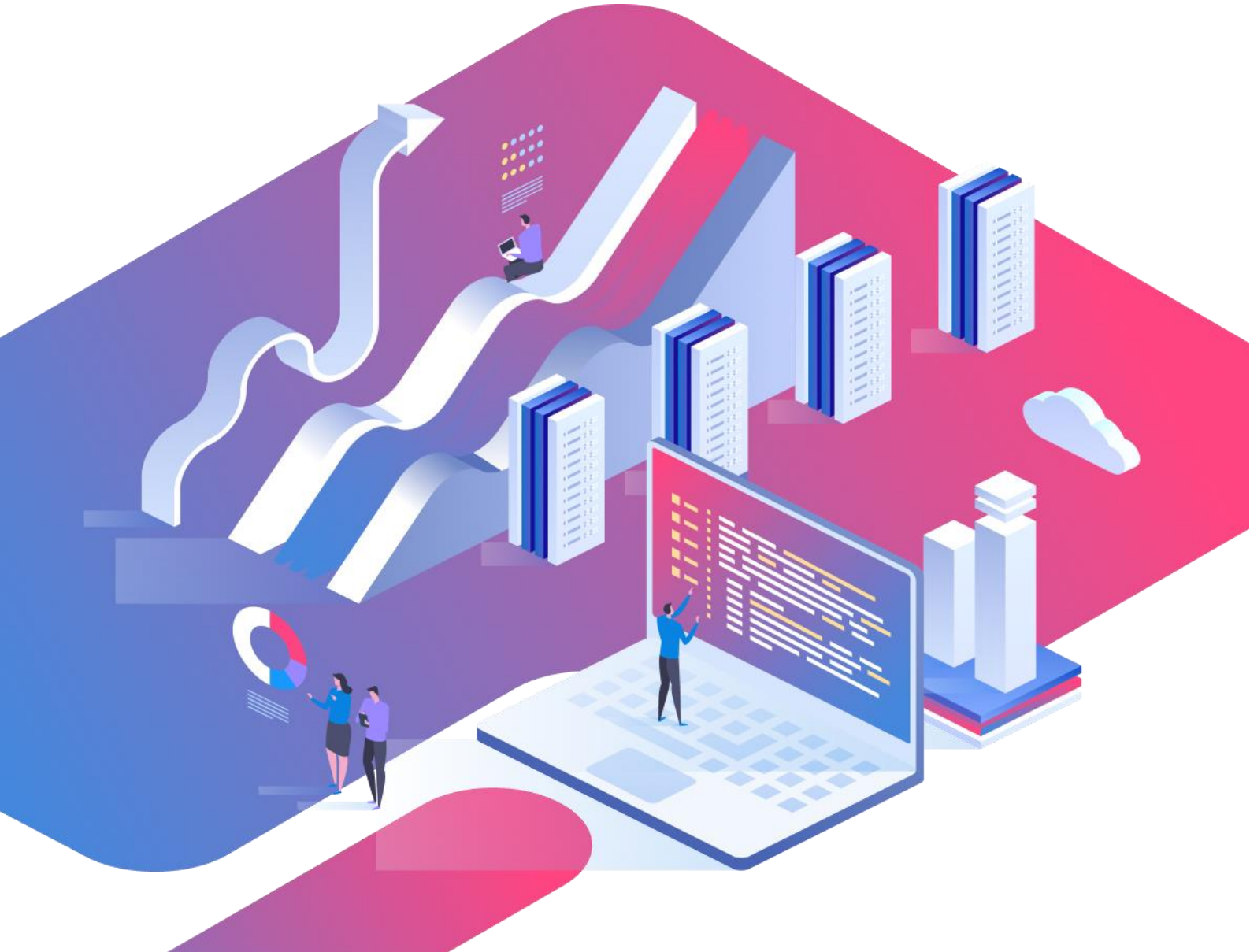
SubQuery

SubQuery Network Whitepaper

Helping everyone create products that allow us to move to a decentralised future



Important Notice

This document (the "Whitepaper") has been prepared by SubQuery Pte Ltd. This notice is intended for all readers who view or access the Whitepaper, regardless of the communication channel or platform. The Whitepaper is strictly for information purposes only, and shall not, under any circumstances, be treated as an offer of securities or an invitation to participate in any regulated investment scheme, howsoever defined in any jurisdiction around the world. In addition, none of the information contained herein is intended to form the basis of any advice or inducement to engage in any sort of investment activity.

In addition, this document is intended to portray the "vision" of SubQuery. It describes the various aspects of the network but it is not intended to be a comprehensive nor final design. Where parameters are specified, they are likely to change in response to community ideas and feedback. It is also envisioned that the core description of this protocol will be used as a starting point for a series of proof-of-concepts, afterwhich improvements will be made.

You are strongly encouraged to read the entire Whitepaper, particularly the section entitled "Risks and Disclaimers", and familiarise yourself with all the information set out below. Please seek independent advice from your professional advisors, including lawyers, financial advisors and tax accountants, if you have any issues, uncertainties or doubts as to any of the matters presented in the Whitepaper.

Introduction

SubQuery's mission is to help others create products that allow us to move to a decentralised future faster. SubQuery is a blockchain developer toolkit and the backbone of web3 infrastructure. A SubQuery project is a complete API to organise and query data from chains. Operating between layer-1 blockchains and decentralised apps (dApp), SubQuery is an open-source indexer organising and serving well-structured data over GraphQL. SubQuery powers the next generation of dApps and tools with web3 data

Currently, anyone can already use SubQuery to extract and query blockchain data in only minutes and at no cost but in a centralised way. The SubQuery Network proposes to enable this same scalable and performant solution, but in a completely decentralised way.

The Problem

In order to build increasingly complex and intuitive applications, developers need powerful tools to process and query their data faster.

A core weakness of blockchain data (and decentralised data in general) is the relatively poor and inefficient performance of processing and querying the data. Due to the way that decentralised data is stored (imagine a chain of pages in a book with some data, each pointing to the next page), answering common questions like how many tokens are in a given wallet is notoriously difficult. You either must traverse through every transaction since the genesis block, or you need to index and transform the data. To build increasingly complex and intuitive applications, developers need more powerful tools to process and query their data faster.

SubQuery also believes in a multi-chain future. As more layer 1 networks take off and attract developers, dApps, and users, the challenge of querying all of this rich data is going to grow exponentially. Thus, the world needs a unique, flexible, and open-source platform that unlocks the value of this data.

SubQuery's Solution

SubQuery already powers some of the top applications in Polkadot and serves tens of millions of daily API requests through the managed service. Many customers now rely on SubQuery to provide mission critical data to their production apps. These customers represent some of the largest wallets (Nova and Fearless), scanners (Subscan, SubVis, and DotMarketCap), NFT platforms (Kodadot and Yuser), and more. The opportunities for SubQuery are endless. This is achieved by the four essential tools available to the developers. The SDK, SubQuery Projects, SubQuery Explorer, and the soon to be launched SubQuery Network.

SubQuery's SDK

Through SubQuery's involvement in the Web3 Grants Program, the SubQuery team delivered the open-source Software Development Kit (SDK). This SDK allows users to generate their own SubQuery Project, defining how the Indexer should traverse and aggregate their own protocol.

The SDK is open-sourced with the Apache licence (v2.0) and is being actively maintained by the SubQuery team - SubQuery intends to continually bring new features and performance improvements to the SDK and anyone in the world can use this SDK to create, build, and even run their own SubQuery infrastructure.

SubQuery has also provided the community with help documentation, walk-through guides, and other material to help them get started with using SubQuery to unlock data for their use cases. In SubQuery's view, success is dependent on the community's success.

SubQuery Projects

SubQuery Projects is an online managed service where anyone can publish their own SubQuery Projects for public or private consumption. They are hosted on SubQuery's secure and highly available managed hosting service for free. Once signed in, you are only minutes away from sharing your SubQuery Project with the world.

The experienced SubQuery team manages the production grade infrastructure on your behalf, deploying your project to high-performance nodes for a superior user

experience. SubQuery will focus on running reliable, geo-redundant, and scalable production indexing servers so that you do not have to.

SubQuery Explorer

SubQuery Explorer is an online managed service that provides access to published SubQuery Projects made by contributors in the community. You can test queries directly in your browser using the playground or get GraphQL API endpoints for each Project. Be inspired by what others are building so you can give back!

The SubQuery Network

Providing productionised mission-critical services is a demanding task. Running complex, scalable, resilient infrastructure requires a small team of infrastructure engineers, and monitoring it constantly for outages is a task that nobody wants to do. SubQuery has always believed that development teams should not need to spend time managing infrastructure - they should focus on building the future.

Unfortunately, with economies of scale, centralised service providers may be seen to be dominating the markets. SubQuery is one of them, but it does believe that a healthy decentralised future requires multiple data service providers, that is why SubQuery is focussing on the SubQuery Network.

SubQuery aims to move towards a globally decentralised network of participants organising blockchain data in order to ensure no single point of failure for SubQuery. It is expected that this will massively increase SubQuery's uptime, provide better redundancy, and increase performance by driving down latency. It is envisioned that applications will be able to use GraphQL to query any store of data (as defined by the SubQuery Project) from Indexers around the network.

SubQuery will aim to power the future plethora of serverless applications in different blockchain ecosystems and accelerate our transition to a decentralised future.

The guiding principle with the SubQuery Network is simplicity. It is SubQuery's opinion that other approaches to decentralised data query services are overly complex and make it difficult for participants to predict their return on investment. The aim is to make it easy for you to get involved in the network, and to clearly forecast your future potential return.

Additionally, SubQuery is designed to cross multiple layer 1 chains. The SubQuery Network is being designed so that regardless of what chain the data is being indexed from, you can use the same single SubQuery Network to participate in decentralised hosting.

The SubQuery Token (SQT)

The SubQuery Token (SQT) is designed as a utility token that powers the SubQuery Network, providing an incentive for participation, as well as serving as a medium of

exchange for transactions within the SubQuery Network. Consumers of data will commit SQT in exchange for data from Indexers and this SQT will be distributed among Indexers based on the payment method selected.

There is no intention for SQT to be used as a medium of exchange for goods or services outside of the SubQuery Network. SQT does not in any way represent or confer upon its holders any right to, title of, interest or participation in, the ownership, shareholding and/or management of SubQuery whatsoever. SQT will not entitle holders to any promise of fees, dividends, revenue, profits, or investment returns.

It is envisaged that in order to become an Indexer on the SubQuery Network, the Indexer must acquire the necessary hardware, run the required SubQuery services, and then choose what SubQuery Projects they index and provide a query service for. In exchange, they will be rewarded in SQT.

SubQuery's view is that an industry can provide these services better than any single organisation can - it is expected that the performance of SubQuery will only increase with progressive decentralisation.

Network Participants

There are three major participants planned for in the SubQuery Network:

- Consumers: Consumers make requests to the SubQuery network for specific data and pay an advertised amount of SQT
- Indexers: Indexers host SubQuery Projects in their own infrastructure, running both the node and query service to index data and answer GraphQL requests.
- Delegators: Delegators participate in the network by supporting their favourite Indexers to earn rewards

Consumers

Indexers

Delegators

Additional minor participants include the following:

- Verifiers: Verifiers help resolve conflicts between different Indexers by temporarily indexing projects and confirming correct proof of indexing hashes when there are disagreements between different Indexers for the same project.
- Query Provider: Query Provider receives data from other indexers, runs query services and answers GraphQL requests. In the beginning of the network, Indexers provide query service as well as indexing, but these two tasks may diverge over time into more clear division.

In other protocols, there may be a *Curator* role who is generally the creator of a particular source of data. SubQuery aims to essentially replace the *Curator* role by using *Plans*. It is expected that the creator of the SubQuery Project can be any type of participant in the SubQuery Network (they could index their own creation, or just consume it in their app).

The Era

The SubQuery Network is oriented around a single constant heartbeat or period - this is called the SubQuery Era. At this stage it is expected that an Era will represent 7 days. The Era represents a period that many settings and actions within the SubQuery Network are orientated around including:

- Network reward allocations are made at the end of an Era
- The length of Plans are represented in a number of Era
- Any re-staging or re-delegation actions will be queued up for the end of the Era
- Changes to the Indexer Commission Rate will be queued up for the end of the Era (or the subsequent Era in some cases)

Payment Methods

Three different payment methods are planned for the SubQuery Network, this provides all participants with various flexible ways to transact SQT. Both Indexers and Consumers will come together on the Plan Marketplace to advertise their pricing and supported payment methods.

Pay as You Go (PAYG)

The first, and a standard amongst the web3 industry, is Pay as you Go. This is the baseline payment method and a fallback for others. Each Indexer will advertise their PAYG prices when registering their ability to serve requests for specific SubQuery Projects.

Consumers making requests will have to lock the tokens necessary to make that request, and at the end of an Era, these tokens will be distributed to the Indexers based on the Cobb-Douglas production function (see Indexer Staking). As part of our work to tokenise SubQuery, a conditional micropayment pallet on Substrate is planned.

Closed Agreement

Closed Agreement represents an agreement between only 1 Indexer and 1 Consumer. It's a direct relationship where all payment flows between the two parties for the work that is done. This allows Indexers to have confidence in the ROI when choosing to index a new SubQuery project, and allows Consumers to quickly attract an Indexer to a new project.

A Closed Plan can be advertised on the Plan Marketplace by either an Indexer or a Consumer. The Closed Plan can be structured similarly to a renewal subscription based payment, just like what we all use in web2. A Closed Plan will include the following on-chain details:

- The maximum number of Indexers and/or Consumers that can accept the Closed Plan (and therefore the resulting number of Closed Agreements that can result)
- The advertising period of the Plan on the Plan Marketplace (in terms of a number of Eras)

- How many complete Eras this Plan is for (the Plan may start in an Era and these are not counted
- The maximum number of requests in each 24 hour period
- The total reward of the Plan expressed in SQT

Any other party can accept these conditions, from which a Closed Agreement will be created between the two parties. If any additional party accepts the Closed Plan in the future, this will result in an independent Closed Agreement being created.

Open Agreement

Open Agreements are similar to Closed Agreements, but allow multiple Indexers to join and compete to provide data to the Consumer. An Open Agreement may start as an Agreement between 1 Consumer and 1 Indexer, but more parties may join the existing Agreement resulting in *n* Indexers and *n* Consumers. Each Open Agreement results in a new reward pool being created for that Agreement, and SQT is distributed amongst participating indexers by the Cobb-Douglas production function.

An Open Plan can be advertised on the Plan Marketplace by either an Indexer or Consumer, whenever another party accepts the terms an Open Agreement is initialised and a new reward pool created. If an Open Agreement already exists for the Open Plan, then the party just joins the existing Open Agreement and reward pool. The Open Plan can be structured similarly to a renewal subscription based payment, just like what we all use in web2. An Open Plan will include the following on-chain details:

- The optional maximum number of indexers that can join the Open Agreement
- The advertising period of the Open Plan on the Plan Marketplace (in terms of a number of Eras)
- How many complete Eras this Plan is for (the Plan may start in an Era and these are not counted
- The maximum number of requests in each 24 hour period
- The total reward of the Plan expressed in SQT

Open Agreements provide favourable terms for both Indexers and Consumers, but enable better performance and reliability for Consumers by attracting more Indexers to compete and serve the same data. If Consumers are running large scale applications with users around the world, then Open Agreements are ideal.

Comparison of Payment Methods

SubQuery is intended to function as a marketplace where both Consumers and Indexers can meet to exchange data for SQT tokens. However, there are a lot of up-front costs that an Indexer must incur before they are able to sell data from a new SubQuery Project.

Closed and Open Agreements are designed to give Indexers confidence that there is a market for data from a particular SubQuery Project, and essentially signal to them which Projects should be indexed. Plans can also be placed on existing SubQuery Projects to attract additional Indexers to that SubQuery Project. This may be useful in situations where the existing monopolistic Indexer may be charging an unreasonable amount for the data or there is a lack of competition to drive prices to equilibrium.

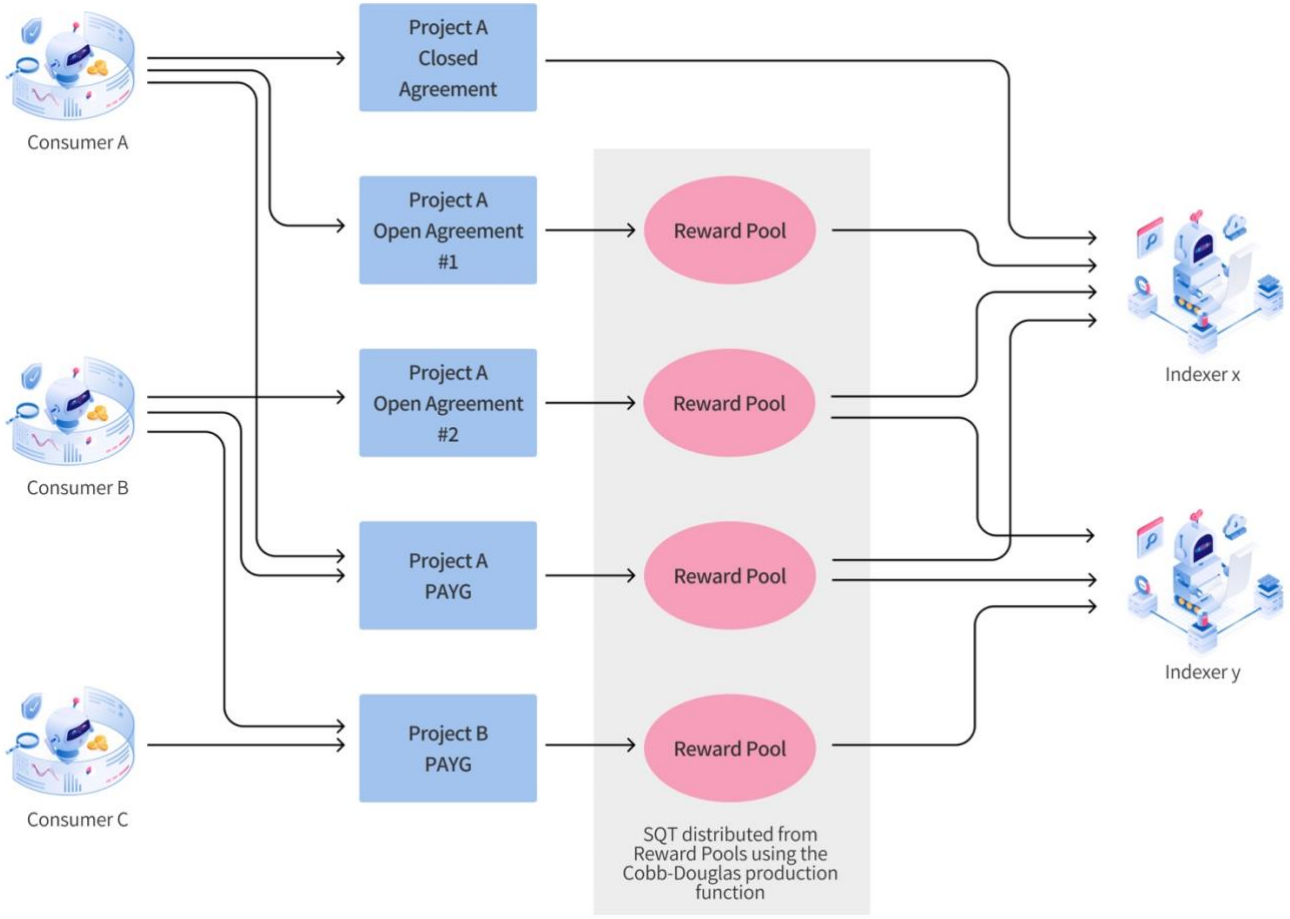
When a Consumer exceeds the limitations of the Open or Closed Agreement that they have in place, then all subsequent requests that do not come under the Open or Closed Agreement's terms may automatically occur under a Pay as you Go term. This can be used to prevent service interruptions after usage exceeds the prescribed daily limit.

Comparison	Pay as you Go	Open Agreement	Closed Agreement
Favours who?	Both	Indexers	Consumers
Reward Distribution	Cobb-Douglas pool	Cobb-Douglas pool	Direct
Number of Indexers per agreement	>= 1	>= 1	1
Number of Consumers per agreement	>= 1	>= 1	1

Indexer Staking

In order to earn rewards from query revenue as an Indexer it is proposed that Indexers must stake SQT against a particular SubQuery Project that they are providing the service to. The Cobb-Douglas production function will be used to determine the rewards distributed to each Indexer.

There may be multiple reward pools simultaneously active for a given Indexer. The indexer's job is to allocate their staked and delegated SQT amongst these pools (in terms of a percentage of their total SQT). There will be a reward pool for each project that the Indexer accepts PAYG, and a reward pool for each Market Agreement that the Indexer is a party of. For a Closed Agreement, the Cobb-Douglas production is not used to allocate rewards to indexers.



$$\text{Revenue}_{\text{ip}} = \text{Revenue}_{\text{p}} \times (\frac{\sigma_{\text{ip}}}{\sigma_{\text{p}}})^{\alpha} \times (\frac{\theta_{\text{ip}}}{\theta_{\text{p}}})^{1-\alpha} \text{ where } 0 < \alpha < 1$$

The query fee revenue that Indexer (i) can receive for the reward pool (p) is defined by the Cobb-Douglas production function. Where $Revenue_p$ is the total SQT in the reward pool p, σ_{ip} the number of requests provided by Indexer i for the reward pool p, σ_{p} the number of requests for reward pool p across the entire protocol, θ_{ip} is the staked amount for Indexer i for reward pool p, θ_{p} the total staked amount for the reward pool p across all participating indexers.

This approach was championed by the 0x team, and in simple terms, means that revenue is allocated to competing Indexers as a proportion of both requests answered and revenues staked. The beauty of this equation is that a rational Indexer must maintain a stable level of staked SQT relative to the work they do in order in each reward pool in order to receive optimal revenue. As a result, the SubQuery Network does not need to enforce arbitrary staking requirements because Indexers are incentivised to self-manage and maintain a stake or skin in the game.

SubQuery plans to add a constraint to the network where an indexer must stake a minimum amount of SQT on the relevant reward pool to be able to participate in its matching Open Agreement. They must also stake a minimum amount on an equivalent staking contract for any Closed Agreements in the same fashion. This indexer staked minimum value must be a certain percentage of the Agreement's per Era reward value, which means in order to renew the Agreement to higher volumes, the indexer must also increase their stake. When an indexer's stake decreases beneath this minimum amount, they will be unable to renew the Agreement at the existing price.

If an Indexer is caught misbehaving (such as by providing invalid, incomplete, or incorrect data), they are liable to have a portion of their staked SQT (on the particular reward pool θ_{ip}) reallocated to the SubQuery Foundation Treasury, diminishing their holdings of staked SQT in the network and therefore their potential reward. Since the indexer's allocated stake is determined by a percentage of their total SQT, this will have a flow on effect to all other reward pools that the indexer is party to.

Indexer Delegation

SubQuery plans to allow SQT token holders to help increase Indexers' query fee revenue by delegating their own SQT tokens for staking.

The Indexer will advertise an *Indexer Commission Rate*, which reflects the portion of revenue that the indexer takes across all their revenue streams. The remaining revenue will then be shared within the total delegation/staking pool proportionally to the individual delegated/staked value in the pool. Delegators will only receive revenue for staking Eras that they were a part of for the entire period. For example, if they join a staking Era in the middle of the relevant period, then they will not earn any Query Fee revenue for that particular Era.

If an Indexer wishes to increase the *Indexer Commission Rate* that they offer to their Delegators, they must advertise this for an entire staking Era . The Indexer will be able to decrease their *Indexer Commission Rate* at any point to raise more delegated SQT for staking in the short term. Delegators can withdraw or undelegate their staked amount at any time, but they will forfeit any rewards earned within the staking Era (as they were not part of the delegation pool for the entire duration of the staking Era).

SubQuery intends to set an *Indexer Delegation Ratio*, a limit to the amount of delegation an Indexer can accept in terms of the total value of their own indexer stake. The ratio ensures that Indexers still have enough personal skin in the game with their own SQT at stake to prevent them from misbehaving.

Indexer Discovery

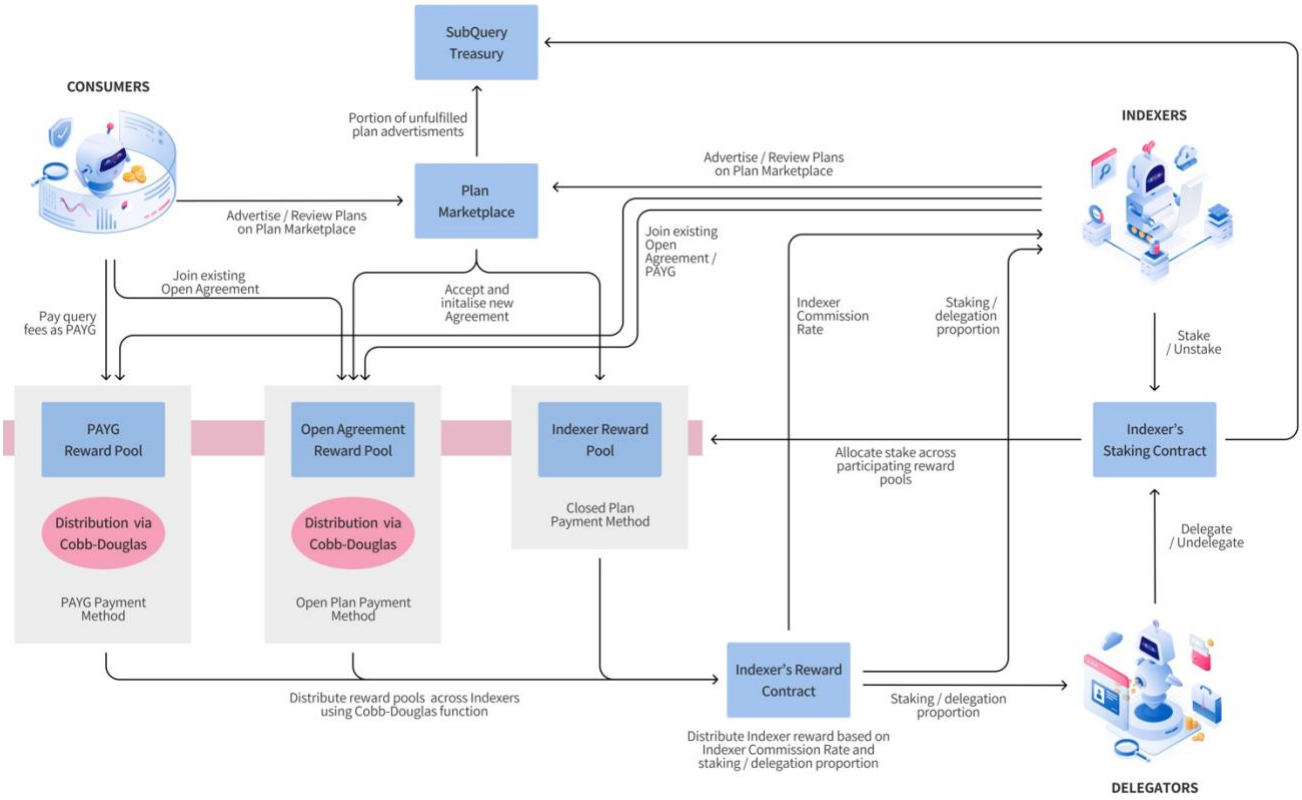
For Consumers to discover and select Indexers in the SubQuery Network within Open Agreements and PAYG, a discovery network based on a Kademlia DHT is planned. Any participant can run a DHT service in our network and Consumers can use these to discover SubQuery project endpoints on the Network. Since the compute requirements for this directory service are low, and high traffic Consumers might find it useful to run their own directory service for performance, no rewards are intended to be provided for operating this service.

The DHT network will provide information about SubQuery Project hashes for each Indexer, and for each Project, it will list that Indexer's endpoint URL, current block, the summary of latest service reports (latency etc), and an allowlist of IPs that this data can be provided to.

These service reports will be provided by Consumers at certain intervals. By recording and aggregating average speeds from these Indexers, the network will reward more performant providers with more traffic.

The IP address allowlist allows Indexers to focus on providing their service to a specific geographic region to ensure they are most competitive in terms of performance. An Indexer may run infrastructure in multiple regions, each dedicated to that region for a globally distributed network. Additionally, this allows private companies to run private SubQuery Projects for private Consumer groups limited by the IP address allowlist (e.g. internal-only data for a private organisation).

Network Value Flow



Competitive Advantages

The guiding principle with the SubQuery Network is simplicity and flexibility for different use cases, payment methods, and networks. While other data services have many different major network participants, SubQuery focuses on three key ones. While other networks have complicated algorithmic signalling mechanisms, SubQuery relies on the most fundamental signal, consumer demand. While other networks provide only one type of payment model (generally PAYG), SubQuery provides several advanced subscription based options for Consumers and Indexers, And finally, while other networks only support one layer-1 chain, SubQuery is designed to be multi-chain from the outset.

Multi-Chain by Design

SubQuery is native to the Polkadot ecosystem, it's our home and will be the location of the SubQuery Network. The core premise of Polkadot is to create a thriving community of developers, users, and businesses that will tap into its multichain interoperability. SubQuery believes in the idea that a community of blockchains, working together to encourage web3 adoption, is the future and that Polkadot will be a leading player in that initiative.

But the future is multi-chain. SubQuery knows that there are going to be many different blockchains working together to solve different problems. The plan is to take SubQuery and to adapt it to work for other blockchains that don't have sufficient indexing solutions. The multi-chain approach that is needed to make it work for Polkadot means SubQuery is uniquely suited for this challenge.

The SubQuery Network is designed to support any SubQuery Project from any Layer 1 network (within Polkadot or not) within it. It will be designed and built to be multi-chain from the outset, where you will see projects from one network being indexed alongside projects from another.

Natural Demand Signalling and Different Payment Options

With marketplaces like what SubQuery is proposing, where there are both buyers and sellers attempting to commoditise data, signalling demand for future supply tends to be a tricky issue. Other networks create an artificial role in an attempt to predict

future demand, and they're rewarded when that future demand materialises. The plan is to take a different approach, one that requires up-front natural demand signalling.

A Consumer can take advantage of either Open or Closed Plans to concretely indicate and commit demand for a new SubQuery Project. This will facilitate and encourage supply at a fixed price and volume (essentially helping secure pre-allocated rewards for Indexers of a SubQuery Project) and provide price and service certainty to both parties. This can be used both to attract Indexers to new SubQuery Projects, or to attract additional Indexers to existing and uncompetitive SubQuery Projects.

It additionally provides several advanced subscription based options for Consumers and Indexers. Some parties may benefit from the certainty of rewards provided by Closed Agreements and the predictability of recurring costs. Some may instead prefer to hunt out the most affordable data by going for high volume recurring agreements or low spot prices on the Pay as you Go market.

Flexibility

The potential of SubQuery may lie in its flexibility - users will have the freedom to adapt and transform decentralised data to suit their needs. dApp developers need data in a specific format tailored for their dApp for ease of development and to set it apart from others.

Unlike other "unified" decentralised API service providers, SubQuery is open source, so Consumers will have the freedom to define their data set specifically for their needs. Rather than having to combine queries from different API endpoints - the creators and consumers of SubQuery projects can define the shape of their APIs data models themselves. It saves time, money, and provides a vastly better experience for end-users.

Simple and Accessible

The SubQuery Network is designed to be the data provider of the people. It is planned that it won't require high staking thresholds to participate or huge investment into hardware. The focus will be on making SubQuery easier to use and build on than competitors - SubQuery's success depends on the success of others creating the future on it.

This means that a design goal is to make it as easy as possible for anyone to participate. You don't need to be a developer or have a deep knowledge of the token economic model, you can easily participate as a Delegator. As a Consumer, you also have plenty of payment options to best suit your needs.

SubQuery project developers do not need to be a blockchain expert to take advantage of what SubQuery offers. The key focus of the SubQuery Foundation and community is to ensure that there is enough support that anyone, from an expert blockchain team to a new hobbyist developer, can build their own Project.

Indexer/Delegator Imbalance

Among some competitors, it is observed that there is a serious imbalance between Indexers and Delegators in terms of the ability to change delegation rates without warning. SubQuery has tried to equalise this imbalance by requiring that the Indexer advertise an increase to the Indexer Commission Rate for an entire staking Era. Delegators are also free to withdraw their delegated tokens at any point during the staking Era, but they will lose any rewards that they could have been eligible for during that Era.

Incentives for Query Performance

To become a high-performing, mission-critical platform - the SubQuery Network must operate at the highest level. That is why the Indexer discovery process will include performance data (latency and uptime) for all Indexers, and we will take steps to ensure that Consumers report on query speed and performance as often as possible.

Tools may also be provided to limit the availability of Indexers to a certain geographical region so that they can focus on providing the best service to that region, attract the most requests, and potentially maximise rewards for their contributions. This will allow larger and more mature Indexers to run location specific infrastructure all around the world.

SubQuery Foundation

The SubQuery Network will be managed by a SubQuery Foundation. The SubQuery Foundation will be a not for profit entity created specifically to serve, manage, and develop the SubQuery Network and provide support for users and developers to participate.

The SubQuery Foundation is expected to have the following mandates:

- Developing and updating the SubQuery Network
- Manage and distributing assets from the Foundation Treasury
- Managing the SubQuery Grants Programme to stimulate ecosystem and network development
- Developing SubQuery ecosystem of partners and user community
- Driving educational programmes and documentation
- Decentralising the control over the SubQuery Network

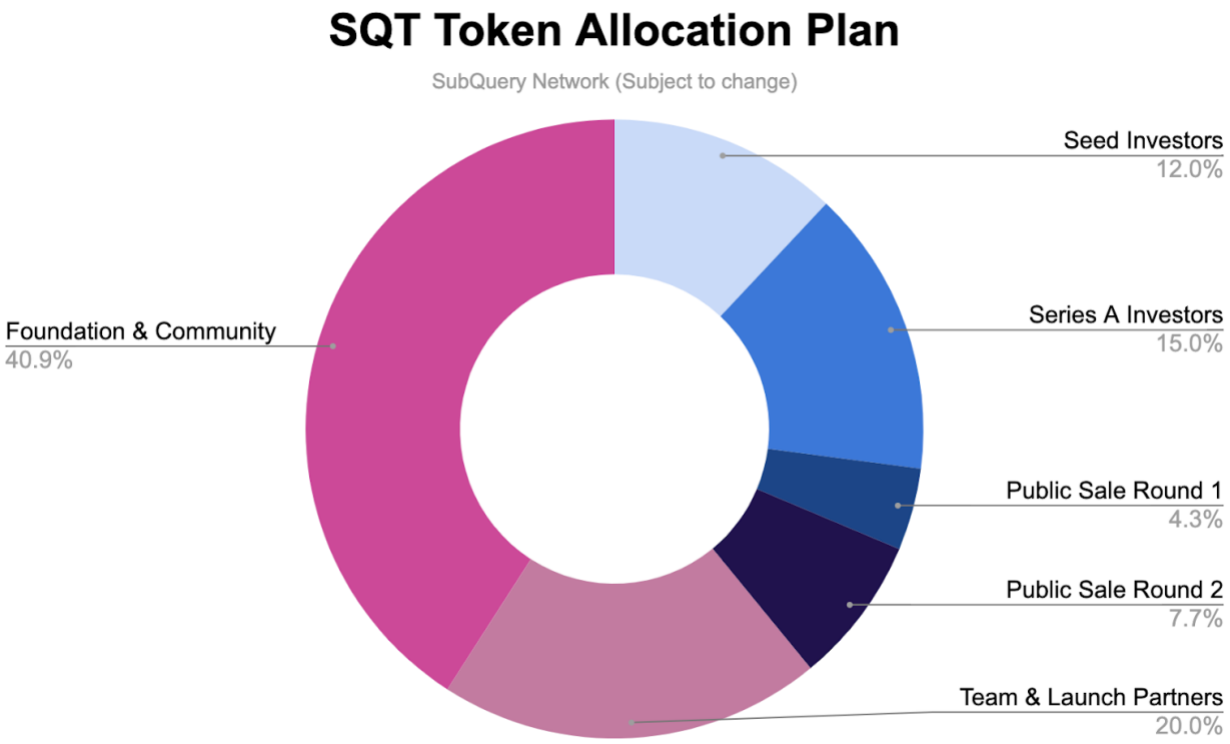
It is planned that the SubQuery Foundation will be accountable to the SubQuery Council, who will oversee governance decisions and will be made up of key representatives from the core SubQuery team and other key partners and advisers.

Tokenomics

Please note that the following SQT Token Allocation Plan and Token Vesting Schedule are still subject to change.

Token Distribution

SubQuery will initially mint a supply of 10 billion SQT which will be allocated in the following manner. A small rate of inflation of newly minted tokens is expected to go directly to a treasury-like token pool, which will be managed by the SubQuery Foundation.



From the start, SubQuery has been focused on building value within the community and this aim continues with the largest allocation of tokens (41%) being apportioned to the Community and SubQuery Foundation.

The Foundation, which is expected to be established in early 2022, will administer the future governance and growth of the ecosystem and the ownership of the SubQuery Network will come under the SubQuery Foundation initially. This large allocation also

includes consideration for future investment into the development and operations of the Network, and key ecosystem growth drivers. This will include tools such as grants and ecosystem incentives/events as well as other marketing activities including bug bounties and mainnet incentives.

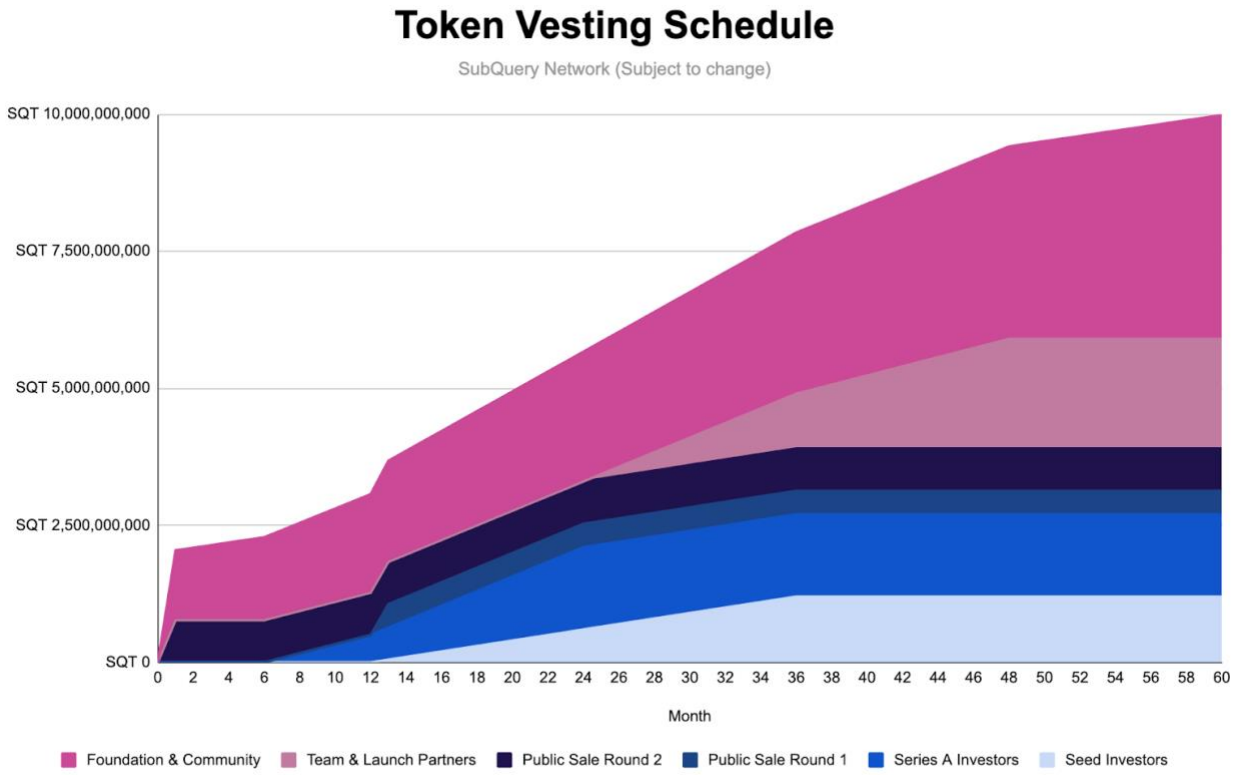
Early investors in both the Seed and Series A rounds have a combined allocation of 27%. In the case of our Seed investors, SubQuery is grateful for their early vision and commitment to build the initial phase of SubQuery. Following on from this, growth was accelerated with the support of Series A investors who allowed the project to accelerate to the next level.

For the Public Sale, 12% of token supply has been allocated across at least two sequential rounds. The exact structure and timing of these rounds will be provided at a later date, however guaranteed allocation will be provided for key community members (e.g. Ambassadors, Spartans) and network participants (e.g. test network participants and referenceable customers). Each category will have its own minimum and maximum allocation.

Finally, the SubQuery Team and Launch Partners have been allocated 20% of the token supply in return for their tireless dedication and contribution in building and promoting the project from the outset.

Token Vesting Schedule

The token allocation by itself is nothing without understanding the way in which the tokens are distributed to the relative holders. The graphic below illustrates the release of the SQT tokens to each participant over time culminating in the full circulation of tokens occurring 5 years (60 months) after launch.



The vesting schedules for each participant has been designed to create long-term value for the project and generate confidence to token-holders. Perhaps most significantly, the core team will have a 24 month lock-up period which will then vest over another 24 months while some Public Sale participants can freely use the utility of their token upon launch.

The Foundation and Community will have approximately 30% of the allocation unlocked from the start to meet the operational needs of launching and promoting mainnet with the rest of the allocation vesting gradually over 5 years.

Risks and Disclaimers

Please read this section titled “Risks and Disclaimers” very carefully and in its entirety. If you are in any doubt as to the action you should take, you should consult your legal, financial, tax or other professional advisor(s). By accessing the information set forth in this document or any part hereof, you represent and warrant to SubQuery Pte. Ltd. (referred to in this section, “Risks and Disclaimers” as “SubQuery”) that you unconditionally and irrevocably accept and agree with the following:

1. No viewing in a Restricted Territory

It may not be lawful in certain jurisdictions for individuals, or certain categories of individuals in other jurisdictions, to view this document. An individual who wishes to view this document must first satisfy himself or herself that he or she is not subject to any local requirements that prohibits or restricts him or her from doing so. In particular, unless otherwise determined by SubQuery and permitted by the applicable law and regulations, it is not intended that any offering of the tokens mentioned in this document (the "Tokens") by SubQuery should be made, or any documentation be sent, directly or indirectly, in or into, countries where participating in Initial Coin/Token Offerings are banned due to legal restrictions, and countries sanctioned by the US or countries considered as high risk and monitored by the Financial Action Task Force (“FATF”) (each, a “Restricted Territory”) and nor should it be accessed by any individual who is a national citizen or resident of a Restricted Territory, including corporations, partnerships, or other entities created or organized in any such jurisdiction, unless they are exempted from the prohibition against participating in Initial Coin/Token Offerings. SubQuery shall not be responsible for individuals who access this document from territories whose laws prohibit such access or where any part of the document may be illegal. Such individuals do so at their own risk.

2. No Offer

This document is for information purposes only and does not constitute or form, and not intended to be, an offer or solicitation of an offer to buy or sell, subscribe for, underwrite or purchase any form of investment or securities or other financial instruments, nor shall it or any part of it form the basis of, or be relied upon, in any way in connection with any contract or investment decision relating to the same. No regulatory authority has examined or approved of any of the information set out in this Whitepaper. No such action has been or will be taken under the laws, regulatory requirements or rules of any jurisdiction.

3. Information

All information is provided without any warranties of any kind and SubQuery, its employees, officers and/or advisors make no representations and disclaim all express and implied warranties and conditions of any kind and each of SubQuery, its employees, officers and/or professional advisors assume no responsibility or liability to you or any third party for the consequence of reliance on such information, errors or omissions in such information or any action resulting therefrom.

The information contained on this document may contain statements that are deemed to be “forward-looking statements”, which are prospective in nature and are not statements of historic facts. Some of these statements can be identified by forward-looking terms such as “aim”, “target”, “anticipate”, “believe”, “could”, “estimate”, “expect”, “if”, “intend”, “may”, “plan”, “possible”, “probable”, “project”, “should”, “would”, “will” or other similar terms. However, these terms are not exhaustive. Forward-looking statements inherently contain risks and

uncertainties as they relate to events or circumstances in the future. Therefore, the information, opinions and forward-looking statements, including estimates and projections, in this document in respect of the anticipated roadmaps, development and projected terms and performance of the relevant entities, are selective and subject to updating, expansion, revision, independent verification and amendment.

SubQuery is not making any representation or warranty or undertaking, including those in relation to the truth, accuracy, and completeness of any of the information set out in this paper. SubQuery also expressly disclaims any obligation or undertaking to update or revise any forward-looking statements except to the extent required by law and neither SubQuery, its employees, officers or professional advisors make any assurance, representation or guarantee that any event referred to in a forward-looking statement will actually occur. Whilst SubQuery intends to fulfil all the goals set out in this document, in case of unforeseen circumstances, the goals may change or may not be achieved without any notice to you.

4. No Advice

None of the contents of this document constitutes legal, financial, tax or other advice. You must conduct your own due diligence and ensure you comply with all local laws regarding cryptocurrency, tax, securities and other regulations in your jurisdiction. We encourage you to consult with the relevant professional advisors independently.

5. Regulatory risks

The regulatory status of cryptographic tokens, including any digital currency, digital assets and blockchain applications is unclear or unsettled in many jurisdictions. The publication and dissemination of this document do not imply that any relevant laws, regulations and rules have been complied with. No regulatory authority has examined or approved this document. Where any relevant governmental authority makes changes to existing laws, regulations and/or rules, or where financial institutions make certain commercial decisions, it may have a material adverse effect and/or impair the ability of any relevant entity referred to in the document to function as intended, or at all.

6. No Agreement

This document shall not be relied on to enter into any contract or to form basis of any investment decision. Any agreement(s) between SubQuery and you are to be governed by a separate document (“Sale Document”). In the event of any inconsistency between this document and the Sale Document, the terms contained in the respective Sale Document shall prevail.

7. Advertisement and Distribution

The publication, distribution or dissemination of this Whitepaper does not imply that the applicable laws, regulatory requirements or rules have been complied with. This document is for general information purpose only and is not an advertisement, nor is it intended to be used to call for an offer on behalf of SubQuery. Persons to whom a copy of this Whitepaper has been distributed or disseminated, provided access to or who otherwise have the Whitepaper in their possession shall not circulate it to any other persons, reproduce or otherwise distribute this Whitepaper or any information contained herein for any purpose whatsoever nor permit or cause the same to occur. Distribution of this document may be restricted or prohibited by law or regulatory authority in your jurisdiction. This Whitepaper, any part thereof and any copy thereof must not be taken or transmitted to any country where distribution or dissemination of this Whitepaper is prohibited or restricted. Recipients should inform themselves of and comply with all such restrictions or prohibitions and SubQuery does not accept any

liability to any person in relation thereto. No part of this Whitepaper is to be reproduced, distributed or disseminated without including this part titled “RISKS AND DISCLAIMERS”.

8. Disclaimer of Liability

In no event shall either SubQuery, or any of their respective current or former employees, officers, directors, partners, trustees, representatives, agents, advisors, contractors, or volunteers be liable for any indirect, special, incidental, consequential or other losses of any kind, in tort, contract or otherwise (including but not limited to loss of revenue, income or profits, and loss of use or data), arising out of or in connection with:

(i) any acceptance of or reliance on this Whitepaper or any part thereof by you;
(ii) any failure by SubQuery, or any of their its affiliate companies, partners, or third party contractors or licensors to deliver or realize all or any part of the project described in or envisaged in this Whitepaper;
(iii) any information contained in or omitted from this Whitepaper;
(iv) your use or inability to use at any time the services or products or Tokens offered by SubQuery,
(v) mistakes or errors in code, text, or images involved in the Token sale or in this Whitepaper; or
(vi) any expectation, promise, representation or warranty arising (or purportedly arising) from this Whitepaper;
(vii) the purchase, use, sale, resale, redemption, or otherwise of the Tokens; or
(viii) the volatility in pricing of tokens in any countries and/or on any exchange or market (regulated, unregulated, primary, secondary or otherwise);
(ix) any security risk or security breach or security threat or security attack or any theft or loss of data including but not limited to hacker attacks, losses of password, losses of private keys, or anything similar; and

your failure to properly secure any private key to a wallet containing Tokens.

9. Other Disclaimers

There are risks involved in the technologies relating to the blockchain technology referred to herein, the Tokens, and the Initial Coin/Token Offering, such as unforeseen bugs, security issues or disruptions. By way of the above and other factors not within our control, the entire sum used to purchase the Tokens may be lost.

Despite our best efforts, SubQuery may not be able to execute or implement its goals, business strategies and plans.

Certain proposed activities and functions described in the Whitepaper may require obtaining further regulatory or licensing approval from relevant authorities, which may be protracted, incur significant cost, or be denied completely. In such event, the proposed features and functions herein may never come to fruition as intended.

There may be changes in political, social, economic and stock or cryptocurrency market conditions and/or there may be no or little acceptance/adoption of the relevant Blockchain system and/or Tokens, such that the relevant Blockchain system and/or the Tokens become no longer commercially viable.

If any provision or part of any provision in this section titled, “RISKS AND DISCLAIMERS” is or becomes invalid, illegal or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal and enforceable. If such modification is not possible, the relevant provision or part-provision shall be deemed deleted. Any modification to or deletion of a provision or part of any provision under this section titled, “RISKS AND DISCLAIMERS” shall not affect the validity and enforceability of the rest of this section titled, “RISKS AND DISCLAIMERS”.

To the fullest extent possible, SubQuery shall not be liable for any responsibility, liability, claims, demands and/or damages (actual and consequential) of every kind and nature, known and unknown (including, but not limited to, claims of negligence), arising out of or related to any acceptance or reliance on the information set forth in this document by you.

Where references have been made to third-party websites or sources of information, we may not have sought further verification as to the accuracy, completeness, or timeliness of the information referred to therein, and no warranties whatsoever are made as to the same.

The disclaimers set out above are not exhaustive.