



## Qlink White Paper

**Qlink, a decentralized mobile network, dedicated to constructing an open-source telecom infrastructure on blockchain.**

### Version 9.1

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#### Disclaimer:

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# Executive Summary

Qlink aims to build the world's first decentralized mobile network, which will extend network coverage, reduce the cost of telecom infrastructures, and reward users for sharing unused network assets.

This white paper explains the technical architecture of the decentralized mobile network.

By utilizing blockchain technology, Qlink applies digital identities to telecom assets, repackages those assets, and records the usage footprint of each asset to a distributed ledger. Additionally, Qlink aims to launch applications designed to allow peer-to-peer sharing of assets, including Wi-Fi, mobile data access, and enterprise-to-peer SMS.

While improving the efficiency of existing networks, Qlink plans to launch its custom base stations, including a model suitable for vehicle installation. By utilizing the idle resources of network equipment, these base stations will allow users to become a part of the crypto-economy, and at the same time create a decentralized solution to cover network black spots.

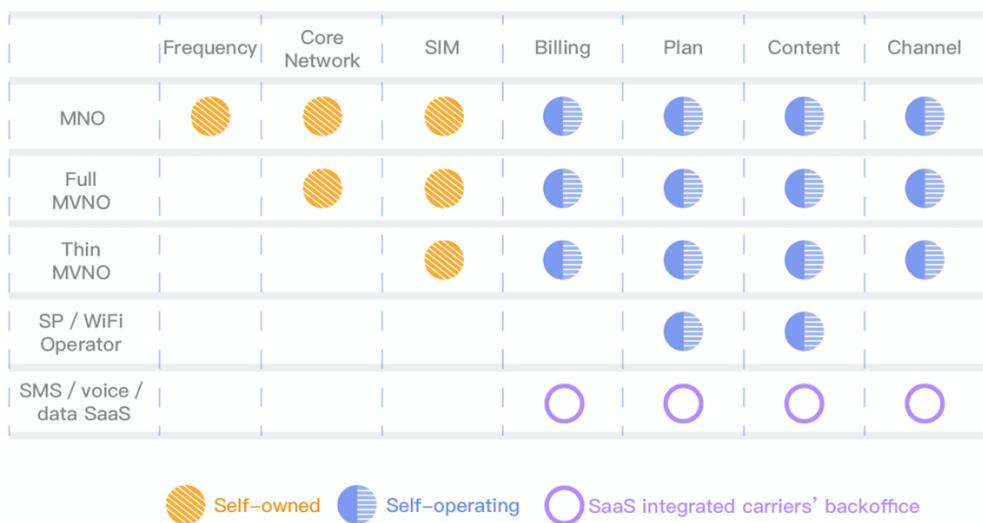
Qlink has assembled a team of seasoned telecom and blockchain developers, along with experienced business and marketing professionals. Allen Li, founder of Qlink, previously founded Youyou Mobile (invested by Alibaba Capital), which is a leading mobile data distributor in China and Southeast Asia, and has partnered with 40 telecom operators around the world to provide mobile data services to 6 million customers. Qlink's R&D team has spent last four years working for Youyou Mobile, and developed the company's first virtual SIM card bank.

The Qlink ecosystem is supported by the Qlink token (QLC). QLC is the utility token used to settle every transaction on the Qlink network, functioning as a cryptocurrency to measure the value of assets and content.

Qlink will begin issuing Qlink tokens (QLC) in November 2017. Through the QLC token sale, Qlink aims to raise the equivalent of USD\$15,000,000 in ETH and NEO. The total supply of QLC is six hundred million tokens (600,000,000).

# 1. The Problem with Centralized Telecom Operations

Currently, more than 2000 mobile network operators around the world are providing communication services through inflexible centralized infrastructure. Common examples of these centralized services include Wi-Fi, 3G / 4G network facilities and mobile communication BOSS solutions (billing and operation supporting system), to Nasdaq listed companies such as Twilio, who provide corporate SMS / voice / data and other cloud based communication services. A common business model of these centralized mobile network operators (including virtual operators) is as follows:



Unfortunately, this widely adopted centralized system is largely inflexible and has many issues. These include difficulty in accurate content distribution and billing, expensive usage based fees, operators overcharging customers, and security issues surrounding data transmission. Unlike a centralized model, decentralized communication infrastructure and service operations do not have these problems. They solve these problems via innovative solutions based on blockchain technologies. More importantly, from end-users' perspective, this type of decentralized system can protect user privacy in a better way, while providing a more flexible and affordable option to traditional service offerings.

Qlink is differentiated because it is able to identify and digitize telecom assets, deploy smart contracts and transfer asset usage rights. Features of blockchain technology such as asymmetric encryption, distributed ledger and consensus algorithm allow Qlink to assign ownership of digital assets to users by utilizing secure digital identity. Qlink will also enable the deployment of smart contracts between telecom assets and users, which will allow users to purchase usage right of assets such as Wi-Fi hotspots, SMS packages or mobile data, directly from an asset sharer, rather than through a centralized mobile operator.

## 2. Qlink Platform

Qlink's decentralized network provides telecom service through an ecosystem comprised of telecom assets, the Public Chain, the Qlink Chain, smart contracts, mobile operators, content providers and users.

Definitions:

**Telecom Service:** A telecom service is a service used to access, accept, transmit and deliver information or content from one point to another, such as Wi-Fi access, mobile data access, SMS, voice, quality of service, or virtual private network.

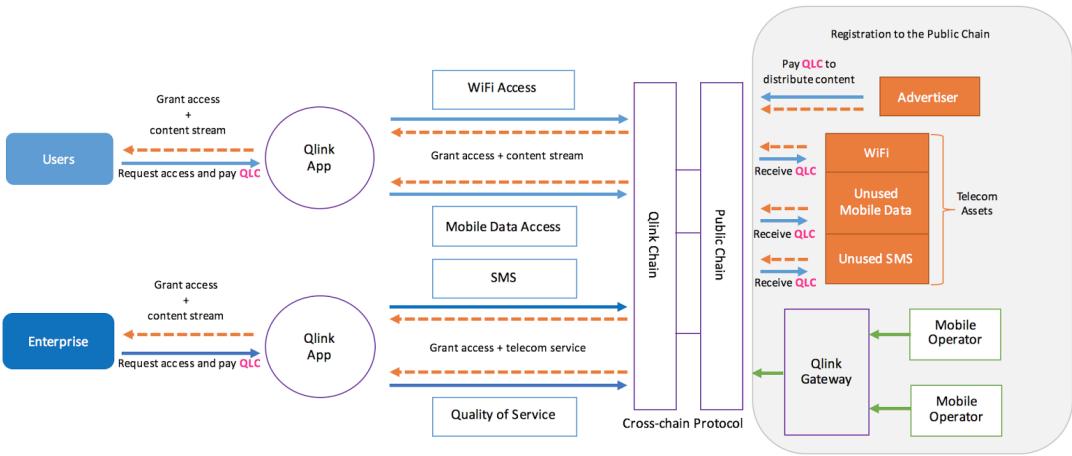
**Telecom Asset:** A telecom asset is broadly defined as a telecom service, which is owned by users or carriers. Examples of telecom assets are Wi-Fi hotspots, SMS packages, mobile data, or hardware used to create network coverage, such as a router or base station.

Qlink provides telecom services through the Qlink network. By utilizing blockchain technology, Qlink is able to transfer QLC tokens whilst delivering telecom services, making it possible to generate a ledger of all completed telecom service transactions.

Qlink also allows a variety of telecom assets to be registered, authenticated and traded on the Public Chain and Qlink Chain. Qlink will allow asset owners to register their rights to access certain telecom assets on the Qlink platform. The owners can then share and transfer the usage rights to other users through smart contracts. By sharing telecom assets on Qlink, owners can collect rewards in the form of QLC tokens.

### 2.1. Network Structure

Qlink has designed its technology architecture based on business logic. The network is comprised of various functional modules.



## Blockchain

The network core layer is blockchain, which includes both the Public Chain and the Qlink Chain.

The **Public Chain** will be used to register telecom assets and assign them a digital identity. Digital identity is the unique information used to represent a telecom asset on Qlink network. Once this information is generated it cannot be changed. Qlink uses the NEO blockchain for telecom asset registration.

The **Qlink Chain** has two primary functions. Firstly, it keeps a record of transactions between asset owners and users on a ledger, and secondly, it deploys and executes smart contracts.

A Qlink **smart contract** is an algorithmic contract deployed between users and telecom assets, establishing trading rules and automatically executing transactions through code.

For example, Anna wants to access her neighbor's Wi-Fi, and agrees to pay a QLC reward to the Wi-Fi owner based on the length of time she is connected. These trading terms will be written into a smart contract and are then executed automatically through the Qlink platform without any manual intervention.

## Qlink Gateway

The **Qlink Gateway** is the protocol that connects Qlink users with global operators, allowing the user direct access to mobile data and the freedom to create customized service packages through the deployment of smart contracts.

## Applications

Qlink's decentralized framework will enable the development of various new services.

Qlink will provide the following service applications through the Qlink app -

- Wi-Fi sharing
- Mobile data access & content distribution
- Enterprise-to-peer SMS service

Qlink will open up the Qlink Chain API to allow developers to build their own service applications.

Qlink will provide two apps to interface with these service applications -

1. The **Qlink mobile app**, which allows users to connect to Wi-Fi hotspots, access mobile data and view registered content. It can also be used to register telecom assets, such as a Wi-Fi hotspot, and register unused SMS on the E2P SMS platform to earn QLC tokens.
2. The **Qlink desktop app**, which will offer most of the same features found in the Qlink mobile app. However, the desktop app will allow for the purchase, instead of registration, of unused E2P SMS, and allow the user to register and distribute content through Qlink.

Qlink allows content creators such as advertisers, video providers, and copyright holders to **register content** on the Qlink platform. The content can then be distributed to users on the Qlink network through the Qlink app, without the user incurring the cost of data.

## Distributed network infrastructure

Qlink will launch the **Qlink BaseStation** that will provide mobile data and Wi-Fi access, and also features mining capability. The deployment of Qlink BaseStations will create a decentralized infrastructure that will complement the existing network, whilst providing additional coverage of black spots through solutions such as vehicle fitted base stations. The Qlink BaseStation's mining capability will make use of idle telecom network resources to maintain the distributed ledger and secure the Qlink network.

## 2.2. Qlink Proprietary Technology

### Qlink Chain

The Qlink Chain is being developed specifically for the telecommunication industry, based on the industry's unique requirements. The Public Chain supports the registration of telecommunication infrastructure as digital assets in various scenarios, whilst the Qlink Chain provides billing and operational support.

The Qlink Chain contains -

- Digital content: Fingerprints of digital content registered by content creators or IP owners
- Data traffic billing information: Billing information based on users' data usage on the Qlink network
- Users visit records: Encrypted records of users' browsing history

To accommodate the requirements of the mobile network business, the Qlink Chain will adopt a Delegated Proof-of-Stake<sup>4</sup> (DPOS) consensus algorithm to generate billing data and create a ledger of content accessed by users. This algorithm supports high frequency and concurrent transactions with low fees. Qlink users will be able to deploy smart contracts seamlessly between telcos, content producers, IoT terminals and enterprises.

## **Qlink Gateway**

Qlink will establish the Qlink Gateway - a platform that connects the Qlink blockchain to traditional telecom operator systems. This will allow users to gain direct access to global operator data services through the deployment of smart contracts.

Smart contracts created on the Qlink Gateway to support data clearance between content providers and mobile operators function as follows:

- A smart contract guarantees the terms of a mobile data service agreement. For example, if a content provider would like to purchase data to distribute a movie through the Qlink network, the data allocation and billing terms will be written onto the Qlink Chain as a smart contract. The smart contract will then be deployed between the Qlink Chain and the Gateway, and will remain fixed until a new contract is created.
- Smart contracts guarantee that a service agreement will be executed successfully. When a user successfully gains access to a service as defined by a smart contract, the user account will send a transaction message to the contract to trigger a fulfillment action, which will then transfer payment in QLC tokens to the mobile operator.

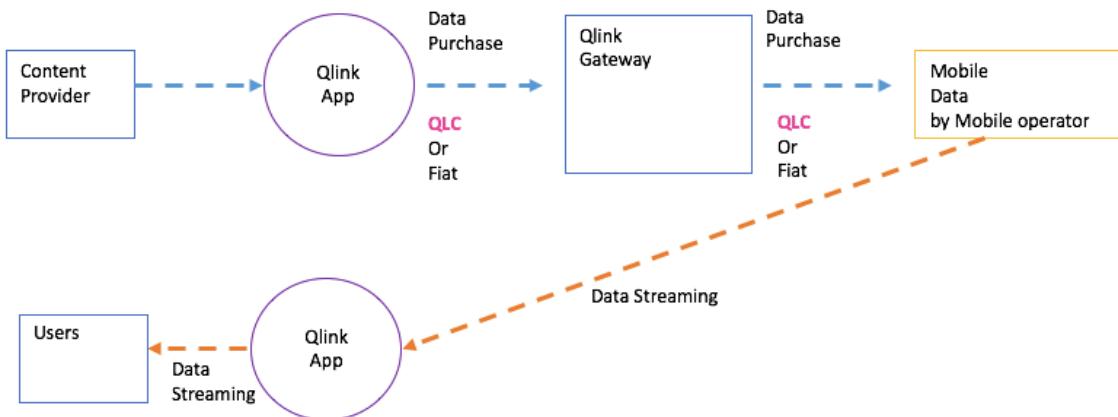
Meanwhile, the smart contract will also broadcast the transaction information to the Qlink network for the miners to confirm and record to the Qlink Chain.

Qlink's smart contracts are open source and will be publicly available in Qlink's GitHub repository. A smart contract will not be subject to the control of any individual node once it has been written to the Qlink Chain. In order to change smart contract code, the changes must be supported by the community as a whole, therefore ensuring fairness and transparency.

## Fiat Integration and QLC Clearance

In consideration of traditional business practices, Qlink offers a few additional features for the convenience of users. For example, Qlink will also enable the purchase of mobile data in fiat. If the user chooses to buy mobile data with fiat, it will not be executed as a smart contract on the Qlink Chain. Qlink will process the transaction in the same manner as a traditional data reseller. This option is provided to allow customers time to gradually adopt the use of QLC.

To encourage mobile operators to provide services through Qlink, the Gateway will also provide QLC to fiat clearance. When a content provider purchases mobile data through QLC, the Qlink Gateway will provide an option to exchange QLC to fiat currency, based on market rate, and act like a clearance agent for the transaction. This provides an easy on ramp for operators who are not ready to settle transactions in cryptocurrency, but still allows for the deployment of smart contracts.



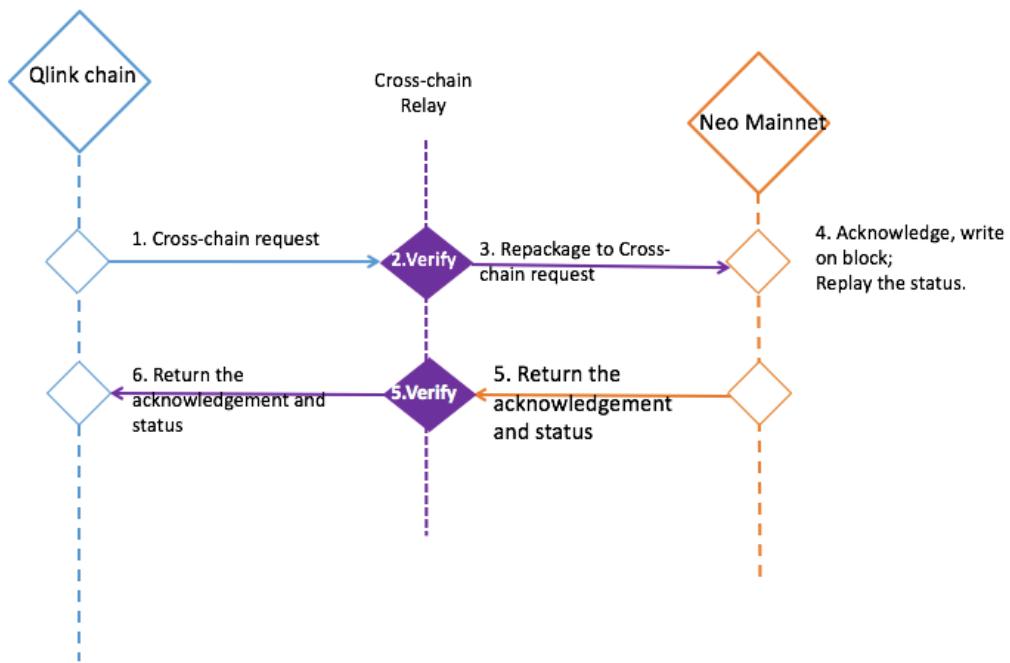
## Cross-Chain Protocol

The Qlink team is working closely with NEO, the largest open source blockchain community in China, to conduct interoperability with NEO's public blockchain through a cross-chain protocol. The Qlink Chain and NEO blockchain will communicate to synchronize the registration of telecommunication infrastructures as digital assets, while at the same time providing billing and operational support on a case-by-case basis.

Wi-Fi networks, Qlink BaseStations, and future operator base stations will all be registered on the NEO blockchain.

The cross-chain protocol between the Qlink and NEO blockchains is executed based on physical asset mapping. A reliable link is established between Qlink and NEO by Coin Packet message delivery.

Please refer to the process outlined in the below graphic:



### **3. Applications**

Qlink will set up an open network, which will support a variety of applications. Some examples are as follows -

#### **Wi-Fi Access / Data Access + Content Distribution**

Qlink will establish a decentralized global Wi-Fi sharing network with P2P login. Prior to the launch of the Qlink Chain, P2P login will be authenticated on the Public Chain and use a Delegated Byzantine Fault Tolerance (dBFT) consensus algorithm.

Once the Qlink Chain has been launched, registration of Wi-Fi assets will remain on the Public Chain, however the authentication of P2P login will move to the Qlink Chain and utilize a Proof-of-Stake consensus mechanism.

By enforcing encrypted P2P distribution of login information we can ensure stronger security for the public Wi-Fi network.

Qlink will also support mobile data access and content distribution, allowing for content access through a P2P connection.

This will enable business use cases such as -

- Content producers or advertisers can distribute content through the purchase of prepaid mobile data packages with byte by byte accuracy. For example, a movie studio may purchase 100GB of mobile data to distribute a movie trailer to fans, which can then be accessed without the user incurring the cost of the data transfer.
- Mobile access and data usage can be provided to IoT suppliers. For example, a courier company could install Qlink BaseStations on vehicles to transmit operational data to those who have access. Qlink's ability to bill this data on micro-level is a critical advantage.

#### **E2P SMS service on decentralized network**

Qlink will allow users to sell unused SMS to enterprise customers for the purpose of registration codes, one-time dynamic passwords, verification codes, marketing messages and other direct messaging communications.

#### **Crowdsourcing telecom infrastructure**

All users can deploy their own Qlink BaseStation on LTE-U protocol without worrying about spectrum resources. The Qlink BaseStation will support 3GPP LTE-U and OpenBTS SIP

communication protocol framework. The Qlink BaseStation is also a miner that supports Proof-of-Work and Proof-of-Stake consensus algorithms, allowing users to contribute hash power to secure the Qlink Chain. Essentially, the network is built and secured by the users. This network structure is a perfect solution to the tide phenomenon of telecom usage. It is also the first system that combines base station technology with mining hardware, utilizing a consensus algorithm to ensure the resiliency of the Qlink Chain.

### 3.1. Decentralized Wi-Fi Sharing

Wi-Fi sharing is a massive global market. There are approximately 300 million users accessing the internet through shared Wi-Fi in China alone.

#### The problem with the current Wi-Fi sharing model

Wi-Fi is still one of the most popular network choices for indoor mobile phone users, even in the 5G era, and is an important supplement to existing mobile networks. There are currently roughly 300 million Wi-Fi hotspots around the world. The top five countries by volume are as follows:

Country	Wi-Fi Hotspots	Ranking
France	13,096,824	1
US	9,858,246	2
UK	5,611,944	3
China	4,910,368	4
Japan	3,303,459	5

The current global Wi-Fi hotspot coverage is extremely fragmented. The world's largest Wi-Fi sharing platform has 300 million active users and is built on a centralized network that grants access to a large number of Wi-Fi hotspots in retail spaces, homes, and workplaces. This company is valued at USD\$5 billion. However, there are many flaws in this centralized Wi-Fi sharing model:

- Centralized Wi-Fi sharing companies often transfer user's Wi-Fi passwords without permission, or even encourage Wi-Fi freeloading activities.
- Centralized platforms profit through Wi-Fi key transmission and targeted advertising, but the network sharers do not receive any rewards.

- Frequent password modifications severely reduce the accessibility of Wi-Fi hotspots.
- This system is unable to accurately or directly charge the user on the amount of data consumed.
- These issues make life difficult for Wi-Fi sharers, which has a flow on effect in reducing the number and availability of Wi-Fi hotspots.

Despite these challenges, global mobile network operators are investing heavily in building up their Wi-Fi coverage, while continually expanding their mobile network coverage across not only their native countries, but the whole world. Wi-Fi networks can greatly reduce the mobile network telecom load during peak hours. However, the operating systems currently used by existing mobile operators are not compatible with Wi-Fi networks. To access the internet, customers are required to use their mobile phone number to receive a temporary password from their network operator. This Wi-Fi login mechanism is too complicated and often leads to unstable, slow and fractured service which hurts the user experience.

Qlink addresses these issues by building a network based on blockchain technology. This will provide better service for Wi-Fi users, and better privacy protection for Wi-Fi sharers.

## **Implementation of decentralized Wi-Fi sharing (For sharers)**

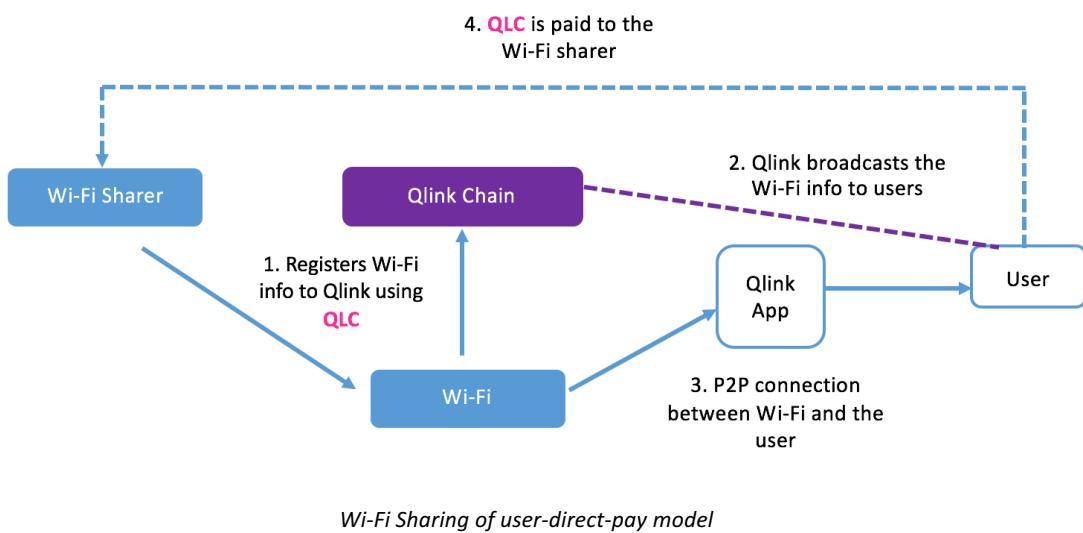
1. Qlink will enable the registration of Wi-Fi hotspots through the Qlink app as a digital asset on the Public Chain. This will allow Wi-Fi sharers to receive QLC tokens as payment for allowing access to the hotspot through the execution of a smart contract.
2. Qlink will support the P2P transmission of passwords between Wi-Fi hotspot sharers and Wi-Fi network users, ensuring that Wi-Fi passwords are securely transferred from one party to another.
3. Qlink will support the authentication of Wi-Fi keys through the blockchain consensus mechanism. If a registered Wi-Fi hotspot, password, or SSID configuration has changed, the asset will need to be re-registered on the Public Chain (with at least 6 confirmations), and new passwords will need to be broadcast.

## **Implementation of decentralized Wi-Fi sharing (For users)**

1. When a Qlink user shares a new Wi-Fi hotspot for the first time, it will be registered as a digital asset by Qlink on the Public Chain. Registration information will include the GPS address of the Wi-Fi hotspot, IP address, MAC address, internet speed test report, SSID, and other associated information. Encrypted password will kept to Wi-

Fi with sharer not on Public Chain.

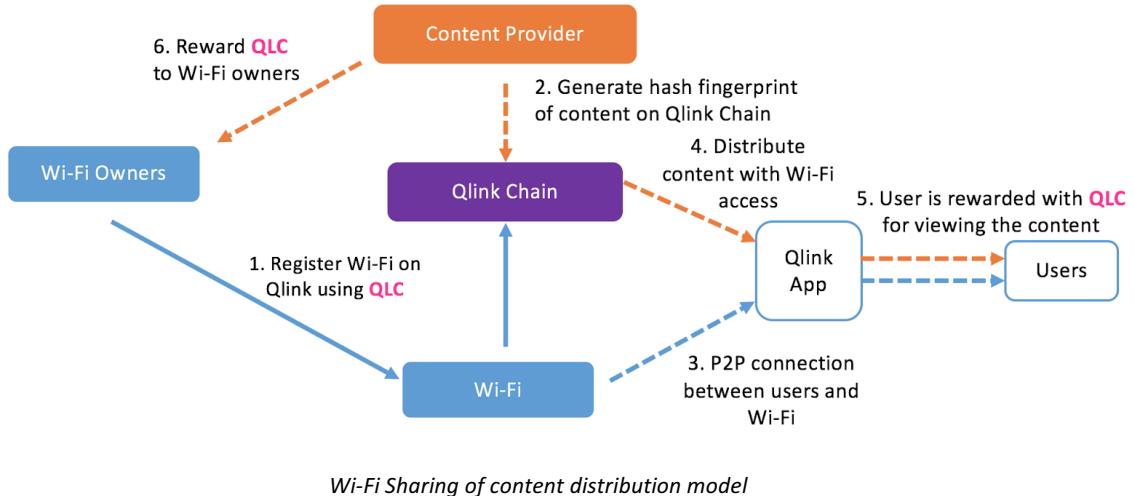
2. Once a new Wi-Fi hotspot has been successfully registered on the Qlink Chain, the Wi-Fi will become available to all Qlink users.
3. Users can log in to the Qlink app to find a list of nearby Wi-Fi hotspots based on GPS data.
4. Users can gain access to a Wi-Fi hotspot after Wi-Fi sharer authorize the connection and Qlink will support P2P transmission of passwords between Wi-Fi hotspot sharers and Wi-Fi network users. If sharing of Wi-Fi requires QLC, a smart contract will be transferring a certain number of QLC tokens to Wi-Fi sharer, determined by the Wi-Fi sharer's settings.
5. The Qlink app will automatically use this password to login to the Wi-Fi hotspot.



## Token usage and Wi-Fi billing

QLC tokens will be used to pay for access to Wi-Fi hotspots. Wi-Fi owners can create a smart contract that charges a fee in QLC to users who would like access to the connection. In this instance, the contract will start billing from the moment the users connect to the Wi-Fi hotspot, and cease when the users disconnect.

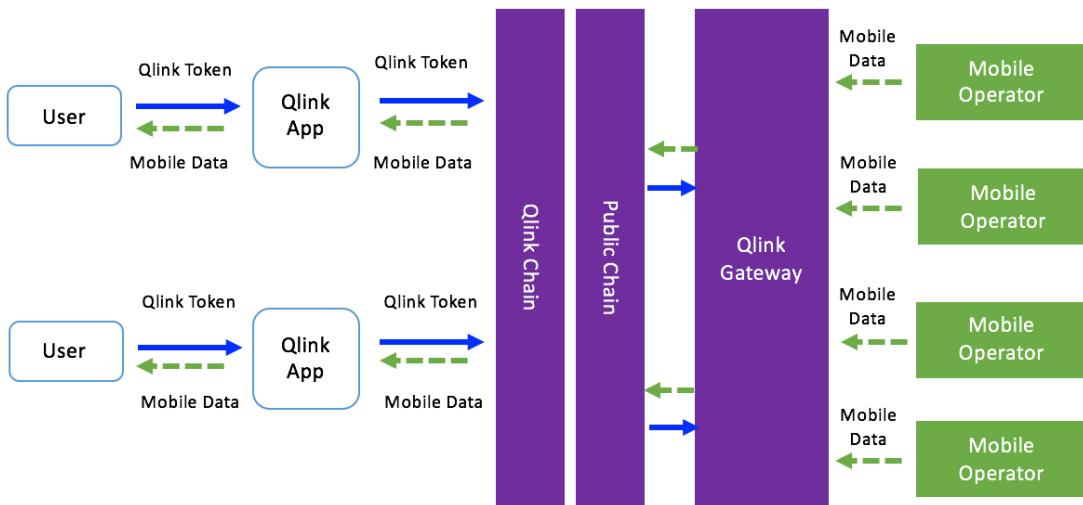
Alternatively, the hotspot owner may choose to provide free Wi-Fi and simply accept voluntary QLC donations. Wi-Fi owners also have the option to incorporate advertising or content distribution as another way to monetize their connection and still provide a free Wi-Fi service.



*Wi-Fi Sharing of content distribution model*

### 3.2. Mobile Data and Content Distribution

The process of gaining access to mobile data on Qlink is very similar to the process used to gain Wi-Fi access. The main difference, however, is that pre-paid mobile data packages must be purchased, with data being consumed as the user connects to the internet. This enables Qlink to provide mobile data access on a very flexible billing model.



### The market for decentralized mobile data distribution

In recent years, global network operators have spent between USD\$10 to \$15 billion annually on Billing and Operation Supporting Systems<sup>1</sup> (BOSS). With the emergence of the Internet of Things (IoT), Ericsson has predicted that by 2020, IoT devices connected to

mobile networks and Wi-Fi will reach 1.5 billion, whilst the total number of IoT devices is expected to reach 25 billion<sup>3</sup>.

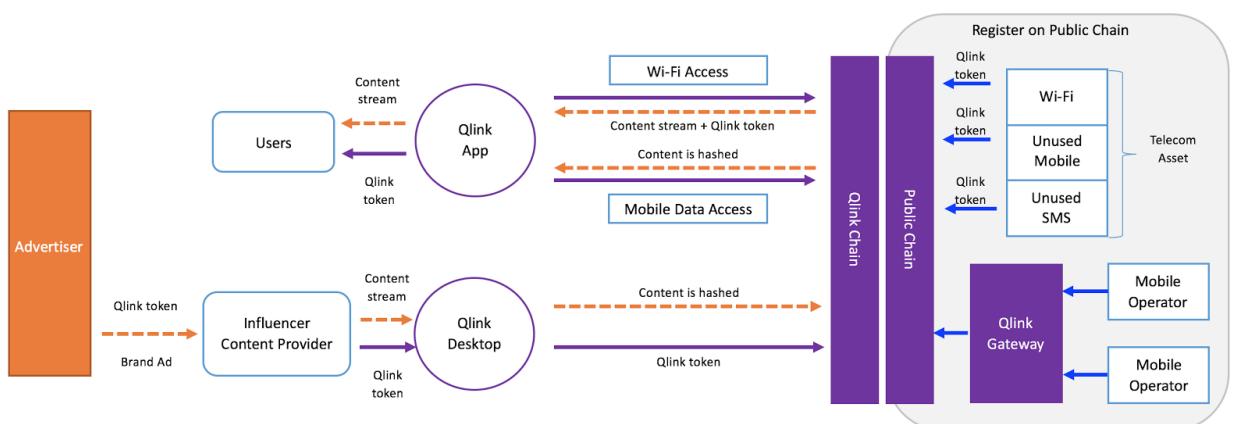
In an increasingly connected world, BOSS solutions need to support secure digital identity of IoT devices, as well as have the capability to converge insurance, legal services, and other associated billing services, which all require smart contracts. Current BOSS solutions employed by traditional mobile network operators do not support the deployment of smart contracts.

Qlink's decentralized network, on the other hand, is a BOSS that will allow users to seamlessly deploy smart contracts among network operators, content providers, IoT devices, and corporate users. It will give users the flexibility to customize their own packages, as well as the capability to accurately distribute large amounts of content. The Qlink platform will support customizable data usage billing in any given scenario, meaning operator to user, user to user, and IoT billing are all possible on the Qlink platform.

In short, Qlink will enable:

- A mobile data distribution platform for content providers, which further reduces the cost of content consumption and will change the expensive online promotion model.
- The deployment of smart contracts for IoT, and the provision of billing and management service for IoT based companies.

## Mobile content distribution on the decentralized network



In addition to users paying tokens to access Wi-Fi or mobile data, Qlink also enables advertisers to pay for network access.

Content consumption is a big part of online activity. When users are connected to the internet, they tend to engage with content consuming activities such as reading social media

feeds, scanning through Twitter, chatting with friends, shopping, watching movies, reading books, and a whole host of other recreational activities. When using mobile data, since content platforms cannot offer free data, users may choose to wait until they find a Wi-Fi hotspot, or opt against using the service entirely. Qlink provides a solution that will allow content providers to prepay for data usage, enabling users to consume select content in non-Wi-Fi environments without worrying about mobile data cost.

Traditional mobile network operating systems are outdated and cannot precisely pinpoint a user's content consumption activities. Therefore, they cannot provide customized content-based service or billing. Qlink is able to certify the uniqueness of content, which as a result makes customized content distribution plans possible. Operators can participate in the transaction of content to boost their overall revenue, content providers benefit from accurate distribution, and users can enjoy free access to sponsored content. In this way, Qlink will generate new business opportunities and completely change the traditional subscription or advertisement based business model.

Qlink connects the following three parties -

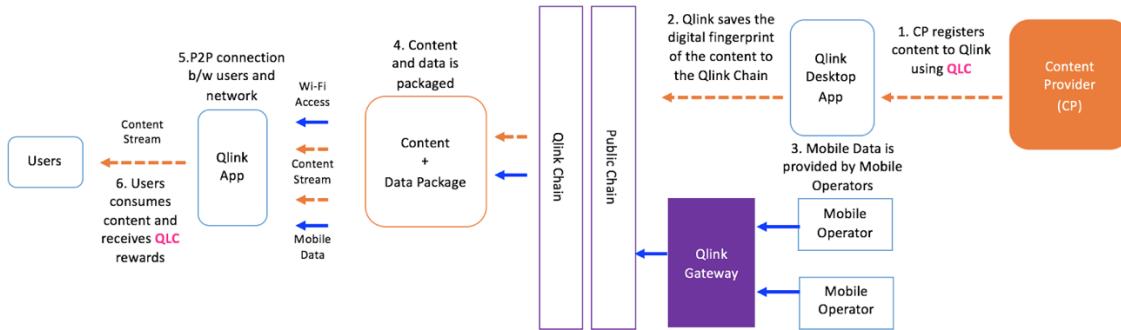
- The content provider: The content producer or owner, such as a content library, who registers their content on Qlink.
- Mobile data provider: The recharge platform managed by a network operator, who sells data packages through Qlink.
- Content users & sharers: Qlink users who consume content on Qlink, or who transfer/share their unused data to others.

Content providers can register their content on Qlink and then purchase mobile data according to file size and the size of the audience they aim to reach. For example, the trailer of Kingsman is roughly 3 minutes long and 20MB in size. The content provider could purchase 500GB of data and then share the trailer with their targeted audience. The audience would then be able to watch the trailer without using any of their own monthly mobile data.

Another user could be a company who needs to share internal training videos with their staff. The company could pre-purchase data and distribute the videos through Qlink, which would allow employees to access videos on or off site, without needing to worry about connecting to Wi-Fi or using their personal data.

Additionally, mobile network operators in any country will be able to accurately sell data to content providers and users through Qlink. Users can access, share or even sponsor other users to access content. In short, the Qlink platform will offer any party the freedom to define their data needs and purchase fragmented data accordingly.

## Distribution mechanism



## Content registration

Content can be registered by any user, regardless of whether they are an individual user, IP owner or otherwise. When a user wants to share content through Qlink, they simply register it on Qlink and pay a fee in QLC. Qlink will then generate a hash signature for the content and record it to the blockchain. Due to the collision resistance of hash functions, it is hard to find two inputs that hash to the same output. Therefore, by comparing hash signatures we can pin down specific content accurately.

Registering content on Qlink serves two purposes:

1. Duplicate content can be identified and the owner of the original file will be directly rewarded.
2. As each hash signature is unique, the full history of a user's content consumption can be recorded.

## Content consumption

Users will be able to enjoy content through the Qlink platform at a low cost, or even for free. If the content is sponsored by a content provider, the user may even be rewarded for viewing the content with QLC.

When a user first accesses content, Qlink will generate a hash signature for that content. By matching the hash signature generated when the content was registered by the owner on Qlink with the hash signature generated upon the content being accessed, Qlink can track the consumption history of specific content and generate accurate billing information.

Through Qlink, users can access their own content consumption records anytime, anywhere. Importantly, this evolution to a more decentralized bill management model will reduce the risk of data contamination on all fronts.

### **Measuring data usage**

The internal billing systems of mobile data providers can be integrated with the Qlink platform through the Qlink Chain API. By comparing the hash signatures of viewed content with the hash signatures of registered content, the mobile data provider can measure precise data usage of consumed content for more accurate billing or to support content based promotions.

### **Token usage and data usage**

The QLC token functions as both a reward for advertisers to incentivize user interaction and as a running meter to record the data usage on Qlink Chain.

There is a dynamic ratio set up between the number of QLC and the amount of data purchased for content distribution. For example, a video producer might have a 10MB movie they would like to distribute to 10 people, which requires a total of 100MB of data. They also might choose to set a total reward of 1 QLC to incentivize viewing, which will then be divided by the total amount of data required. As each user accesses the movie, they will receive a reward of 0.1 QLC,  $(1 \text{ QLC} \times (10\text{MB} / 100\text{MB}))$ . If 0.7 QLC has been distributed, the ledger will show that 70MB of data has been used. When all 10 users have watched the video, the total of 1 QLC will have been distributed and the ledger will show that 100MB of data has been used.

By recording this dynamic ratio between QLC and bytes, according to the number of QLC tokens transferred, we can ensure that accurate consumption of data is calculated.

Qlink will also support the purchase of mobile data in fiat. If the user chooses to buy mobile data with fiat, it will not be executed as a smart contract on the Qlink Chain. This option is provided as an additional convenience for users to encourage gradual adoption of QLC.

The Qlink Gateway will also provide QLC to fiat clearance for mobile operators. When a content provider purchases mobile data through QLC, the Qlink Gateway will provide an option for the operator to exchange QLC to fiat currency, based on market rate, and act like a clearance agent for the transaction.

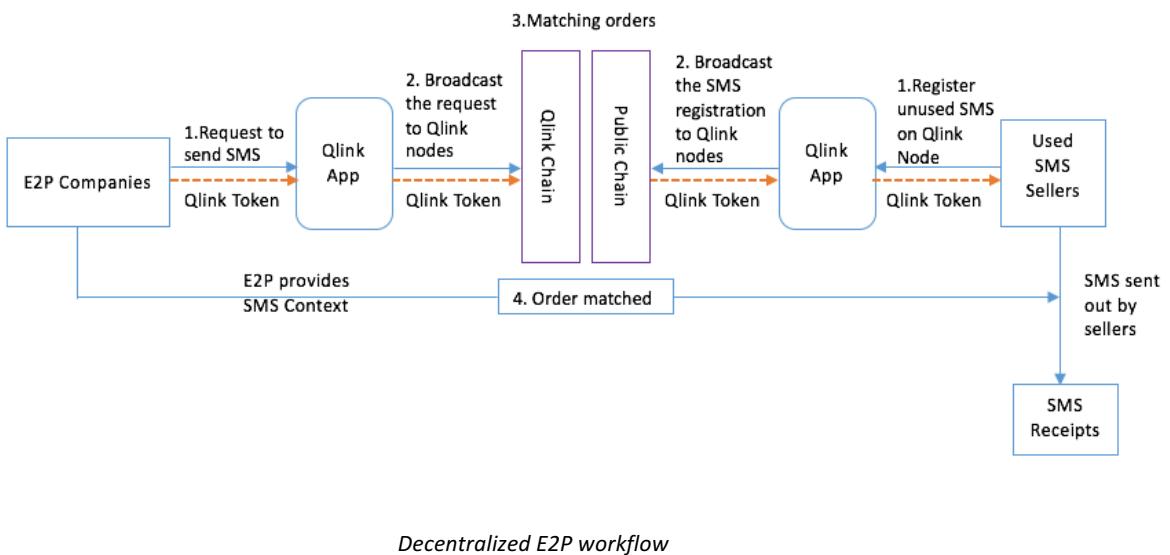
### **3.3. Decentralized E2P SMS Service**

Every day we receive various text messages (SMS) sent to us by businesses, such as registration codes, one-time dynamic passwords, verification codes, or marketing messages.

Examples of types of companies that use enterprise-to-peer (E2P) SMS to communicate with customers are -

- Banks - to send out notifications about credit card payments

- Utility companies - to notify customers when a bill is due
- Retailers - to notify customers on the latest promotions
- Internet companies - to send out various codes



## Request and fulfillment of E2P SMS

Using the Qlink desktop app, any company that utilizes E2P SMS and wishes to purchase a package can submit a SMS request including details such as quantity, content and price per SMS, all of which will be written into a smart contract.

The Qlink network will then broadcast the request to all potential SMS contributors. SMS contributors can compare their own offering with the details in the smart contract and, if it matches the request, agree to the smart contract.

The acceptance will then be broadcast back to the Qlink Chain where the transaction will be processed and recorded to the blockchain. Finally, completion of transaction will be broadcast to the Qlink network.

In the event that an SMS contributor is not able to fulfill an order, for example, if the contributor does not have a data connection or their device is off, the Qlink Chain will rebroadcast the unfulfilled SMS request back to all potential SMS contributors. A new SMS contributor will be matched to fulfill the order.

Qlink's E2P SMS service enables the purchase and distribution of SMS internationally. For example, a user from Australia could find an SMS contributor from China to distribute SMS messages to their Chinese customers.

## **Token usage and E2P SMS billing**

QLC tokens are paid by E2P senders to SMS contributors upon acceptance of a smart contract. The QLC charge for SMS packages will depend on the availability and market rate.

## **E2P SMS service launch plan**

Qlink will first roll out the E2P SMS service to Android users, whilst the iOS version is undergoing research and development.

## 4. Hardware

A base station is a device that sends and receives signals, serving as a fixed point of communication for a wireless network, and may also act as a gateway between a wired network and a wireless network. Examples of base stations include home routers and radio receiver/transmitters.

### 4.1. Qlink BaseStation

The Qlink BaseStation is hardware that will allow Qlink to expand the existing network and cover black spots in a decentralized manner. The Qlink BaseStation is an integrated hardware device that supports LTE-U and OpenBTS<sup>5</sup> architecture. Other Qlink BaseStation functions include the support of Wi-Fi hotspots, and support of both Proof of Work (PoW) and Proof of State (PoS) consensus algorithms through the inclusion of mining hardware. The Qlink BaseStation is currently undergoing research and development and will be released after the launch of the Qlink Chain.

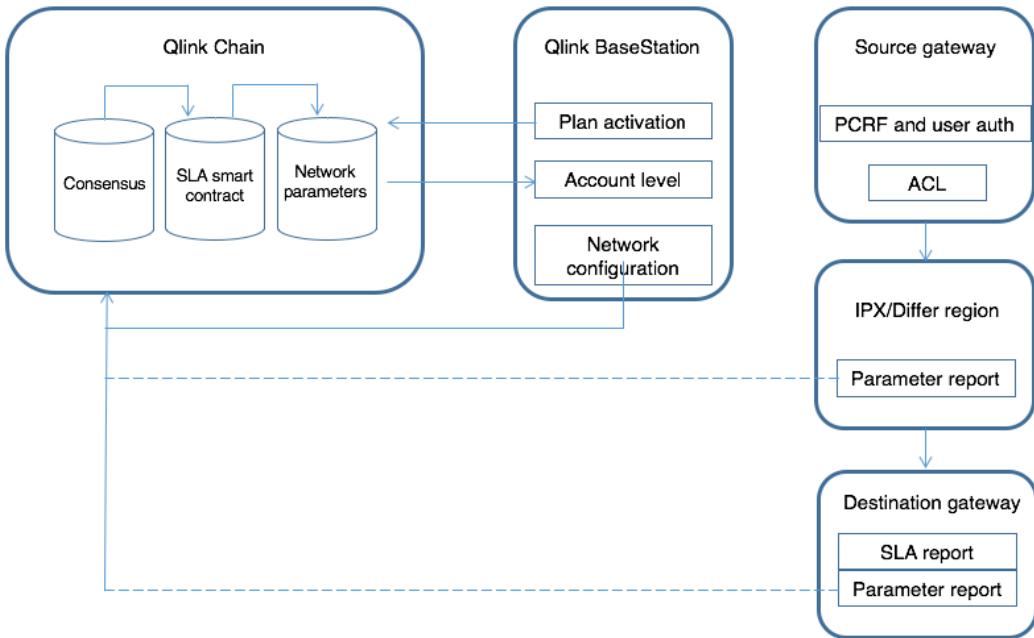
Qlink BaseStation Specifications:

1. Chip Configuration: FSM9016
2. Cell Capacity: 8-10 users
3. Power: 100mW
4. Modulation: LTE/Wi-Fi
5. Coverage radius: Maximum 300m

The Qlink BaseStation adopts a CPU+DSP architecture, serving as a full node and keeping a ledger of all assets registered on the Qlink Chain, deploying smart contracts on Qlink, and configuring the Qlink Gateway to global operators. At the same time, the Qlink BaseStation is able to provide hash power to the Qlink Chain through the PoW and PoS consensus mechanism and contribute to a mining pool.

### 4.2. Wi-Fi and Mobile Data Access

The Qlink BaseStation can be used as a home router for Wi-Fi coverage or as a portable device for 4G coverage. Qlink users will register their Qlink BaseStation on the Public Chain as standard procedure, recording the static configuration of the device. Qlink BaseStation owners can then set a general billing policy for Wi-Fi sharing and mobile data access by deploying a smart contract. When Qlink users access network coverage through these BaseStations, the smart contract will execute the policy and will transfer the determined amount of QLC tokens from the user to the BaseStation owner. Qlink uses blockchain technology to authenticate all assets and transactions and avoid incorrect billing.



*Smart contract deployment between the Qlink network and Qlink BaseStation.*

### 4.3. Mining

The Qlink BaseStation is equipped with 1GHz CPU and 512MB ROM, and supports Delegated Proof-of-Stake mining, which is less dependent on electricity consumption. The Qlink BaseStation will have the ability to contribute hash power to the network, especially when users are away from the device. For example, a home router or BaseStation could be idle for 80%-90% of a night, or during the day whilst the user is at work. In events like these, the Qlink BaseStation can -

1. Function as full node for the Qlink Chain, working with other Qlink BaseStations, to enhance the security of the Qlink Network.
2. Contribute computing power to the Qlink Chain or selected public chains that support Proof-of-Stake or Proof-Of-Work algorithm mining. Qlink can deploy protocol to form a mining pool for all the Qlink BaseStations supporting the same algorithm and distribute the mining profits between Qlink BaseStation owners and mining pool operators.



*The Qlink BaseStation with LTE-U protocol can be used for PoW and PoS consensus mining. [Example image. The final product may vary]*

## **5. Development Roadmap**

There are three main development phases on the path to launching the Qlink network.  
(Marketing plan is not included in this timeline.)

### **Phase One - End of Q1 2018**

Qlink will develop the Wi-Fi sharing protocol and E2P SMS application and deploy to the Public Chain. Wi-Fi sharing will target individual users, whilst the E2P SMS application will bring enterprise clients onboard. Qlink will first roll out the E2P SMS service to Android users, whilst the iOS version is undergoing research and development. Qlink aims to publish the code for these applications to GitHub by the end of Q1 2018. The launch will also include the Qlink mobile and desktop app.

### **Phase Two - End of Q2 2018**

Qlink will develop the mobile data access and content distribution protocol and deploy to the Public Chain. Qlink aims to publish the code for these applications to GitHub by the end of Q2 2018. The launch will also include enhanced versions of the Qlink mobile and desktop apps, along with the Qlink Gateway.

### **Phase Three - End of Q4 2018**

Qlink will launch the Qlink Chain, which will be co-developed by Onchain, and will also launch the Qlink BaseStation. Qlink aims to publish all phase three code to GitHub and debut the BaseStation prototype by the end of Q4 2018. The launch will also include cross-chain protocol.

## **6. Qlink Token**

QLC is the token of the Qlink ecosystem and it will circulate between content providers, asset owners and users.

QLC tokens are used to pay for Wi-Fi access, mobile data access, E2P SMS packages, and registration of content on the Qlink Chain, along with rewarding users for viewing the sponsored content. QLC can also be acquired by using the Qlink BaseStation to contribute to the network through mining.

Six hundred million (600,000,000) QLC tokens will be minted during the token sale, with no further tokens being created in the future.

### **6.1. Token Standard**

Qlink is excited to become a part of the NEO community. As the first open source blockchain in China, NEO has many users and an experienced development community.

More importantly, NEO token holders have the ability to vote in trustworthy consensus nodes, who are responsible for verifying network transactions through the Delegated Byzantine Fault Tolerance (dBFT) consensus algorithm.

In comparison, blockchains that utilize Proof-of-Stake (PoS) or Proof-of-Work (PoW) algorithms rely on nodes that can be run by any user with a large quantity of coins or those who are able to contribute large amounts of computing power.

Therefore, NEO's dBFT approach results in higher quality consensus nodes and a more efficient network, reducing both the potential security risks and resource wastage of PoS and PoW respectively. As Qlink requires a high level of security for the storage of telecom infrastructure assets, the NEO blockchain is the most appropriate choice.

Qlink will consult with NEO to issue tokens that comply with NEO's NEP-5 protocol.

## 6.2. QLC Token Sale Plan

### Token sale timeline

Timeline				
31st Oct	28th Nov	TBA	TBA	TBA
Strategic Investor	Pre-sale Begins	Pre-sale Ends	Crowd Sale Begins	Crowd Sale Ends

### Pre-sale

Conversion rate: 1 ETH: 4,000 QLC

Pre-sale hard cap: 40,000 ETH

Investors can choose to participate with NEO at conversation rate of 10 NEO to 1 ETH

<u>Stage</u>	<u>ETH</u>	<u>Token Bonus</u>	<u>Lockup Period</u>	<u>Cap per investor</u>
Strategic Investor	10,000	30%	1 Month	
Presale Bonus	30,000	10%	No Lockup	Min of 100 ETH per investor
				Max of 2000 ETH per investor

### Crowd sale

Conversation rate: 1 NEO: 400 QLC (Approximate price, to be finalized later)

Crowd sale hard cap: 100,000 NEO

<u>Stage</u>	<u>NEO</u>	<u>Token Plan</u>	<u>Lockup Period</u>	<u>Caps per investor</u>
Crowd sale	100,000	TBA	None	TBD

### Token allocation

- Total issuance: 600 million QLC Tokens, 224 million QLC to be sold
- 40% - Launch participants, community bonding, token sale related marketing and bounty campaigns

- 20% - Qlink development team and advisors (Tokens to team and advisors are released over a 3-year vesting period)
- 40% - Held as a provision for partnerships, marketing, strategic initiatives, and future QLC expenses

## KYC

All participants in the Qlink token sale are required to be approved through a KYC process, which will start November on Qlink's website.

## Unsold Tokens

Any unsold tokens will be re-distributed to token sale investors.

## 6.3. Qlink Troopers

Qlink Troopers are loyal members of our community, who take part in Qlink missions to win QLC tokens. These missions could include tasks such as redesigning our logo, or helping with community meetups. The best performing Trooper(s) from each mission stand to receive free QLC tokens. There is no limit to how many missions you can take part in. Participants of some Qlink missions may also get an early allocation of the Qlink Troopers bonus (Quantity is TBA).

## 6.4. Foundation Governance

The token sale fund will be used for the development of the Qlink project and the growth of Qlink ecosystem, which includes, but not limited to, Product R&D, Business Development, Strategic Alliance (e.g. Joint Venture), and potential Merge and Acquisitions of important assets. The Qlink team will strive to keep the project transparent for the benefit of all supporters. To accomplish this goal, the Qlink team will continually update the wider community with new information regarding platform development and fund status as pertinent news becomes available. Additionally, further important information will be published on the official Qlink website.

The use of ETH and NEO raised during the token sale will require a multi-sig by members of the Qlink Foundation. Additionally, the Qlink Foundation will be audited annually by a professional auditing firm specializing in foundation operation and risk assessments.

Funds raised will be used in the following areas:

- Launching the decentralized telecom service industry protocol and connecting with industry experts - 10%

- Recruiting talent, expanding the current development team and launching applications - 20%
- Project marketing to attract both data sharing parties and data using parties - 15%
- Paying team members salary and other business operating expenses - 10%
- Continuous development and production of Qlink hardware - 35%
- Rewarding talented engineers and consultants for outstanding contributions to Qlink platform to drive growth and sustainability - 5%
- Pre-purchasing data to run the project during the trial stage - 5%

## 7. Team & Advisors

### 7.1. Qlink Core Development Team



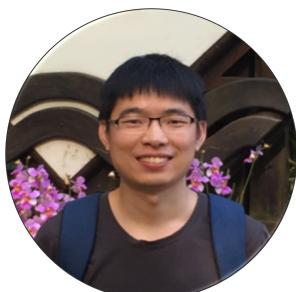
**Li Jianbo, Allen – Core developer & Co-CEO**

Former Huawei software engineer and multiple patent owner. Li founded Youyou Mobile and entered into the data distribution business. Youyou Mobile has received multiple rounds of investments from LI-Wei, XIE-Shihuang, WANG-Lijie and Changi Airport Group for a total sum of USD\$30 million.



**Wang Peng – Senior Developer**

10+ years as an internet industry software engineer with diverse experience in areas including SaaS systems, gaming systems, BOSS solutions and blockchain technology.



**Zhao Zhijie – Senior Developer**

Senior 3GPP protocol software engineer and multiple patent owner. Successfully established Youyou Mobile's global virtual SIM system from ground zero.

## 7.2. Qlink Operation Team



**Susan Zhou – Co-founder & COO**

10+ years experience in the telecom and investment industry. Susan is in charge of Qlink's overall business operations. Susan graduated from the University of Hong Kong with an MBA degree.



**Roger Lim – Head of Investor Relations**

20+ years experience in the IT industry. Co-founder and former CEO of Webvisions. Cryptocurrency and blockchain Investor. Roger helps with Qlink's business development.



**Toya Zhang – CMO**

Former senior PR manager of OKCoin, OKLink and early participant in the cryptocurrency industry. Toya is in charge of Qlink's marketing and PR activities.



**Tony Gu – Head of Business Development**

Seasoned tech investor and now managing director of Rhodium Capital. Tony was with Sytex for DPI deployment and billing systems in SEA. Tony graduated from Zhejiang University.

## **7.3. Advisors**

### **Wei Li**

Founder of Green Pine Capital Partners. A senior investor in Shenzhen with rich experience in VC investments, bond investments, M&A and IPOs.

### **Shihuang Xie**

Founder of Riverhill Fund. Co-founder of Alibaba Group. One of the original 18 founding partners of Alibaba and former head of investment at Alibaba.

### **Zuguang Wang**

Ex-senior researcher at Bell Lab, founding partner at UTStarcom, chairman of PACS Telecom Association and former associate chairman of the Economic Committee of the US Republican Party.

### **Leo Wang**

Angel investor in the cryptocurrency space. Investor of NEO and Metrovalle.

### **Pak Lum**

Senior advisor with Tembusu Partners, former CTO and Chief Business Development Officer in StarHub, the second largest telco in Singapore.

### **Josh Dai**

Former CTO of Bitmain

### **Zheng Zuo**

Partner of HongQiao Capital and early Blockchain Capital investor. Angel investor of Qtum and InkChain.

## **8. Conclusion**

To better satisfy market and consumer needs, Qlink will strive to develop an innovative platform which integrates blockchain and is deployed on a decentralized network. Qlink will build a more transparent and trustworthy international data and digital content billing platform that will benefit users, carriers, digital content distributors and IoT companies globally.

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