Graphene Documentation

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TECHNOLOGY

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Welcome to the Graphene Documentation

Welcome to the documentation portal for the Graphene Blockchain. The content on this page is managed by the Graphene community and is constantly improved.

The purpose of this site is to provide in-depth documentation about the Graphene Blockchain and make it easier for users and developers to leverage the full power of the Graphene Blockchain.

- Graphene Whitepaper
- **Development**
  - Graphene Developers Documentation Portal
  - Graphene-Core Release
  - Graphene-UI Release

CHAPTER

ONE

GRAPHENE

1.1 Welcome to the Graphene Documentation

Much of that technology is embodied in Graphene™, an industrial strength software platform for deploying third generation cryptographically secure decentralized ledgers known as block chains.

Graphene based systems have orders of magnitude better performance than first-generation Bitcoin-derived systems or even the second generation "Bitcoin 2.0" systems that constitute our current closest competitors. Graphene based systems go beyond mere "checkbook" style payments to offer a broad range of financial services distinguished by their transparency and inherent incorruptibility.

This page documents the *Graphene* technology. You can see Graphene as a toolkit for real-time blockchains. We separated the documentation into smaller parts for convenience and for the sake of easy location of relevant information.

1.1.1 Blockchain Specific Guides

The Graphene Technology has been applied to several blockchain already. You will be able to find almost everything feature implemented in Graphene. Further blockchains will be added independently.

Graphene is a Financial Smart Contracts platform that enables trading of digital assets and has market-pegged assets that track the value of their underlying asset (e.g. gpUSD tracking the U.S. dollar).

CHAPTER

TWO

WHAT IS GRAPHENE?

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- *What is Graphene?*
  - *Graphene*
  - *Consensus Technology*
  - *Distributed Autonomous Companies*
  - *Community*

2.1 Graphene

Graphene is a technology supported by next generation entrepreneurs, investors, and developers with a common interest in finding free market solutions by leveraging the power of globally decentralized consensus and decision making. Consensus technology has the power to do for economics what the internet did for information. It can harness the combined power of all humanity to coordinate the discovery and aggregation of real-time knowledge, previously unobtainable. This knowledge can be used to more effectively coordinate the allocation of resources toward their most productive and valuable use.

Bitcoin is the first fully autonomous system to utilize distributed consensus technology to create a more efficient and reliable global payment network. The core innovation of Bitcoin is the Blockchain, a cryptographically secured public ledger of all accounts on the Bitcoin network that facilitates the transfer of value from one individual directly to another. For the first time in history, financial transactions over the internet no longer require a middle man to act as a trustworthy, confidential fiduciary.

Graphene looks to extend the innovation of the blockchain to all industries that rely upon the internet to provide their services. Whether its banking, stock exchanges, lotteries, voting, music, auctions or many others, a digital public ledger allows for the creation of distributed autonomous companies (or DACs) that provide better quality services at a fraction of the cost incurred by their more traditional, centralized counterparts. The advent of DACs ushers in a new paradigm in organizational structure in which companies can run without any human management and under the control of an incorruptible set of business rules. These rules are encoded in publicly auditable open source software distributed across the computers of the companies' shareholders, who effortlessly secure the company from arbitrary control.

Graphene does for business what bitcoin did for money by utilizing distributed consensus technology to create companies that are inherently global, transparent, trustworthy, efficient and most importantly profitable.

Graphene has went through many changes and has done its best to stay on top of blockchain technology.

2.2 Consensus Technology

Consensus is the mechanism by which organizations of people decide upon unitary rational action. While not considered technology in the traditional since, consensus "technology" is the basis of democratic governance and the coordination of free market activity first coined by Adam Smith as the "Invisible Hand." The process of consensus decision-making allows for all participants to consent upon a resolution of action even if not the favored course of action for each individual participant. Bitcoin was the first system to integrate a fully decentralized consensus method with the modern technology of the internet and peer-to-peer networks in order to more efficiently facilitate the transfer of value through electronic communication. The proof-of-work structure that secures and maintains the Bitcoin network is one manner of organizing individuals who do not necessarily trust one another to act in the best interest of all participants of the network. The Graphene ecosystem employs Delegated Proof of Stake in order to find efficient solutions to distributed consensus decision making.

2.3 Distributed Autonomous Companies

Distributed Autonomous Companies (DAC) run without any human involvement under the control of an incorruptible set of business rules. (That's why they must be distributed and autonomous.) These rules are implemented as publicly auditable open source software distributed across the computers of their stakeholders. You become a stakeholder by buying "stock" in the company or being paid in that stock to provide services for the company. This stock may entitle you to a share of its "profits", participation in its growth, and/or a say in how it is run.

2.4 Community

The Graphene community is a global network of people who all share the same goal of creating and participating in various Distributed Autonomous Companies. The community mainly revolves around the Graphene Team and third parties who use Graphene (the toolkit that makes Graphene possible) to create their own Distributed Autonomous Companies.

CHAPTER

THREE

DELEGATED PROOF OF STAKE (DPOS)

Delegated Proof of Stake (DPOS) is a new method of securing a crypto-currency's network. DPOS attempts to solve the problems of both Bitcoin's traditional Proof of Work system, and the Proof of Stake system of Peercoin and NXT. DPOS implements a layer of technological democracy to offset the negative effects of centralization.

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- *Background*
- *Rationale Behind DPOS*
  - *Shareholders are in Control*
  - *Pooled Mining as Delegated Proof of Work*
  - *Reasons to not randomly select representatives from all users*
- *Scalability*
- *Role of Delegates*
- *Voting Algorithm*
  - *How do I get "votes?"*
  - *Why use only upvotes?*
  - *How are 'votes' counted?*
  - *Is there an anti-vote?*
- *Disincentives for Attacks*
- *How many witnesses are securing the network*

3.1 Background

Delegated proof of stake mitigates the potential negative impacts of centralization through the use of witnesses (formally called *delegates*). A total of N witnesses sign the blocks and are voted on by those using the network with every transaction that gets made. By using a decentralized voting process, DPOS is by design more democratic than comparable systems. Rather than eliminating the need for trust all together, DPOS has safeguards in place the ensure that those trusted with signing blocks on behalf of the network are doing so correctly and without bias. Additionally, each block signed must have a verification that the block before it was signed by a trusted node. DPOS eliminates the need to wait until a certain number of untrusted nodes have verified a transaction before it can be confirmed.

This reduced need for confirmation produces an increase in speed of transaction times. By intentionally placing trust with the most trustworthy of potential block signers, as decided by the network, no artificial encumbrance need be imposed to slow down the block signing process. DPOS allows for many more transactions to be included in a block than either proof of work or proof of stake systems. DPOS technology allows cryptocurrency technology to transact at a level where it can compete with the centralized clearinghouses like Visa and Mastercard. Such clearinghouses administer the most popular forms of electronic payment systems in the world.

In a delegated proof of stake system centralization still occurs, but it is controlled. Unlike other methods of securing cryptocurrency networks, every client in a DPOS system has the ability to decide who is trusted rather than trust concentrating in the hands of those with the most resources. DPOS allows the network to reap some of the major advantages of centralization, while still maintaining some calculated measure of decentralization. This system is enforced by a fair election process where anyone could potentially become a delegated representative of the majority of users.

3.2 Rationale Behind DPOS

- Give shareholders a way to delegate their vote to a key (one that doesn't control coins 'so they can mine')
- Maximize the dividends shareholders earn
- Minimize the amount paid to secure the network
- Maximize the performance of the network
- Minimize the cost of running the network (bandwidth, CPU, etc)

3.2.1 Shareholders are in Control

The fundamental feature of DPOS is that shareholders remain in control. If they remain in control then it is decentralized. As flawed as voting can be, when it comes to shared ownership of a company it is the only viable way. Fortunately if you do not like who is running the company you can sell and this market feedback causes shareholders to vote more rationally than citizens.

Every shareholder gets to vote for someone to sign blocks in their stead (a representative if you will). Anyone who can gain 1% or more of the votes can join the board. The representatives become a "board of directors" which take turns in a round-robin manner, signing blocks. If one of the directors misses their turn, clients will automatically switch their vote away from them. Eventually these directors will be voted off the board and someone else will join. Board members are paid a small token to make it worth their time ensuring uptime and an incentive to campaign. They also post a small bond equal to 100x the average pay they receive for producing a single block. To make a profit a director must have greater than 99% uptime.

3.2.2 Pooled Mining as Delegated Proof of Work

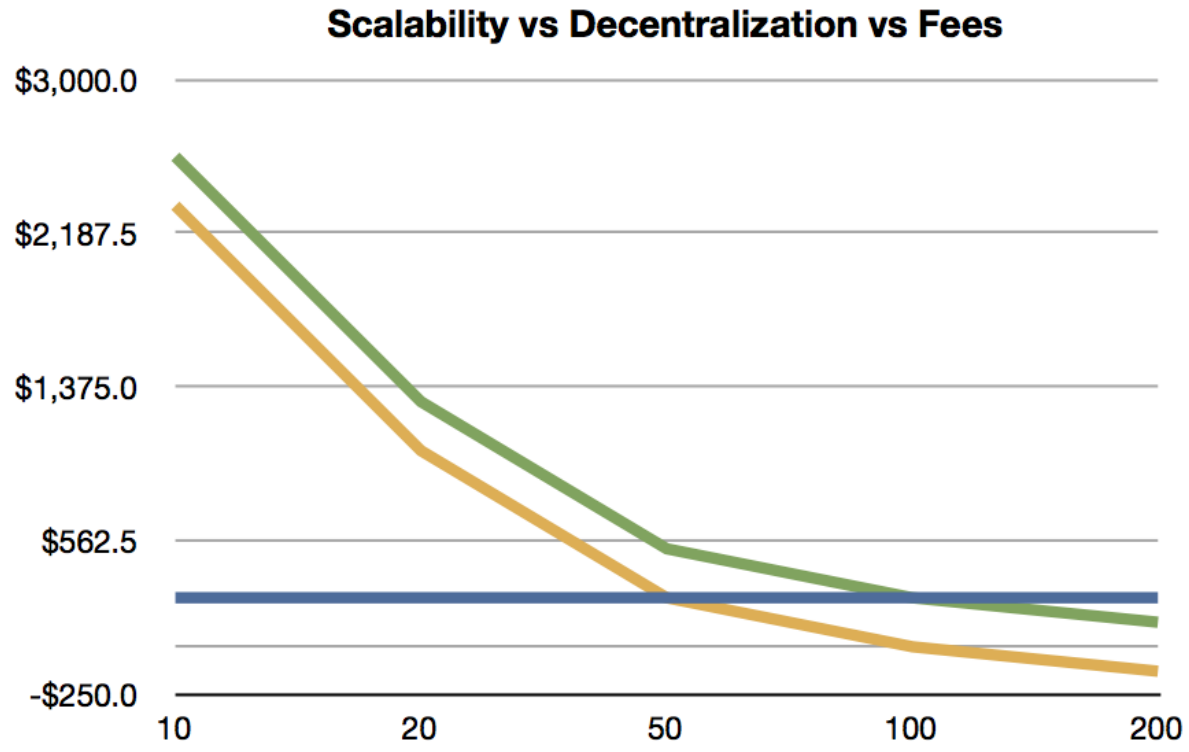
So how is this different than Bitcoin? With Bitcoin, users must pick a mining pool and each pool generally has 10% or more of the hash power. The operator of these pools is like a representative of the clients pointed at the pool. Bitcoin expects the users to switch pools to keep power from becoming too centralized, but collectively five major pools control the network and manual user intervention is expected if one of the pools is compromised. If a pool goes down then the block production rate slows proportionally until it comes back up. Which pool one mines with becomes a matter of politics.

3.2.3 Reasons to not randomly select representatives from all users

- High probability they are not online.
- Attackers would gain control proportional to their stake, without any peer review.
- Without any mining at all, the generation of a random number in a decentralized manner is impossible and thus an attacker could control the random number generation.

3.3 Scalability

Assuming a fixed validation cost per transaction and a fixed fee per transaction, there is a limit to the amount of decentralization that can take place. Assuming the validation cost exactly equals the fee, a network is completely centralized and can only afford one validator. Assuming the fee is 100x the cost of validation, the network can support 100 validators.



Systems like Nxt and Peercoin will have excessive fees if they intend to allow everyone to be a validator and earn fees at scale. What this means for Nxt and Peercoin is that anyone with less than 1% stake cannot validate profitably unless their fees are higher than our DPOS chain. If these chains assume 100 delegates is too centralized and start promoting they have 1000 validators, then their fees must be 10x those of DPOS. If such a chain grew to be the size of Bitcoin ($10 B) then only those with $1M worth of coin could validate profitably and most would consider that an elite club. If they reduce the minimum stake to be a validator to $1000, then their fees would be 10,000 times higher than DPOS.

Developers of DPOS assume that everyone with less than the amount required to validate won't participate. Also assumed is a "reasonable" distribution of wealth. It's clear that unless alternate chains have unusually high fees, there will only be a handful of people with enough stake to validate profitably.

In conclusion, the only way for POS to work efficiently is to delegate. In the case of Nxt, they can pool their stake by

some means and ultimately this will end up like DPOS prior to approval voting with a variable number of delegates. Delegates wouldn't actually receive any income as with mining pools because the validation expenses will consume the vast majority of the transaction fees.

The end result is that decentralization has a cost proportional to the number of validators and that costs do not disappear. At scale, these costs will centralize any system that does not support delegation. This kind of centralization should be designed as part of the system from the beginning so that it can be properly managed and controlled by the users, instead of evolving in some ad hoc manner as an unintended consequence.

3.4 Role of Delegates

- A witness is an authority that is allowed to produce and broadcast blocks.
- Producing a block consists of collecting transactions of the P2P network and signing it with the witness' signing private key.
- A witness' spot in the round is assigned randomly at the end of the previous block

3.5 Voting Algorithm

3.5.1 How do I get "votes?"

- Persuade others to give upvotes to your witness
- When another user gives an upvote to your (and possibly other) delegates
- A user can give an upvote for more than one witness. As a result all upvoted witnesses get a vote
- Convince proxies (that vote on behalf of their followers) to vote for you

3.5.2 Why use only upvotes?

- Giving only upvotes, and allowing multiple votes per share, is called **Approval Voting**, and comes with several advantages over the old *delegation* voting.
- No downvotes are needed, which not only simplifies usability but also reduces code and complexity.

3.5.3 How are 'votes' counted?

Once every *maintenance interval*, all votes are recounted and the corresponding result takes effect.

3.5.4 Is there an anti-vote?

Not any more. The developers decided to use **Approval Voting**.

3.6 Disincentives for Attacks

- By choosing not to produce a block, a witness risks getting fired and they lose guaranteed profits in the future.
- A dishonest delegate would only fail to produce a block if they were sure to win something from it
- If a lottery only payed out 50% to a jackpot (giving the other 50% to charity) then the most this dishonest delegate could do is break even.
- Witnesses can't sign invalid blocks as the block needs confirmation by the other witnesses as well

3.7 How many witnesses are securing the network

This is totally in the hands of the shareholders. If the majority votes for 50 witnesses, then 50 witnesses will be used. If the shareholders only vote for 20, so be it. The minimum possible witness count is 11.

CHAPTER

FOUR

WHAT IS DIFFERENT GRAPHENE

Here we give a brief overview of what is different in Graphene when compared to satoshi-based blockchains such as Bitcoin, Litecoin, etc.. from the perspective of an exchange.

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- *Several Tokens*
- *Registered Identities*
- *No More Addresses*
- *Memos*
- *Securing Funds*
- *Full Nodes and Clients*
- *Object IDs*

4.1 Several Tokens

In contrast to all satoshi-based clients, Graphene offers a variety of blockchain tokens. There is not just the GPH (core token) but many others. Hence, as an exchange you need to distinguish different assets, either by their id (1.3.0 (GPH), 1.3.1 (USD), . . .) or by there symbol.

4.2 Registered Identities

All participants in Graphene are required to have a registered unique name. This is similar to mail addresses and are used to address recipients for transfers. As an exchange you will only ever need to tell your customers your Graphene account name and they will be able to send you funds.

4.3 No More Addresses

In Graphene, we have separated the permissions from the identity. Hence, as an exchange you don't need to ever deal with addresses again. In fact, you actually cannot possibly use an address because they only define so called *authorities* that can control the funds (or the account name). This should greatly simplify integration as you don't need to store thousands of addresses and their corresponding private keys.

4.4 Memos

In order to distinguish customers, we make use of so called *memos*, which are encrypted. We now have a separated memo key that is only capable of decoding your memo and cannot spend funds. Hence, in order to monitor deposits to the exchange you no longer need to expose the private key to an internet connected machine. Instead you only decode the memo and leave the funds where they are.

4.5 Securing Funds

Funds can be secured by *hierarchical cooperate accounts*. In practice, they are (Threshold) Multi-Signature accounts from which funds can only be spend if several signatures are valid. In contrast to mostly every other crypto currency, you can propose a transaction on the blockchain and don't need other means of communications to add your approval to a certain transactions. You can find more details about these account types in

- account-membership
- securing-funds

4.6 Full Nodes and Clients

We have rewritten the core components from scratch and separated the core P2P and blockchain components from the wallet. Hence, you can run a full node without a wallet and connect your wallet to any public (or non-public) full-node (executable *witness_node*). The communication can be established securely but the private keys never leave the wallet.

4.7 Object IDs

Since Graphene offers a variety of features to its users that are different in many ways, we have decided to address them using *object ids*.

For instance:

Object ID | translates to	
`1.3.1`	asset USD
`1.3.0`	asset GPH
`1.2.<id>`	user with id `<id>`
`1.6.<id>`	block signer `<id>`
`1.11.<id>`	operation with id `<id>`

CHAPTER

FIVE

TECHNOLOGY - GRAPHENE - GPH.AI

- https://gph.ai/

The Graphene platform itself is run and maintained by the Graphene community an open consortium of individuals and organizations committed to providing universal access to the power of smart contracts.

Working together, this community has designed and developed the Graphene platform to include numerous innovative features which are not found elsewhere within the smart contract industry:

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- *Price-Stable Cryptocurrencies*
- *Decentralized Asset Exchange*
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- *User-Issued Assets*
- *Stakeholder-Approved Project Funding*
- *Transferable Named Accounts*
- *Delegated Proof-of-Stake Consensus*

5.1 Price-Stable Cryptocurrencies

- SmartCoins provide the freedom of cryptocurrency with the stability of the dollar

A SmartCoin is a cryptocurrency whose value is pegged to that of another asset, such as the US Dollar or gold. SmartCoins always have 100% or more of their value backed by the Graphene core currency, GPH, to which they can be converted at any time at an exchange rate set by a trustworthy price feed. In all but the most extreme market conditions, SmartCoins are guaranteed to be worth at least their face value (and perhaps more, in some circumstances). Like any other cryptocurrency, SmartCoins are fungible, divisible, and free from any restrictions.

5.2 Decentralized Asset Exchange

- Graphene provides a built in high-performance decentralized exchange - “DEX”

Graphene provides a high-performance decentralized exchange, with all the features you would expect in a trading platform. It can handle the trading volume of the NASDAQ, while settling orders the second you submit them. With this kind of performance on a decentralized exchange, who needs risky centralized exchanges?

5.3 Industrial Performance and Scalability

- Graphene is capable of 100,000 TPS with proper industrial-grade setup

High performance blockchain technology is necessary for cryptocurrencies and smart contract platforms to provide a viable alternative to existing financial platforms. Graphene is designed from the ground up to process more transactions every second than VISA and MasterCard combined. With Delegated Proof of Stake, the Graphene network can confirm transactions in an average of just 1 second, limited only by the speed of light.

5.4 Dynamic Account Permissions

- On-the-fly management, risk prevention, authority assignments and much more for corporate environments

Graphene designs permissions around people, rather than around cryptography, making it easy to use. Every account can be controlled by any weighted combination of other accounts and private keys. This creates a hierarchical structure that reflects how permissions are organized in real life, and makes multi-user control over funds easier than ever. Multi-user control is the single biggest contributor to security, and, when used properly, it can virtually eliminate the risk of theft due to hacking.

5.5 Recurring & Scheduled Payments

- Flexible withdrawal permissions, subscriptions and bills

Graphene is the first smart contract platform with built-in support for recurring payments and subscription payments. This feature allows users to authorize third parties to make withdrawals from their accounts within certain limits. This is a convenient way to “set it and forget it” for monthly bills and subscriptions.

5.6 Referral Rewards Program

- Network growth through adoption rewards and single-level referrals

Graphene has an advanced referral program built directly into its software. Financial networks derive their value primarily from their network effect: more people on the same network increases the value of that network for everyone. Graphene capitalizes on this by rewarding those who sign up new users, and does so in a fully transparent and automated way.

5.7 User-Issued Assets

- Regulation-compatible crypto-assets from the Token Factory.

The Graphene platform provides a feature known as "user-issued assets" to help facilitate profitable business models for certain types of services. The term refers to a type of custom token registered on the platform, which users can hold and trade within certain restrictions. The creator of such an asset publically names, describes, and distributes its tokens, and can specify customized requirements, such as an approved whitelist of accounts permitted to hold the tokens, or the associated trading and transfer fees.

5.8 Stakeholder-Approved Project Funding

- Built in dApps powered by a core utility token

Graphene is designed to be self funding and self-sustaining by giving the stakeholders the power to direct where blockchain reserves are spent. Graphene has a reserve pool of 60 million GPH that automatically grows as transaction fees are collected and the share price rises. Each day, the blockchain is authorized to spend GPH, which is enough to hire a small team to maintain the network for years, even with no price appreciation.

5.9 Transferable Named Accounts

- Human-readable account names registered in the blockchain

Named accounts enable users to easily remember and communicate their account information. We don't use IP addresses to browse the internet or numbers to identify our email, so why shouldn't we have human-friendly account names for our financial transactions?

5.10 Delegated Proof-of-Stake Consensus

- A robust and flexible consensus protocol

Delegated Proof of Stake (DPOS) is the fastest, most efficient, most decentralized, and most flexible consensus model available. DPOS leverages the power of stakeholder approval voting to resolve consensus issues in a fair and democratic way. All network parameters, from fee schedules to block intervals and transaction sizes, can be tuned via elected delegates. Deterministic selection of block producers allows transactions to be confirmed in an average of just 1 second. Perhaps most importantly, the consensus protocol is designed to protect all participants against unwanted regulatory interference.

CHAPTER

SIX

THINGS YOU SHOULD KNOW

6.1 For the Starter

- **Security and Control over accounts and funds**: No one can access your funds unless you let them, intentionally, or unintentionally. With the power to be independent from 3rd parties, comes the responsibility to protect what belongs to you.
- **Can interact with people directly**: With Graphene it becomes possible to interact with people directly without needing to go through a middleman. Hence, Graphene is a platform of free speech that implements a payment platform and exchange for digital goods.
- **Fast**: Transactions in Graphene are verified and irrevocable in only a few seconds time.
- **Decentralized Committee**: Decisions that can effect the Graphene ecosystem are made using a on-chain committee voted upon by shareholders. Hence, no single entity can change the deal retroactively.
- **Flexible**: Protocol upgrades (formerly known as *hard forks*) can be implemented and executed to improve the Graphene business over time and allow to react on.

6.2 For the Investor

- **Become GPH Holder**: If you buy `GPH` either from a partner exchange or from the DEX, you become a GPH Holder of the Graphene decentralized business and as such can take a cut of its profits and participate in votes for future directions.
- **Expenses**: Vote for expenses of the business and hire workers to do important tasks for Graphene.
- **Leaders**: Participate in political decisions by voting for committee members that represent your views!
- **Protocol upgrades**: Improve the technology, integrate new features and adept legal and regulative changes by voting for upgrades.
- **Decision making for a profit**: Take part in decision finding about fair pricing models for transaction fees to a) increase growth and b) make Graphene profitable for its shareholders

CHAPTER

SEVEN

ASSETS TOKENS

User Issued Assets (UIAs)

Freely traded tokens created by individuals used for a variety of use-cases, such as stock, miles, event tickets or reputation points.

7.1 User Issued Assets (UIAs)

Graphene allows individuals and companies to create and issue their own tokens for anything they can imagine. The potential use cases for so called user-issued assets (UIA) are innumerable. On the one hand, UIAs can be used as simple event tickets deposited on the customers mobile phone to pass the entrance of a concert. On the other hand, they can be used for crowd funding, ownership tracking or even to sell equity of a company in form of stock.

All you need to do is click in order to create a new UIA is a few mouse clicks, define your preferred parameters for your coin, such as supply, precision, symbol, description and see your coin's birth after only a few seconds. From that point on, you can issue some of your coins to whomever you want, sell them and see them instantly **traded against any other existing coin** on Graphene.

Unless you want some restriction. As the issuer, you have certain privileges over your coin, for instance, you can allow trading only in certain market pairs and define who actually is allowed to hold your coin by using white- and blacklists. Of course, an issuer can opt-out of his privileges indefinitely for the sake of trust and reputation.

As the owner of that coin, you don't need to take care of all the technical details of blockchain technology, such as distributed consensus algorithms, blockchain development or integration. You don't even need to run any mining equipment or servers, at all.

So what's the drawback?

There is a drawback in this scenario, namely, a centralized issuance of new tokens. To some extend, this could be managed by a hierarchical multi-signature issuer account that prevents any single entity from issuing new coins but instead requires a consensus among an arbitrary set of people to agree on any changes to the coin.

Obviously, the regulations that apply to each kind of token vary widely and are often different in every jurisdiction. Hence, Graphene comes with tools that allow issuers to remain compliant with all applicable regulations when issuing assets assuming regulators allow such assets in the first place.

7.1.1 Use Cases

- Reward Points
- Fan Credits
- Flight Miles
- Event Tickets
- Digital Property
- Crowd-Funding
- Company Shares

7.1.2 How to create a new UIA by using GUI

- How can I create a new UIA by using GUI?

Market-Pegged Assets (MPA)

These SmartCoins track the value of an underlaying asset, such as Gold, or U.S. Dollar. Smartcoins can be created by anyone contracting with the Graphene ecosystem and putting sufficient GPH (at least 175%) into the so called contract for difference as collateral.

7.2 Market Pegged Assets (MPAs)

A crypto-currency, with the properties and advantages of Bitcoin, that is capable of maintaining price parity with a globally adopted currency (e.g. U.S. dollar), has high utility for convenient and censorship resistant commerce. This can be achieved by Graphene' market pegged assets (MPA), a new type of freely traded digital asset whose value is meant to track the value of a conventional underlying asset by means of contracts for difference (CFD).

Instead of creating a UIA where the full control over supply is in the hands of the issuer, we can also create a **Market Pegged Asset** (MPA) and let the market deal with demand and supply. All we need is a *fair price* and another asset that can be used as collateral.

Why would we need *collateral* for? Since the issuer of a MPA has no control over the supply, the blockchain protocol deals with increasing and decreasing supply. In order for a user to get some of the new coins, he will need to put collateral into a **smart contract** (technically, this contract is a *contract for difference*).

> A simple example would be a MPA that is backed by USD (a stable crypto token within Graphene) that requires a collateral ratio of 200%. Then, in order to get new coin, we can borrow 100 USD worth of new coins by paying 200 USD.

By this, the supply of your coin is increased by 100. But how would it be decreased? The USD are locked in the smart contract and can only be reclaimed if the debt (here, 100 coins) are returned. Returning them will result in the coins being removed from the supply because the are no longer backed by any collateral.

So what for do we need a *fair price*? Remember that we chose a collateral ratio of 200%? That number tells us how well *backed* your coins are by the collateral. But what would happen if the value of your coin goes to the moon? Then your collateral ratio will reduce to say 150%. At a certain percentage, the blockchain will automatically trigger so called *Margin Calls* which will

1. Take your collateral (here, USD)
2. Sell it in the market to buy back the coin you owe
3. Close the contract
4. Pay your the residual USD

A *fair price* thus tells the market what your coin is worth (e.g. traded for on external exchanges) and triggers margin calls if necessary.

But there is more! Everyone that holds your (MPA) coin in Graphene can convert the coin into the backing asset at a fair price. This procedure is called "settlement" and ensures that your MPA is always worth **at least** the *fair price*.

In the User Interface, MPAs are easily distinguishable from UIAs in the asset explorer.

7.2.1 SmartCoins

gpAssets can be created and owned by anyone on the network. However, those that are owned by the Graphene Committee, are called

SmartCoins. Among these are:

- (gp)USD
- (gp)CNY
- (gp)EUR
- (gp)GOLD
- (gp)Silver

Balances in these assets are labeled with *USD*, *CNY*, etc., because represent the same value as their underly.

7.2.2 Collateralized Tokens

A *SmartCoin* (synonym for MPA) is a crypto-currency that *always* has 100% or more of its value backed by the Graphene core currency (GPH), to which they can be converted at any time, as *collateral* in a CFD.

What makes MPAs unique is that they are free from counterparty risk even though they resemble a CFD backed by collateral. This is achievable by letting the network itself (implemented as a software protocol) be responsible for securing the collateral and performing settlements as will be described in more detail below.

7.2.3 Market Mechanics

Each gpAsset has a feed that is provided by the witnesses that indicate a fair price for that asset. This so called *Settlement Price* or *Feed Price* is used to margin call positions that borrowed gpAssets and can no longer maintain the minimum collateral ratio (i.e. maintenance collateral ratio). The collateral of these positions is used to buy back the debt from the market automatically and the position will be closed. By these rules, the network enforces the exchange participants to always maintain a collateral that is higher than the minimum requirement. Currently, the minimum required collateral ratio is **175%** and can be changed by the witnesses.

Read more about the *margin call mechanics* before trading.

Exchange Backed Assets (EBA)

This kind of asset is commonly known as I owe you (IOU). It represents the right to withdraw the same amount (minus fees) of a backing asset from a central entity. Often they are issued by a bank, an exchange or an other financial institute to represent deposit receipts.

7.3 Exchange Backed Assets (EBA)

Exchange Backed Assets represent deposit receipts that are issued by a centralized entity, such as exchanges, banks or other institutes. These can either be interpreted as *I owe you* (IOUs) or certificates for a deposit at that institute.

From the blockchain perspective, EBA are equivalent to a *User Issued Assets (UIAs)* that is created and issued by an exchange, bank or financial institute. Hence, it is their responsibility to credit you with the corresponding blockchain token (the EBA) on deposits.

7.3.1 Use Case

The most common use case would be a centralized exchange that allows their users to deposit crypto currencies in their wallets. These deposits are usually stored in their own database and the customers internal account balance is matched accordingly. These database balances serve as **deposit receipts** but obviously require some trust that the database is properly secured against any kind of attacks.

Instead of increasing an internal account balance of a user, new shares of an EBA can be issued to the user on deposits. Since EBAs are blockchain tokens, they can be traded on the decentralized exchange similar to any other exchange.

In order to reclaim his crypto tokens on their native blockchain, the users sends back the EBAs to the institute who then destroy the EBAs and transfer the corresponding asset back to its rightful owner.

Since EBAs are implemented as UIA, you can read more about the underlying technology on the *corresponding page - UIA*.

Privatized gp-Assets

A flexible mixture between UIA and MPA that allows 3rd parties to create their own customized MPAs.

7.4 Privatized gpAssets

Alternatively to regular MPA like the gpUSD, Graphene also offers entrepreneurs an opportunity to create their own SmartCoins with custom parameters and a distinct set of price feed producers.

Privatized SmartCoin managers can experiment with different parameters such as collateral requirements, price feeds, force settlement delays and forced settlement fees. They also earn the trading fees from transactions the issued asset is involved in, and therefore have a financial incentive to market and promote it on the network. The entrepreneur who can discover and market the best set of parameters can earn a significant profit. The set of parameters that can be tweaked by entrepreneurs is broad enough that SmartCoins can be used to implement a fully functional prediction market with a guaranteed global settlement at a fair price, and no forced settlement before the resolution date.

Some entrepreneurs may want to experiment with SmartCoins that always trade at exactly $1.00 rather than strictly more than $1.00. They can do this by manipulating the forced settlement fee continuously such that the average trading price stays at about $1.00. By default, Graphene prefers fees set by the market, and thus opts to let the price float above $1.00, rather than fixing the price by directly manipulating the forced settlement fee.

Fee Backed Assets

An FBA is a token that pays you a fraction of the transaction fees generated by a particular feature that has been funded independent of Graphene.

7.5 Fee Backed Asset

Existing core features of the Graphene protocol are Market Pegged Assets (MPA) and issuer backed User Issued Assets (UIA). In this proposal, we introduce another type of asset: *Fee Backed Assets (FBA)*.

Feed backed assets allow to propose and fund *market based* innovation by sharing a cut of future profits generated by this particular innovation with the people that helped fund it. Think of it as a *Kickstarter* for features. Hence, if people can profit from successful features in the form of fees then it can help the Graphene ecosystem to become more adaptable over time as it promotes innovation and can pay for its development.

If you have any features in mind that require new kind of transaction on the blockchain, you can code that feature and fund it with an FBA.

Prediction Market Asset

A prediction market is similar to a MPA, that trades between 0 and 1, only. After an event, a price feed can be used to determine which option to take and participants can settle at this price.

7.6 Prediction Markets

A prediction market is a specialized gpAsset such that total debt and total collateral are always equal amounts (although asset IDs differ). No margin calls or force settlements may be performed on a prediction market asset. A prediction market is globally settled by the issuer after the event being predicted resolves, thus a prediction market must always have the *global_settle* permission enabled. The maximum price for global settlement or short sale of a prediction market asset is 1-to-1.

Table of Contents

- *Creation*
- *Betting*
  - *Betting for a Positive Outcome*
  - *Betting for a Negative Outcome*
- *Resolving*

Note: In the following, we denote a *positive outcome* as a predication market that resolves to *true* (i.e. a price feed of *1*) and a *negative outcome* to resolve to *false* (i.e., a price feed of *0*)

If the bet resolves to *true* (i.e. a price feed of *1*), then the PM-asset can be settled release the collateral to the holder of the asset.

If, instead, the bet resolves to *false* (i.e. a price feed of *0*), then those that sold the PM-asset on the market and went short, made a profit since it PM-asset became worthless.

7.6.1 Creation

Prediction markets are assets that trade freely and can be borrowed from the market at a 1:1 ratio with the backing asset (which could be any other asset, including GPH, USD, GOLD).

7.6.2 Betting

A user can take either bet on a positive outcome, or a negative outcome. We here show how this works, technically.

Betting for a Positive Outcome

If you are confident that the bet will resolve positive, you want to **hold** that particular PM-asset since it allows you to settle it for it's collateral on a 1:1 basis.

In order to get hold of those tokens, you can put a buy order for them at any price (between 0 and 1) and wait for it to be filled, or buy at market rates. By this technique, a user can pre define at which odds to buy shares.

For instance, if you think that the bet resolves positively at a probability of *80%*, you can put your buy order at a price of *0.8*. If the bet resolves positively (price feed of *1*), then you can settle your shares at *1* and make a 20% profit.

If you can buy tokens at a price of *0.2* (i.e. market participants think it is unlikely to resolve positively), then you could make *80%* profits at a risk of loosing with *80%* probability.

After closing of the bet, a user can claim his profits by **settling** his borrow position and taking out the collateral:

- **Settlement in the CLI wallet**:

```
>>> settle_asset <account> <amount> <symbol> True
```

- **Borrowing in the GUI wallet**: A settlement button is available when hovering the asset in your account's overview.

Betting for a Negative Outcome

In order to bet for a negative outcome (bet resolves to *false* with a price feed of *0*), you need to **sell** the tokens. In order to get them, you should **not** buy them at the market, but instead **borrow** them from the network by paying collateral at a 1:1 ratio.

For example, in the *PM.PRESIDENT2016* if you want to bet on a negative outcome with *100k GPH*, you can borrow *100k PM.PRESIDENT2016* by paying *100k GPH* to the network.

Note: Since PM-Assets can technically be pegged by any other asset, you may need to pay USD (or anything else) instead of GPH.

Once you borrowed the token, you can sell them at any price between *0* and *1*. If you thing the probability of a negative outcome is *20%*, you should consider selling your tokens at *0.2*.

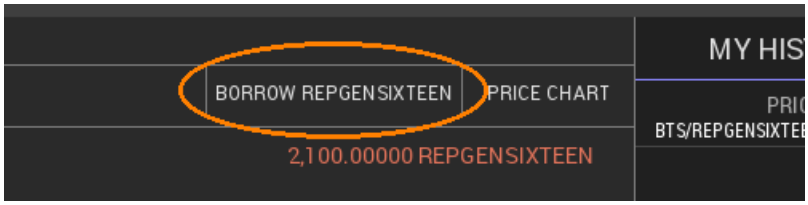
If the bet resolves negatively (price feed of *0*), your debts is worth *debt = amount * price = 0 GPH*, you can reclaim your collateral at zero cost, and get to keep *20%* profits from selling the token at *0.2*. If instead the bet resolves positively and you sold all tokens, you cannot close your borrow position to redeem your collateral. However, your total loss is reduced by *20%* for selling the tokens at the market.

If, by the end of the bet, you still have some of the tokens left, you can of course close your borrow position partly and redeem the corresponding percentage of the collateral.

- **Borrowing in the CLI wallet**:

```
>>> borrow_asset <account> <amount> <PMsymbol> <1:1-amount> true
```

- **Borrowing in the GUI wallet**: Of course, the asset can also be borrowed in the **GUI/web wallet** by using the *Borrow x* button in the market.



7.6.3 Resolving

A price feed needs to be published for the prediction market by the issuer or feed producer. It is essentially a global settlement which will set the parameters of the asset such that the holders of the asset can settle at the outcome of the bet (0, or 1). The details are shown in the guide pm-close-manual (ref: *docs.gph.ai* material)

CHAPTER

EIGHT

BLOCKCHAIN GOVERNANCE

The blockchain can and needs to be governed by **elected** individuals and businesses. The so called *committee* (a set of many individuals), can change blockchain parameters such as block size, block confirmation time and others. Most importantly, though, they deal with the business plan of the blockchain and tweak costs and revenue streams (mainly transaction fees). In contrast to most existing crypto currencies, we re not hoping for a fee market to grow but instead have the committee members deal with fine-tuning of the business plan. Fortunately, the GPH Holders have the final say to approve the executive committee.

Hence, we see businesses competing for seats in the committee to define blockchain parameters.

If business ideas requires certain blockchain parameters or a particular set of fees to be profitable, there are several options:

- Argue with shareholders to approve committee members that vote in their favor
- Get elected as committee member by showing that the business is worth being available in that particular chain
- Deploy the innovative business idea as a smart contract on the blockchain and have the shareholders approve the upgrade in combination with *Fee Backed Asset* that pays future fees of the smart contract to holders of that asset (*Fee Backed Asset*)

CHAPTER

NINE

COMMUNITY MEMBERSHIPS

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- *About Graphene Members*
- *GPH Holders*
- *Committees*
- *Witnesses*
- *Workers / Budget Items*
  - *Payouts*
  - *Working for Graphene*
  - *Pseudo Workers*
    - *Polling Workers*
    - *Refund Worker*
    - *Burn Worker*

9.1 About Graphene Members

Graphene separates responsibilities and incentives activities that are beneficial to the network, thus acknowledging different skill sets and interested community members to have incentives to contribute in the most appropriate way.

- Witnesses are paid for maintaining the back-bone of the network.
- Committee members are unpaid volunteers that organize the community and propose changes to the network.
- Marketers are paid in referral fees.
- Workers are paid for whatever they propose and do.
- GPH Holders are people holding GPH. They can cast a vote and influence the DAC's businesses

Each of the above (except Marketers) requires users to vote for the people, proposals, and/or changes. Those with sufficient approval will be compensated.

Workers are the "catch all" group where if you have an idea for something that could improve the network, you can get "paid" by the network to do it. Organizing meet-ups, developing a new tool or feature for the community, and maintaining websites and infrastructure are all examples of things workers may do.

9.2 GPH Holders

In contrast to most crypto-currencies, Graphene does not claim to be a currency but rather an *equity* in a decentral autonomous company (DAC). As a result, the market valuation of Graphene is free floating and may be as volatile as any other equity (e.g. of traditional companies).

Every entity hold the core token (GPH) is considered a GPH Holder of the Graphene decentralized company.

Nonetheless, GPH tokens can be used as *collateral* in financial smart contracts such as market pegged assets and thus back every existing smartcoin such as the gpUSD.

9.3 Committees

Since Bitcoin struggled to reach a consensus about the size of their blocks, the people in the cryptocurrency space realized that the governance of a DAC should not be ignored. Hence, Graphene offers a tools to reach on-chain consensus about business management decisions.

The Graphene blockchain has a set of parameters available that are subject of GPH Holder approval. GPH Holders can define their preferred set of parameters and thereby create a so called *committee member* or alternatively vote for an existing committee member. The Graphene committee consists of several *active* committee members.

The Graphene ecosystem has a set of parameters available that are subject of GPH Holder approval. Initially, Graphene has the following blockchain parameters:

- **fee structure**: *fess that have to be paid by customers for individual transactions*
- **block interval**: *i.e. block interval, max size of block/transaction*
- **expiration parameters**: *i.e. maximum expiration interval*
- **witness parameters**: *i.e. maximum amount of witnesses (block producers)*
- **committee parameters**: *i.e. maximum amount of committee members*
- **witness pay**: *payment for each witnesses per signed block*
- **worker budget**: *available budget available for budget items (e.g. development)*

Please note that the given set of parameters serves as an example and that the network's parameters are subject to change over time.

Additionally to defining the parameters any active witness can propose a protocol or business upgrade (i.e. hard fork) which can be voted on (or against) by GPH Holders. When the total votes for the hard fork are greater than the median witness weight w then the hard fork takes effect.

9.4 Witnesses

In Graphene, the witnesses' job is to collect transactions, bundle them into a block, sign the block and broadcast it to the network. They essentially are the block producers for the underlying consensus mechanism.

For each successfully constructed block, a witness is payed in shares that are taken from the limited reserves pool at a rate that is defined by the GPH Holders by means of approval voting.

9.5 Workers / Budget Items

Thanks to the funds stored in the reserve pool, Graphene can offer to not only pay for its own development and protocol improvement but also support and encourage growth of an ecosystem.

9.5.1 Payouts

A blockchain parameter (defined by GPH Holders through the committee) defines the daily available budget. No more than that can be paid at any time to all workers combined.

The daily budget is distributed as follows:

- The available budget is taken out of reserves pool.
- The budget items are sorted according to their approval rate (`Pro - Con`) in a descending order.
- Starting at the worker with the highest approval rate, the requested daily pay is payed until the daily budget is depleted.
- The worker with the least approval rate that was paid may receive less than the requested pay

Hence, in order to be successfully funded by the Graphene ecosystem, the GPH Holders approval for your budget item needs to be highly ranked.

Since the payments for workers from the non-liquid reserve pool result in an increased supply of GPH, these payments are vesting over a period of time defined by GPH Holders.

9.5.2 Working for Graphene

In order to be get paid by Graphene, a proposal containing

- the date of work begin,
- the date of work end,
- a daily pay (denoted in GPH),
- the worker's name, and
- an internet address.

has to be publish on the blockchain and approved by GPH Holders.

A worker can also choose on of the following properties:

- **vesting**: *pay to the worker's account*
- **refund**: *return the pay back to the reserve pool to be used for future projects*
- **burn**: *destroys the pay thus reducing share supply, equivalent to share buy-back of a company stock.*

9.5.3 Pseudo Workers

Three types of pseudo workers exist that are not primarily used to for salary.

Polling Workers

A worker proposal can be used to poll the GPH Holders for an opinion. Those workers usually have no or very small pay. Additionally, they come with a *proposal*, *recommendation* or other topic on which GPH Holders can publish a binary opinion (pro, or contra).

Refund Worker

This worker is used to set an approval limit for worker proposals and their payment by simply refunding his payment/salary to the reserve pool. If its amount of daily pay is as large as the daily available funds, and the worker has highest approval among all worker proposals, all funds will be returned to the reserves and no one will be payed. If, however, an other worker proposal has more votes than the refund worker, the proposal gets paid its salary, and the rest is return.

Burn Worker

This type of worker is similar to the *Refund Worker* above but **burns** his pay.

CHAPTER

TEN

DECENTRALIZED EXCHANGE (DEX)

The decentralized exchange (further denoted simply as *the DEX*) allows for direct exchange of digital goods traded in the Graphene ecosystem.

A decentralized exchange has a very particular set of advantages over traditional centralized exchanges and we would like to address some of them briefly below. Although the Graphene DEX comes with all of them, it is up to the reader and customer to leverage those features in full or only partially.

- **Separation of Powers**: There is no reason why the same entity needs to be responsible for issuing IOUs and for processing the order book. In Graphene, order matching is performed by the protocol, which is unaware of implications concerning the involved assets.
- **Global Unified Order Book**: Since Graphene is global, anybody with an internet access can use the DEX for trading. This brings the world's liquidity to a single order book for decentralized trading.
- **Trade Almost Anything**: The Graphene DEX is asset agnostic. Hence you can trade at **any** pair. While some pairs may end up with low liquidity, such as SILVER:GOLD, other pairs such as USD:EUR for FOREX trading will see huge volume.
- **No Limits**: The Graphene protocol is unable to limit your trading experience.
- **Decentralized**: The DEX is decentralized across the globe. This not only means that there is no single point of failure, but it also implies that the Graphene exchange is open for trading 24/7 because it's always daytime somewhere.
- **Secure**: Your funds and trades are secured with industry-grade elliptic curve cryptography. No one will be able to access your funds unless you let them. To further strengthen the security, we allow our customers to setup escrow and multi-signature schemes.
- **Fast**: In contrast to other decentralized networks, the Graphene DEX allows for real-time trading and is only limited by the speed of light and the size of the planet.
- **Provable Order Matching Algorithm**: What makes the Graphene DEX unique is the provable order matching algorithm. Given a set of orders, you will always be able to provably verify that these orders have been matched properly.
- **Collateralized Smartcoins**: One of the biggest features of Graphene are its *smartcoins* such as gpUSD, gpEUR, gpCNY, and others. For the sake of convenience, these assets are denotes simply as USD, EUR, CNY, etc. in the wallet. These digital tokens represent the same value as their underlaying physical asset. Hence 1 USD in this wallet is worth $1 and can be redeemed as such. Any of these tokens is backed by Graphene' company shares (GPH) being locked up as collateral and being available for settlement at its current price.

10.1 Trading

This page will give a very quick introduction on how to interpret the terms used by the DEX and how trading pairs are presented.

Table of Contents

- *Pairs*
- *Market Overview*
- *Market*
- *Order Books*
- *Trading*
- *Order Matching*
- *Playing Orders*
- *Fees*

10.1.1 Pairs

In Graphene, almost any asset can be traded with all other assets. Once we have picked two assets, we usually refer to a *market pair*. For instance, we can trade USD against EUR in the USD:EUR pair.

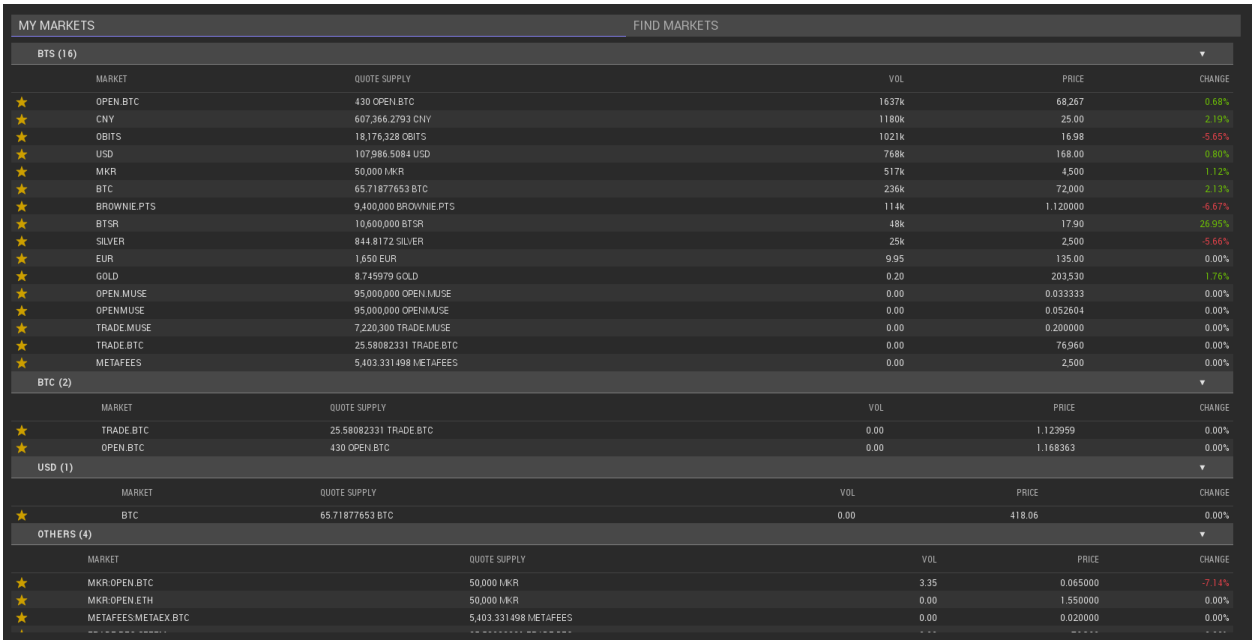
For sake of consistency, we will use the generalized terms *base* and *quote* such that pairs are represented as:

```
quote : base
```

and for instance with *base* being USD and *quote* being EUR, denote the EUR:USD pair.

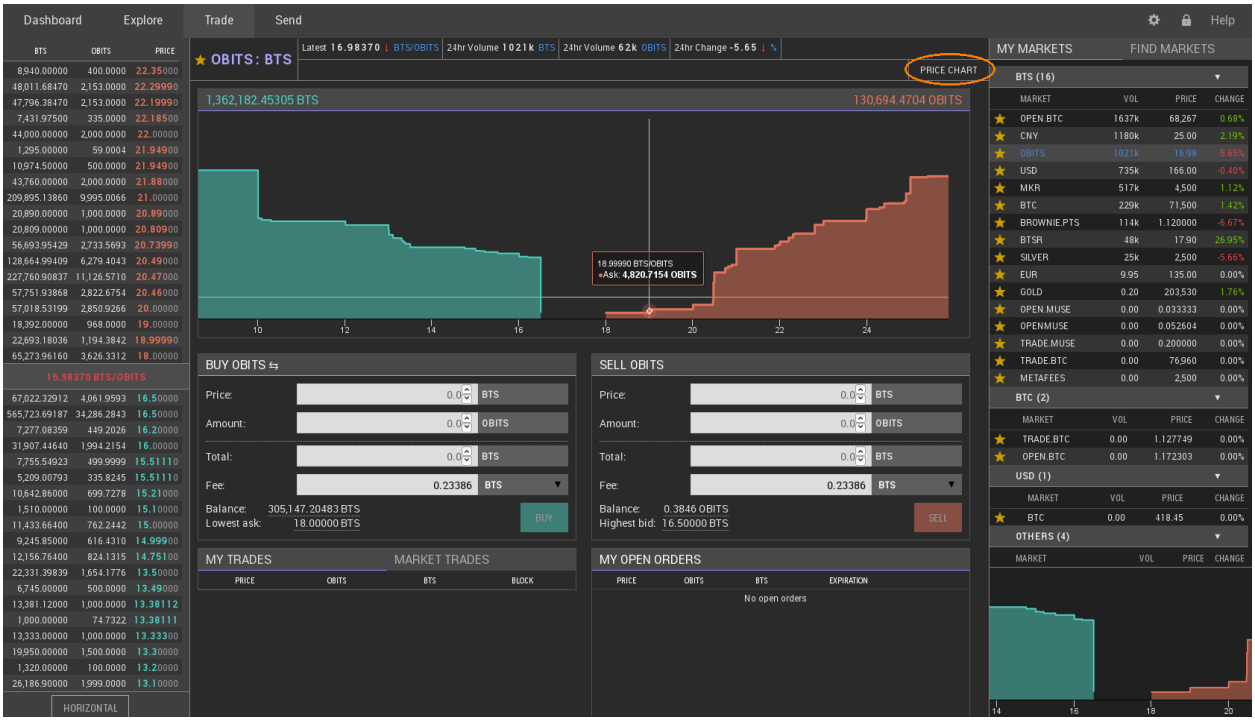
10.1.2 Market Overview

The market overview that can be access via the explorer, shows a set of predefined default markets. Note that the list of default markets may vary depending on the wallet provider. Further markets can be added using the *Find Markets* tab. Adding a *Star* to your favorite markets will make it appear in your list of default markets.

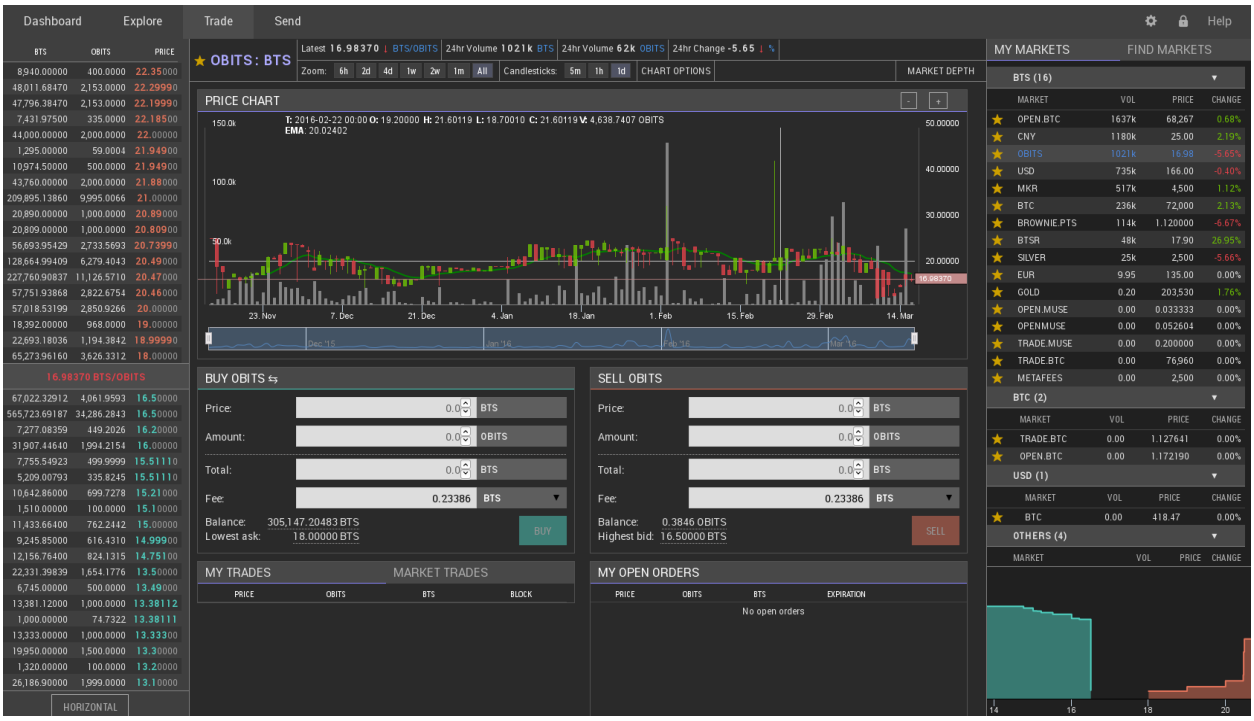


10.1.3 Market

When entering a market, you will presented with either the market depth



. . . or the price chart depending on your settings.



You can switch between your views by pressing the corresponding button as highlighted below.

10.1.4 Order Books

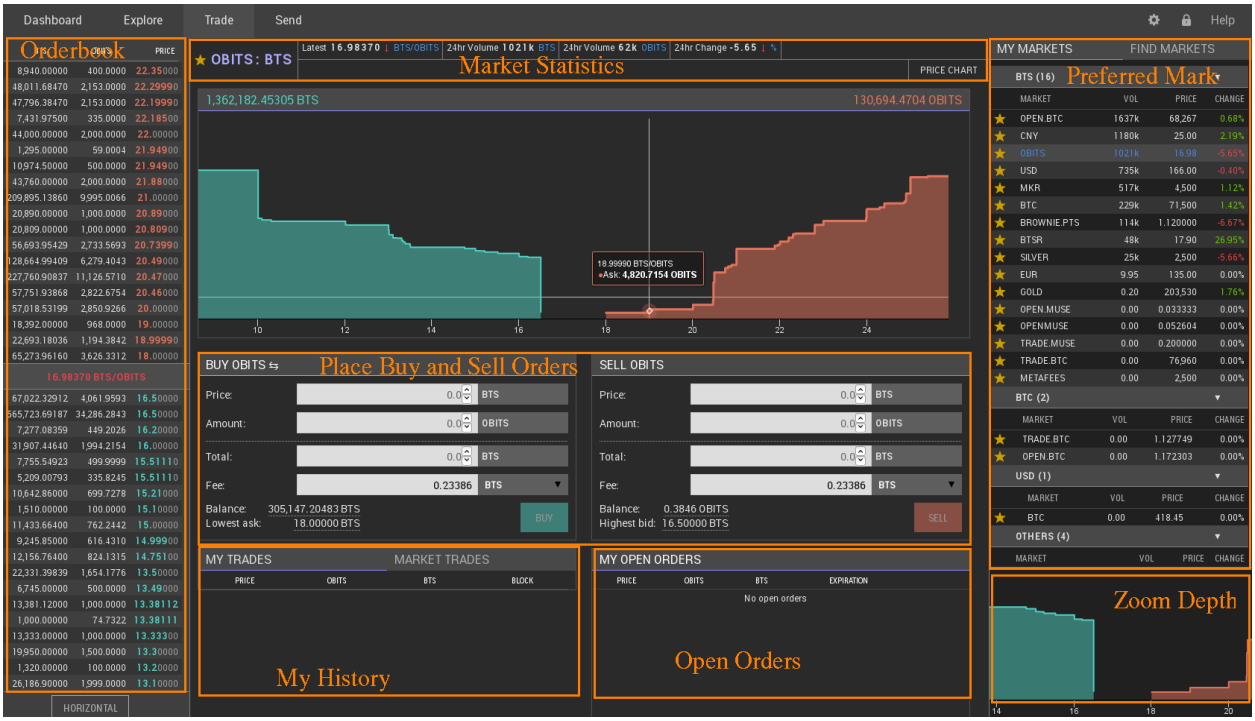
The order book consists of an *ask* and a *bid* side. Since trading pairs do not have a preferred orientation, and can be flipped, the following table shall give an overview of ask/bid and the corresponding buy/sell operations for each side:

Side	Sell	Buy
Ask	*quote*	*base*
Bid	*base*	*quote*

Obviously, what is on the bid side of the USD:EUR pair will be on the ask side on the EUR:USD pair. Of course prices are internally represented as fractions, and thus results in both pairs being identical.

10.1.5 Trading

To place a trading order, it is required to fill the form on either the *ask* or the *bid* side (respectively, *buy* or *sell* side). You will need to define a *price* and an *amount* to sell/buy. The cost for this order will be calculated automatically. Note that there will be an additional fee required to actually place the order.



Once the order is filled (i.e. someone sold/bought your offer), your account will be credited by the corresponding asset.

Unfilled orders can be canceled at any time.

10.1.6 Order Matching

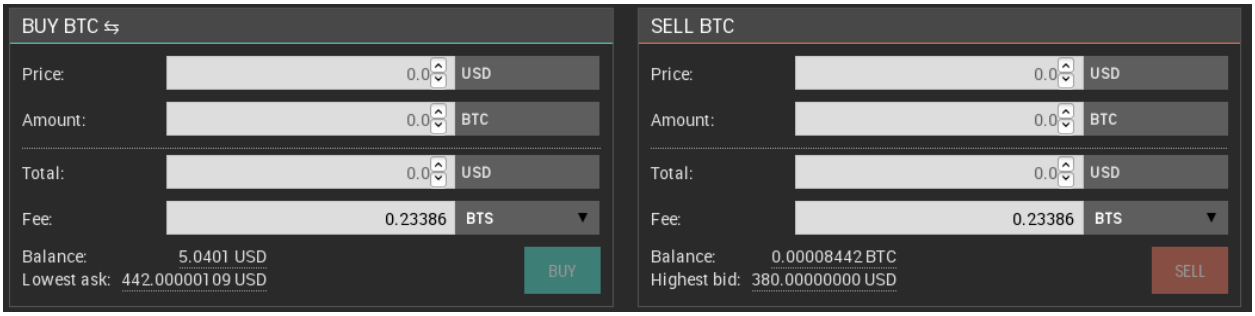
Graphene matches orders on a first-come, first-serve basis and gives the buyer the best price possible up to the limit (also known as "walking the book"). Rather than charging *unpredictable fees* from market overlap (as has been in the previous network), the network charges a defined fee based upon the size of the order matched and the assets involved. Each asset issuer gets an opportunity to configure their fees.

The decentralized exchange (DEX) of Graphene has a similar look&feel as traditional centralized exchanges. However, trading in the DEX can have many different appearances, depending on what user-interface is used. We here describe the user interface of the official wallet.

10.1.7 Playing Orders

Orders can be placed in the same way as everywhere else, by providing

- the amount to buy/sell
- the price at which to buy/sell



10.1.8 Fees

In contrast to other exchanges, Graphene asks for a tiny **flat fee** for placing an order. This fee can be payed in USD, BTC, or GOLD and is independent of the actual assets that are traded.

If you cancel an order that has not been fully or partially filled, 90% of the fee will be payed back to your account. However, this chargeback will be in `GPH` and not in the asset you have originally paid the fee in.

10.2 Short Selling gpAssets

In order to increase your exposure to GPH and offer liquidity to gpAssets, such as USD, EUR, GOLD, etc., you can go *borrow* this gpAsset from the network and *sell it short*. We will here briefly describe the procedure.

Table of Contents

- *Borrowing*
- *Margin Call*
- *Settlement*
- *Selling*
- *Updating Collateral Ratio*
- *Covering*

- *Discussion*

10.2.1 Borrowing

The Graphene network is capable of issuing any amount of any gpAsset and lend it out to participants given enough collateral.

- **settlement price**: The price for 1 GPH as it is traded on external exchanges.
- **maintenance collateral ratio** (MCR): A ratio defined by the witnesses as minimum required collateral ratio
- **maximum short squeeze ratio** (MSQR): A ratio defined by the witnesses as to how far shorts are protected against short squeezes
- **short squeeze protection** (SQP): Defines the most that a margin position will ever be forced to pay to cover
- **call price** (CP): The price at which short/borrow positions are margin called

10.2.2 Margin Call

The Graphene network is capable of margin calling those positions that do not have enough collateral to back their borrowed gpAssets. A margin call will occur any time the highest bid is less than the *call price* and greater than *SQP*. The margin position will be forced to sell its collateral anytime the highest offer to buy the collateral is less than the call price (x/GPH).:

```
SQP        = settlement price / MSQR
call price = DEBT / COLLATERAL * MCR
```

The margin call will take the collateral, buy shares of borrowed gpAsset at market rates up to the SQP and close the position. The remaining GPH of the collateral are returned to the customer.

Read more about the margin call mechanics before trading.

10.2.3 Settlement

Holders of any gpAsset can request a settlement at a *fair price* at any time. The settlement closes the borrow/short positions with lowest collateral ratio and sells the collateral for the settlement.

Note, that there is a maximum daily settlement volume (currently 2%) defined by the committee to prevent exploitation via external price movements.

10.2.4 Selling

After burrowing gpAssets, they can be sold free at any of the corresponding markets at any price a buyer is willing to pay. With this step, the short-selling is now complete and you are short that particular gpAsset.

10.2.5 Updating Collateral Ratio

At any time, the holder of a borrow/short position can modify the collateral ratio in order to flexibly adjust to market behavior. If the collateral ratio is increase, an additional amount of GPH is locked as collateral, while reducing the collateral ratio will require an amount of the corresponding gpAsset to be payed back to the network.

10.2.6 Covering

To close a borrow/short position, one must hold the borrowed amount of that particular gpAsset to hand it over to the Graphene network. After that, the gpAssets are reduced from the corresponding supply and the collateral is released and given back to its owner.

10.2.7 Discussion

Shorts can pick their place in line for settlement. Think of it this way, if you fall in the bottom 2% of shorters by collateral you have been given notice of potential margin call since only 2% can be settled, daily. This is like any other market where they give you 24 hours to add collateral. If someone is short and doesn't want to meet the new higher collateral limits then they can either cover on their own terms or add collateral.

By giving 24 hours shorts have an opportunity to cover prior to any price manipulation by big players.

If there is a 10% premium on gpUSD relative to the feed, then the attacker would have to increase reported price feed (value of GPH) by 10% just to get the force-settlement price to equal the previously fair value for gpUSD. They would have to push beyond 10% before the short starts taking a loss relative to a voluntary cover. All savvy market participants would be aware of a large force-settle order and would therefore reset the manipulator making it much harder to manipulate the price. In effect, price manipulation represents "free money" to those who know it is going on.

Look at it another way, someone enters a large force-settlement order it becomes an opportunity for the shorter to do reverse manipulation. It is a tug of war where both sides (short and long) have equal opportunity to manipulate the market in their favor. They go to battle and the result is just the fair market price at that point in time. It is not a guaranteed win for the potential manipulator.

10.3 Margin call mechanics

The mechanics of a margin call in Graphene are currently poorly understood, so I'd like to try to clarify a little by using examples from the `USD:GPH` market. I think part of the current confusion lies in people talking about the same market but using different market directions, ie. `USD:GPH` or `GPH:USD`, so terms like above/below don't mean the same thing to different people. I will only use USD in these examples, but USD can be replaced by any gp asset in this context. I prefer to use the `USD:GPH` market direction, so these examples will have prices in GPH/USD.

Table of Contents

- *What is a margin call?*
- *How is the call price calculated?*
- *How is the collateral ratio (CR) calculated?*
- *Execution Conditions*
  - *When will a margin call happen?*
    - *** SQPR of `1.1` ***
    - *** SQPR of `1.5` ***
  - *Discussion*
  - *At what price will the margin call execute?*
- *Margin calls only execute in the range [Call Price - SQPP]*

10.3.1 What is a margin call?

A margin call is the market forcing you to sell your collateral in order to buy enough USD to close your position. In the USD:GPH market a margin call is equivalent to a bid: it is an order to buy USD for GPH.

A margin call will happen because the price has increased to the point where your collateral is insufficient with respect to the current collateral requirements of the Graphene market rules. The required collateral is a tuneable parameter in Graphene, set by the maintenance collateral ratio (MCR) which is maintained by the feed producers (i.e., the witnesses).

10.3.2 How is the call price calculated?

As mentioned above the call price of a margin position depends on the MCR and the amount of debt and collateral in your position. It is independent of the price feed (settlement price). As an example, say you have opened the following position:

- Debt: `10 USD`
- Collateral: `10000 GPH`
- MCR is `1.75`

The call price of your position is `10000 GPH / (10 * 1.75 USD) = 571.429 GPH/USD`.

10.3.3 How is the collateral ratio (CR) calculated?

The collateral ratio depends on the feed price (settlement price). Taking a feed price of `300 GPH/USD` and building on the above example with `10 USD` debt and `10000 GPH` collateral:

- CR: `(10000 GPH / 300 GPH/USD) / 10 USD = 3.33`

10.3.4 Execution Conditions

When will a margin call happen?

This is where it gets complicated. Margin Call are only possible if the feed price is below your call price. A margin call will happen whenever the squeeze protection price goes above the call price of your position. To better understand how this works, let's go back to our margin position and look at collateral ratios:

Say we have the following:

- Debt: `10 USD`
- Settlement price: `300 GPH/USD`
- CR: `1`
- Collateral is therefore `3000 GPH`

This is also known as the Black Swan level, and we want to perform a margin call before the collateral ratio goes this low. This is why we have the Maintenance Collateral Ratio (MCR), to enforce a buffer zone before a position goes into Black Swan territory. So if we apply the MCR of `1.75` to this position:

- Debt: `10 USD`
- Settlement Price: `300 GPH/USD`
- CR: `1.75`
- Collateral is therefore `3000 GPH * 1.75 = 5250 GPH`

This is much safer, there is a gp of margin for the position to be closed before going into Black Swan levels. Since in our example, the USD **requires** `1.75` ratio, the call price of this position is now exactly equal to the feed price of `300 GPH/USD`.

- Call price: `5250 / (10 * 1.75) = 300 GPH/USD`

The remaining question then is, at what point should we force the position to attempt to close itself? This is where the SQPR comes in. Let's look at two scenarios, SQPR of `1.1` and SQPR of `1.5`:

** SQPR of `1.1` **

- Settlement price: `300 GPH/USD`
- SQPR: `1.1`
- Squeeze Protection Price (SQPP): `330 GPH/USD`

In this case, any margin position that has a call price below `330 GPH/USD` will be forced to settle, and therefore be added to the orderbook as an order to buy USD for GPH.

** SQPR of `1.5` **

- Settlement price: `300 GPH/USD`
- SQPR: `1.5`
- Squeeze Protection Price (SQPP): `450 GPH/USD`

In this case, any margin position that has a call price below `450 GPH/USD` will be forced to settle, and therefore be added to the orderbook as an order to buy USD for GPH.

Discussion

Another way of looking at this is by looking at the Collateral Ratio of the position. If we want to stay at or above the squeeze protection price, what is the required collateral ratio? Let's do the math:

- Settlement Price: `300 GPH/USD`
- MCR: `1.75`
- SQPR: `1.1`
- Debt: `10 USD`
- Call price: `CP = SQPP = 300 * 1.1 = 330 GPH/USD`
- Collateral = `(10 USD * 1.75) * 330 GPH/USD = 5775 GPH`

The collateral ratio of this position is `(5775 GPH / 300 GPH/USD) / 10 USD = 1.925`.

This is equivalent to the MCR

- SQPR: `1.75 * 1.1 = 1.925`.

In other words, in order to stay **safe** and not be margin called, the margin position must maintain a collateral ratio higher than `MCR * SQPR`.

- **Safe position**: `CR > MCR * SQPR`

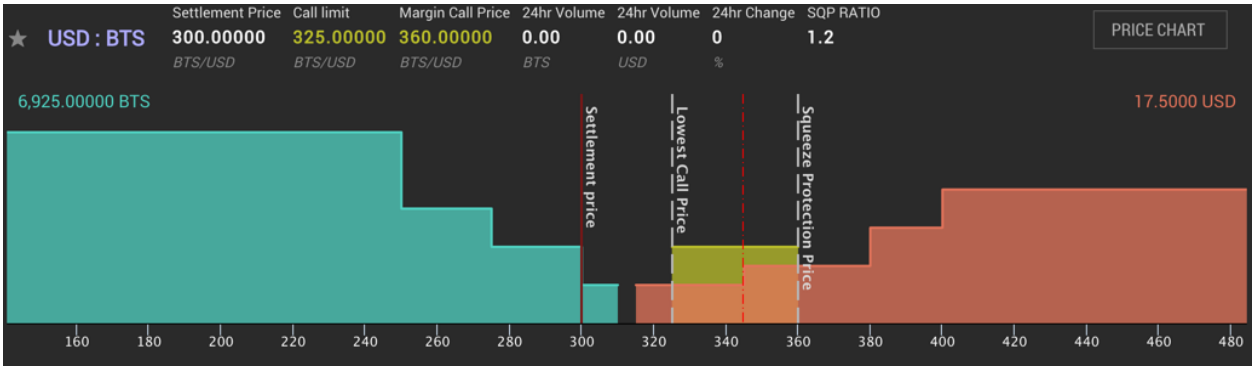
At what price will the margin call execute?

This is the part I believe is most misunderstood, so I will use some screenshots of a fictional `USD:GPH` market to explain. We will use the following parameters:

- SQPR: `1.2`
- MCR: `1.75`
- SQPR * MCR: `2.1`
- Settlement price: `300 GPH/USD`
- Squeeze protection price: `300 * 1.2 = 360 GPH/USD`
- Debt: `10 USD`
- Collateral: `5687.5`
- CR: `1.896`
- Call price: `325 GPH/USD`

From what we've seen above, it's clear that this position should be margin called: it has a CR of `1.896` which is well below the safe ratio of 2.1.

It will therefore get added to the order book as a bid to buy USD like this:



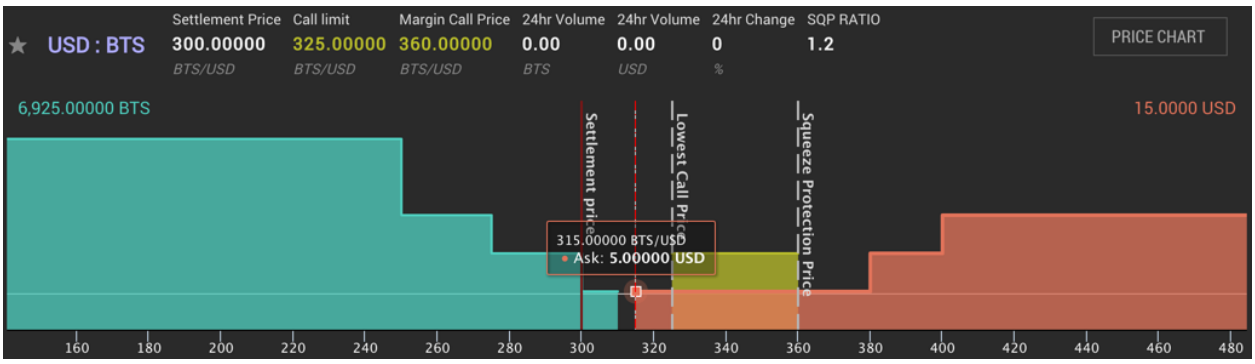
The margin called order will buy any USD priced in the range `325-360 GPH/USD`. The squeeze protection price acts as a price ceiling, meaning the forced margin order will not execute at a very high price in an illiquid market: it is protected from high prices by the SQPR.

10.3.5 Margin calls only execute in the range [Call Price - SQPP]

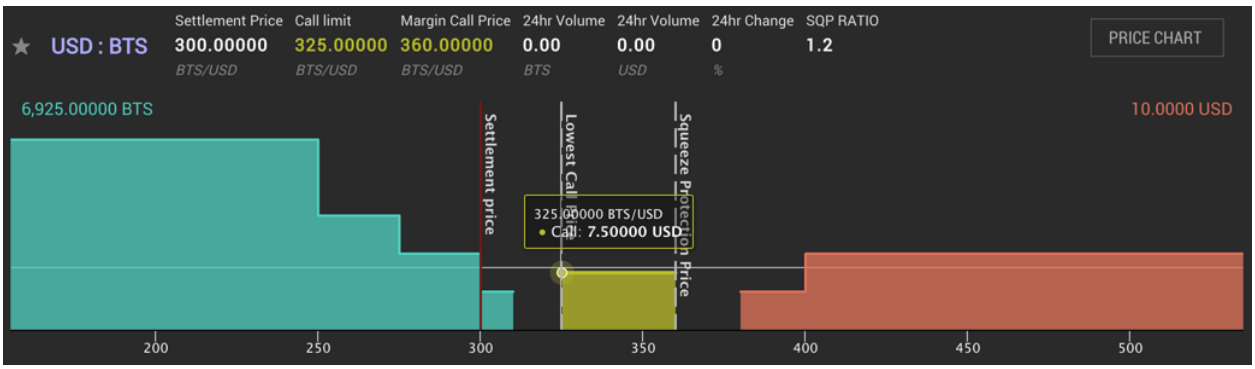
A margin call will occur any time the lowest ask is higher than the call price and lower than the SQPP. This has several consequences, as we will see below. It can create some very strange situations, and also force the margin called orders to "buy high".

Consequence #1: Asks below the call price prevent margin calls from executing

Because margin calls only execute in the range Call Price - SQPP, if there is a sell order for `5 USD` at `315 GPH/USD` in this market, the call order will not use it, which makes the market look like this:

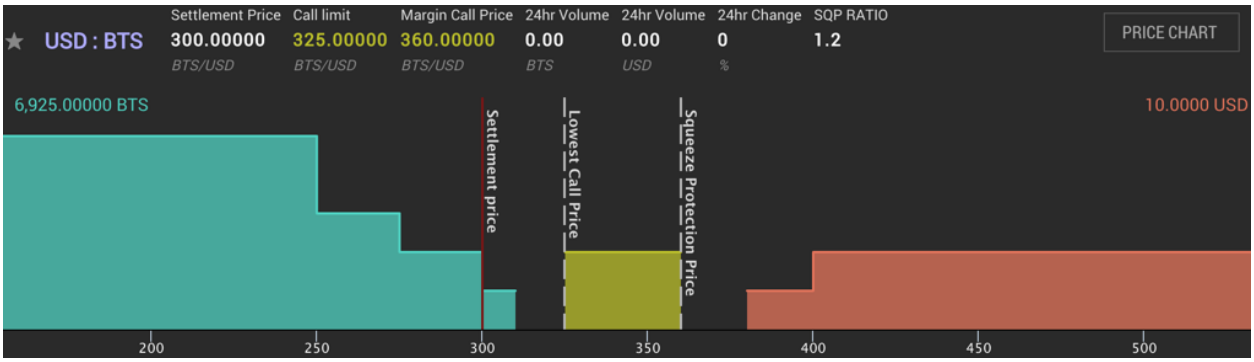


If a second sell order of `2.5 USD` were added at `345 GPH/USD`, the margin called order would still not buy any USD because of the "blocking" sell order at `315 GPH/USD`:



If the order at `315 GPH/USD` were to be removed, either from being canceled or from being filled, the order at `345`

`GPH/USD` would instantly get filled by the margin called order, and the margin called position would have a reduced debt of `10 - 2.5 = 7.5 USD`:



Consequence #2: Margin calls cannot "buy cheap" As we've seen above, unless the settlement price goes above the call price of the position, forced margin calls always buy at a premium relative to the settlement price. Even if there are sell orders available at or near the feed price, the margin called orders will not be matched with those sell orders if their call price is higher than the price of those sell orders.

CHAPTER

ELEVEN

GRAPHENE ACCOUNTS

In Graphene, you can create an account relatively easily by using the Graphene UI wallet. The account comes with the Private/public keys. You should keep the information safe. Also, Graphene account gives you some benefits (i.e., Lifetime Membership (LTM) and Referral Program) and important roles (i.e., voting). We recommend you to read through Graphene Accounts information to learn more.

11.1 Referral Program

The purpose of the referral program is to incentivize people to bring in more people. It compares to a Multi-Level-Marketing (MLM) scheme with the difference of having only **1 level** where referred individuals can opt-out by upgrading their account to a Life-Time Member (LTM). Every lifetime member can get a cut of the fees based on child accounts linked to ours via referral.

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- *Referral Program*
  - *Participation*
  - *How can I do?*
  - *Fee Division*
    - *Fee status*
  - *Claiming Referral Bonus and Cashback*

11.1.1 Participation

Every Graphene Holder can become a Lifetime Member and participate in the Referral Program. In this program:

Basic Accounts are free, but do not qualify for the referral program, nor any cash back on transaction fees.

Lifetime Members pay an upgrade fee and earn **80% cash back on every fee they pay**. They also qualify for **80% cashback of the fees paid by Basic Accounts they refer** to the network. These 80% can be split among the registrar, that actually registers the accounts, and an affiliate referrer, that brought in the new user.

The referral fees are controlled by the blockchain and are distributed like this:

- 20% go to the network
- 80% go to the referral program
  - of this 80%, x% go to the registrar
  - of this 80%, 100%-x% go to the affiliate referrer

11.1.2 How can I do?

If you want to participate in the referral program, you need to have a life-time member account, first! Then you can bring in new users by

- (1)- running your own faucet and actually register new accounts (will give you 80% of all the fees of those minus a fraction that you decide to give to affiliates (the referrers)
- (2)- referring people to a hosted wallet that offers you a cut of the fees as an affiliate.

The case below, most hosted wallets add your account as affiliate if you provide the following link structure to people

```
https://<url>/?r=<your-account>
```

with `<your-account>` being the name of your Graphene Lite-Time Member account.

Note: If you want link to pages with in the wallet(e.g., a particular decentralized market), you need to have the `?r=` parameter **before** the `#`. Example : `https://<url>/?r=<your-account>#/market/USD_BTC`

- (3)- or sending your referral link to people you want to refer to Graphene, your referral link would be:

```
https://wallet.gph.ai/?r=<your-account-name>

(*You might want to use yow wallet address instead of "wallet.gph.ai"*)
```

Example:

When an Basic Account pays $100 to become a Lifetime Member, $50 is paid to their Referrer, $30 is paid to the nearest Lifetime Member, and $20 is paid to the Network. After this point the Lifetime Member becomes its own referrer and nearest Lifetime Member and its prior Referrers no longer get any revenue from this user.

11.1.3 Fee Division

Every time an account you referred pays a transaction fee, that fee is divided among several different accounts. The network takes a cut, and the Lifetime Member who referred the account gets a cut.

The **registrar** is the account that paid the transaction fee to register the account with the network. The registrar gets to decide how to divide the remaining fee between themselves and their affiliate.

Fee status

Pending Fees Fees paid are only divided among the network, referrers, and registrars once every maintenance interval.

Vesting Fees Most fees are made available immediately, but fees over the vesting threshold (such as those paid to upgrade your membership or register a premium account name) must vest for some period as defined by the committee.

To see your vesting balances, open the side menu and select **Vesting balance**. Vesting balances are recalculated hourly, so you might not yet see them right away.

11.1.4 Claiming Referral Bonus and Cashback

If you have a lifetime memb1er account and

- already paid some fees, or
- have referred people that paid some fees,

you can claim them in the "Vesting balances" of your account.

11.2 Vesting Balances

In Graphene, some balances are vesting over time.

Table of Contents

- *Vesting Balances*
  - *What is it?*
    - *Account income*
  - *Claiming A Vesting Balance*

11.2.1 What is it?

Vesting balances contain any fees earned through the referral program or from worker pay, for example. They have a certain vesting period and are continually unlocked during that vesting period until all of the balances are available.

Account income

We make even more use of this functionality in such that an account's income in form of

- worker pay,
- witness pay,
- the referral program, or
- cashback

is vesting over several days with different strategies.

For instance, a worker can define for how long he would like his pay to vest to encourage GPH Holders to vote for him due to no imminent additional sell pressure from the worker.

Strategies

1. **CCD / Coin Days Destroyed**

   The economic effect of this vesting policy is to require a certain amount of "interest" to accrue before the full balance may be withdrawn. Interest accrues as coindays (balance * length held). If some of the balance is withdrawn, the remaining balance must be held longer.

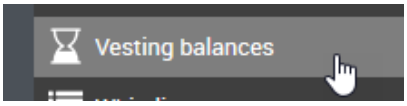
2. **Linear Vesting with Cliff**

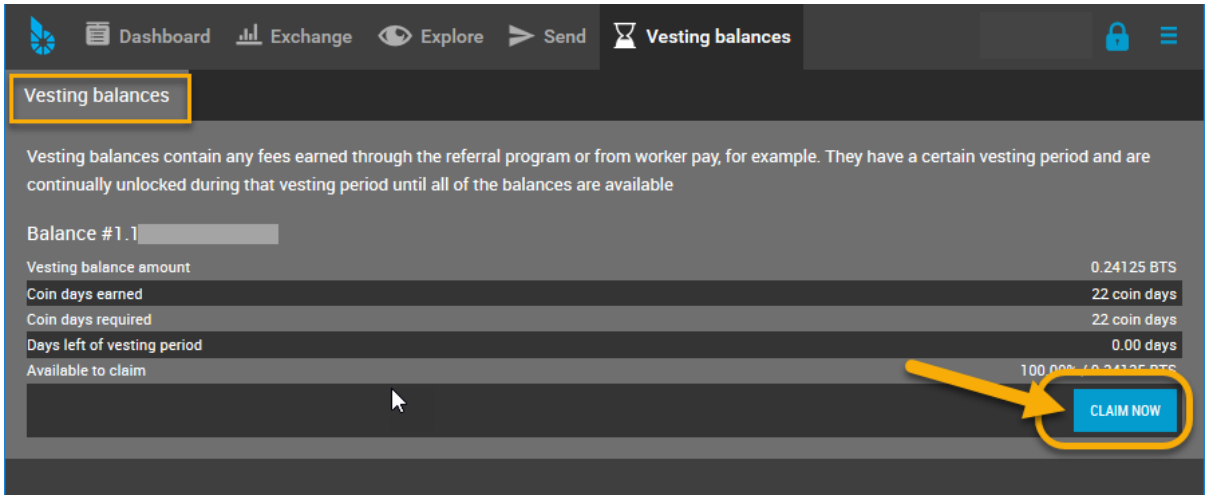
   This vesting balance type is used to mimic traditional stock vesting contracts where each day a certain amount vests until it is fully matured.

11.2.2 Claiming A Vesting Balance

You can claim vesting balances by using Graphene User interface. (You might need to wait certain days to claim.)

Open the side dropdown menu and select **[Vesting Balances]**





11.3 Voting

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- *Voting*
  - *Voting by using Graphene UI*
    - *Setting a proxy*
    - *Voting for Witness, Committee Member or Worker*

If you hold some GPH tokens, you are considered a GPH Holder of the Graphene business and thus have a say in where it should be heading in future. As a GPH Holder you can cast a vote for three different entities within the network:

Block producers Block producers bundle transactions into blocks and sign them with their signing key. These so called *witnesses* keep the blockchain alive by producing one block every few seconds and get paid by newly issued GPH shares similar to Bitcoin. Their second job is to produce reliable and accurate price feeds for the smartcoins.

Committee Members Committee Members *govern the blockchain and the business parameters*, and define the transaction fees.

Workers Workers are freelancers or businesses that provide a non-profitable service for the Graphene ecosystem. Essentially, they apply for a job in the ecosystem by providing actual work and get paid accordingly (if the GPH Holders approve).

Since voting might be a too time-consuming task for many GPH Holders, Graphene offers them a way to committee their voting power to so called **proxies**. The sole purpose of proxies is to follow the ecosystem and be vote according

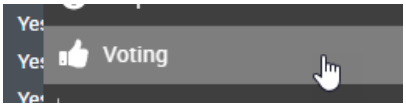
to their *followers*. This is similar to many political votes where citizens vote for representatives which vote on their behalf.

Voting itself is **very simple** with the User interface and requires only a few clicks.

11.3.1 Voting by using Graphene UI

You can cast your vote or set your proxy by Graphene User interface.

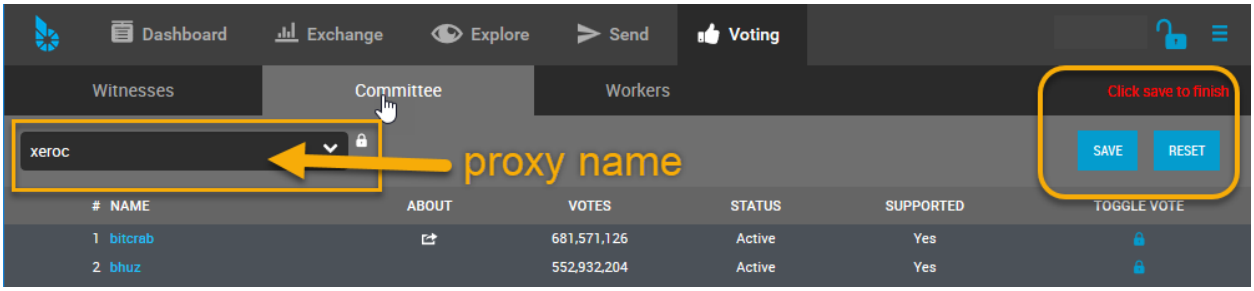
Open the side dropdown menu and select **[Voting]**



Setting a proxy

The picture below shows how to set your trusted proxy:

1. Type a proxy name
2. Click [SAVE]
3. Login to a wallet if you have not logged in
4. Confirm the Transaction



Voting for Witness, Committee Member or Worker

If you have not set a proxy, you can cast your own vote for witnesses, committee members or workers.

1. Select a Witnesses, Committee, or Workers tab
2. Click and check **TOGGLE VOTE**
3. Click [SAVE]
4. Login to a wallet if you have not logged in
5. (vote for each entity)

CHAPTER

TWELVE

CREATE A GRAPHENE WALLET

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- *Create a Graphene Wallet*
  - *Terminology*
  - *Light wallet or Web wallet?*
  - *Create an Account*
    - *Steps*
  - *Login*
    - *Cloud Wallet Login form*
  - *Advanced: Create an Account*
    - *Steps*
  - *Graphene Wallet Features*
    - *Quick Review Wallet Options*
      - *Dashboard*
      - *Side Menus - Dropdown items*

12.1 Terminology

In this section, we want to describe Terminologies and guide you to create and register your Graphene Account.

Wallet

Wallets interacts with the blockchain to process accounts and funds functionalities. Users register to create a single wallet. The single wallet can carry many accounts. Users who have a lifetime membership (LTM) can register multiple accounts in parallel; all of them are stored in a single wallet. Also, users can create multiple wallets to organize their accounts properly.

Accounts

In Graphene, you can create own **unique account name**, so, you can remember easily. And you will use the account name to communicate (e.g. Send fund) with other Graphene account users (GPH Holders) like an email address. The advantage of using account name is that people can identify you by using a readable and memorable word instead of cryptographic addresses.

Each user has at least one account that can be used to interact with the blockchain. The account can be seen as a single banking account with an individual balance, transaction history, etc. Since these accounts are registered on the blockchain and are open to the public, we recommend to pick a pseudonym to achieve some privacy.

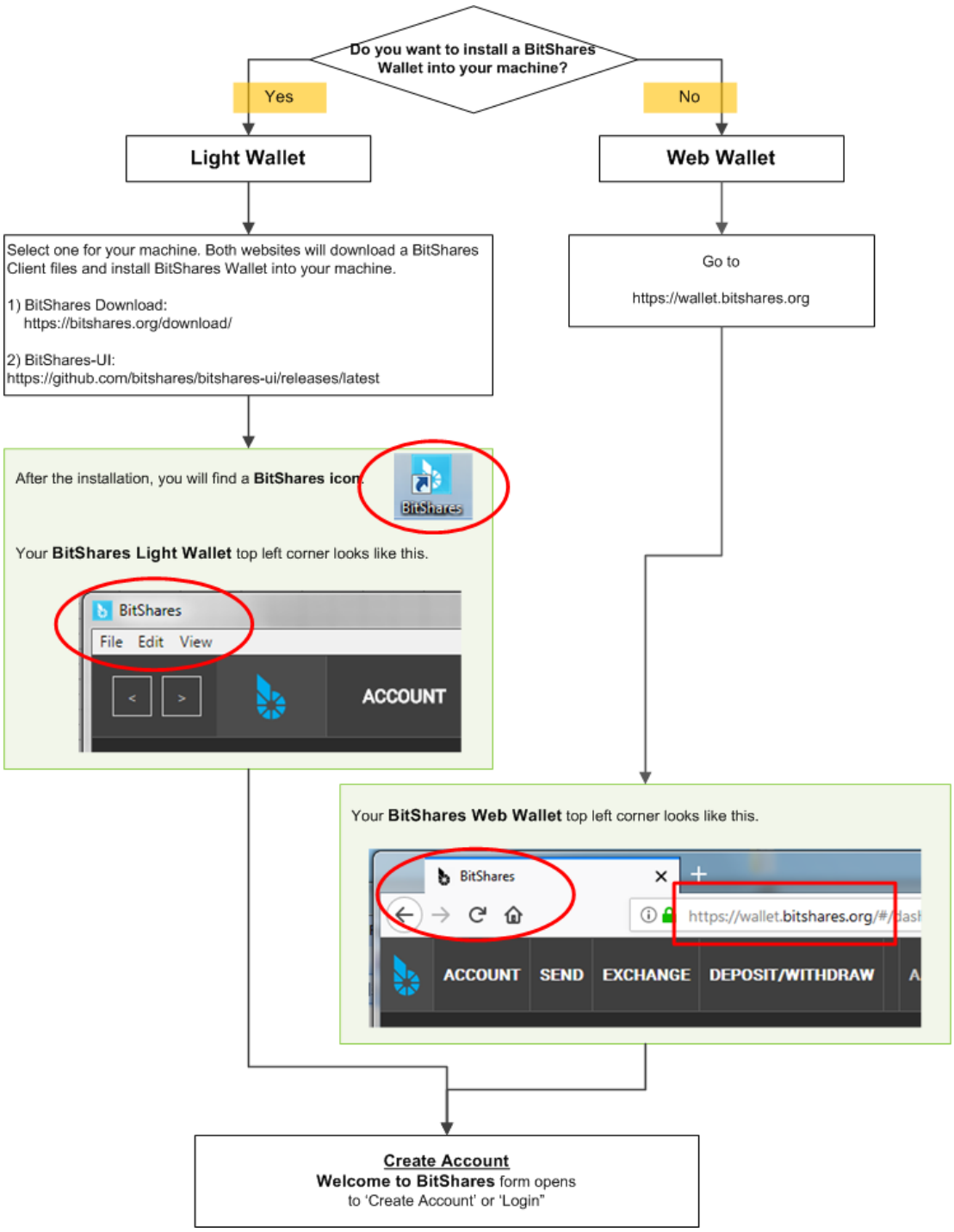
Keys

Keys refer to the cryptography used to secure access to your account and funds. It is of importance to prevent others from gaining access to these keys.

Graphene has *owner, active and memo keys*. And each key has *public key and private key*. It's important to know that Owner permission has administrative powers over the whole account. Active Permission is considered as an "online" permission that allows to access funds and some account settings.

12.2 Light wallet or Web wallet?

Before we create a wallet, let's check what type of wallet you can have as your Graphene wallet. Quick check the below chart.



Did you find out which type of wallet you want to have?

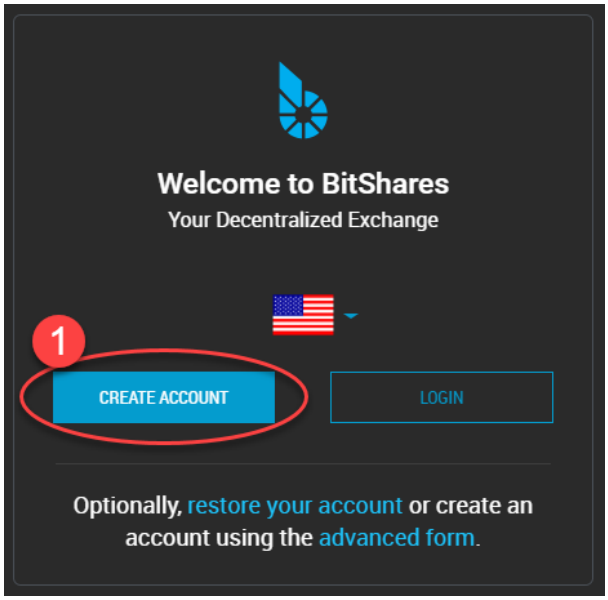
- **If you want to install Light Wallet (Graphene UI), download Graphene UI Releases file and install it to your machine.**
  - *This does not mean you will have a Local wallet.*
- If you want to use **Web Wallet**, go to this link (https://wallet.gph.ai).

12.3 Create an Account

In this section, you will create a **Cloud wallet**.

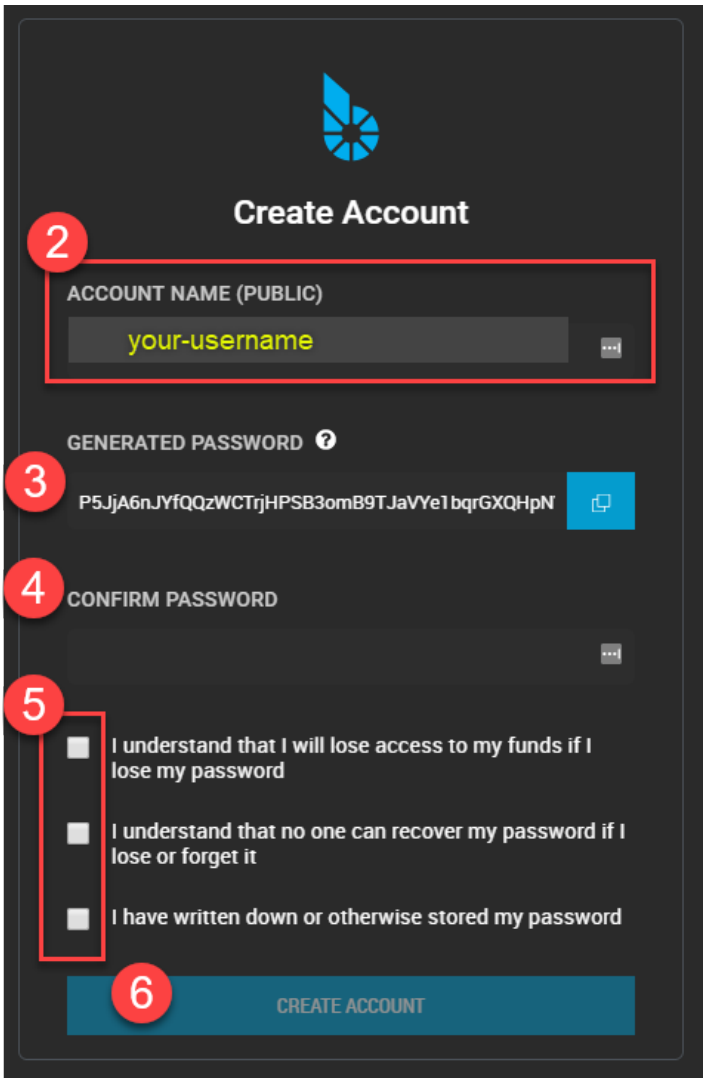
We use the term Cloud Wallet, but technically nothing is stored in the cloud. We call the Cloud Wallet because **you can use your credentials (username and password) from any web browser** at any time to gain access to your account.

Welcome Graphene - Create Account & Login form



12.3.1 Steps

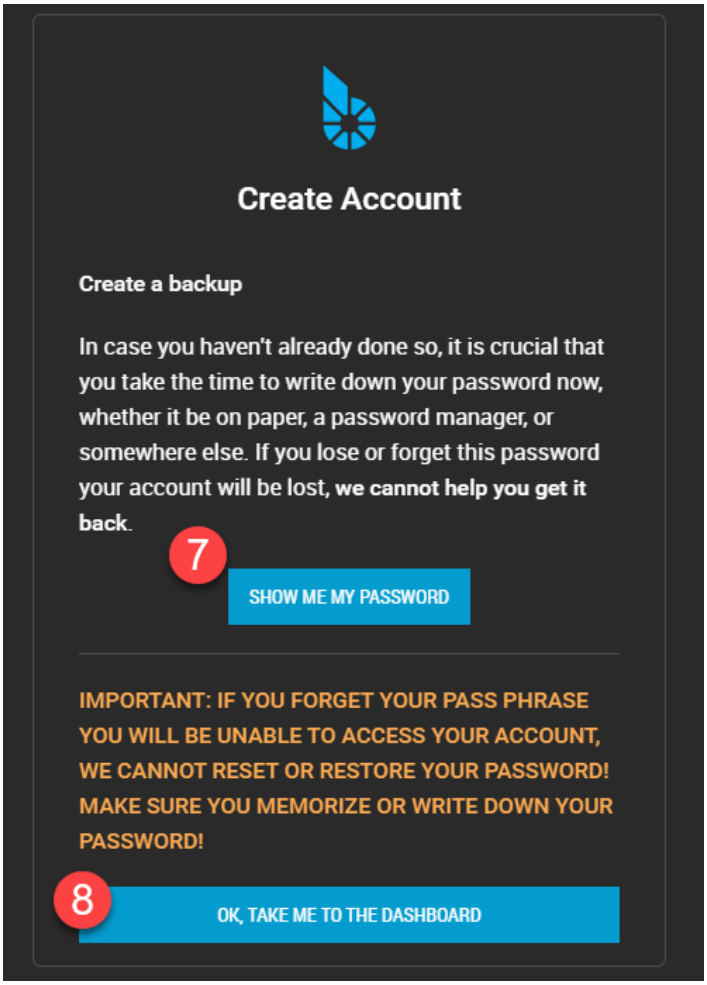
- 1.Click [**CREATE ACCOUNT**]
- 2.Type in [**ACCOUNT NAME**]. You can create your unique Graphene account name.
- 3.Set a password. Copy and use a **GENERATED PASSWORD**
- 4.Type or paste your password to confirm.
- 5.Check the check boxes. **Make sure you read before you check!**
- 6.Click [**CREATE ACCOUNT**]



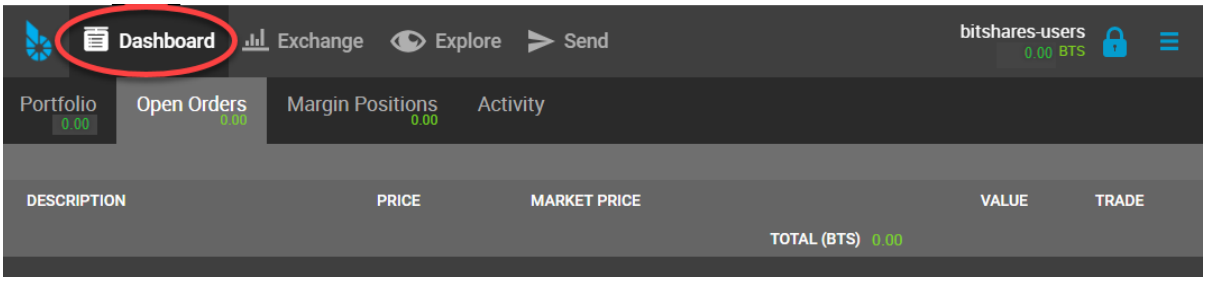
Before you submit, check your password one more time if you saved the correct one.

ONLY you can open your wallet again. No one can help. Do not lose it!

- 7.Click **[SHOW ME MY PASSWORD]** and double check if you have a correct password.
- 8.Click [**OK,TAKE ME TO THE DASHBOARD**]



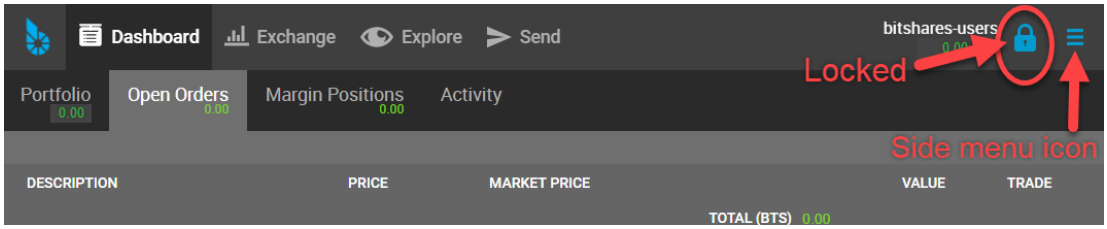
- Click the top menu [**Dashbord**] if it did not open.



Now, you have a Graphene **Cloud Wallet**. Before you fund to your account, let's login to make sure if you have a correct password.

12.4 Login

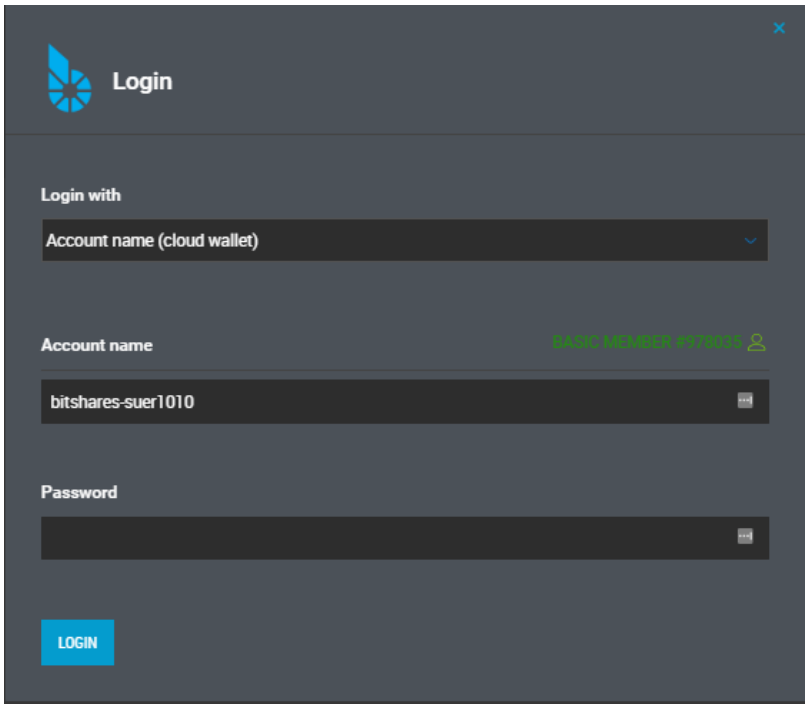
Click a **Locked Key** icon in the top right corner to open a login form.



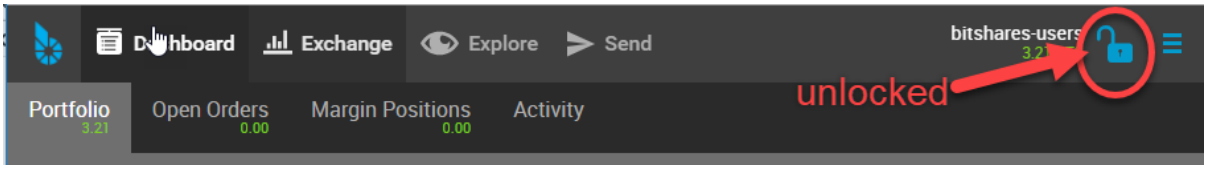
12.4.1 Cloud Wallet Login form

If you followed the above steps to create a Graphene account, you have a Cloud Wallet as a default wallet.

On the Login form, you can see which wallet Login form for. (i.e., Login with: Account name (cloud wallet))



If you logged in successfully, you would find a **Unlocked Key**.

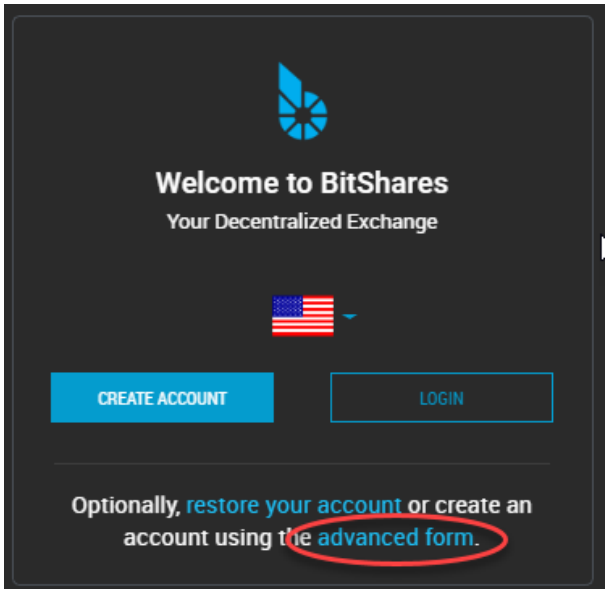


12.5 Advanced: Create an Account

In this section, you will create a **Local Wallet**.

If you have a Cloud Wallet, you can access your wallet from any browsers. However, the Local Wallet, you can only access your funds from **the same computer and web browser** that you have used to register and create your account.

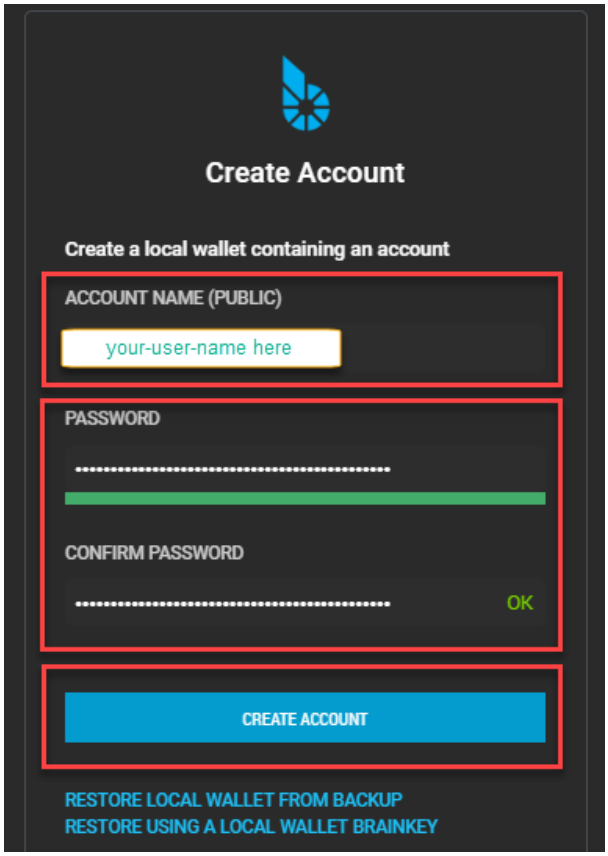
The Local wallet requires you to create **a backup file** to manage your account and funds. The backup file can be used to move



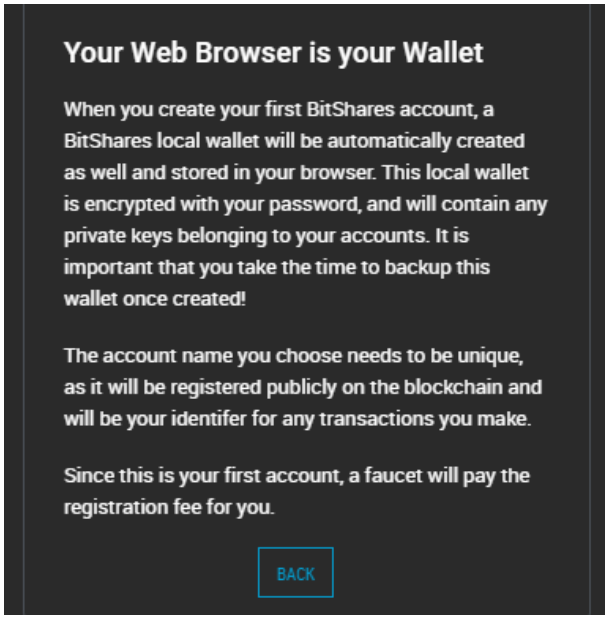
12.5.1 Steps

- 1.Click [**advanced form**]
- 2.Type in [**ACCOUNT NAME**]. You can create your unique Graphene account name.
- 3.Set a password. Create own strong password.
- 4.Type or paste your password to confirm.
- 5.Click [**CREATE ACCOUNT**]

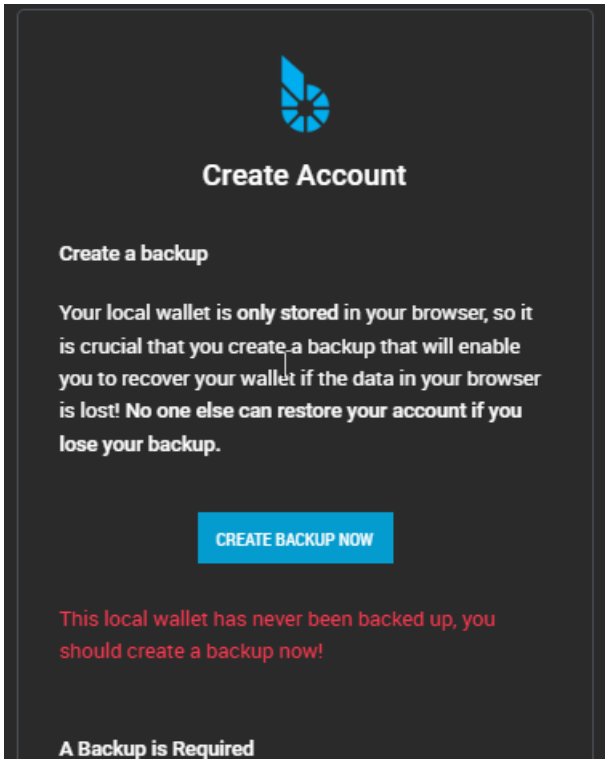
> If this is yore first account, a faucet will pay the registration fee for you!



> **Your Web Browser is your Wallet:** Please read the information below.

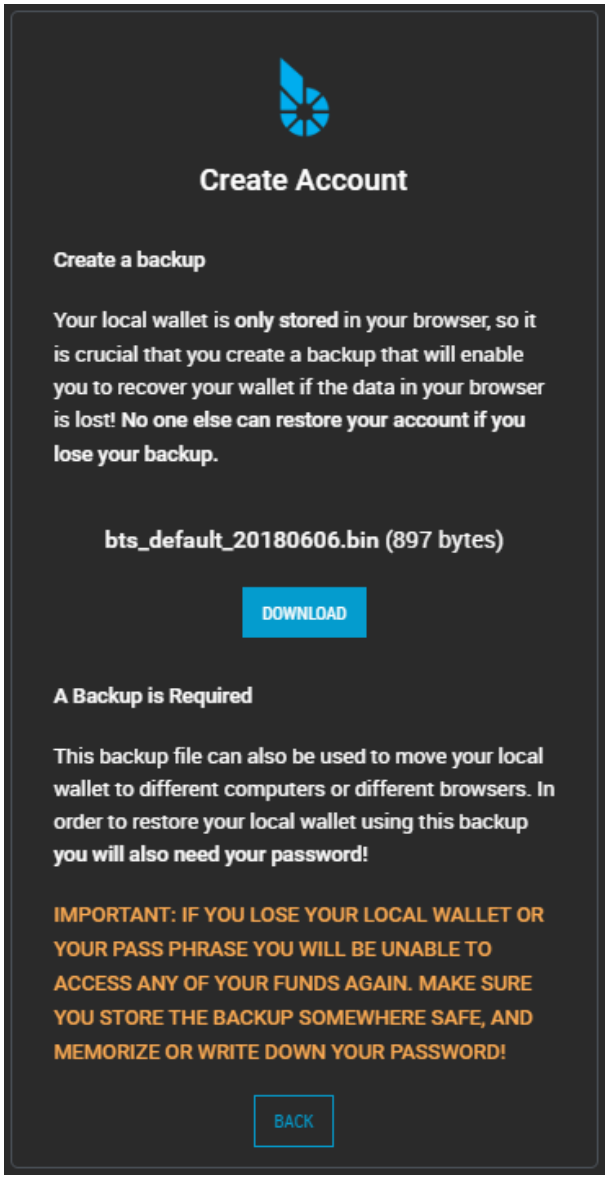


- Click [**CREATE BACKUP NOW**]

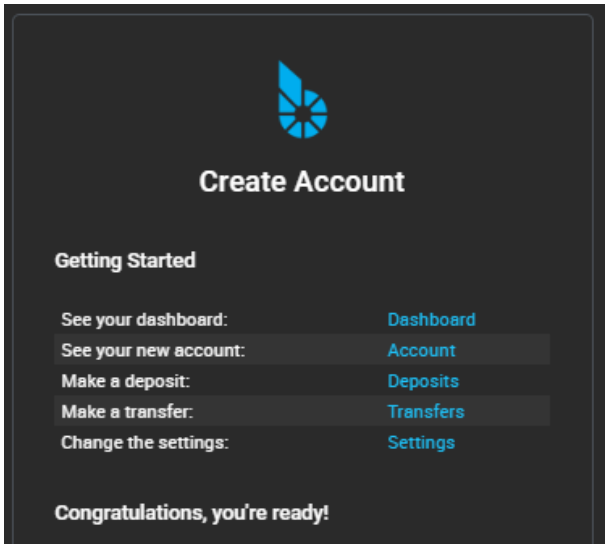


It's extremely important you to create a backup of your account and keep a safe place.

- Click [**DOWNLOAD**] to save a backup (.bin) file.

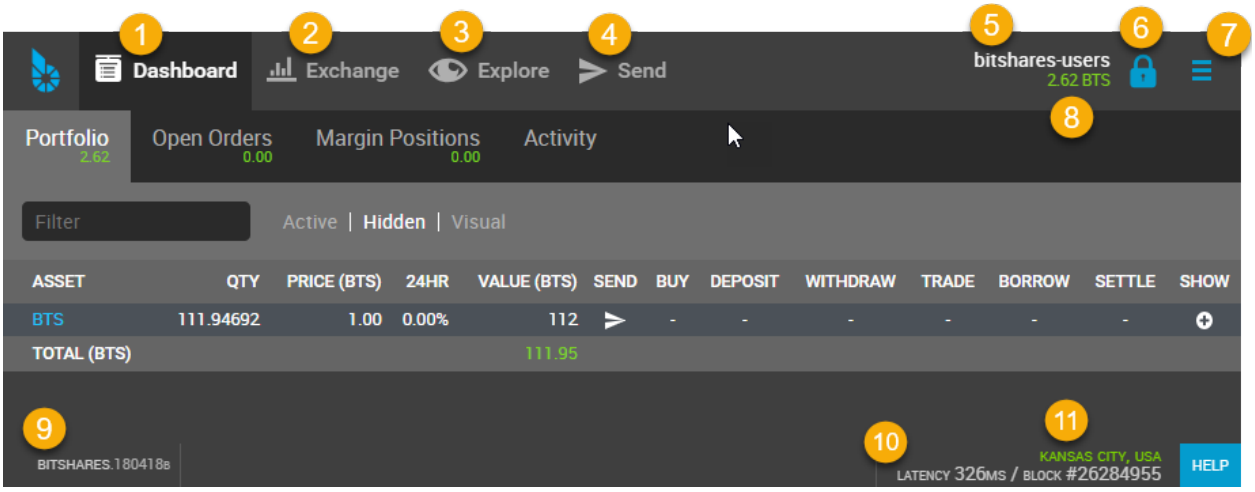


Congratulation, you're ready!



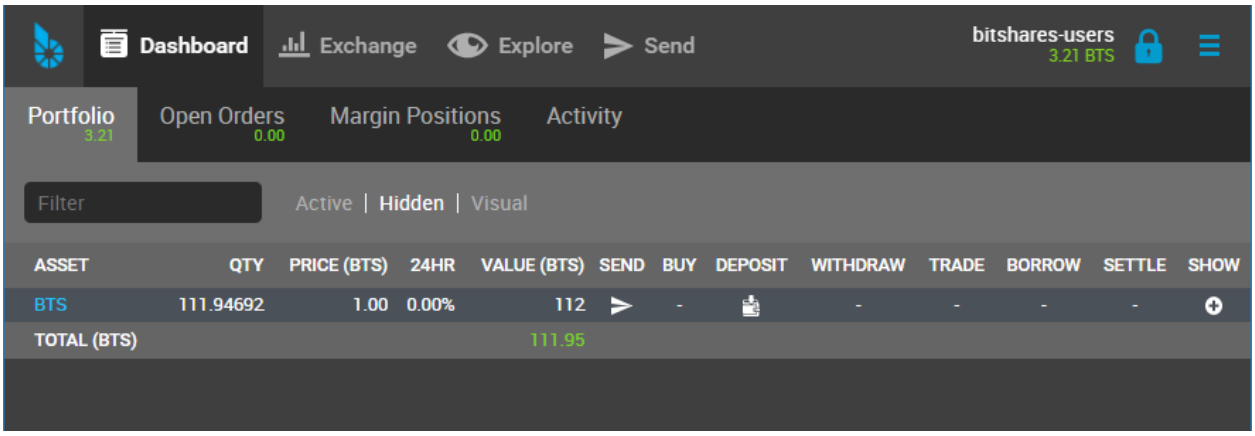
12.6 Graphene Wallet Features

12.6.1 Quick Review Wallet Options



	Item name	note
1	Dashboard	The Wallet Portfolio, Open Orders, Margin Positions, and Activity information
2	Exchange	Graphene Exchange, Trading information
3	Explore	Graphene Live Blockchain, Assets, Accounts, Witnesses members, Committee members, Markets, and Fee Schedule
4	Send	Opens a Send form. You can send funds to other Graphene Account Holders
5	A Graphene account name | A account name that the data shows on a Dashboard page	
6	Key icon	By click, opens a login form. Locked/Unlocked Key icon shows if you've logged in the account currently
7	Side Menu icon	Side Menu icon opens the wallet other menus in a dropdown list
8	Asset Total	Currently showing in a Dashboard Total Assets
9	Graphene Wallet Version | The Release Version of Graphene UI Wallet	
10	Latency	The delay of Network connection
11	Server Node name	A server node name that you are connecting

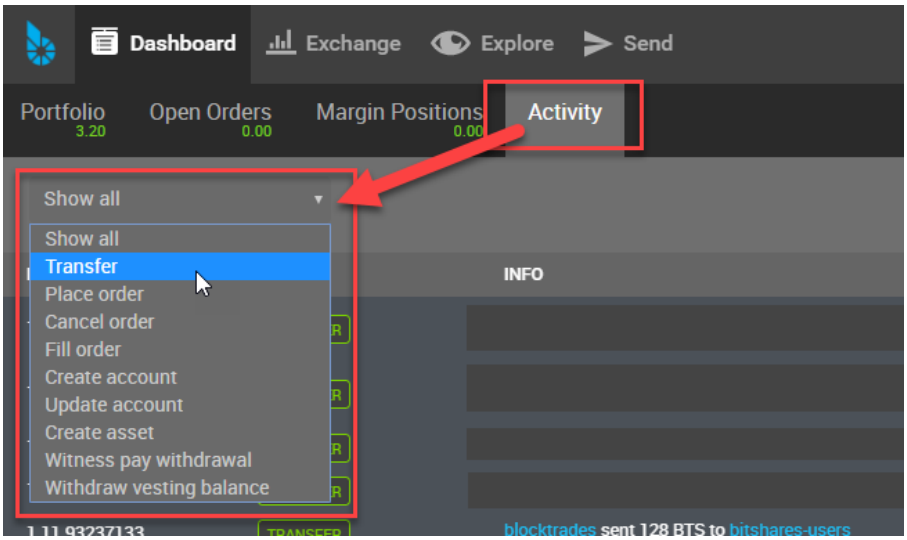
Dashboard



Dashboard Tabs

Tab name	note
Portfolio	Your Assets list. You can filter the assets and hide some assets if you don't need to watch.
Open Orders	
Margin Positions	
Activity	Show your all transactions. (i.e., The below shows a type of transactions to choose from.)

Activity - Filters


Dashboard
Exchange
Explore
Send
Portfolio
3.20
Open Orders
0.00
Margin Positions
0.00
Activity
Show all
Show all
Transfer
Place order
Cancel order
Fill order
Create account
Update account
Create asset
Witness pay withdrawal
Withdraw vesting balance
INFO
blocktrades sent 128 BTS to bitshares-users

Side Menus - Dropdown items

option	
login	By click, opens a login form.
Create Account	Users who have a lifetime membership (LTM) can register multiple accounts in parallel;
	all of them are stored in a single wallet
Send(legacy)	Transfer details (Original page). **Send** on the top menu is new form.
Deposit	Deposit funds from other parties (Original Deposit page)
Deposit(beta)	Select an asset you want to deposit and provide you a sending address, Gateway, identicon, and notes.
Withdraw	(Original Withdraw page)
Withdraw(beta)	Search an asset to withdraw
Settings	You can manage your wallet appearance and other settings.
	Settings - CLOUD Wallet Login Mode:
	• General • Accounts • Restore/Import • Nodes • Faucet • Reset settings
	Settings - LOCAL Wallet Login Mode:
	• General • Local Wallet • Accounts • Password • Backup • Restore/Import • Access • Faucet
News	Graphene Blockchain Foundation and other News
Help	Open a Help page
Voting	You can vote for Witnesses, Committee or Workers. Or you can set a Proxy to case a vote.
	Voting is important: in Graphene in the same way it is important to the community in which you live. The weight of your vote is directly correlated to the number of GPH you own.
	If you aren't heavily involved in the community, you are encouraged to choose a proxy who represents your interests.
Asset	Issued Assets
Signed Message	
Membership stats	Basic Member is a default membership. You can upgrade to Lifetime Membership here.
Vesting balances	Vesting balances contain any fees earned through the referral program or from worker pay,
	For example. They have a tain vesting period and are continually unlocked during that vesting period until all of the balances are available
Whitelist	You can set Whitelist and/or Blicklist. Also, you can view 'Whitelisted by' and 'Blacklisted by'.

CHAPTER

THIRTEEN

GRAPHENE CLIENT AND LOGIN MODE

Table of Contents

- *Graphene Client and Login Mode*
  - *Graphene Client*
    - *Light Client*
    - *Web Client*
  - *Login Forms*
    - *Cloud Wallet Login*
    - *Local Wallet Login*
  - *Summary*
    - *Cloud Wallet*
    - *Local Wallet*
    - *Settings - LOGIN MODE*
  - *Frequently asked Questions*

13.1 Graphene Client

You have sole control of your accounts and funds and they are created on your computer (within the light-client or the browser web-client).

- If you created a **Clout wallet**, you will be able to access to your wallet by using your credentials (username and password) from any browser or computers. You do not need to worry about a backup files. (*You do not have the functionality.*)
- If you created a **Local wallet**, you will be able to access your account **only** on the computer that you have used to register and create your account. If you have created a backup file, you can import it and restore your wallet somewhere else.

13.1.1 Light Client

Download client files and install Graphene Wallet to your computer.

> Note: This download does not mean that you will have a Local wallet.

- Download the Official Light Client
- Graphene-UI – Latest Release

Graphene-UI: This is a web application and runs in a browser. A connection is established to a trusted node in the network that serves as a gateway to the rest of the ecosystem.

13.1.2 Web Client

Access the network and open the wallet in the browsers via one of our partners.

- wallet.gph.ai https://wallet.gph.ai
- (more. . .)

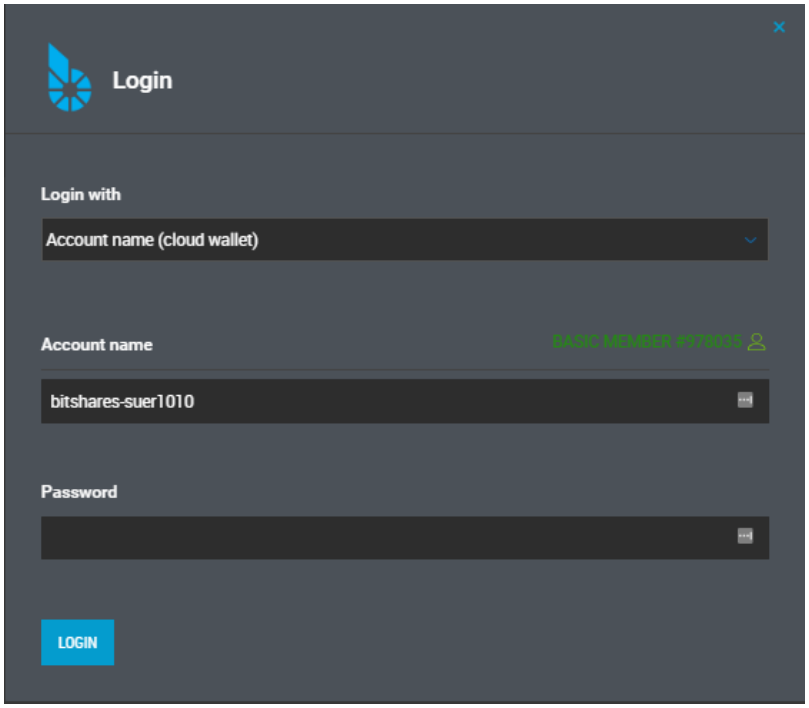
13.2 Login Forms

13.2.1 Cloud Wallet Login

The cloud wallet only allows for a single account to be accessed at a time. This wallet is generally the correct choice for a new user.

Login Form

You login with your account name and your password. The login form shows which type of wallet you login to. (i.e., Login with: **Account name (cloud wallet)**)

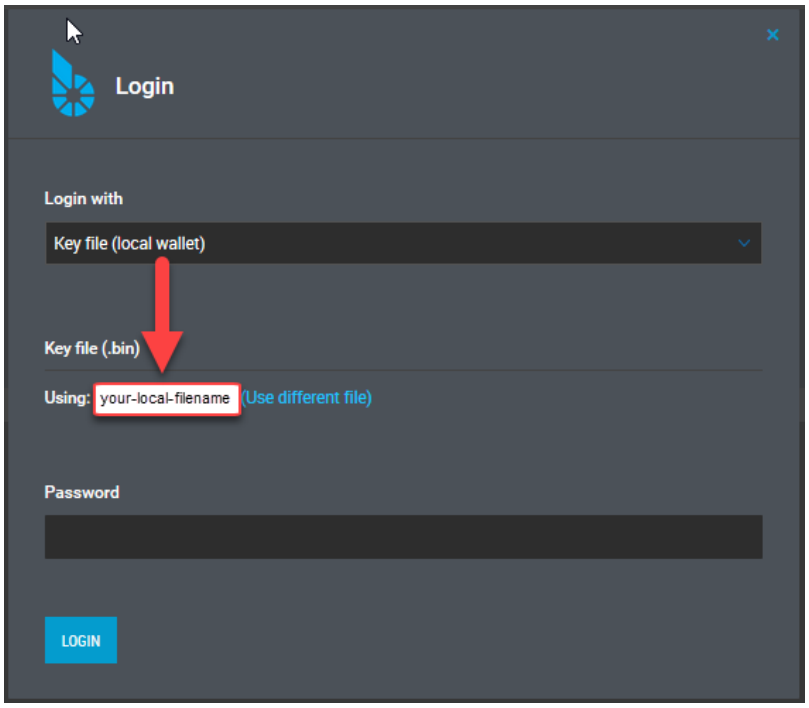


13.2.2 Local Wallet Login

A Big difference between a Cloud wallet and a Local wallet is the local wallet creates a database within your browser. This means that access to your funds is tied to the browser only. If you attempt to access your local wallet from any other computer, or any other browser, it will fail unless you actively import your backup file from the original browser backup file.

Login Form

You select your Local wallet backup file name and type your password to login a Local wallet. The **Key file(.bin)** should be your wallet backup file name. The backup file contains all your keys information.



13.3 Summary

The difference between a Cloud wallet and a Local Wallet.

13.3.1 Cloud Wallet

- Graphene UI wallet will create a **Cloud wallet** as a default wallet. (i.e., [CREATE ACCOUNT])
- The Cloud wallet allows you to login from any web browser at any time to gain access to your account by using your credentials (username and password).
- The Cloud wallet only allows for a single account to be accessed at a time.
- If you have a Cloud wallet, you don't need to worry about a backup. (*You don't have the functionality in the Cloud wallet*).
- **You can switch the INTERFACE by using the [Settings] - [General] - [Login Mode], however your account won't switch, only the *interface* switches.**
- **Even you import Private keys (was in the Cloud wallet) to the Local wallet, you do not have a brain key to associate with the Private keys you imported. Therefor, a brainkey restore won't find those Private keys. (In this case, no meaning to do a brainkey backup and restore.)**
- **The Cloud wallet has no brainkey.** The password is basically the equivalent of the brainkey, but it's only used for that one account.

13.3.2 Local Wallet

- **If you know you want to have a Local wallet, use an [advanced form] link on the Welcome to Graphene form and create a backup file. This is the only way to create a Local wallet.**
- The Local wallet creates a correct pair of keys (a brainkey and private keys) and save the information to your browser.
- The Local wallet creates a database with in your browser. This means that you can only access your funds from the same computer and web browser that you have used to register and create your account. If you attempt to access your local wallet from any other computer, or any other browser, it will fail unless you actively import your backup file from the original browser backup file.
- You have to create a backup files to manage the Cloud wallet account.
- The Cloud wallet has Backup options. Go to [Settings] - [Backup] to find. - **Create local wallet backup** : create a Binary File (.bin) backup. - **Create brainkey backup** : give you long random phrases. You need to write down and keep it in a safe place.
- The backup files can be used to move your local wallet to different computers or different browsers. In order to restore your local wallet you will need the backup file and your password! Therefor, it's extremely important you create a backup and keep a safe place.

13.3.3 Settings - LOGIN MODE

Users often misunderstand about this feature.

This setting feature allows you to select the LOGIN MODE. You can just switch the *interface*. You are **not** switching your account from one to another.

Go to [Settings] - [General] - **LOGIN MODE** to find the feature.

> This feature only switch the *interface*! Not your account self.

13.4 Frequently asked Questions

- **Can I switch (by changing the Wallet Mode or importing private keys) my Cloud wallet to a Local wallet?**
  - No. Your account won't switch, only the *interface* switches.
- **I have a Cloud wallet. Can I have a Local wallet?**
  - Yes. But you will have to create new account for the Local wallet.
- **How can I move my funds from a Cloud wallet to a Local wallet?**
  - We mentioned before. You have to create new account for the Local wallet. You can create the Local wallet by using an [**advanced form**] link on Welcome to Graphene form. After you created new Local wallet, send your funds from your old account (Cloud wallet) to new account (Local wallet). And create a backup!!
- **I have a Cloud wallet. Do I have to save my private keys information somewhere?**
  - Not necessary. Because the Could wallet always do it for extra security. Also lets you login without exposing your owner key, you can login using only the active key.

- **Can I change a Cloud wallet password?**
  - Yes.
  - Go to How to change a password if using a Cloud Wallet : from Graphene UI wiki
- **Can I change a Local wallet password?**
  - Yes.
  - Go to [**Settings**] - [**Password**] - Change your password. Use this page

  .
- **There is [Create Account] in a Side navigation menu. Can I create and add new account in the same wallet I logged in?**
  - Yes. However, the account you logged in must have a LifeTime Membership (LTM) stats.

CHAPTER

FOURTEEN

BACKUPS AND RESTORE YOUR WALLET

Table of Contents

- *Backups and Restore your Wallet*
  - *Create Local Wallet Backup*
    - *Backup Types*
    - *How to Create a backup (.bin) file*
    - *About the Brain Key*
    - *How to Create a Brainkey backup (Advanced User Only)*
  - *Restore / Import*
    - *Restore / Import Options*
    - *How to Restore from a backup (.bin) file*
    - *How to Check Active Local Wallet backup file name*
    - *How to Recover Account with Brain key*

> If you use a Cloud Wallet, you do not need to create a backup. **You do not have the option also.**

14.1 Create Local Wallet Backup

It is recommended to make regular backups of your Local wallet. Please note that in order to recover from a backup you will also need to provide the passphrase (password) because backups are encrypted. If you lose your wallet backup file or your passphrase, you will not be able to access any of your funds again.

You are the only individual that has access to your account and funds, it is your responsibility to make a secure backup of your registered Local wallet account.

14.1.1 Backup Types

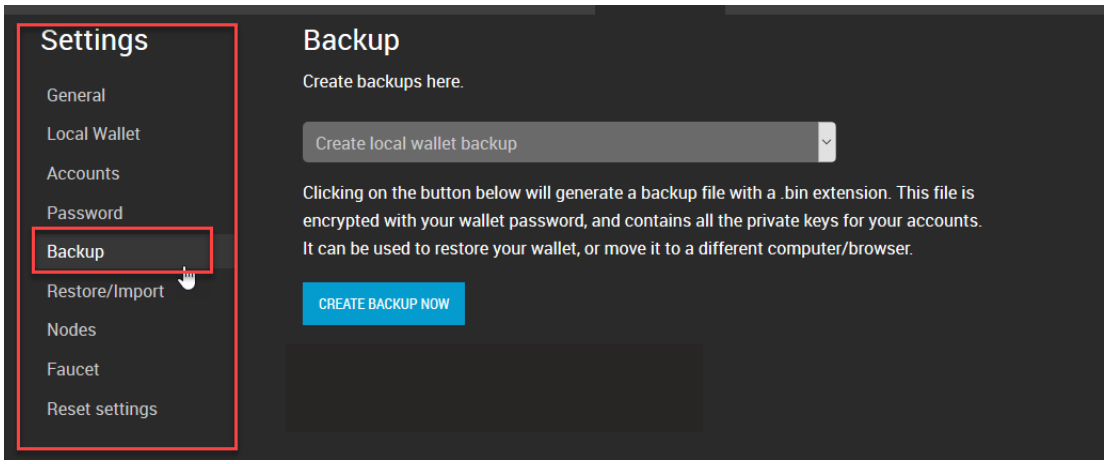
There are three types of backups.

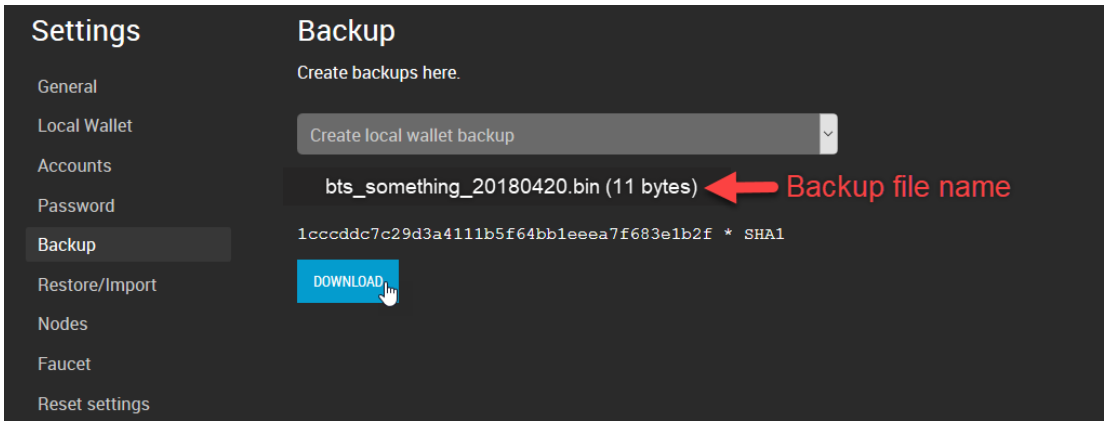
type	
Create local wallet backup	create a Binary File (.bin)
Create brainkey backup	give you long random phrases. You need to write down.
Create favorites backup	

14.1.2 How to Create a backup (.bin) file

1. Open a Side menu and select [**Settings**]
2. In [**Settings**], select [**Backup**].
3. Make sure the backup type is *Create local wallet backup*
4. Click [**CREATE BACKUP NOW**]
5. Check your backup file name (e.g. bts_somrthing_20180420.bin)
6. Click [**DOWNLOAD**]

Store this backup in at least two secure locations only accessible by you





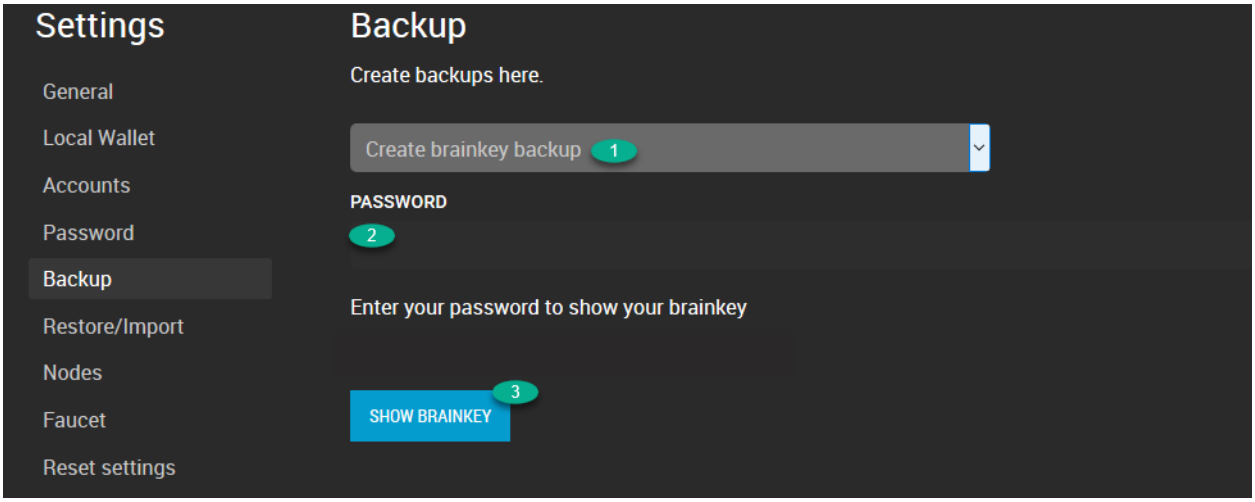
14.1.3 About the Brain Key

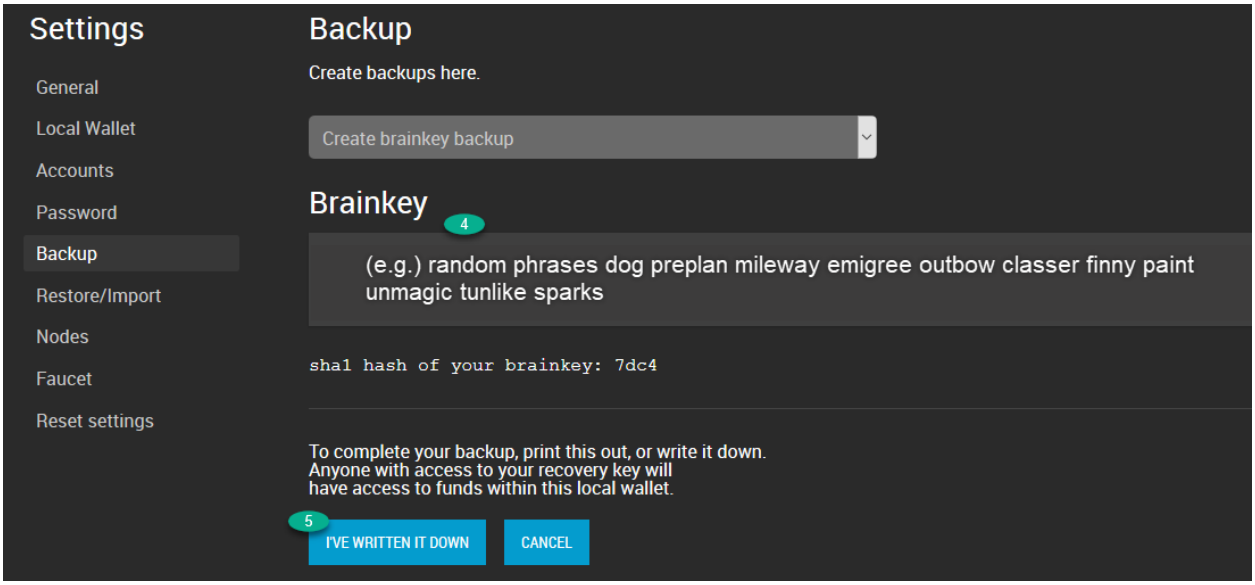
The brain key is used as source for all cryptographic keys generated in the wallet. If you have it secured, you will be able to regain access to your accounts and funds (unless the access keys have been changed)

14.1.4 How to Create a Brainkey backup (Advanced User Only)

1. Open a Side menu and select [**Settings**]
2. In [**Settings**], select [**Backup**].
3. (#1) Make sure the backup type is *Create brainkey backup*
4. (#2) Type in a password
5. (#3) Click [**SHOW BRAINKEY**]
6. (#4) Write down *Brainkey* (i.e. very random long phrases)
7. (#5) Click [**I'VE WRITTEN IT DOWN**]

Write it down!! Anyone with access to your recovery key will have access to funds with in the local wallet.





14.2 Restore / Import

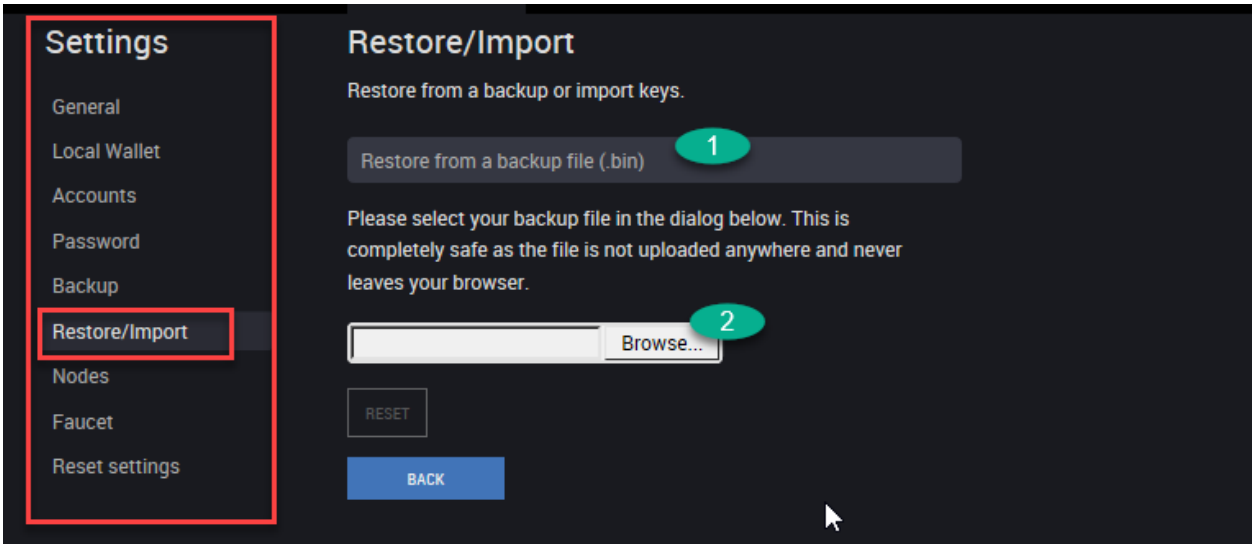
We assume you have created a backup file (.bin) and use a Local wallet.

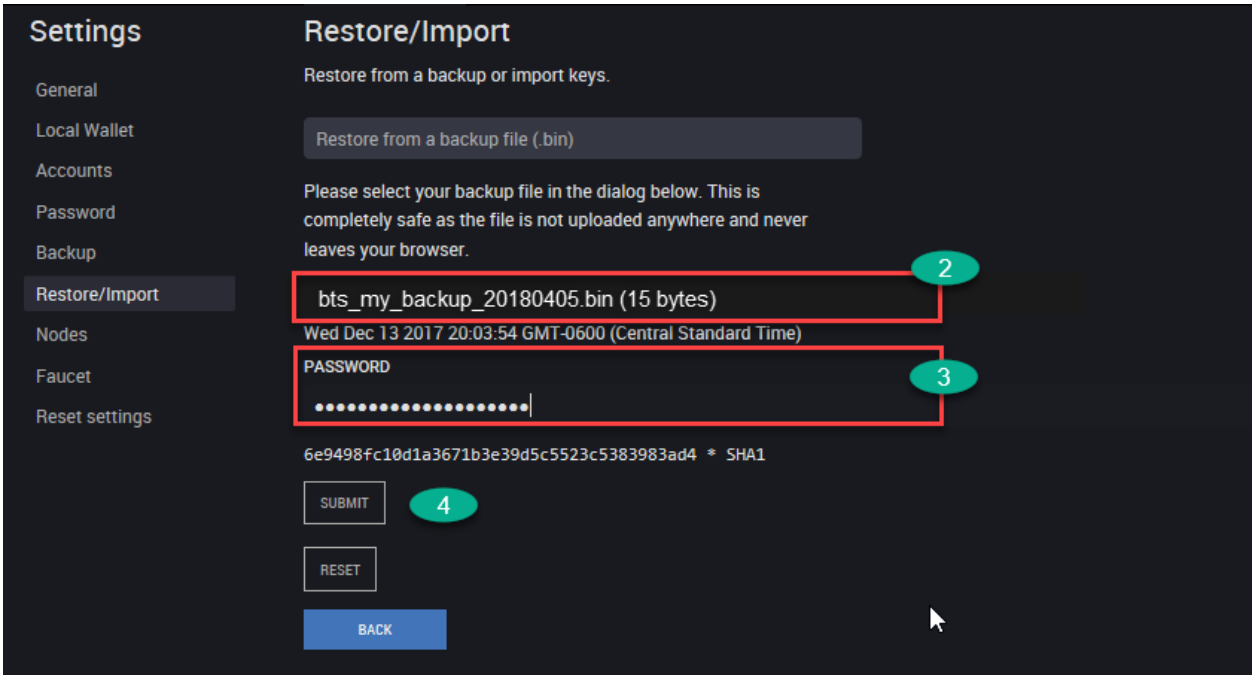
14.2.1 Restore / Import Options

option	
Restore from a backup file (.bin)	restore from a backup file and a password
Import a private key	import Private keys to a Local wallet. The imported keys will be saved in the bin file. If this happens, you cannot rely on the brainkey for backup after that.
Import a GPH 0.9.3c key export file (.json)	
Restore using a local wallet brainkey	use a password and a Brain key
Restore favorites using a json file	

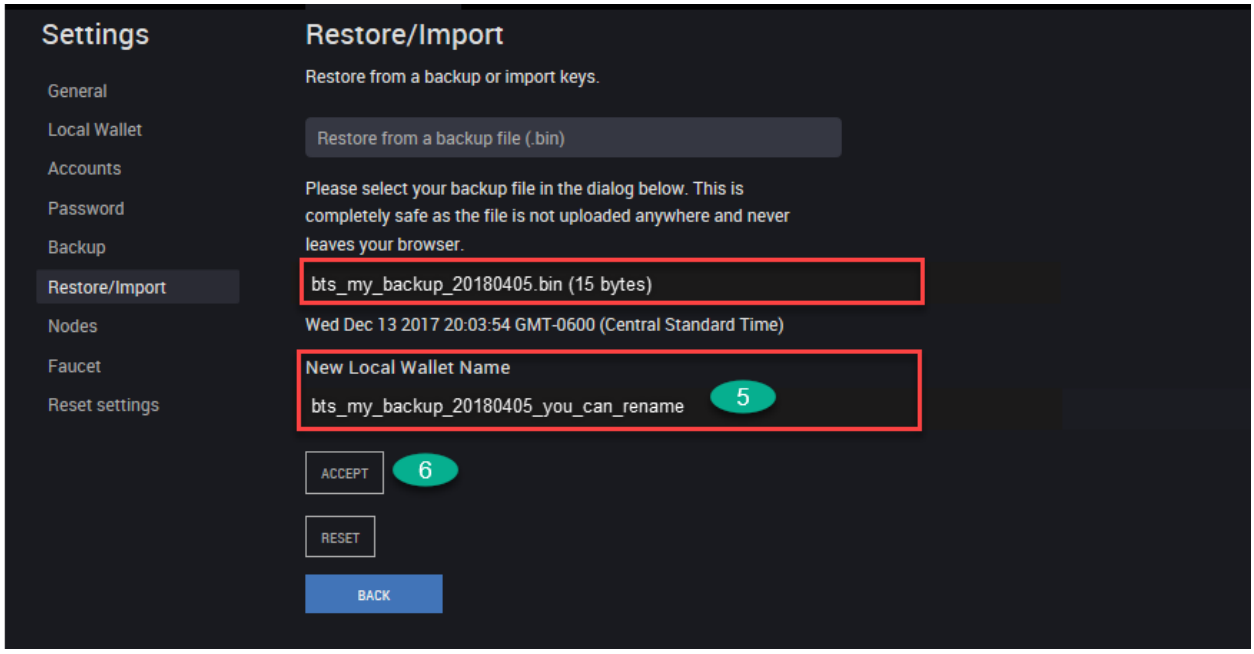
14.2.2 How to Restore from a backup (.bin) file

1. Open a Side menu and select [**Settings**]
2. In [**Settings**], select [**Restore/Import**].
3. (#1) Make sure you selected *Restore from a backup file (.bin)*
4. (#2) Click [**Browse...**] to find a backup file.

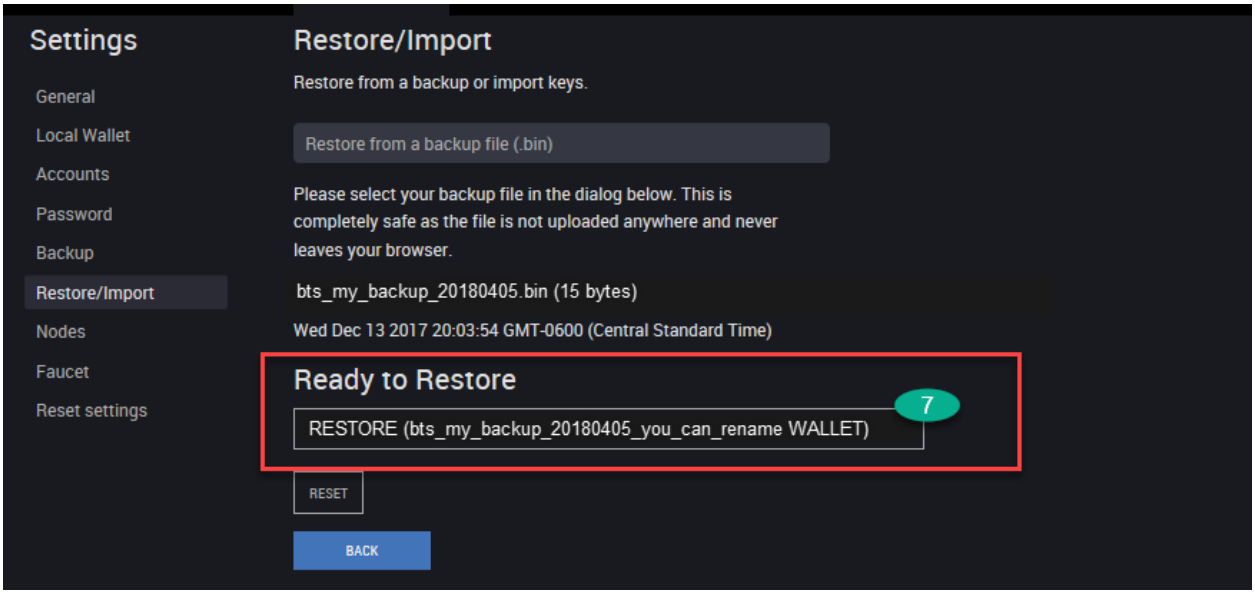


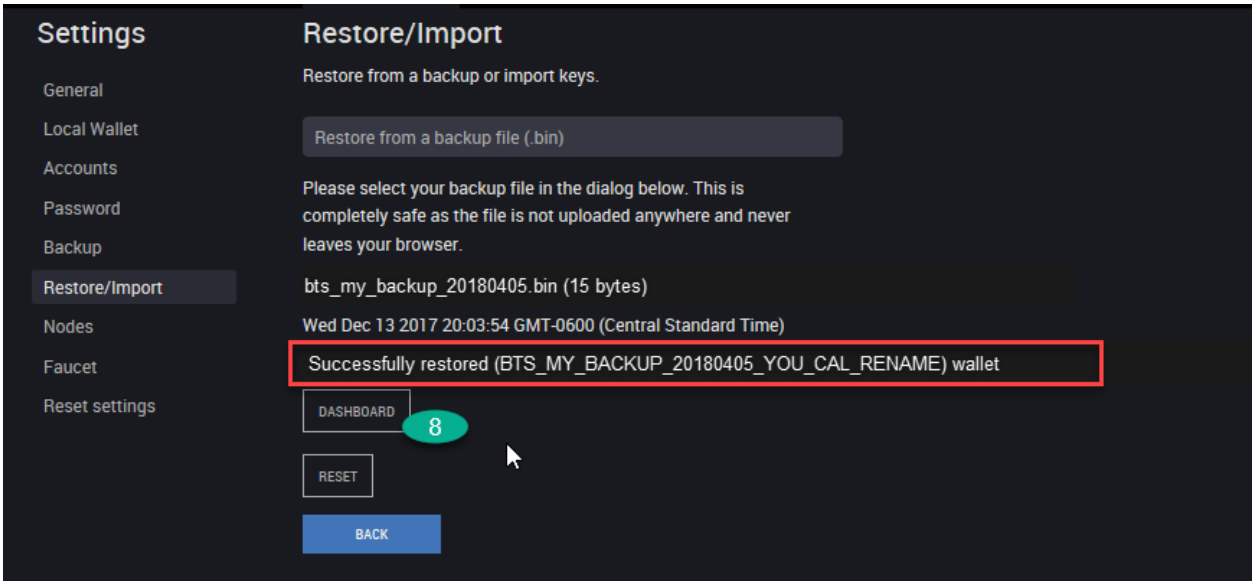


5. (#3) Type in a password
6. (#4) Click [**SUBMIT**]



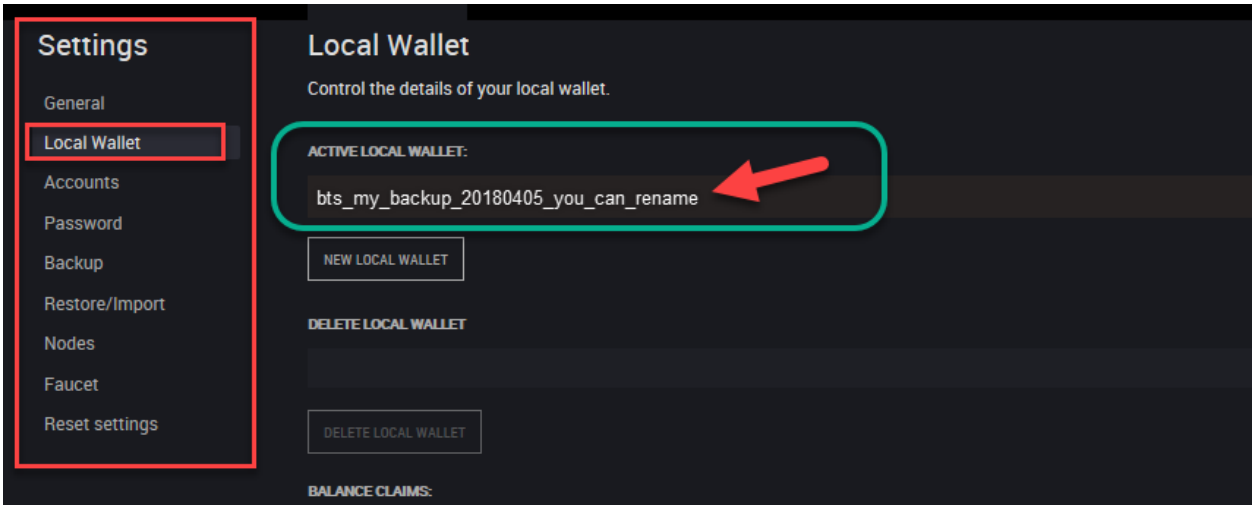
7. (#5) Type in *New Local Wallet Name* if you want to change the backup file name.
8. (#6) Click [**ACCEPT**]
9. (#7) **Ready to Restore** - below "RESTORE(….. WALLET)" is a button. Click it.
10. You will find "Successfully restored (….)wallet. Done!!
11. (#8) Click [**DASHBOARD**]





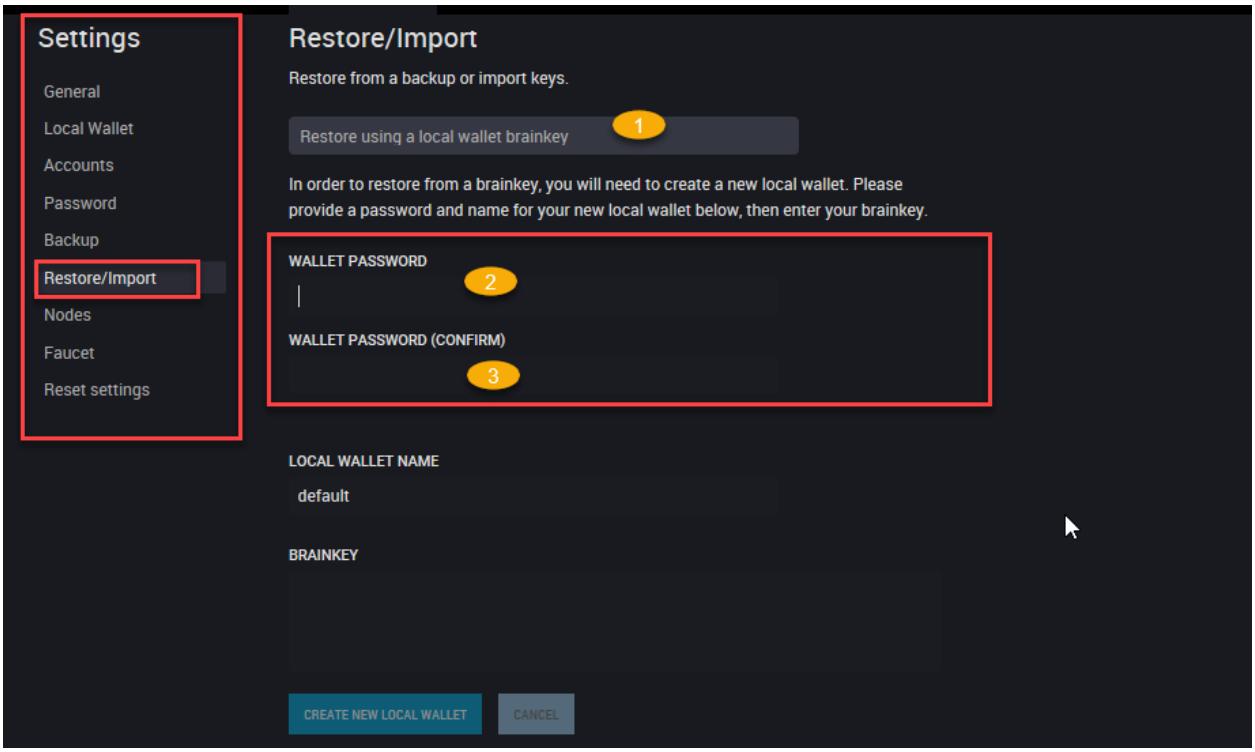
14.2.3 How to Check Active Local Wallet backup file name

- [**Settings**] - [**Local Wallet**] - Active Local Wallet

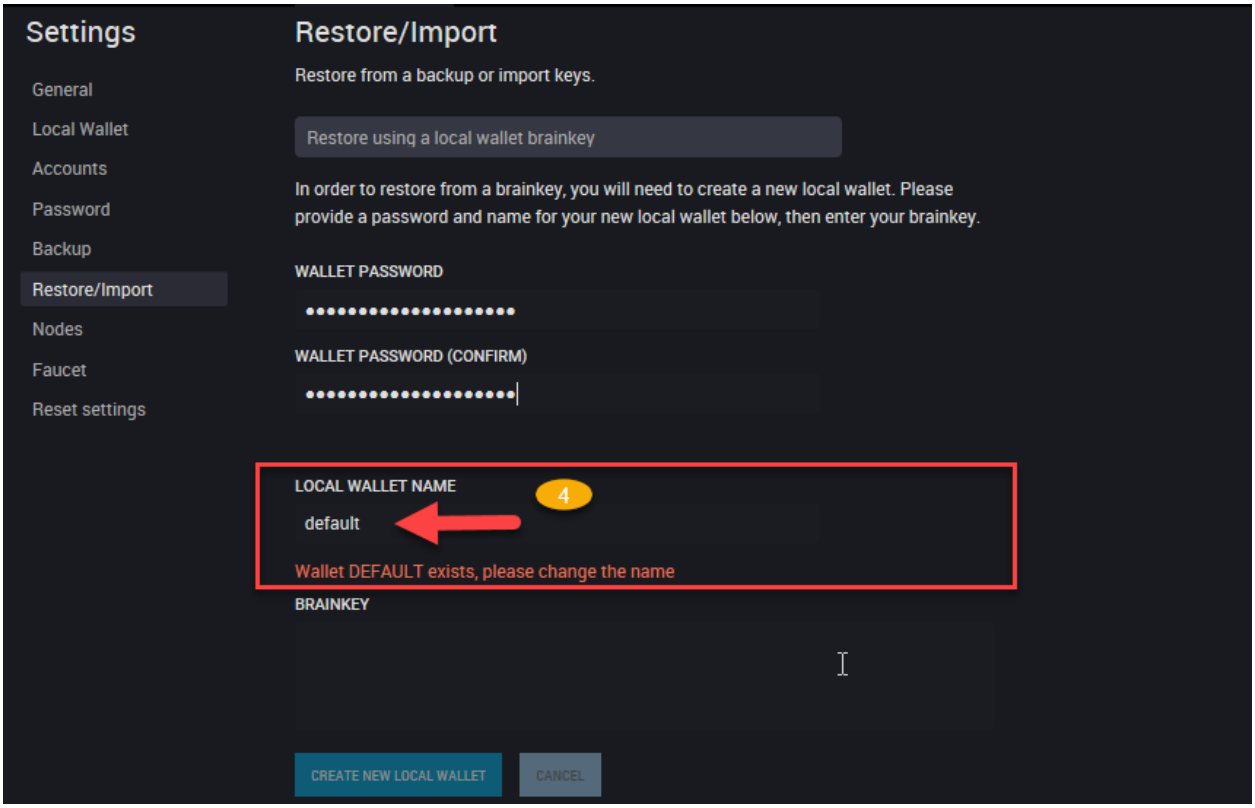


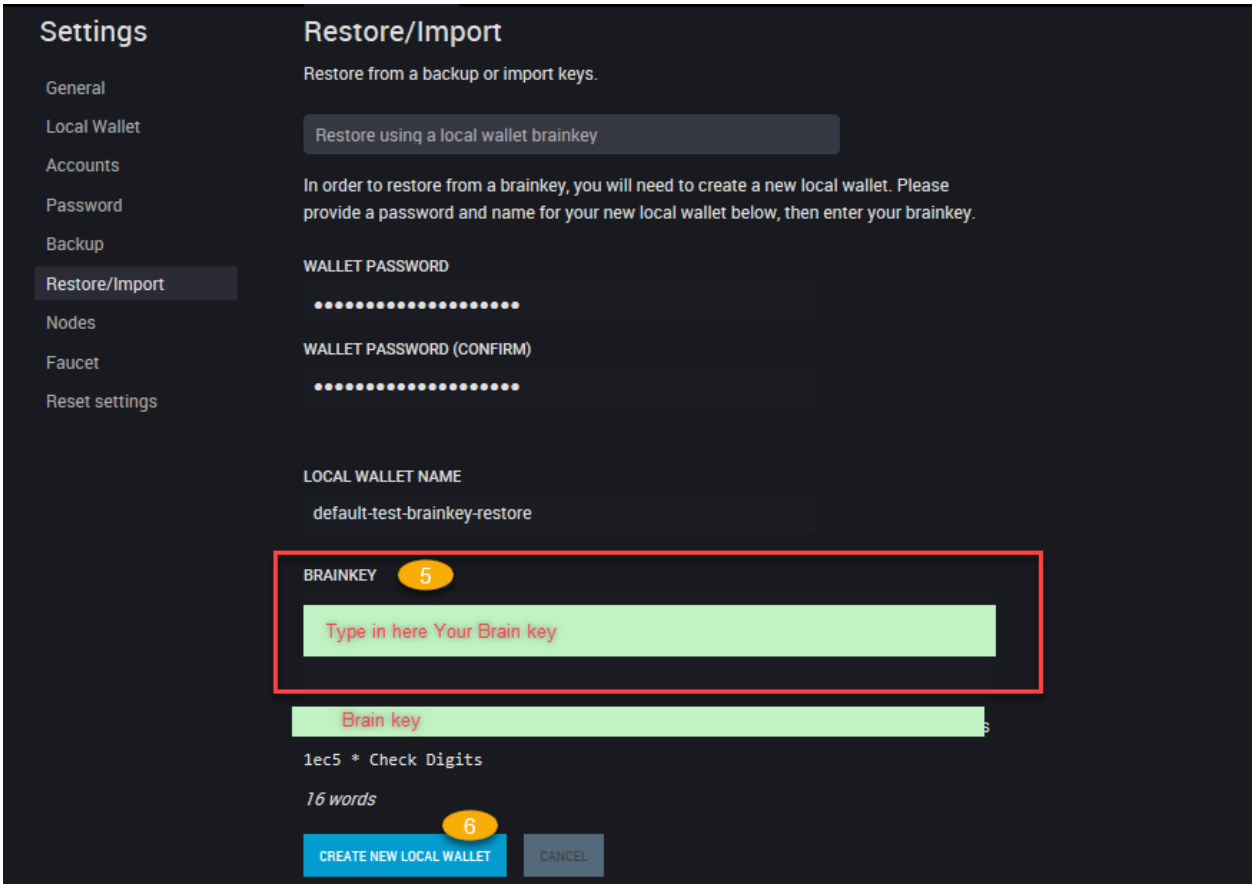
14.2.4 How to Recover Account with Brain key

1. Open a Side menu and select [**Settings**]
2. In [**Settings**], select [**Restore/Import**].
3. (#1) Make sure you selected *Restore using a local wallet brainkey*
4. (#2) Type in a password
5. (#3) Type in a password (Confirm)

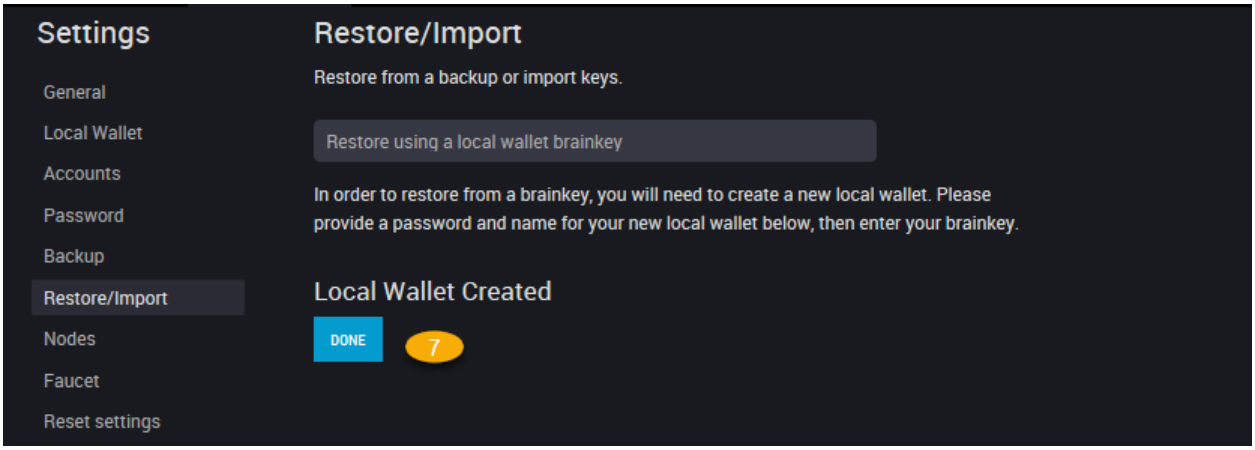


6. (#4) Type in new *Local Wallet Name* if needed. (e.g. “default-test-brainkey-restore”)

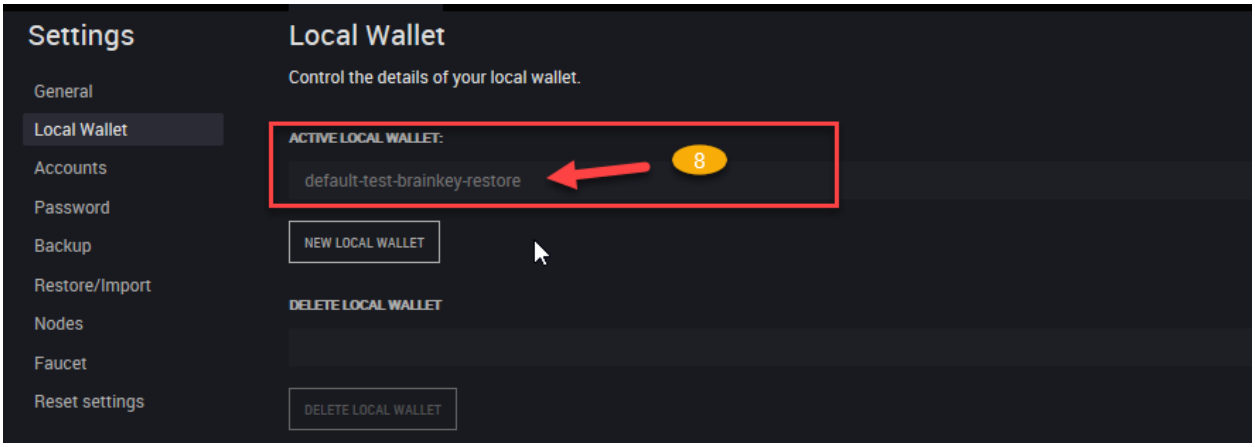

Settings
General
Local Wallet
Accounts
Password
Backup
Restore/Import
Nodes
Faucet
Reset settings
Restore/Import
Restore from a backup or import keys.
Restore using a local wallet brainkey
In order to restore from a brainkey, you will need to create a new local wallet. Please provide a password and name for your new local wallet below, then enter your brainkey.
WALLET PASSWORD
WALLET PASSWORD (CONFIRM)
LOCAL WALLET NAME
4
default
Wallet DEFAULT exists, please change the name
BRAINKEY
CREATE NEW LOCAL WALLET
CANCEL


Settings
General
Local Wallet
Accounts
Password
Backup
Restore/Import
Nodes
Faucet
Reset settings
Restore/Import
Restore from a backup or import keys.
Restore using a local wallet brainkey
In order to restore from a brainkey, you will need to create a new local wallet. Please provide a password and name for your new local wallet below, then enter your brainkey.
WALLET PASSWORD
WALLET PASSWORD (CONFIRM)
LOCAL WALLET NAME
default-test-brainkey-restore
BRAINKEY
5
Type in here Your Brain key
Brain key
1ec5 * Check Digits
16 words
6
CREATE NEW LOCAL WALLET
CANCEL

7. (#5) Type in **BRAINKEY**
8. (#6) Click [CREATE NEW LOCAL WALLET]



9. (#7) Click [DONE]
10. (#8) Let's check *ACTIVE LOCAL WALLET* name (Go to [Settings] - [Local Wallet])



CHAPTER

FIFTEEN

FUND (SEND) & TRANSACTIONS

Table of Contents

- *Fund (Send) & Transactions*
  - *Fund your Account*
    - *Two Options to Fund your Account*
  - *Send (Transfer)*
    - *Send Forms items and descriptions*
    - *Form: Send*
  - *Deposit*
    - *Deposit Forms Items and Descriptions*
      - *Examples*
  - *Transactions*
    - *Proposed Transactions*
    - *Confidential Transactions*

15.1 Fund your Account

15.1.1 Two Options to Fund your Account

- **Send (Transfer)**: This is for between Graphene account holders to send funds. On the Graphene Blockchain , people never need to deal with *addresses* or *public keys*. Graphene account holders can use their *account names* for communication.
- **Deposits**: Graphene account holders can use one of our partners to move over existing funds into your Graphene account.

15.2 Send (Transfer)

Currently, there are two forms to send funds. One is **Send** on the top menu. Another one is **Send (legacy)** on the side menu. Both work the same.

First, we want to list what information on the Send form. Next, you can check each item in the Send form images.

15.2.1 Send Forms items and descriptions

15.2.2 Form: Send

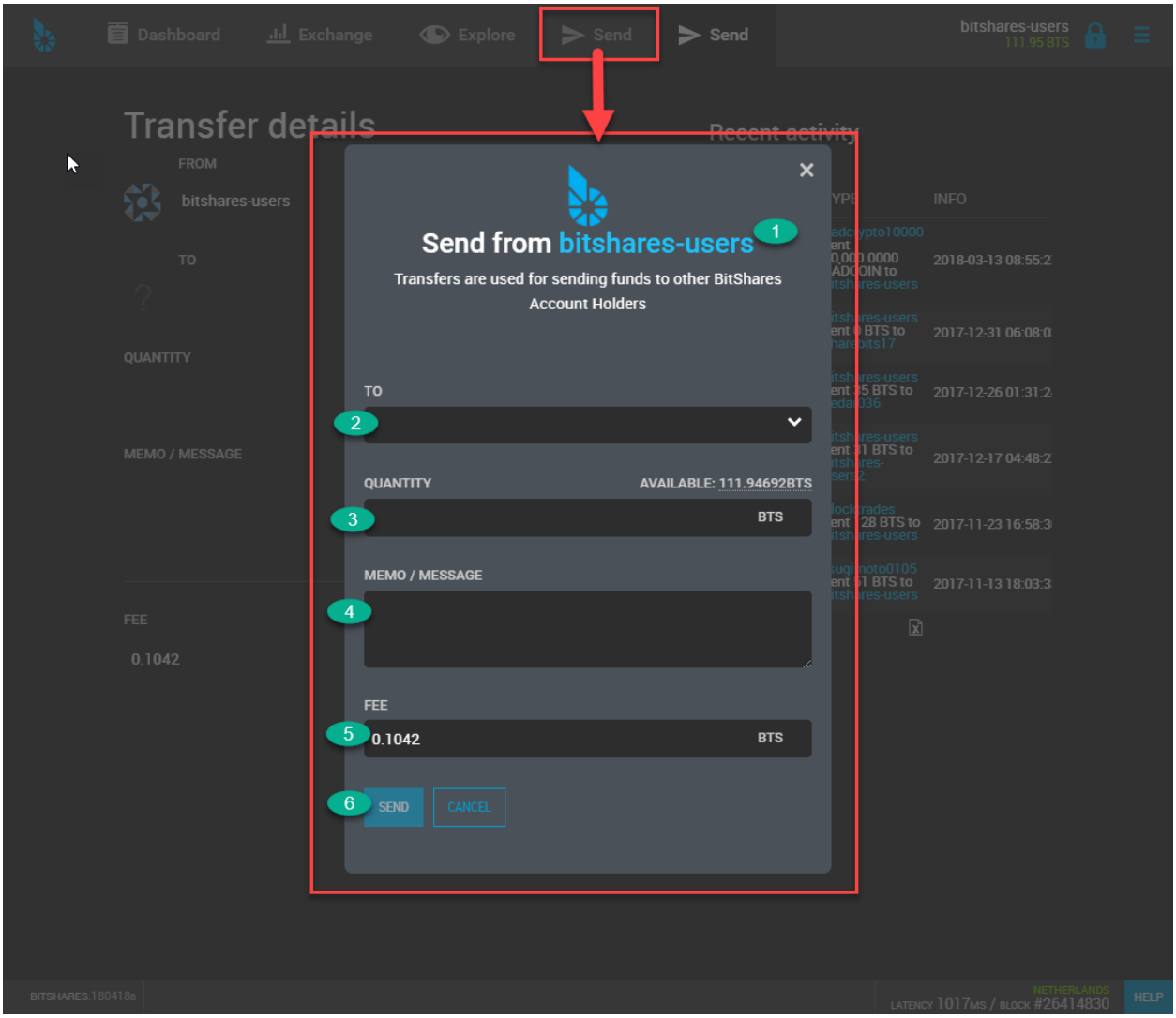
A send (transfer) operation moves funds from user `A` to user `B`. In contrast to most other blockchain-based financial networks, we do **not** use *addresses* or *public keys* for transfers.

Instead, all that is needed for transfers is:

- source account name: From
- destination account name: To
- funds (amount and asset): Quantity
- asset/token type
- memo (optional)

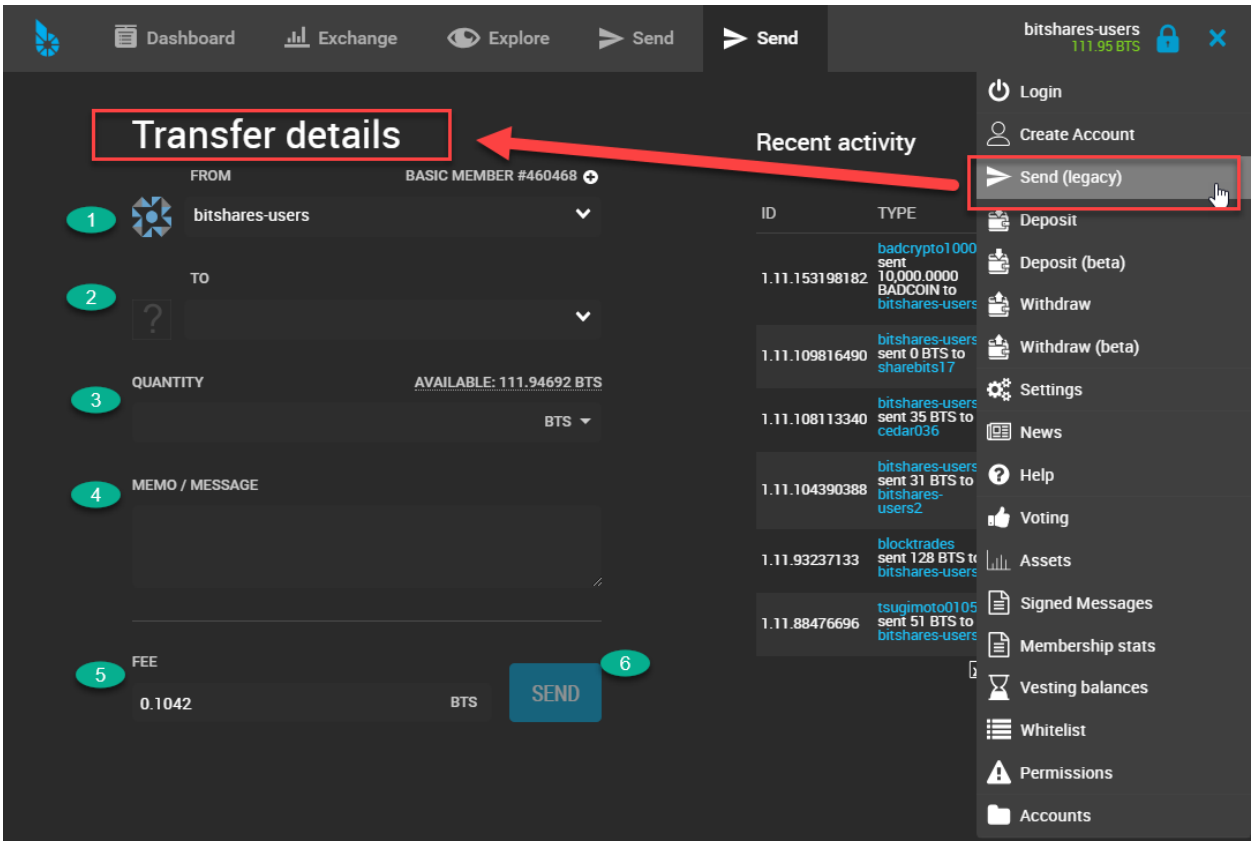
A transfer may contain a memo with arbitrary text.

Note: The `memo` is **encrypted** by default can only be decrypted by the participants of the transfer! The transfer fee depends on the length of the memo!



> After click [SEND], you need to login (if it's not yet) and [CONFIRM] the Transaction.

Form: Send - Transfer details (legacy form)



15.3 Deposit

Currently, there are two forms to deposit funds. One is **Deposit** and another one is **Deposit (Beta)**. Both locate on the side menu.

Graphene has partners to provide Transfer (i.e. Gateway/Bridge) services which you can choose from. Each Transfer service has own instruction and available coins to handle. When you select a Transfer Service, please follow the instruction. In the next section, we will show you several examples and patterns to compare the deposit forms.

Note: On the Graphene blockchain, people never need to deal with *addresses* or *public keys* but can instead use account names. Your account name becomes the *email address* for your funds.

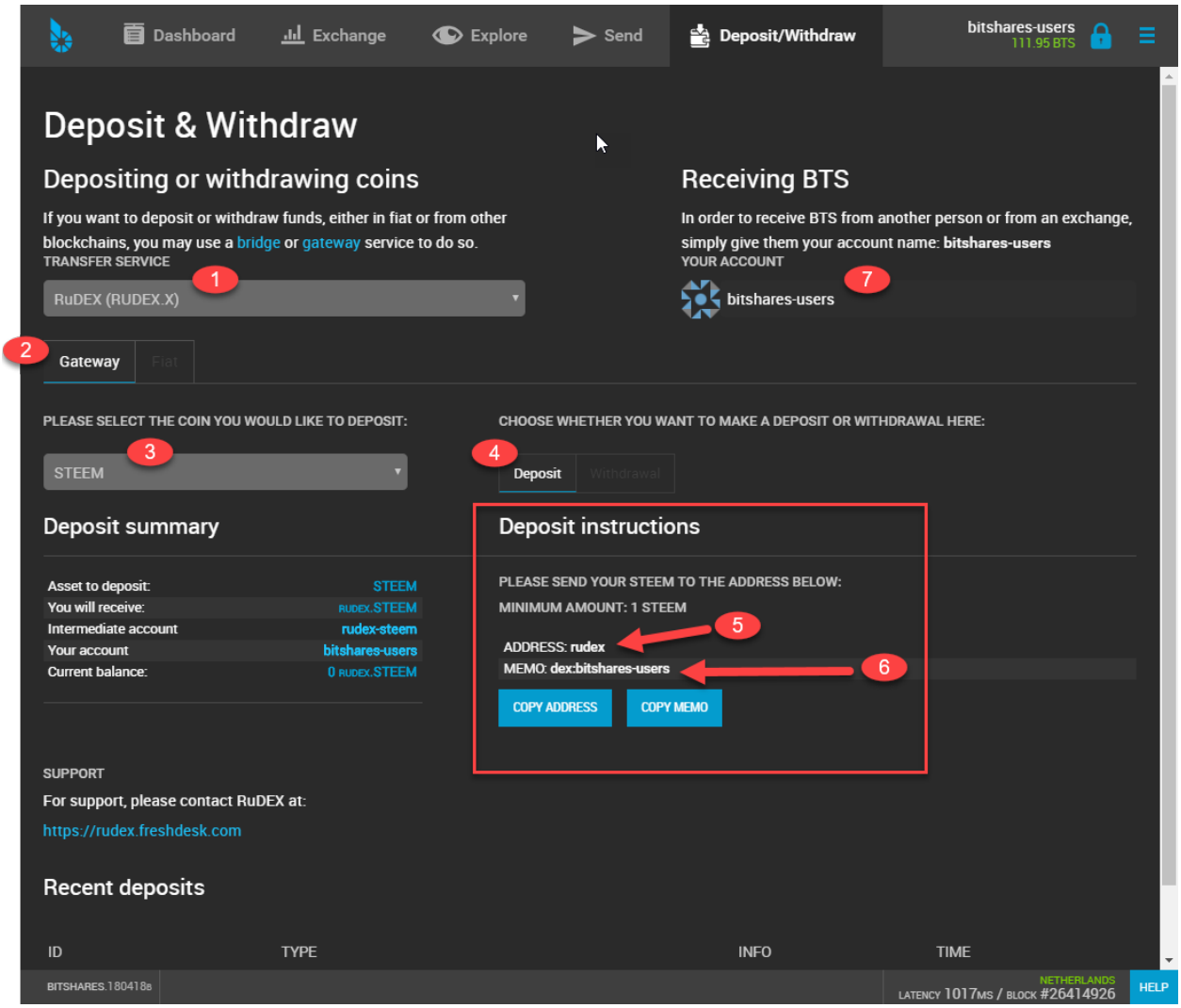
15.3.1 Deposit Forms Items and Descriptions

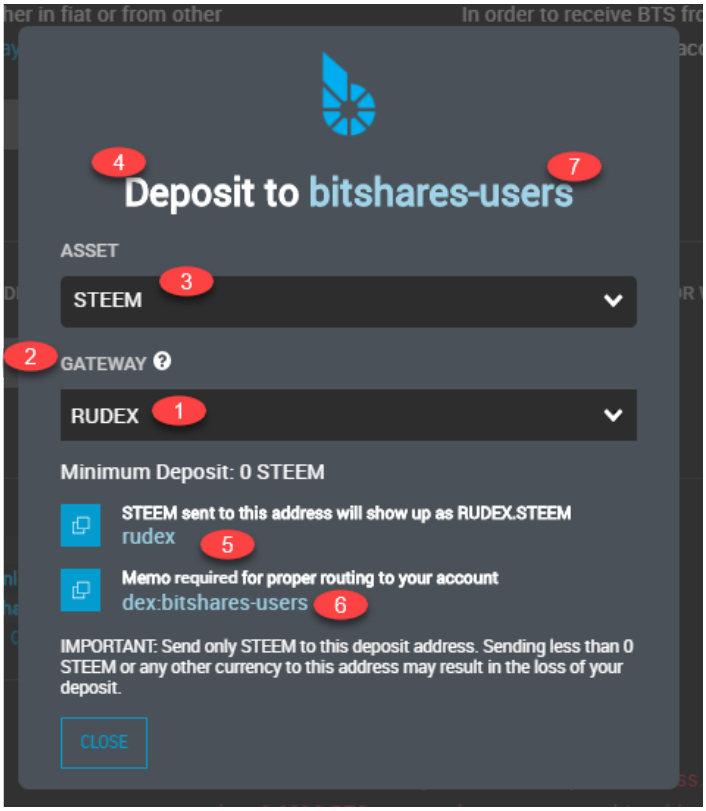
If you cannot select an Asset on the Deposit(Beta) form, try to login to your wallet first.

Examples

(Example 1) Deposit STEEM by using a Gateway service

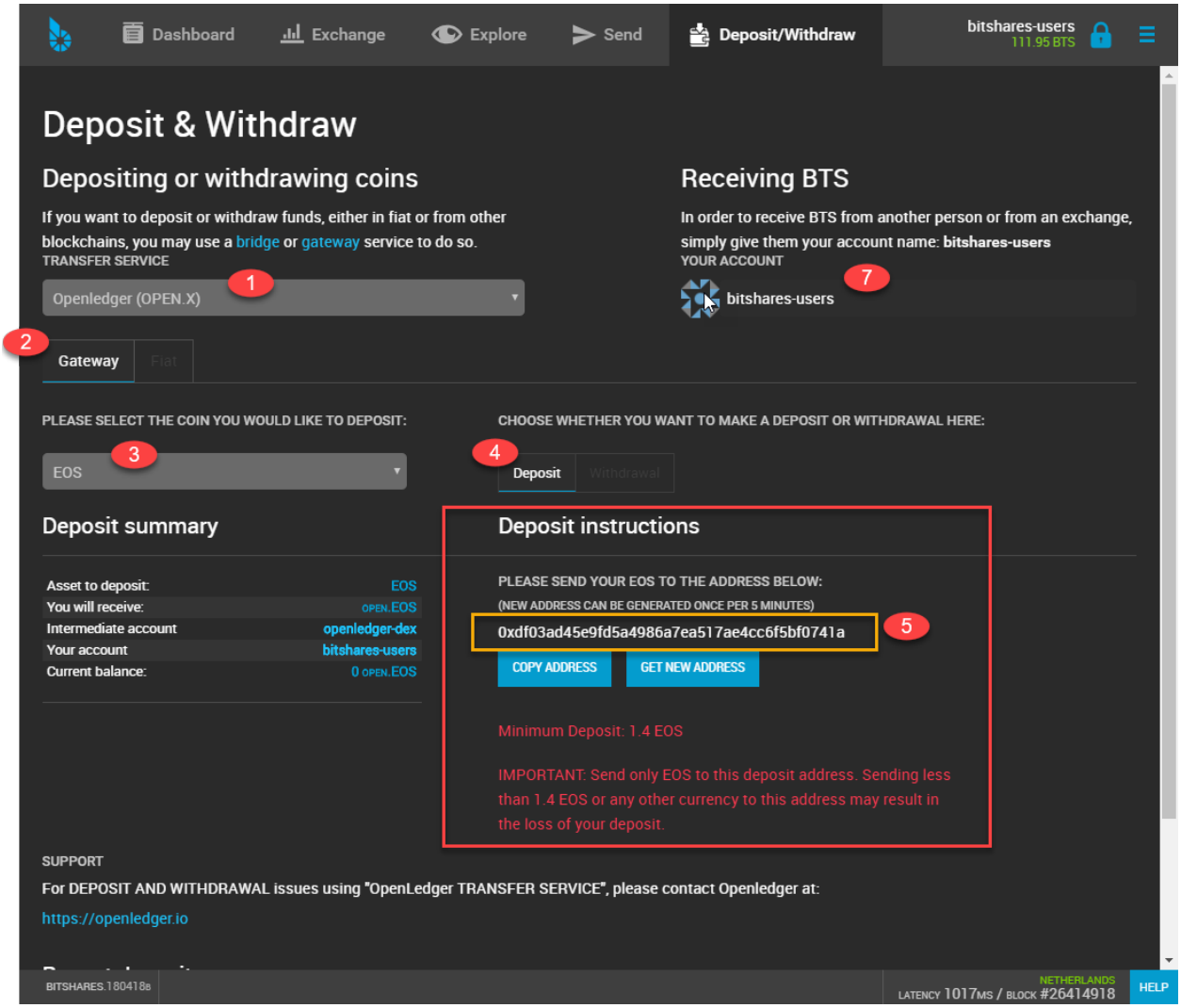
You use *ADDRESS* and *MEMO* to deposit funds. The below images show a Deposit and a Deposit(Beta) forms.





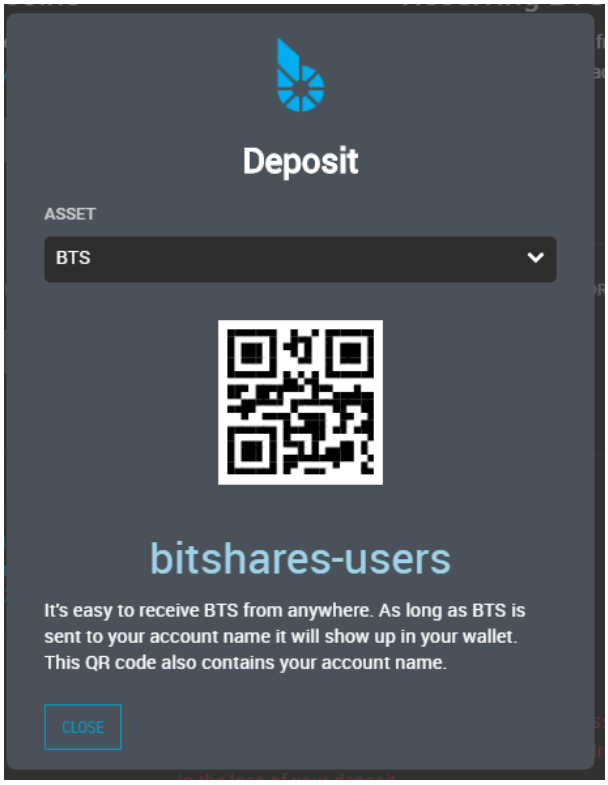
(Example 2) Deposit EOS by using a Gateway service

You use *ADDRESS* to deposit funds. The below images show a Deposit and a Deposit(Beta) forms.


Dashboard
Exchange
Explore
Send
Deposit/Withdraw
bitshares-users
111.95 BTS
Deposit & Withdraw
Depositing or withdrawing coins
If you want to deposit or withdraw funds, either in fiat or from other blockchains, you may use a bridge or gateway service to do so.
TRANSFER SERVICE
Openledger (OPEN.X)
1
2
Gateway
Fiat
Receiving BTS
In order to receive BTS from another person or from an exchange, simply give them your account name: bitshares-users
YOUR ACCOUNT
bitshares-users
7
PLEASE SELECT THE COIN YOU WOULD LIKE TO DEPOSIT:
EOS
3
CHOOSE WHETHER YOU WANT TO MAKE A DEPOSIT OR WITHDRAWAL HERE:
4
Deposit
Withdrawal
Deposit summary
Asset to deposit: EOS
You will receive: OPEN.EOS
Intermediate account openledger-dex
Your account bitshares-users
Current balance: 0 OPEN.EOS
Deposit instructions
PLEASE SEND YOUR EOS TO THE ADDRESS BELOW:
(NEW ADDRESS CAN BE GENERATED ONCE PER 5 MINUTES)
0xdf03ad45e9fd5a4986a7ea517ae4cc6f5bf0741a
5
COPY ADDRESS
GET NEW ADDRESS
Minimum Deposit: 1.4 EOS
IMPORTANT: Send only EOS to this deposit address. Sending less than 1.4 EOS or any other currency to this address may result in the loss of your deposit.
SUPPORT
For DEPOSIT AND WITHDRAWAL issues using "OpenLedger TRANSFER SERVICE", please contact Openledger at:
https://openledger.io
BITSHARES.180418
NETHERLANDS
LATENCY 1017MS / BLOCK #26414918
HELP

(Example 3) Deposit GPH

You use Graphene Account Name as *ADDRESS* to deposit funds. The below image shows a Deposit(Beta) form.



15.4 Transactions

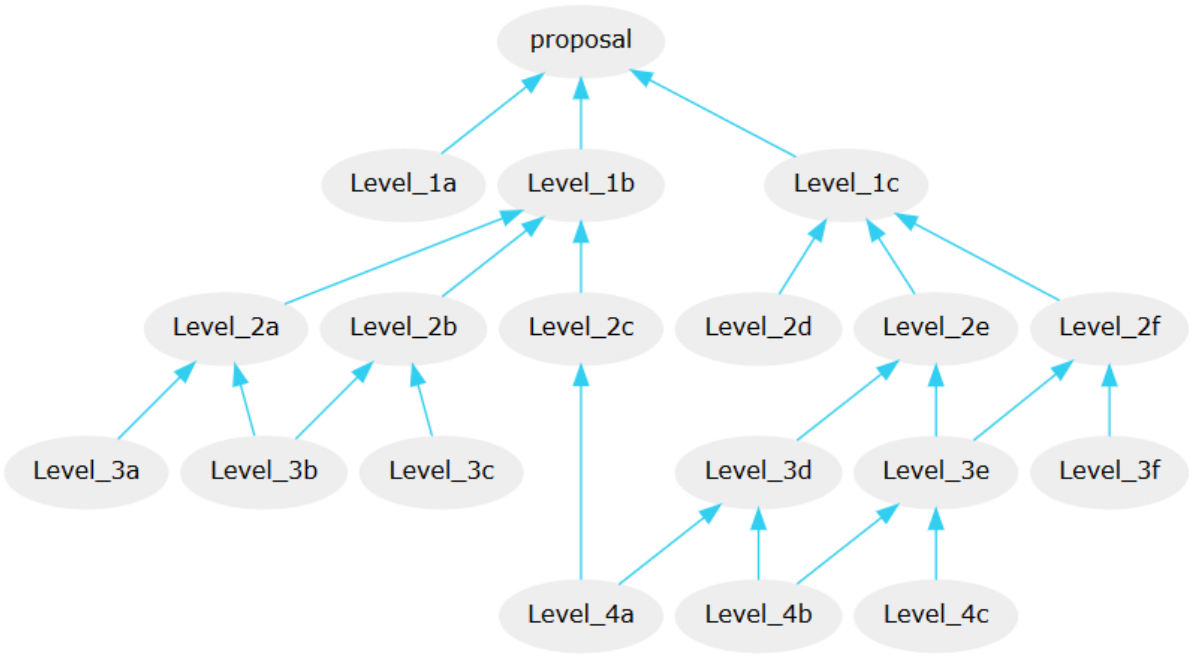
15.4.1 Proposed Transactions

The Graphene technology allows users to *propose* a transaction on the blockchain which requires approval of multiple accounts in order to execute.

At any time, a proposal can be approved in a single transaction if sufficient signatures are available (see `proposal_update_operation` as constructed by the `approve_proposal` call), as long as the authority tree to approve the proposal does not exceed the maximum recursion depth. In practice, however, it is easier to use proposals to acquire all approvals, as this leverages on-chain notification of all relevant parties that their approval is required. Off-chain multi-signature approval requires some off-chain mechanism for acquiring several signatures on a single transaction. This off-chain synchronization can be avoided using proposals.

The user proposes a transaction, then signatory accounts use add or remove their approvals from this operation. When a sufficient number of approvals have been granted, the operations in the proposal are evaluated. Even if the transaction fails, the proposal will be kept until the expiration time, at which point, if sufficient approval is granted, the transaction will be evaluated a final time. This allows transactions which will not execute successfully until a given time to still be executed through the proposal mechanism. The first time the proposed transaction succeeds, the proposal will be regarded as resolved, and all future updates will be invalid.

The proposal system allows for arbitrarily complex or recursively nested authorities. If a recursive authority (i.e. an authority which requires approval of 'nested' authorities on other accounts) is required for a proposal, then a second proposal can be used to grant the nested authority's approval. That is, a second proposal can be created which, when sufficiently approved, adds the approval of a nested authority to the first proposal. This multiple-proposal scheme can be used to acquire approval for an arbitrarily deep authority tree.



Note that each account in the figure can carry a **different weight**. An example of how to setup your permissions accordingly is given in account-permissions.

15.4.2 Confidential Transactions

A confidential transfer is one that hides the amount being sent. Confidential transfers are also referred to as blinded transfers. It makes use of Oleg Andreev's blind signatures.

When privacy is important no account is ever used twice and it is impossible for any third party to identify how money is moving through blockchain analysis alone.

CHAPTER

SIXTEEN

BRIDGE AND GATEWAY

If you want to deposit or withdraw funds, either in fiat or from other blickchains, You may use a bridge or gateway service to do so. In the next section describes about *Bridge* and *Gateway* services.

16.1 Bridge and gateway services

Both bridges and gateways allow you to deposit and withdraw coins, but there is a difference in the amount of trust you need to place in the service providers.

16.2 Bridges: trust-free model

A bridge service provides a way to deposit an amount of a crypto-currency other than Graphene, and in turn receive a SmartCoin equivalent. SmartCoins have no counterparty risk, so the only risk you experience when using a bridge is during the short time it takes to complete the transfer. This is better than a centralized exchange such as Poloniex, where you are always at risk of the exchange being hacked, going bankrupt, or experiencing any number of other issues.

16.3 Gateways: trust-based model

Gateways are basically equivalent to the standard exchange model where you depend on the solvency of the exchange to be able to redeem your coins. Generally gateways issue assets prefixed with their symbol, like RUDEX, NBSDEX, or GDEX. These assets are backed 100% by the real BTC or ETH or any other coin that people deposit with the gateways.

An RUDEX.BTC is thus in theory equivalent to the BTC you get on Poloniex, which could be prefixed POLO.BTC. In both cases you rely on the service provider, RuDEX for RUDEX. assets and Poloniex for POLO. assets, to remain solvent in order to back the value of the assets they've issued. Because gateways only provide this one service which is normally only one part of running an exchange, one might even argue that they have an easier job of securing their holdings.

(ref: https://wallet.gph.ai/#/help/introduction/bridges_gateways)

CHAPTER

SEVENTEEN

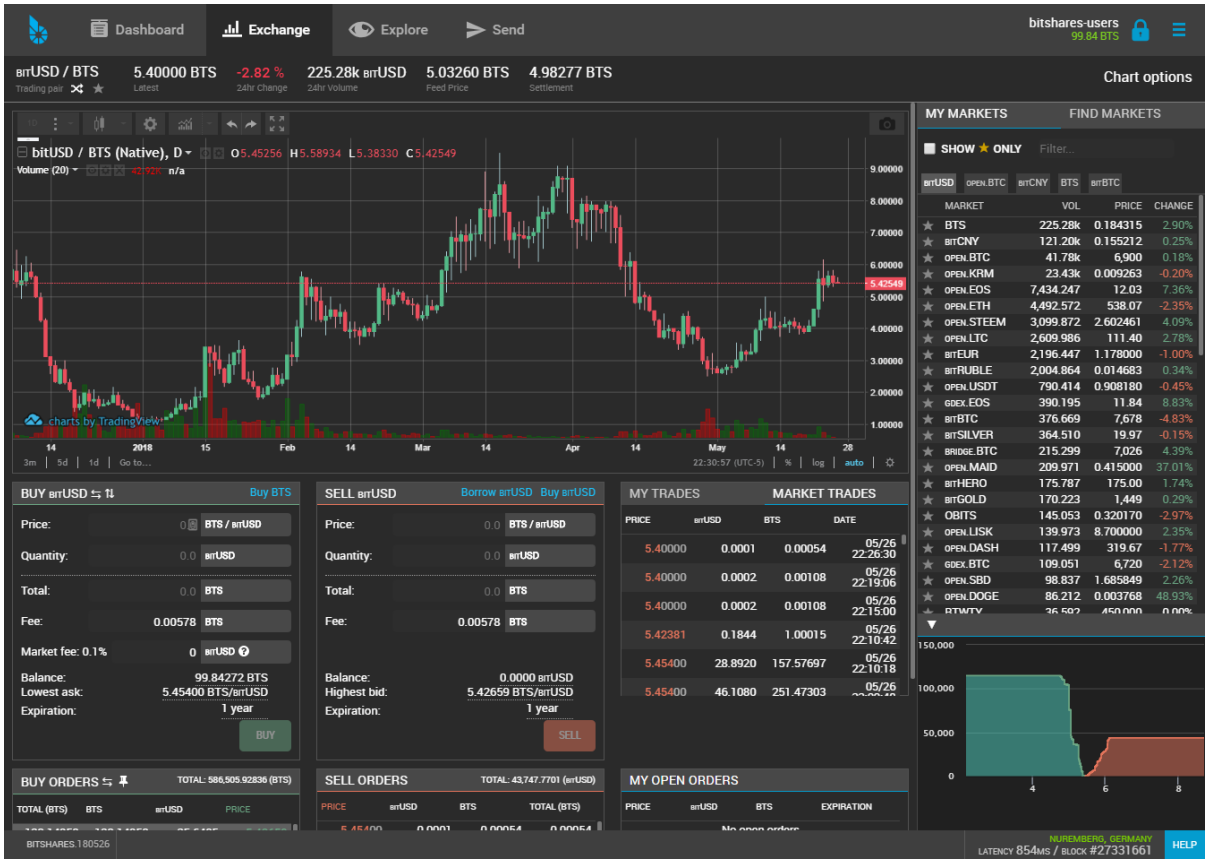
EXCHANGE AND EXPLORE

Table of Contents

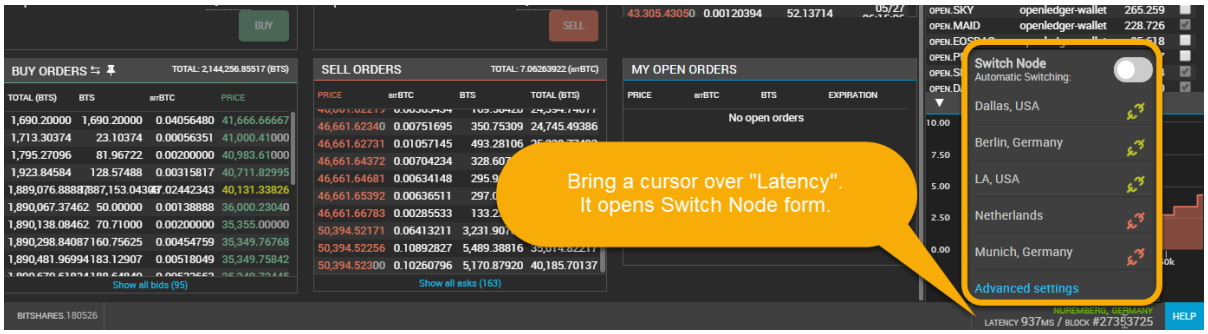
- *Exchange and Explore*
  - *Exchange*
    - *Form Features*
  - *How to trade in the DEX*
    - *Playing Orders*
      - *Fees*
  - *Explore*

17.1 Exchange

https://wallet.gph.ai/#/market/USD_GPH



17.1.1 Form Features



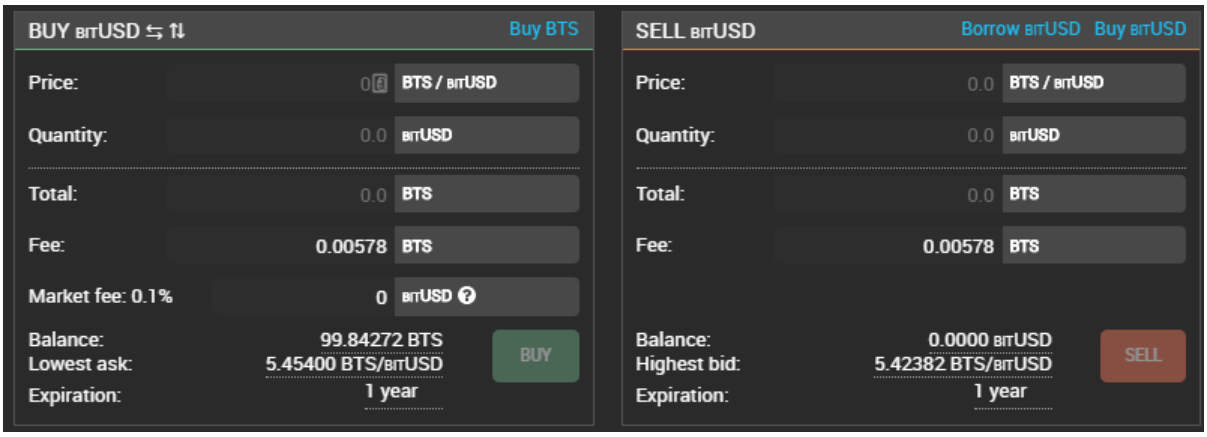
17.2 How to trade in the DEX

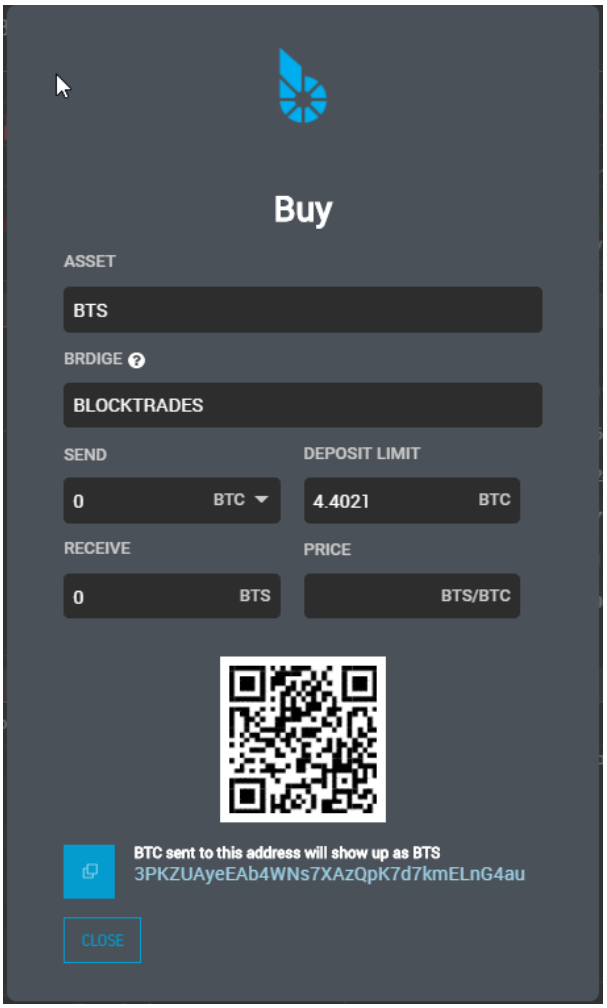
The decentralized exchange (DEX) of Graphene has a similar look&feel as traditional centralized exchanges. However, trading in the DEX can have many different appearances, depending on what user-interface is used. We here describe the user interface of the official wallet.

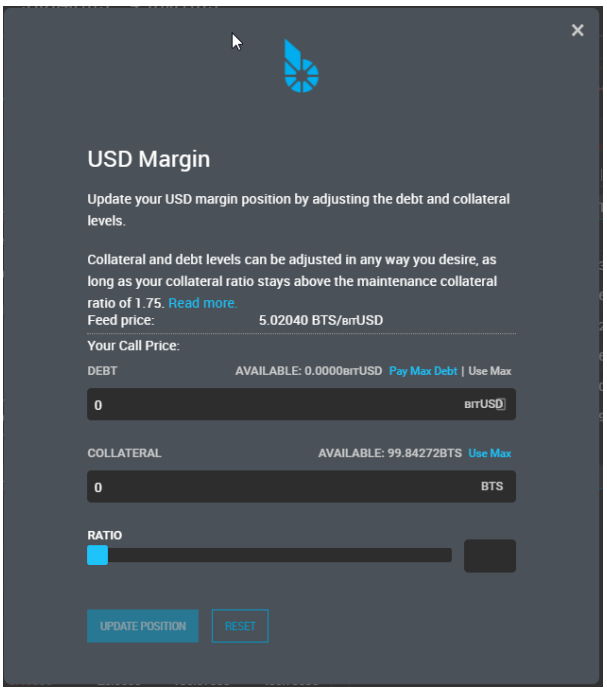
17.2.1 Playing Orders

Orders can be placed in the same way as everywhere else, by providing

- the amount to buy/sell
- the price at which to buy/sell




Buy
ASSET
BTS
BRDIGE
BLOCKTRADES
SEND
DEPOSIT LIMIT
0
BTC
4.4021
BTC
RECEIVE
PRICE
0
BTS
BTS/BTC
BTC sent to this address will show up as BTS
3PKZUAyeEAb4WNs7XAzQpK7d7kmELnG4au
CLOSE


USD Margin
Update your USD margin position by adjusting the debt and collateral levels.
Collateral and debt levels can be adjusted in any way you desire, as long as your collateral ratio stays above the maintenance collateral ratio of 1.75. Read more.
Feed price:
5.02040 BTS/BITUSD
Your Call Price:
DEBT
AVAILABLE: 0.0000BITUSD
Pay Max Debt
Use Max
0
BITUSD
COLLATERAL
AVAILABLE: 99.84272BTS
Use Max
0
BTS
RATIO
UPDATE POSITION
RESET

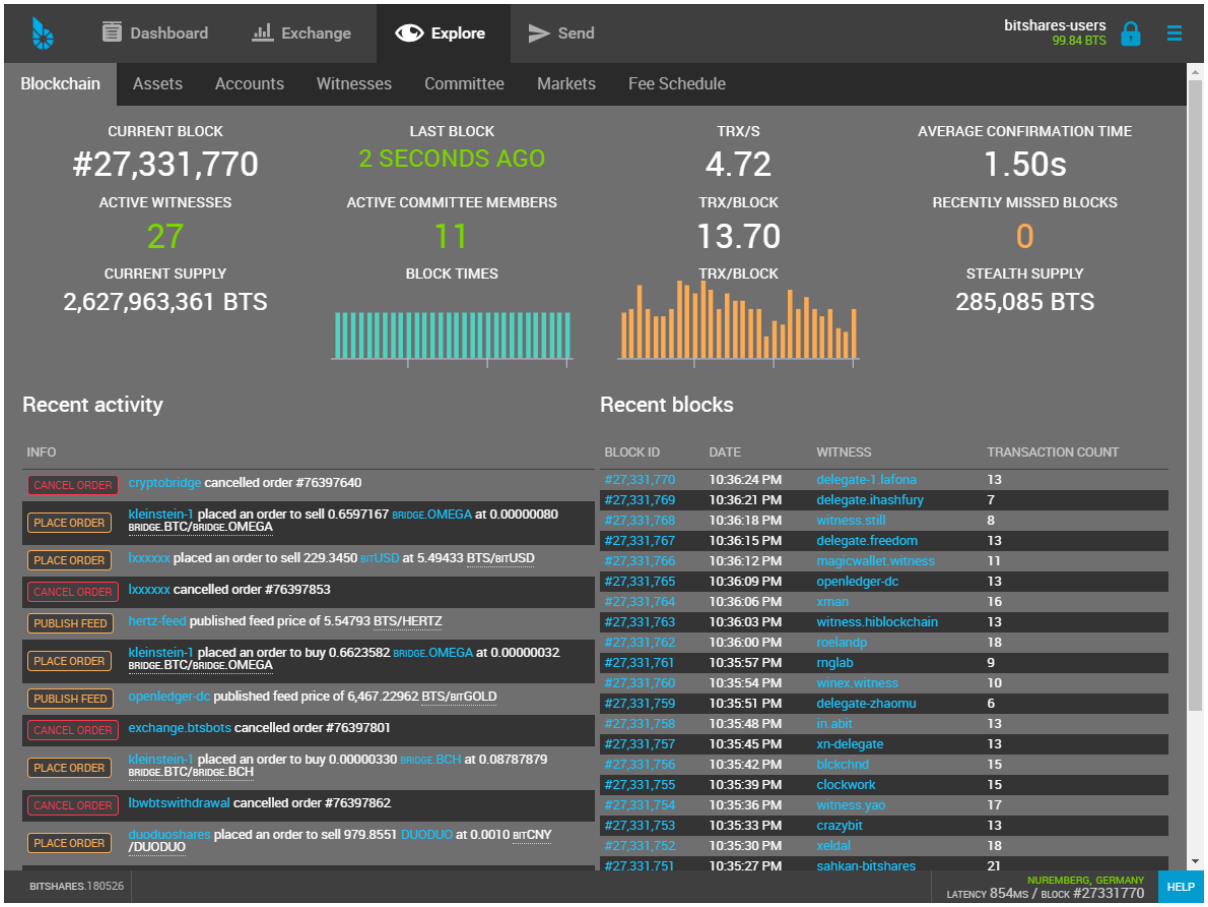
Fees

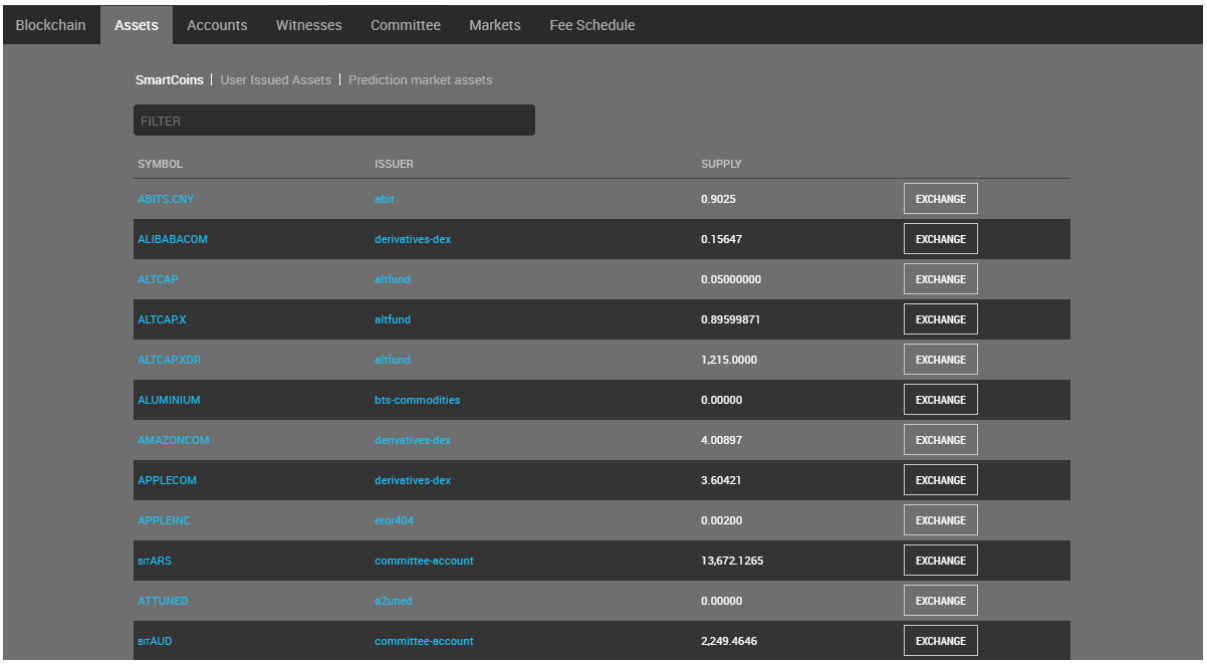
In contrast to other exchanges, Graphene asks for a tiny **flat fee** for placing an order. This fee can be payed in USD, BTC, or GOLD and is independent of the actual assets that are traded.

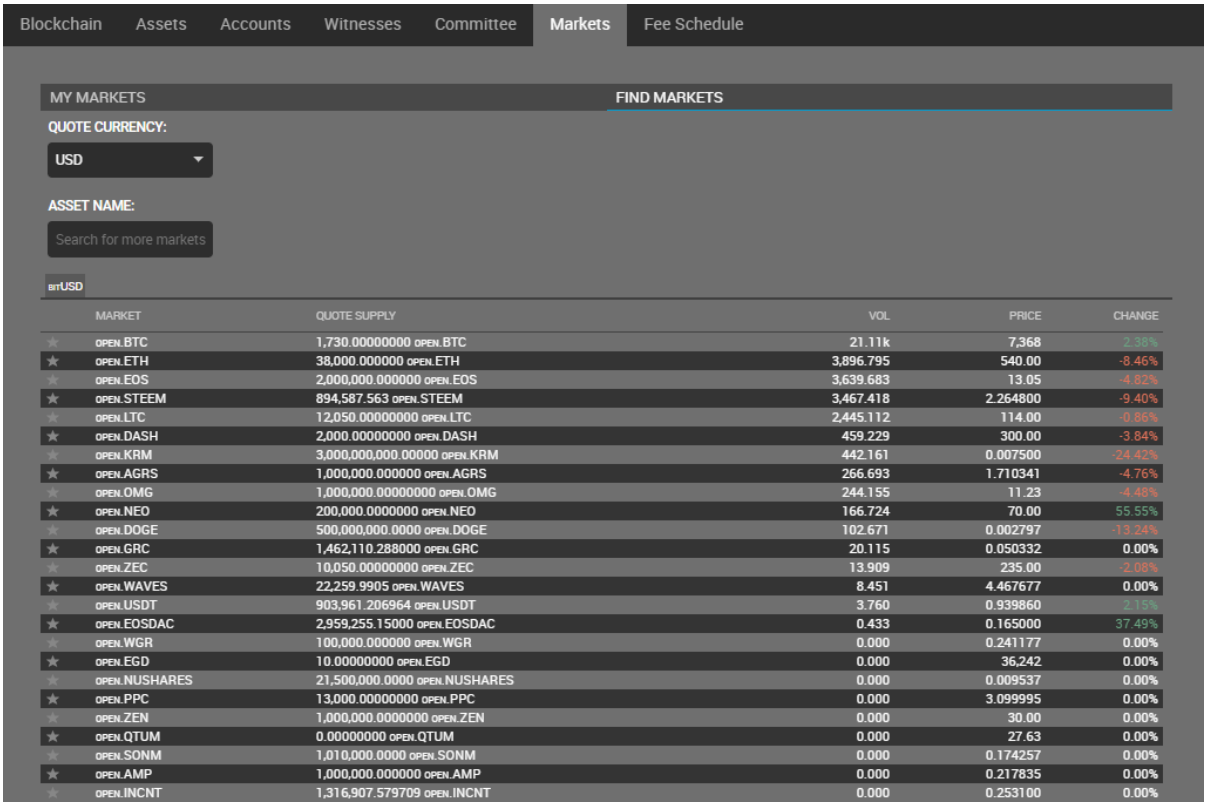
If you cancel an order that has not been fully or partially filled, 90% of the fee will be payed back to your account. However, this chargeback will be in *GPH* and not in the asset you have originally paid the fee in.

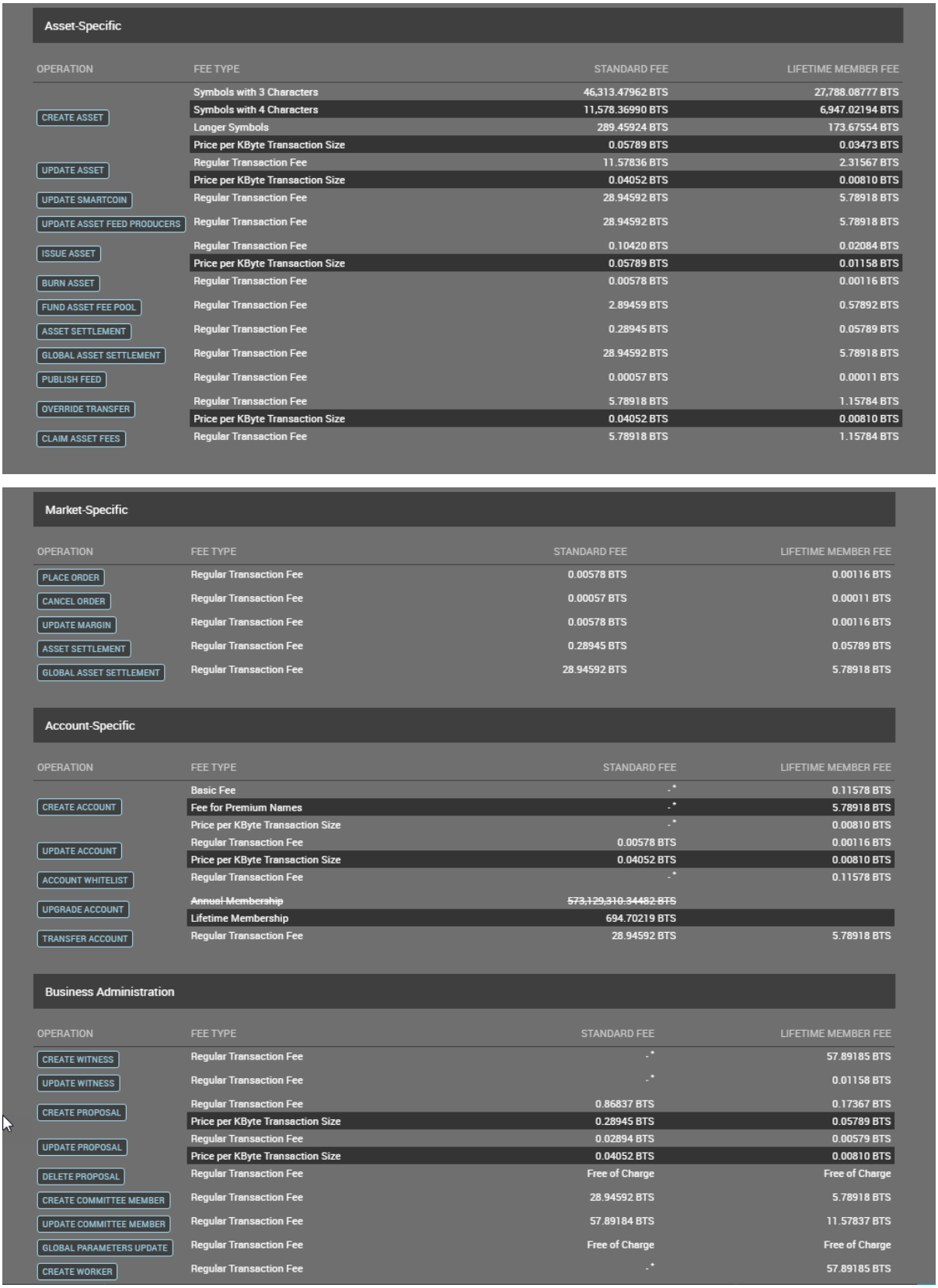
17.3 Explore

(*Forms layouts*)




Blockchain
Assets
Accounts
Witnesses
Committee
Markets
Fee Schedule
SmartCoins | User Issued Assets | Prediction market assets
FILTER
SYMBOL
ISSUER
SUPPLY
ABITS.CNY abit 0.9025 EXCHANGE
ALIBABACOM derivatives-dex 0.15647 EXCHANGE
ALTCAP altfund 0.05000000 EXCHANGE
ALTCAP.X altfund 0.89599871 EXCHANGE
ALTCAP.XDR altfund 1,215.0000 EXCHANGE
ALUMINIUM bts-commodities 0.00000 EXCHANGE
AMAZONCOM derivatives-dex 4.00897 EXCHANGE
APPLECOM derivatives-dex 3.60421 EXCHANGE
APPLEINC eror404 0.00200 EXCHANGE
BITARS committee-account 13,672.1265 EXCHANGE
ATTUNED a2uned 0.00000 EXCHANGE
BITAUD committee-account 2,249.4646 EXCHANGE


Blockchain
Assets
Accounts
Witnesses
Committee
Markets
Fee Schedule
MY MARKETS
FIND MARKETS
QUOTE CURRENCY:
USD
ASSET NAME:
Search for more markets
BITUSD
MARKET
QUOTE SUPPLY
VOL
PRICE
CHANGE
OPEN.BTC 1,730.00000000 OPEN.BTC 21.11k 7,368 2.38%
OPEN.ETH 38,000.000000 OPEN.ETH 3,896.795 540.00 -8.46%
OPEN.EOS 2,000,000.000000 OPEN.EOS 3,639.683 13.05 -4.82%
OPEN.STEEM 894,587.563 OPEN.STEEM 3,467.418 2.264800 -9.40%
OPEN.LTC 12,050.00000000 OPEN.LTC 2,445.112 114.00 -0.86%
OPEN.DASH 2,000.00000000 OPEN.DASH 459.229 300.00 -3.84%
OPEN.KRM 3,000,000,000.00000 OPEN.KRM 442.161 0.007500 -24.42%
OPEN.AGRS 1,000,000.000000 OPEN.AGRS 266.693 1.710341 -4.76%
OPEN.OMG 1,000,000.00000000 OPEN.OMG 244.155 11.23 -4.48%
OPEN.NEO 200,000.0000000 OPEN.NEO 166.724 70.00 55.55%
OPEN.DOGE 500,000,000.0000 OPEN.DOGE 102.671 0.002797 -13.24%
OPEN.GRC 1,462,110.288000 OPEN.GRC 20.115 0.050332 0.00%
OPEN.ZEC 10,050.00000000 OPEN.ZEC 13.909 235.00 -2.08%
OPEN.WAVES 22,259.9905 OPEN.WAVES 8.451 4.467677 0.00%
OPEN.USDT 903,961.206964 OPEN.USDT 3.760 0.939860 2.15%
OPEN.EOSDAC 2,959,255.15000 OPEN.EOSDAC 0.433 0.165000 37.49%
OPEN.WGR 100,000.000000 OPEN.WGR 0.000 0.241177 0.00%
OPEN.EGD 10.00000000 OPEN.EGD 0.000 36,242 0.00%
OPEN.NUSHARES 21,500,000.0000 OPEN.NUSHARES 0.000 0.009537 0.00%
OPEN.PPC 13,000.00000000 OPEN.PPC 0.000 3.099995 0.00%
OPEN.ZEN 1,000,000.0000000 OPEN.ZEN 0.000 30.00 0.00%
OPEN.QTUM 0.00000000 OPEN.QTUM 0.000 27.63 0.00%
OPEN.SONM 1,010,000.0000 OPEN.SONM 0.000 0.174257 0.00%
OPEN.AMP 1,000,000.000000 OPEN.AMP 0.000 0.217835 0.00%
OPEN.INCNT 1,316,907.579709 OPEN.INCNT 0.000 0.253100 0.00%



Asset-Specific

OPERATION	FEE TYPE	STANDARD FEE	LIFETIME MEMBER FEE
CREATE ASSET	Symbols with 3 Characters	46,313.47962 BTS	27,788.08777 BTS
	Symbols with 4 Characters	11,578.36990 BTS	6,947.02194 BTS
	Longer Symbols	289.45924 BTS	173.67554 BTS
	Price per KByte Transaction Size	0.05789 BTS	0.03473 BTS
UPDATE ASSET	Regular Transaction Fee	11.57836 BTS	2.31567 BTS
	Price per KByte Transaction Size	0.04052 BTS	0.00810 BTS
UPDATE SMARTCOIN	Regular Transaction Fee	28.94592 BTS	5.78918 BTS
UPDATE ASSET FEED PRODUCERS	Regular Transaction Fee	28.94592 BTS	5.78918 BTS
ISSUE ASSET	Regular Transaction Fee	0.10420 BTS	0.02084 BTS
	Price per KByte Transaction Size	0.05789 BTS	0.01158 BTS
BURN ASSET	Regular Transaction Fee	0.00578 BTS	0.00116 BTS
FUND ASSET FEE POOL	Regular Transaction Fee	2.89459 BTS	0.57892 BTS
ASSET SETTLEMENT	Regular Transaction Fee	0.28945 BTS	0.05789 BTS
GLOBAL ASSET SETTLEMENT	Regular Transaction Fee	28.94592 BTS	5.78918 BTS
PUBLISH FEED	Regular Transaction Fee	0.00057 BTS	0.00011 BTS
OVERRIDE TRANSFER	Regular Transaction Fee	5.78918 BTS	1.15784 BTS
	Price per KByte Transaction Size	0.04052 BTS	0.00810 BTS
CLAIM ASSET FEES	Regular Transaction Fee	5.78918 BTS	1.15784 BTS

Market-Specific

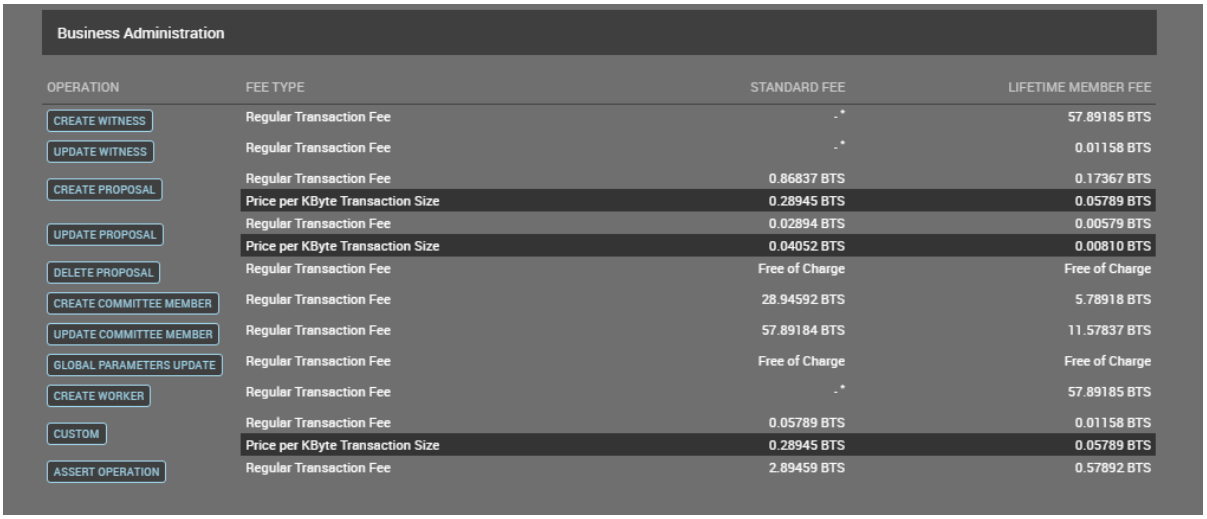
OPERATION	FEE TYPE	STANDARD FEE	LIFETIME MEMBER FEE
PLACE ORDER	Regular Transaction Fee	0.00578 BTS	0.00116 BTS
CANCEL ORDER	Regular Transaction Fee	0.00057 BTS	0.00011 BTS
UPDATE MARGIN	Regular Transaction Fee	0.00578 BTS	0.00116 BTS
ASSET SETTLEMENT	Regular Transaction Fee	0.28945 BTS	0.05789 BTS
GLOBAL ASSET SETTLEMENT	Regular Transaction Fee	28.94592 BTS	5.78918 BTS

Account-Specific

OPERATION	FEE TYPE	STANDARD FEE	LIFETIME MEMBER FEE
CREATE ACCOUNT	Basic Fee	-*	0.11578 BTS
	Fee for Premium Names	-*	5.78918 BTS
	Price per KByte Transaction Size	-*	0.00810 BTS
UPDATE ACCOUNT	Regular Transaction Fee	0.00578 BTS	0.00116 BTS
	Price per KByte Transaction Size	0.04052 BTS	0.00810 BTS
ACCOUNT WHITELIST	Regular Transaction Fee	-*	0.11578 BTS
UPGRADE ACCOUNT	~~Annual Membership~~	~~573,129,310.34482 BTS~~	
	Lifetime Membership	694.70219 BTS	
TRANSFER ACCOUNT	Regular Transaction Fee	28.94592 BTS	5.78918 BTS

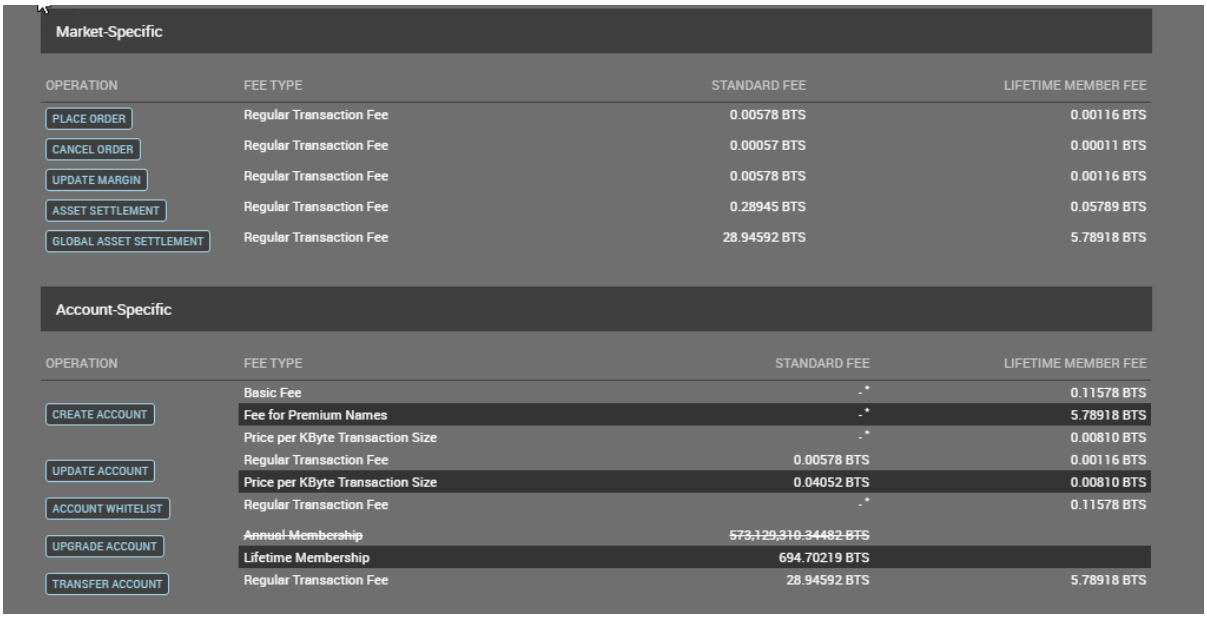
Business Administration

OPERATION	FEE TYPE	STANDARD FEE	LIFETIME MEMBER FEE
CREATE WITNESS	Regular Transaction Fee	-*	57.89185 BTS
UPDATE WITNESS	Regular Transaction Fee	-*	0.01158 BTS
CREATE PROPOSAL	Regular Transaction Fee	0.86837 BTS	0.17367 BTS
	Price per KByte Transaction Size	0.28945 BTS	0.05789 BTS
UPDATE PROPOSAL	Regular Transaction Fee	0.02894 BTS	0.00579 BTS
	Price per KByte Transaction Size	0.04052 BTS	0.00810 BTS
DELETE PROPOSAL	Regular Transaction Fee	Free of Charge	Free of Charge
CREATE COMMITTEE MEMBER	Regular Transaction Fee	28.94592 BTS	5.78918 BTS
UPDATE COMMITTEE MEMBER	Regular Transaction Fee	57.89184 BTS	11.57837 BTS
GLOBAL PARAMETERS UPDATE	Regular Transaction Fee	Free of Charge	Free of Charge
CREATE WORKER	Regular Transaction Fee	-*	57.89185 BTS



Business Administration

OPERATION	FEE TYPE	STANDARD FEE	LIFETIME MEMBER FEE
CREATE WITNESS	Regular Transaction Fee	-*	57.89185 BTS
UPDATE WITNESS	Regular Transaction Fee	-*	0.01158 BTS
CREATE PROPOSAL	Regular Transaction Fee	0.86837 BTS	0.17367 BTS
	Price per KByte Transaction Size	0.28945 BTS	0.05789 BTS
UPDATE PROPOSAL	Regular Transaction Fee	0.02894 BTS	0.00579 BTS
	Price per KByte Transaction Size	0.04052 BTS	0.00810 BTS
DELETE PROPOSAL	Regular Transaction Fee	Free of Charge	Free of Charge
CREATE COMMITTEE MEMBER	Regular Transaction Fee	28.94592 BTS	5.78918 BTS
UPDATE COMMITTEE MEMBER	Regular Transaction Fee	57.89184 BTS	11.57837 BTS
GLOBAL PARAMETERS UPDATE	Regular Transaction Fee	Free of Charge	Free of Charge
CREATE WORKER	Regular Transaction Fee	-*	57.89185 BTS
CUSTOM	Regular Transaction Fee	0.05789 BTS	0.01158 BTS
	Price per KByte Transaction Size	0.28945 BTS	0.05789 BTS
ASSERT OPERATION	Regular Transaction Fee	2.89459 BTS	0.57892 BTS



Market-Specific

OPERATION	FEE TYPE	STANDARD FEE	LIFETIME MEMBER FEE
PLACE ORDER	Regular Transaction Fee	0.00578 BTS	0.00116 BTS
CANCEL ORDER	Regular Transaction Fee	0.00057 BTS	0.00011 BTS
UPDATE MARGIN	Regular Transaction Fee	0.00578 BTS	0.00116 BTS
ASSET SETTLEMENT	Regular Transaction Fee	0.28945 BTS	0.05789 BTS
GLOBAL ASSET SETTLEMENT	Regular Transaction Fee	28.94592 BTS	5.78918 BTS

Account-Specific

OPERATION	FEE TYPE	STANDARD FEE	LIFETIME MEMBER FEE
CREATE ACCOUNT	~~Basic Fee~~	-*	0.11578 BTS
	Fee for Premium Names	-*	5.78918 BTS
	Price per KByte Transaction Size	-*	0.00810 BTS
UPDATE ACCOUNT	Regular Transaction Fee	0.00578 BTS	0.00116 BTS
	Price per KByte Transaction Size	0.04052 BTS	0.00810 BTS
ACCOUNT WHITELIST	Regular Transaction Fee	-*	0.11578 BTS
UPGRADE ACCOUNT	~~Annual Membership~~	~~573,129,310.34482 BTS~~	
	Lifetime Membership	694.70219 BTS	
TRANSFER ACCOUNT	Regular Transaction Fee	28.94592 BTS	5.78918 BTS

CHAPTER

EIGHTEEN

GRAPHENE COMMUNITY

18.1 Communities

- Telegram - Graphene
- (*will be added more*)

CHAPTER

NINETEEN

GRAPHENE BLOCKCHAIN

19.1 Graphene UI Wallet

- Graphene UI wallet

19.2 Graphene Block Exploer

- (*will be added more*)

19.3 Blockchain Activity

- Blocktivity