Swap

Release 0.4.0

Meheret Tesfaye Batu

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CONTENTS

CHAPTER ONE

SWAP

Cryptocurrencies were created to make it possible for advanced, encrypted payments to be made between two or more people digitally, without the parties involved having to trust each other for the payment be completed. In other words, cryptocurrencies make it possible to send money reliably to other people over the internet without the money being double spent, and without people getting scammed out of their money when they try to make these digital payments.

Note: Hash Time Lock Contracts (HTLC's) are a perfect example of a payment technology for cryptocurrencies which makes all of the aforementioned things possible.

Swap is a python library for Cross-chain atomic swap between the networks of two cryptocurrencies. Cross-chain atomic swap are the cheapest and most secure way to swap cryptocurrencies. It's a brand new decentralized payment environment based on Hash Time Lock Contracts (HTLC's) protocol.

CHAPTER

TWO

WHAT IS A HTLC?

A Hash Time Lock contract (HTLC) is essentially a type of payment in which two people agree to a financial arrangement where one party will pay the other party a certain amount of Cryptocurrency, such as Bitcoin or Bytom assets. However, because these contracts are Time Locked, the receiving party only has a certain amount of time to accept the payment, otherwise the money can be returned to the sender.

Hash time lock contracts can help to eliminate the need for third parties in contracts between two parties. Third parties that are often involved in contracts are lawyers, banks, etc. Lawyers are often required to draw up contracts, and banks are often required to help store money and then transfer it to the receiving party in the contract.

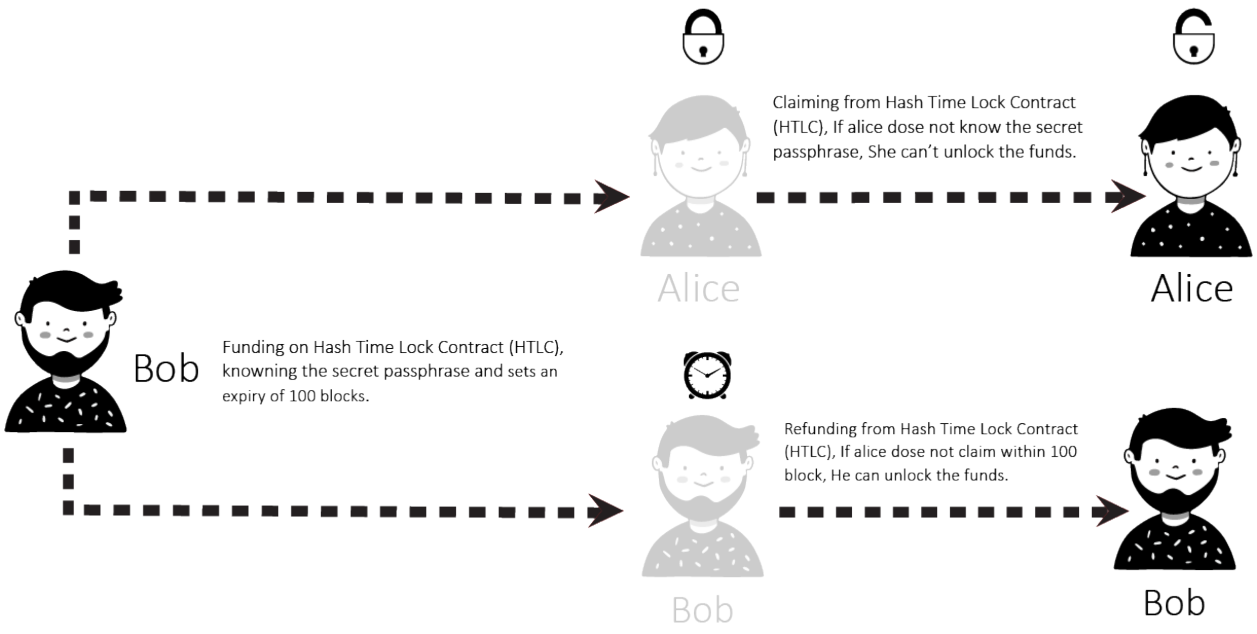
With hash time lock contracts, two parties could hypothetically set up contracts and transfer money without the need for third parties. This is because the sending party could create the conditional payment, and then the receiving party could agree to it, receive it, and help validate the transaction in the process.

This could potentially revolutionize the way that many businesses interact with one another and dramatically speed up the time that it takes for business deals to be set up.

2.1 How do HTLC work?

The way that Hash Time Lock Contracts work is that the person who will be making the payment sets up a specific hash, which represents the amount of money that will be paid. To receive the payment, the recipient will have to create a cryptographic proof of payment, and he or she will have to do this within the specified amount of time. The amount of time that the recipient has to accept the payment can vary significantly from one Time Locked contract to the next. If the recipient meets the deadline, then the money will be theirs, if he or she fails to meet the deadline, it won't. So, there is an often a lot at stake when it comes to meeting deadlines from hash Time Locked contracts, when Cryptocurrencies are being exchanged.

The amount of time that the recipient has to accept the payment can vary significantly from one Time Locked contract to the next. If the recipient meets the deadline, then the money will be theirs, if he or she fails to meet the deadline, it won't. So, there is an often a lot at stake when it comes to meeting deadlines from hash Time Locked contracts, when Cryptocurrencies are being exchanged.

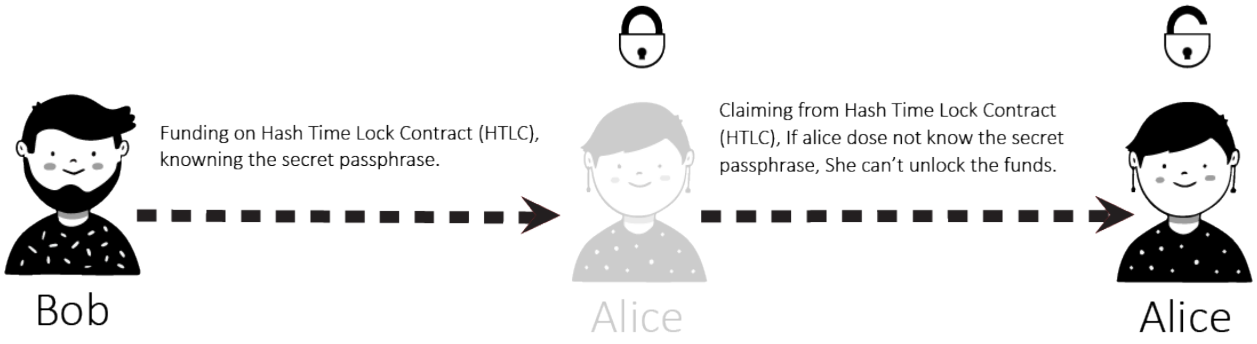

Claiming from Hash Time Lock Contract (HTLC), If alice dose not know the secret passphrase, She can't unlock the funds.
Alice
Alice
Bob
Funding on Hash Time Lock Contract (HTLC), knowning the secret passphrase and sets an expiry of 100 blocks.
Refunding from Hash Time Lock Contract (HTLC), If alice dose not claim within 100 block, He can unlock the funds.
Bob
Bob

A Hash Time Lock Contract or HTLC is a class of payments that uses Hash Locked and Time Locked to require that the receiver of a payment either acknowledge receiving the payment prior to a deadline by generating cryptographic proof of payment or forfeit the ability to claim the payment, returning(refunding) it to the payer.

Hash Time Lock Contracts (HTLCs) allow payments to be securely routed across multiple payment channels which is super important because it is not optimal for a person to open a payment channel with everyone he/she is transacting with.

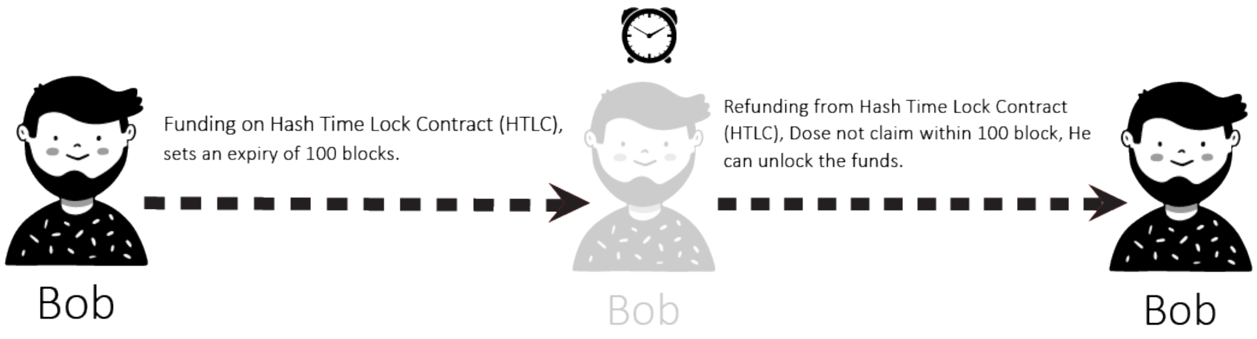
2.1.1 Hash Locked

A Hash Locked functions like "two-factor authentication" (2FA). It requires the intended recipient to provide the correct secret passphrase to claim the funds.


Funding on Hash Time Lock Contract (HTLC), knowning the secret passphrase.
Bob
Claiming from Hash Time Lock Contract (HTLC), If alice dose not know the secret passphrase, She can't unlock the funds.
Alice
Alice

2.1.2 Time Locked

A Time Locked adds a "timeout" expiration date to a payment. It requires the intended recipient to claim the funds prior to the expiry. Otherwise, the transaction defaults to enabling the original sender of funds to claim a refund.


Funding on Hash Time Lock Contract (HTLC), sets an expiry of 100 blocks.
Refunding from Hash Time Lock Contract (HTLC), Dose not claim within 100 block, He can unlock the funds.
Bob
Bob
Bob

2.2 Benefits of HTLC's

There are many benefits to these types of contracts. First, because they are time sensitive, it prevents the person who is making the payment from having to wait indefinitely to find out whether or not his or her payment goes through. Second, the person who makes the payment will not have to waste his or her money if the payment is not accepted. It will simply be returned.

2.2.1 Time Sensitivity

The time sensitive nature of the transaction prevents the sender from having to wait forever to find out whether their payment went through. If the time runs out, the funds will just be sent back to the sender, so they don't have to worry and can wait for the process to unfold.

2.2.2 Trustless system

As is the case with all smart contracts, trust is not needed as the rules are already coded into the contract itself. Hash Time Lock Contracts take this one step further by implementing a time limit for recipients to acknowledge the payment.

2.2.3 Validation of the Blockchain

Transactions are validated because of the cryptographic proof of payment required by the receiver.

2.2.4 Private Information's

There are no complicated account setups or KYC/AML restrictions. Trade directly from your wallet with a counterparty of your choice. Only the parties involved know the details of the trade.

2.2.5 Trading across multiple Cryptocurrencies

HTLC makes Cross-chain transactions easier and more secure than ever. Cross chain transactions are the next step in the evolution of Cryptocurrency adoption. The easier it becomes to unite the hundreds of blockchain's that currently exist in silos, the faster the technology as a whole can begin to scale and achieve mass adoption.

CHAPTER THREE

INSTALLING SWAP

The easiest way to install Swap is via pip:

```
$ pip install swap
```

If you want to run the latest version of the code, you can install from git:

```
$ pip install git+git://github.com/meherett/swap.git
```

For the versions available, see the tags on this repository.

3.1 Development

We welcome pull requests. To get started, just fork this github repository, clone it locally, and run:

```
$ pip install -e . -r requirements.txt
```

Once you have installed, type `swap` to verify that it worked:

```
$ swap
Usage: swap [OPTIONS] COMMAND [ARGS]...

Options:
  -v, --version  Show Swap version and exit.
  -h, --help     Show this message and exit.

Commands:
  bitcoin  Select Bitcoin provider.
  bytom    Select Bytom provider.
  vapor    Select Vapor provider.
```

3.2 Dependencies

Swap has the following dependencies:

- solc v0.8.3 - Solidity, the Smart Contract Programming Language
- bytom-wallet-desktop - version 1.1.0 or greater.
- vapor-wallet-desktop - version 1.1.7 or greater.
- pip - To install packages from the Python Package Index and other indexes
- python3 version 3.6 or greater

CHAPTER

FOUR

COMMAND LINE INTERFACE (CLI)

After you have installed, type swap to verify that it worked:

```
$ swap
Usage: swap [OPTIONS] COMMAND [ARGS]...

Options:
  -v, --version  Show Swap version and exit.
  -h, --help     Show this message and exit.

Commands:
  bitcoin   Select Bitcoin provider.
  bytom     Select Bytom provider.
  ethereum  Select Ethereum provider.
  vapor     Select Vapor provider.
  xinfin    Select XinFin provider.
```

4.1 swap

```
swap [OPTIONS] COMMAND [ARGS]...
```

Options

-v, --version
Show Swap version and exit.

4.1.1 bitcoin

Select Bitcoin provider.

```
swap bitcoin [OPTIONS] COMMAND [ARGS]...
```

decode

Select Bitcoin Transaction raw decoder.

```
swap bitcoin decode [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
Required Set Bitcoin transaction raw.

-i, --indent <indent>
Set json indent.

Default 4

-o, --offline <offline>
Set Offline decode transaction raw.

Default True

fund

Select Bitcoin Fund transaction builder.

```
swap bitcoin fund [OPTIONS]
```

Options

-a, --address <address>
Required Set Bitcoin sender address.

-ca, --contract-address <contract_address>
Required Set Bitcoin Hash Time Lock Contract (HTLC) address.

-am, --amount <amount>
Required Set Bitcoin fund amount.

-u, --unit <unit>
Set Bitcoin fund amount unit.

Default Satoshi

-n, --network <network>
Set Bitcoin network.

Default mainnet

-v, --version <version>
Set Bitcoin transaction version.

Default 2

htlc

Select Bitcoin Hash Time Lock Contract (HTLC) builder.

```
swap bitcoin htlc [OPTIONS]
```

Options

-sh, --secret-hash <secret_hash>
    Required Set secret 256 hash.

-ra, --recipient-address <recipient_address>
    Required Set Bitcoin recipient address.

-sa, --sender-address <sender_address>
    Required Set Bitcoin sender address.

-e, --endtime <endtime>
    Required Set Expiration block time (Seconds).

-n, --network <network>
    Set Bitcoin network.

    Default mainnet

-i, --indent <indent>
    Set json indent.

    Default 4

refund

Select Bitcoin Refund transaction builder.

```
swap bitcoin refund [OPTIONS]
```

Options

-a, --address <address>
    Required Set Bitcoin sender address.

-th, --transaction-hash <transaction_hash>
    Required Set Bitcoin funded transaction hash/id.

-n, --network <network>
    Set Bitcoin network.

    Default mainnet

-v, --version <version>
    Set Bitcoin transaction version.

    Default 2

sign

Select Bitcoin Transaction raw signer.

```
swap bitcoin sign [OPTIONS]
```

Options

-xpk, --xprivate-key <xprivate_key>
: **Required** Set Bitcoin root xprivate key.

-tr, --transaction-raw <transaction_raw>
: **Required** Set Bitcoin unsigned transaction raw.

-b, --bytecode <bytecode>
: Set Bitcoin witness HTLC bytecode. [default: None]

-sk, --secret-key <secret_key>
: Set secret key. [default: None]

-e, --endtime <endtime>
: Set Expiration block timestamp. [default: None]

-ac, --account <account>
: Set Bitcoin derivation from account.

  Default 1

-ch, --change <change>
: Set Bitcoin derivation from change.

  Default False

-ad, --address <address>
: Set Bitcoin derivation from address.

  Default 1

-p, --path <path>
: Set Bitcoin derivation from path. [default: None]

-v, --version <version>
: Set Bitcoin transaction version.

  Default 2

submit

Select Bitcoin Transaction raw submitter.

```
swap bitcoin submit [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
Required Set signed Bitcoin transaction raw.

withdraw

Select Bitcoin Withdraw transaction builder.

```
swap bitcoin withdraw [OPTIONS]
```

Options

-a, --address <address>
Required Set Bitcoin recipient address.

-th, --transaction-hash <transaction_hash>
Required Set Bitcoin funded transaction hash/id.

-n, --network <network>
Set Bitcoin network.

Default mainnet

-v, --version <version>
Set Bitcoin transaction version.

Default 2

4.1.2 bytom

Select Bytom provider.

```
swap bytom [OPTIONS] COMMAND [ARGS]...
```

decode

Select Bytom Transaction raw decoder.

```
swap bytom decode [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
Required Set Bytom transaction raw.

-i, --indent <indent>
Set json indent.

Default 4

fund

Select Bytom Fund transaction builder.

```
swap bytom fund [OPTIONS]
```

Options

-a, --address <address>
    Required Set Bytom sender address.

-ca, --contract-address <contract_address>
    Required Set Bytom Hash Time Lock Contract (HTLC) address.

-am, --amount <amount>
    Required Set Bytom fund amount.

-u, --unit <unit>
    Set Bytom amount unit.

    Default NEU

-as, --asset <asset>
    Set Bytom asset id.

    Default ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

-n, --network <network>
    Set Bytom network.

    Default mainnet

htlc

Select Bytom Hash Time Lock Contract (HTLC) builder.

```
swap bytom htlc [OPTIONS]
```

Options

-sh, --secret-hash <secret_hash>
    Required Set secret 256 hash.

-rpk, --recipient-public-key <recipient_public_key>
    Required Set Bytom recipient public key.

-spk, --sender-public-key <sender_public_key>
    Required Set Bytom sender public key.

-e, --endblock <endblock>
    Required Set Bytom expiration block height.

-n, --network <network>
    Set Bytom network.

    Default mainnet

-i, --indent <indent>
Set json indent.

Default 4

refund

Select Bytom Refund transaction builder.

```
swap bytom refund [OPTIONS]
```

Options

-a, --address <address>
Required Set Bytom sender address.

-th, --transaction-hash <transaction_hash>
Required Set Bytom funded transaction id/hash.

-as, --asset <asset>
Set Bytom asset id.

Default ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

-n, --network <network>
Set Bytom network.

Default mainnet

sign

Select Bytom Transaction raw signer.

```
swap bytom sign [OPTIONS]
```

Options

-xpk, --xprivate-key <xprivate_key>
Required Set Bytom xprivate key.

-tr, --transaction-raw <transaction_raw>
Required Set Bytom unsigned transaction raw.

-b, --bytecode <bytecode>
Set Bytom witness HTLC bytecode. [default: None]

-sk, --secret-key <secret_key>
Set secret key. [default: None]

-ac, --account <account>
Set Bytom derivation from account.

Default 1

-ch, --change <change>
Set Bytom derivation from change.

Default False

-ad, --address <address>
Set Bytom derivation from address.

Default 1

-p, --path <path>
Set Bytom derivation from path. [default: None]

-i, --indexes <indexes>
Set Bytom derivation from indexes. [default: None]

submit

Select Bytom Transaction raw submitter.

```
swap bytom submit [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
Required Set signed Bytom transaction raw.

withdraw

Select Bytom Withdraw transaction builder.

```
swap bytom withdraw [OPTIONS]
```

Options

-a, --address <address>
Required Set Bytom recipient address.

-th, --transaction-hash <transaction_hash>
Required Set Bytom funded transaction hash/id.

-as, --asset <asset>
Set Bytom asset id.

Default ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

-n, --network <network>
Set Bytom network.

Default mainnet

4.1.3 ethereum

Select Ethereum provider.

```
swap ethereum [OPTIONS] COMMAND [ARGS]...
```

decode

Select Ethereum Transaction raw decoder.

```
swap ethereum decode [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
    Required Set Ethereum transaction raw.

-i, --indent <indent>
    Set json indent.

        Default 4

fund

Select Ethereum Fund transaction builder.

```
swap ethereum fund [OPTIONS]
```

Options

-sh, --secret-hash <secret_hash>
    Required Set secret 256 hash.

-ra, --recipient-address <recipient_address>
    Required Set Ethereum recipient address.

-sa, --sender-address <sender_address>
    Required Set Ethereum sender address.

-e, --endtime <endtime>
    Required Set Expiration block timestamp.

-am, --amount <amount>
    Required Set Ethereum fund amount.

-u, --unit <unit>
    Set Ethereum fund amount unit.

        Default Wei

-ca, --contract-address <contract_address>
    Set Ethereum HTLC contact address. [default: None]

-n, --network <network>
    Set Ethereum network.

Default mainnet

htlc

Select Ethereum Hash Time Lock Contract (HTLC) builder.

```
swap ethereum htlc [OPTIONS]
```

Options

-ca, --contract-address <contract_address>
Set Ethereum HTLC contact address. [default: None]

-n, --network <network>
Set Ethereum network.

Default mainnet

-i, --indent <indent>
Set json indent.

Default 4

refund

Select Ethereum Refund transaction builder.

```
swap ethereum refund [OPTIONS]
```

Options

-th, --transaction-hash <transaction_hash>
Required Set Ethereum funded transaction hash/id.

-a, --address <address>
Required Set Ethereum sender address.

-ca, --contract-address <contract_address>
Set Ethereum HTLC contact address. [default: None]

-n, --network <network>
Set Ethereum network.

Default mainnet

sign

Select Ethereum Transaction raw signer.

```
swap ethereum sign [OPTIONS]
```

Options

-xpk, --xprivate-key <xprivate_key>
Required Set Ethereum root xprivate key.

-tr, --transaction-raw <transaction_raw>
Required Set Ethereum unsigned transaction raw.

-ac, --account <account>
Set Ethereum derivation from account.

Default 0

-ch, --change <change>
Set Ethereum derivation from change.

Default False

-ad, --address <address>
Set Ethereum derivation from address.

Default 0

-p, --path <path>
Set Ethereum derivation from path. [default: None]

submit

Select Ethereum Transaction raw submitter.

```
swap ethereum submit [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
Required Set signed Ethereum transaction raw.

withdraw

Select Ethereum Withdraw transaction builder.

```
swap ethereum withdraw [OPTIONS]
```

Options

-th, --transaction-hash <transaction_hash>
  Required Set Ethereum funded transaction hash/id.

-a, --address <address>
  Required Set Ethereum recipient address.

-sk, --secret-key <secret_key>
  Required Set secret password/passphrase.

-ca, --contract-address <contract_address>
  Set Ethereum HTLC contact address. [default: None]

-n, --network <network>
  Set Ethereum network.

  Default mainnet

4.1.4 vapor

Select Vapor provider.

```
swap vapor [OPTIONS] COMMAND [ARGS]...
```

decode

Select Vapor Transaction raw decoder.

```
swap vapor decode [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
  Required Set Vapor transaction raw.

-i, --indent <indent>
  Set json indent.

  Default 4

fund

Select Vapor Fund transaction builder.

```
swap vapor fund [OPTIONS]
```

Options

-a, --address <address>
: **Required** Set Vapor sender address.

-ca, --contract-address <contract_address>
: **Required** Set Vapor Hash Time Lock Contract (HTLC) address.

-am, --amount <amount>
: **Required** Set Vapor fund amount.

-u, --unit <unit>
: Set Vapor amount unit.

  Default NEU

-as, --asset <asset>
: Set Vapor asset id.

  Default ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

-n, --network <network>
: Set Vapor network.

  Default mainnet

htlc

Select Vapor Hash Time Lock Contract (HTLC) builder.

```
swap vapor htlc [OPTIONS]
```

Options

-sh, --secret-hash <secret_hash>
: **Required** Set secret 256 hash.

-rpk, --recipient-public-key <recipient_public_key>
: **Required** Set Vapor recipient public key.

-spk, --sender-public-key <sender_public_key>
: **Required** Set Vapor sender public key.

-e, --endblock <endblock>
: **Required** Set Vapor expiration block height.

-n, --network <network>
: Set Vapor network.

  Default mainnet

-i, --indent <indent>
: Set json indent.

  Default 4

refund

Select Vapor Refund transaction builder.

```
swap vapor refund [OPTIONS]
```

Options

`-a, --address` `<address>`
  Required Set Vapor sender address.

`-th, --transaction-hash` `<transaction_hash>`
  Required Set Vapor funded transaction id/hash.

`-as, --asset` `<asset>`
  Set Vapor asset id.

  Default ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

`-n, --network` `<network>`
  Set Vapor network.

  Default mainnet

sign

Select Vapor Transaction raw signer.

```
swap vapor sign [OPTIONS]
```

Options

`-xpk, --xprivate-key` `<xprivate_key>`
  Required Set Vapor xprivate key.

`-tr, --transaction-raw` `<transaction_raw>`
  Required Set Vapor unsigned transaction raw.

`-b, --bytecode` `<bytecode>`
  Set Vapor witness HTLC bytecode. [default: None]

`-sk, --secret-key` `<secret_key>`
  Set secret key. [default: None]

`-ac, --account` `<account>`
  Set Vapor derivation from account.

  Default 1

`-ch, --change` `<change>`
  Set Vapor derivation from change.

  Default False

`-ad, --address` `<address>`
  Set Vapor derivation from address.

  Default 1

-p, --path <path>
    Set Vapor derivation from path. [default: None]

-i, --indexes <indexes>
    Set Vapor derivation from indexes. [default: None]

submit

Select Vapor Transaction raw submitter.

```
swap vapor submit [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
    Required Set signed Vapor transaction raw.

withdraw

Select Vapor Withdraw transaction builder.

```
swap vapor withdraw [OPTIONS]
```

Options

-a, --address <address>
    Required Set Vapor recipient address.

-th, --transaction-hash <transaction_hash>
    Required Set Vapor funded transaction hash/id.

-as, --asset <asset>
    Set Vapor asset id.

    Default ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff

-n, --network <network>
    Set Vapor network.

    Default mainnet

4.1.5 xinfin

Select XinFin provider.

```
swap xinfin [OPTIONS] COMMAND [ARGS]...
```

decode

Select XinFin Transaction raw decoder.

```
swap xinfin decode [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
    Required Set XinFin transaction raw.

-i, --indent <indent>
    Set json indent.

        Default 4

fund

Select XinFin Fund transaction builder.

```
swap xinfin fund [OPTIONS]
```

Options

-sh, --secret-hash <secret_hash>
    Required Set secret 256 hash.

-ra, --recipient-address <recipient_address>
    Required Set XinFin recipient address.

-sa, --sender-address <sender_address>
    Required Set XinFin sender address.

-e, --endtime <endtime>
    Required Set Expiration block timestamp.

-am, --amount <amount>
    Required Set XinFin fund amount.

-u, --unit <unit>
    Set XinFin fund amount unit.

        Default Wei

-ca, --contract-address <contract_address>
    Set XinFin HTLC contact address. [default: None]

-n, --network <network>
    Set XinFin network.

        Default mainnet

htlc

Select XinFin Hash Time Lock Contract (HTLC) builder.

```
swap xinfin htlc [OPTIONS]
```

Options

-ca, --contract-address <contract_address>
Set XinFin HTLC contact address. [default: None]

-n, --network <network>
Set XinFin network.

Default mainnet

-i, --indent <indent>
Set json indent.

Default 4

refund

Select XinFin Refund transaction builder.

```
swap xinfin refund [OPTIONS]
```

Options

-th, --transaction-hash <transaction_hash>
Required Set XinFin funded transaction hash/id.

-a, --address <address>
Required Set XinFin sender address.

-ca, --contract-address <contract_address>
Set XinFin HTLC contact address. [default: None]

-n, --network <network>
Set XinFin network.

Default mainnet

sign

Select XinFin Transaction raw signer.

```
swap xinfin sign [OPTIONS]
```

Options

-xpk, --xprivate-key <xprivate_key>
Required Set XinFin root xprivate key.

-tr, --transaction-raw <transaction_raw>
Required Set XinFin unsigned transaction raw.

-ac, --account <account>
Set XinFin derivation from account.

Default 0

-ch, --change <change>
Set XinFin derivation from change.

Default False

-ad, --address <address>
Set XinFin derivation from address.

Default 0

-p, --path <path>
Set XinFin derivation from path. [default: None]

submit

Select XinFin Transaction raw submitter.

```
swap xinfin submit [OPTIONS]
```

Options

-tr, --transaction-raw <transaction_raw>
Required Set signed XinFin transaction raw.

withdraw

Select XinFin Withdraw transaction builder.

```
swap xinfin withdraw [OPTIONS]
```

Options

-th, --transaction-hash <transaction_hash>
Required Set XinFin funded transaction hash/id.

-a, --address <address>
Required Set XinFin recipient address.

-sk, --secret-key <secret_key>
Required Set secret password/passphrase.

-ca, --contract-address <contract_address>
Set XinFin HTLC contact address. [default: None]

-n, --network <network>
Set XinFin network.

Default mainnet

CHAPTER

FIVE

UTILS

class swap.utils.**NestedNamespace**(*dictionary*, ***kwargs*)

swap.utils.**generate_passphrase**(*length: int = 32*) → str

Generate entropy hex string.

Parameters **length** (*int*) – Passphrase length, default to 32.

Returns str – Passphrase hex string.

```
>>> from swap.utils import generate_passphrase
>>> generate_passphrase(length=32)
"N39rPfa3QvF2Tm2nPyoBpXNiBFXJywTz"
```

swap.utils.**generate_entropy**(*strength: int = 128*) → str

Generate entropy hex string.

Parameters **strength** (*int*) – Entropy strength, default to 128.

Returns str – Entropy hex string.

```
>>> from swap.utils import generate_entropy
>>> generate_entropy(strength=128)
"ee535b143b0d9d1f87546f9df0d06b1a"
```

swap.utils.**generate_mnemonic**(*language: str = 'english'*, *strength: int = 128*) → str

Generate mnemonic words.

Parameters

- **language** (*str*) – Mnemonic language, default to english.
- **strength** (*int*) – Entropy strength, default to 128.

Returns str – Mnemonic words.

```
>>> from swap.utils import generate_mnemonic
>>> generate_mnemonic(language="french")
"sceptre capter sequence girafe absolu relatif fleur zoologie muscle sirop saboter␣
↪parure"
```

swap.utils.**get_current_timestamp**(*plus: int = 0*) → int

Get current timestamp.

Parameters **plus** (*int*) – Add seconds on current time, default to `0`.

Returns int – Current timestamp.

```
>>> from swap.utils import get_current_timestamp
>>> get_current_timestamp()
1623869258
```

swap.utils.**is_entropy**(*entropy: str*) → bool

Check entropy hex string.

Parameters **entropy** (*str*) – Mnemonic words.

Returns bool – Entropy valid/invalid.

```
>>> from swap.utils import is_entropy
>>> is_entropy(entropy="ee535b143b0d9d1f87546f9df0d06b1a")
True
```

swap.utils.**is_mnemonic**(*mnemonic: str*, *language: Optional[str] = None*) → bool

Check mnemonic words.

Parameters

- **mnemonic** (*str*) – Mnemonic words.
- **language** (*str*) – Mnemonic language, default to None.

Returns bool – Mnemonic valid/invalid.

```
>>> from swap.utils import is_mnemonic
>>> is_mnemonic(mnemonic="sceptre capter sequence girafe absolu relatif fleur␣
↪zoologie muscle sirop saboter parure")
True
```

swap.utils.**get_entropy_strength**(*entropy: str*) → int

Get entropy strength.

Parameters **entropy** (*str*) – Entropy hex string.

Returns int – Entropy strength.

```
>>> from swap.utils import get_entropy_strength
>>> get_entropy_strength(entropy="ee535b143b0d9d1f87546f9df0d06b1a")
128
```

swap.utils.**get_mnemonic_strength**(*mnemonic: str*, *language: Optional[str] = None*) → int

Get mnemonic strength.

Parameters

- **mnemonic** (*str*) – Mnemonic words.
- **language** (*str*) – Mnemonic language, default to None.

Returns int – Mnemonic strength.

```
>>> from swap.utils import get_mnemonic_strength
>>> get_mnemonic_strength(mnemonic="sceptre capter sequence girafe absolu relatif␣
↪fleur zoologie muscle sirop saboter parure")
128
```

swap.utils.**get_mnemonic_language**(*mnemonic: str*) → str

Get mnemonic language.

Parameters **mnemonic** (*str*) – Mnemonic words.

Returns str – Mnemonic language.

```
>>> from swap.utils import get_mnemonic_language
>>> get_mnemonic_language(mnemonic="sceptre capter sequence girafe absolu relatif␣
↪fleur zoologie muscle sirop saboter parure")
"french"
```

`swap.utils.`**`entropy_to_mnemonic`**(*entropy: str*, *language: str = 'english'*) → str

Get mnemonic from entropy hex string.

Parameters

- **entropy** (*str*) – Entropy hex string.
- **language** (*str*) – Mnemonic language, default to english.

Returns str – Mnemonic words.

```
>>> from swap.utils import entropy_to_mnemonic
>>> entropy_to_mnemonic(entropy="ee535b143b0d9d1f87546f9df0d06b1a", language="korean
↪")
"           "
```

`swap.utils.`**`mnemonic_to_entropy`**(*mnemonic: str*, *language: Optional[str] = None*) → str

Get entropy from mnemonic words.

Parameters

- **mnemonic** (*str*) – Mnemonic words.
- **language** (*str*) – Mnemonic language, default to english.

Returns str – Enropy hex string.

```
>>> from swap.utils import mnemonic_to_entropy
>>> mnemonic_to_entropy(mnemonic="           ", language="korean")
"ee535b143b0d9d1f87546f9df0d06b1a"
```

`swap.utils.`**`sha256`**(*data: Union[str, bytes]*) → str

SHA256 hash.

Parameters **data** (*str, bytes*) – Any string/bytes data.

Returns str – SHA256 hash.

```
>>> from swap.utils import sha256
>>> sha256(data="Hello Meheret!")
"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb"
```

`swap.utils.`**`double_sha256`**(*data: Union[str, bytes]*) → str

Double SHA256 hash.

Parameters **data** (*str, bytes*) – Any string/bytes data.

Returns str – Double SHA256 hash.

```
>>> from swap.utils import double_sha256
>>> double_sha256(data="Hello Meheret!")
"821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e0158"
```

swap.utils.**clean_transaction_raw**(*transaction_raw: str*) → str

Clean transaction raw.

Parameters **transaction_raw** (*str*) – Any transaction raw.

Returns str – Cleaned transaction raw.

```
>>> from swap.utils import clean_transaction_raw
>>> clean_transaction_raw(transaction_raw=
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcTluZHlseDAyc3lmd2Q3bnBlaGZ4ejRsZGRoenFzdmUyZnU2dmM3
↪")

↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcTluZHlseDAyc3lmd2Q3bnBlaGZ4ejRsZGRoenFzdmUyZnU2dmM3
↪"
```

CHAPTER

SIX

BITCOIN

Bitcoin is a Cryptocurrency. It is a decentralized digital currency without a central bank or single administrator that can be sent from user to user on the peer-to-peer bitcoin network without the need for intermediaries.

For more https://bitcoin.org

6.1 Wallet

The implementation of Hierarchical Deterministic (HD) wallets generator for Bitcoin blockchain.

class `swap.providers.bitcoin.wallet.`**`Wallet`**(*network: str = 'mainnet'*, *use_default_path: bool = False*)

Bitcoin hierarchical deterministic wallet.

Parameters

- **`network`** (*`str`*) – Bitcoin network, defaults to `mainnet`.
- **`use_default_path`** (*`bool`*) – Use default derivation path, defaults to `False`.

Returns Wallet – Bitcoin instance.

Note: Bitcoin has only two networks, `mainnet` and `mainnet`.

`from_entropy`(*entropy: str*, *language: str = 'english'*, *passphrase: Optional[str] = None*) → *swap.providers.bitcoin.wallet.Wallet*

Initialize wallet from entropy.

Parameters

- **`entropy`** (*`str`*) – Bitcoin entropy.
- **`language`** (*`str`*) – Bitcoin language, default to english.
- **`passphrase`** (*`str`*) – Bitcoin passphrase, default to None.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

`from_mnemonic`(*mnemonic: str*, *language: Optional[str] = None*, *passphrase: Optional[str] = None*) → *swap.providers.bitcoin.wallet.Wallet*

Initialize wallet from mnemonic.

Parameters

- **mnemonic** (*str*) – Bitcoin mnemonic.
- **language** (*str*) – Bitcoin language, default to english.
- **passphrase** (*str*) – Bitcoin passphrase, default to None.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_mnemonic(mnemonic="unfair divorce remind addict add roof park␣
↪clown build renew illness fault")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_seed(*seed: str*) → *swap.providers.bitcoin.wallet.Wallet*

Initialize wallet from seed.

Parameters **seed** (*str*) – Bitcoin seed.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_seed(seed=
↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_root_xprivate_key(*xprivate_key: str*, *strict: bool = True*) → *swap.providers.bitcoin.wallet.Wallet*

Master from Root XPrivate Key.

Parameters

- **xprivate_key** (*str*) – Bitcoin XPrivate key.
- **strict** (*bool*) – Strict for must be root xprivate key, default to True.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTv
↪")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_root_xpublic_key(*xpublic_key: str*, *strict: bool = True*) → *swap.providers.bitcoin.wallet.Wallet*

Master from Root XPublic Key.

Parameters

- **xpublic_key** (*str*) – Bitcoin XPublic key.
- **strict** (*bool*) – Strict for must be root xprivate key, default to True.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_root_xpublic_key(xpublic_key=
↪"tpubD6NzVbkrYhZ4XpK9BpGhJuvfHJMeAggFcHCZH3NKsSbcettti Jnp184yx2cp2uJyapPQLt7LGTLUZvnKWbdgKBkv
↪")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_xprivate_key(*xprivate_key: str*) → *swap.providers.bitcoin.wallet.Wallet*

Initialize wallet from root xprivate key.

Parameters **xprivate_key** (*str*) – Bitcoin root xprivate key.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"tprv8kqWVfMdSgo9WhUAxbmL6GNW4ivePvEZBu8QiiRfMXbVDgnHx16vndnAsv7Uds4iFvjMpdJiB6q6hhh753fRb89
↪")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_xpublic_key(*xpublic_key: str*) → *swap.providers.bitcoin.wallet.Wallet*

Initialize wallet from XPrivate key.

Parameters **xpublic_key** (*str*) – Bitcoin XPrivate key.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"tpubDHXYe5Psb4UpQAVxrFRvVg2cdkSaZFRTmCjC1ETxmoPt4B34aPvWy8Q343tUsTaCQCiSJVpzgyP1NQ3mffY7oF6
↪")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_wif(*wif: str*) → *swap.providers.bitcoin.wallet.Wallet*

Initialize wallet from wallet important format (WIF).

Parameters **wif** (*str*) – Bitcoin important format.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_wif(wif="cS6utJFQYTQEAY455hRQ5nardhCCoc2yf4M45P71ve5Dx44ag7qg")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_private_key(*private_key*) → *swap.providers.bitcoin.wallet.Wallet*

Initialize wallet from private key.

Parameters **private_key** (*str*) – Bitcoin private key.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
```

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```
>>> wallet.from_private_key(private_key=
↪"86e4296c4b8804b952933ddf9b786a0bad1049c1d5b372e43f9336eb4ac2fcb6")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_path(*path: str*) → *swap.providers.bitcoin.wallet.Wallet*

Drive Bitcoin from path.

Parameters **path** (*str*) – Bitcoin path.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet", use_default_path=False)
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/1'/0'/0/0")
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

from_index(*index: int*, *hardened: bool = False*) → *swap.providers.bitcoin.wallet.Wallet*

Drive Bitcoin from index.

Parameters

- **index** (*int*) – Bitcoin index.
- **hardened** (*bool*) – Use harden, default to False.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet", use_default_path=False)
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_index(index=44, hardened=True)
>>> wallet.from_index(index=1, hardened=True)
>>> wallet.from_index(index=0, hardened=True)
>>> wallet.from_index(index=0)
>>> wallet.from_index(index=0)
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
```

clean_derivation() → *swap.providers.bitcoin.wallet.Wallet*

Clean derivation Bitcoin.

Returns Wallet – Bitcoin instance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.path()
"m/44'/1'/0'/0/0"
>>> wallet.clean_derivation()
<swap.providers.bitcoin.wallet.Wallet object at 0x040DA268>
>>> wallet.path()
None
```

strength() → Optional[int]

Get Bitcoin strength.

Returns int – Bitcoin strength.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.strength()
128
```

entropy() → Optional[str]
Get Bitcoin entropy.

Returns str – Bitcoin entropy.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_mnemonic(mnemonic="unfair divorce remind addict add roof park␣
↪clown build renew illness fault")
>>> wallet.entropy()
"ed0802d701a033776811601dd6c5c4a9"
```

mnemonic() → Optional[str]
Get Bitcoin mnemonic.

Returns str – Bitcoin mnemonic.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.mnemonic()
"unfair divorce remind addict add roof park clown build renew illness fault"
```

passphrase() → Optional[str]
Get Bitcoin passphrase.

Returns str – Bitcoin passphrase.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9", passphrase="meherett
↪")
>>> wallet.passphrase()
"meherett"
```

language() → Optional[str]
Get Bitcoin language.

Returns str – Bitcoin language.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.language()
"english"
```

seed() → Optional[str]
Get Bitcoin seed.

Returns str – Bitcoin seed.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.seed()

↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪"
```

root_xprivate_key(*encoded: bool = True*) → Optional[str]

Get Bitcoin root xprivate key.

Parameters **encoded** (*bool*) – Encoded root xprivate key, default to True.

Returns str – Bitcoin root xprivate key.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.root_xprivate_key()

↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTv
↪"
```

root_xpublic_key(*encoded: bool = True*) → Optional[str]

Get Bitcoin root xpublic key.

Parameters **encoded** (*bool*) – Encoded root xpublic key, default to True.

Returns str – Bitcoin root xpublic key.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.root_xpublic_key()

↪"tpubD6NzVbkrYhZ4XpK9BpGhJuvfHJMeAggFcHCZH3NKsSbcetttiJnp184yx2cp2uJyapPQLt7LGTLUZvnKWbdgKBk
↪"
```

xprivate_key(*encoded: bool = True*) → Optional[str]

Get Bitcoin root xprivate key.

Parameters **encoded** (*bool*) – Encoded root xprivate key, default to True.

Returns str – Bitcoin root xprivate key.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.xprivate_key()

↪"tprv8kqWVfMdSgo9WhUAxbmL6GNW4ivePvEZBu8QiiRfMXbVDgnHx16vndnAsv7Uds4iFvjMpdJiB6q6hhh753fRb89
↪"
```

xpublic_key(*encoded: bool = True*) → Optional[str]

Get Bitcoin xpublic key.

Parameters **encoded** (*bool*) – Encoded xprivate key, default to True.

Returns str – Bitcoin xpublic key.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.xpublic_key()

↪"tpubDHXYe5Psb4UpQAVxrFRvVg2cdkSaZFRTmCjC1ETxmoPt4B34aPvWy8Q343tUsTaCQCiSJVpzgyP1NQ3mffY7oF6u
↪"
```

uncompressed(*compressed: Optional[str] = None*) → str

Get Bitcoin Uncompressed public key.

Parameters **compressed** (*str*) – Compressed public key, default to None.

Returns str – Bitcoin Uncompressed public key.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.uncompressed()

↪"f4206f9c6d35f50b3b05edc13118ab64d27959d0b7412638bfea5d132b3fb36c6d9515384318aab7fc4d15d5a1ec
↪"
```

compressed(*uncompressed: Optional[str] = None*) → str

Get Bitcoin Compressed public key.

Parameters **uncompressed** (*str*) – Uncompressed public key, default to None.

Returns str – Bitcoin Compressed public key.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.compressed()
"02f4206f9c6d35f50b3b05edc13118ab64d27959d0b7412638bfea5d132b3fb36c"
```

chain_code() → str

Get Bitcoin chain code.

Returns str – Bitcoin chain code.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.chain_code()
"cbe00345c4cfa83dc315e52b1d5acaf2c6fce1bc8760f02696c05c3a94171304"
```

private_key() → str

Get Bitcoin private key.

Returns str – Bitcoin private key.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.private_key()
"86e4296c4b8804b952933ddf9b786a0bad1049c1d5b372e43f9336eb4ac2fcb6"
```

public_key(*compressed: bool = True*, *private_key: Optional[str] = None*) → str
Get Bitcoin Public key.

Parameters

- **compressed** (*bool*) – Compressed public key, default to `True`.
- **private_key** (*str*) – Private key hex string, default to `None`.

Returns str – Bitcoin public key.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.public_key()
"02f4206f9c6d35f50b3b05edc13118ab64d27959d0b7412638bfea5d132b3fb36c"
```

path() → Optional[str]
Get Bitcoin path.

Returns str – Bitcoin path.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.path()
"m/44'/1'/0'/0/0"
```

wif() → str
Get Bitcoin important format (WIF).

Returns str – Bitcoin important format.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.wif()
"cS6utJFQYTQEAY455hRQ5nardhCCoc2yf4M45P71ve5Dx44ag7qg"
```

hash(*private_key: Optional[str] = None*) → str
Get Bitcoin public key/address hash.

Returns str – Bitcoin public key/address hash.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
```

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```
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.hash()
"e00ff2a640b7ce2d336860739169487a57f84b15"
```

address() → str
Get Bitcoin address.

Returns str – Bitcoin address.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.address()
"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a"
```

balance(*unit: str = 'Satoshi'*) → Union[int, float]
Get Bitcoin balance.

Parameters **unit** (*str*) – Bitcoin unit, default to Satoshi.

Returns int, float – Bitcoin balance.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.balance(unit="BTC")
0.2
```

utxos(*limit: int = 15*) → list
Get Bitcoin unspent transaction output (UTXO's).

Parameters **limit** (*int*) – Limit of UTXO's, default is 15.

Returns list – Bitcoin unspent transaction outputs.

```
>>> from swap.providers.bitcoin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy("ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/1'/0'/0/0")
>>> wallet.utxos()
[{'index': 0, 'hash':
↪'9d60a8b4dd16d4bf02835a21a3e9154e636ba06ad55368f36114eb7e930b35e8', 'output_
↪index': 1, 'amount': 100000, 'script':
↪'76a914e00ff2a640b7ce2d336860739169487a57f84b1588ac'}, {'index': 1, 'hash':
↪'77ecb5ffe0f85454183bcab0cf1e15bfc62dc86cbdeaf374224ba03cb5cd7d29', 'output_
↪index': 0, 'amount': 10000, 'script':
↪'76a914e00ff2a640b7ce2d336860739169487a57f84b1588ac'}, {'index': 2, 'hash':
↪'e3ed50900a06990c123f3e87187009ce124cb65a46cd45eba5773fb0979fce43', 'output_
↪index': 0, 'amount': 1797372, 'script':
↪'76a914e00ff2a640b7ce2d336860739169487a57f84b1588ac'}]
```

6.2 Hash Time Lock Contract (HTLC)

Bitcoin Hash Time Lock Contract (HTLC).

class `swap.providers.bitcoin.htlc.`**`HTLC`**(*network: str = 'mainnet'*, *contract_address: Optional[str] = None*)

Bitcoin Hash Time Lock Contract (HTLC).

Parameters **`network`** (*str*) – Bitcoin network, defaults to mainnet.

Returns HTLC – Bitcoin HTLC instance.

Note: Bitcoin has only two networks, `mainnet` and `testnet`.

`build_htlc`(*secret_hash: str*, *recipient_address: str*, *sender_address: str*, *endtime: int*) → *swap.providers.bitcoin.htlc.HTLC*

Build Bitcoin Hash Time Lock Contract (HTLC).

Parameters

- **`secret_hash`** (*str*) – secret sha-256 hash.
- **`recipient_address`** (*str*) – Bitcoin recipient address.
- **`sender_address`** (*str*) – Bitcoin sender address.
- **`endtime`** (*int*) – Expiration block time (Seconds).

Returns HTLC – Bitcoin Hash Time Lock Contract (HTLC) instance.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", sender_address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", endtime=1624687630)
<swap.providers.bitcoin.htlc.HTLC object at 0x0409DAF0>
```

`from_opcode`(*opcode: str*) → *swap.providers.bitcoin.htlc.HTLC*

Initiate Bitcoin Hash Time Lock Contract (HTLC) from opcode script.

Parameters **`opcode`** (*str*) – Bitcoin opcode script.

Returns HTLC – Bitcoin Hash Time Lock Contract (HTLC) instance.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> opcode: str = "OP_IF OP_HASH256␣
↪821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e0158 OP_
↪EQUALVERIFY OP_DUP OP_HASH160 0a0a6590e6ba4b48118d21b86812615219ece76b OP_
↪EQUALVERIFY OP_CHECKSIG OP_ELSE 0ec4d660 OP_CHECKLOCKTIMEVERIFY OP_DROP OP_
↪DUP OP_HASH160 e00ff2a640b7ce2d336860739169487a57f84b15 OP_EQUALVERIFY OP_
↪CHECKSIG OP_ENDIF"
>>> htlc.from_opcode(opcode=opcode)
<swap.providers.bitcoin.htlc.HTLC object at 0x0409DAF0>
```

`from_bytecode`(*bytecode: str*) → *swap.providers.bitcoin.htlc.HTLC*

Initialize Bitcoin Hash Time Lock Contract (HTLC) from bytecode.

Parameters **bytecode** (*str*) – Bitcoin bytecode.

Returns HTLC – Bitcoin Hash Time Lock Contract (HTLC) instance.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140a0a6590e6ba4
↪"
>>> htlc.from_bytecode(bytecode=bytecode)
<swap.providers.bitcoin.htlc.HTLC object at 0x0409DAF0>
```

bytecode() → str
Get Bitcoin Hash Time Lock Contract (HTLC) bytecode.

Returns str – Bitcoin HTLC bytecode.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(sha256("Hello Meheret!"),
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", "n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a",␣
↪1624687630)
>>> htlc.bytecode()

↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140a0a6590e6ba4
↪"
```

opcode() → str
Get Bitcoin Hash Time Lock Contract (HTLC) OP_Code.

Returns str – Bitcoin HTLC opcode.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(sha256("Hello Meheret!"),
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", "n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a",␣
↪1624687630)
>>> htlc.opcode()
"OP_IF OP_HASH256␣
↪821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e0158 OP_
↪EQUALVERIFY OP_DUP OP_HASH160 0a0a6590e6ba4b48118d21b86812615219ece76b OP_
↪EQUALVERIFY OP_CHECKSIG OP_ELSE 0ec4d660 OP_CHECKLOCKTIMEVERIFY OP_DROP OP_
↪DUP OP_HASH160 e00ff2a640b7ce2d336860739169487a57f84b15 OP_EQUALVERIFY OP_
↪CHECKSIG OP_ENDIF"
```

hash() → str
Get Bitcoin HTLC hash.

Returns str – Bitcoin Hash Time Lock Contract (HTLC) hash.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(sha256("Hello Meheret!"),
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", "n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a",␣
↪1624687630)
```

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```
>>> htlc.hash()
"a914c8c77a9b43ee2bdf1a07c48699833d7668bf264c87"
```

contract_address() → str

Get Bitcoin Hash Time Lock Contract (HTLC) address.

Returns str – Bitcoin HTLC address.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(sha256("Hello Meheret!"),
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", "n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a",␣
↪1624687630)
>>> htlc.contract_address()
"2NBYr6gvh4ujsRwKKjDrrRr2vGonazzX6Z6"
```

balance(*unit: str = 'Satoshi'*) → Union[int, float]

Get Bitcoin HTLC balance.

Parameters **unit** (*str*) – Bitcoin unit, default to Satoshi.

Returns int, float – Bitcoin wallet balance.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(sha256("Hello Meheret!"),
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", "n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a",␣
↪1624687630)
>>> htlc.balance(unit="BTC")
0.001
```

utxos(*limit: int = 15*) → list

Get Bitcoin HTLC unspent transaction output (UTXO's).

Parameters **limit** (*int*) – Limit of UTXO's, default is 15.

Returns list – Bitcoin unspent transaction outputs.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(sha256("Hello Meheret!"),
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", "n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a",␣
↪1624687630)
>>> htlc.utxos()
[{'index': 0, 'hash':
↪'a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31', 'output_
↪index': 0, 'amount': 100000, 'script':
↪'a914c8c77a9b43ee2bdf1a07c48699833d7668bf264c87'}]
```

6.3 Transaction

Bitcoin transaction in blockchain network.

class `swap.providers.bitcoin.transaction.`**`Transaction`**(*network: str = 'mainnet', version: int = 2*)

Bitcoin Transaction.

Parameters

- **`network`** (*`str`*) – Bitcoin network, defaults to `mainnet`.
- **`version`** (*`int`*) – Bitcoin transaction version, defaults to `2`.

Returns Transaction – Bitcoin transaction instance.

Note: Bitcoin has only two networks, `mainnet` and `testnet`.

`fee`(*unit: str = 'Satoshi'*) → Union[int, float]

Get Bitcoin transaction fee.

Parameters **`unit`** (*`str`*) – Bitcoin unit, default to `Satoshi`.

Returns int, float – Bitcoin transaction fee.

```
>>> from swap.providers.bitcoin.transaction import WithdrawTransaction
>>> withdraw_transaction = WithdrawTransaction("testnet")
>>> withdraw_transaction.build_transaction("mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V",
↪ "a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
>>> withdraw_transaction.fee(unit="Satoshi")
576
```

`hash`() → str

Get Bitcoin transaction hash.

Returns str – Bitcoin transaction id/hash.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.providers.bitcoin.transaction import FundTransaction
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", sender_address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", endtime=1624687630)
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", htlc=htlc, amount=0.001, unit="BTC")
>>> fund_transaction.hash()
"9cc0524fb8e7b2c5fecaee4eb91d43a3dc5cc18e9906abcb35a5732ff52efcc7"
```

`json`() → dict

Get Bitcoin transaction json format.

Returns dict – Bitcoin transaction json format.

```
>>> from swap.providers.bitcoin.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="testnet")
>>> refund_transaction.build_transaction(address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
```

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```
>>> refund_transaction.json()
{"hex":
↪"02000000012c392217483906f902e73c4bc132864de58153772d79268960998162266634be0100000000ffffff
↪", "txid": "9cc0524fb8e7b2c5fecaee4eb91d43a3dc5cc18e9906abcb35a5732ff52efcc7",
↪ "hash": "9cc0524fb8e7b2c5fecaee4eb91d43a3dc5cc18e9906abcb35a5732ff52efcc7",
↪"size": 117, "vsize": 117, "version": 2, "locktime": 0, "vin": [{"txid":
↪"be346626628199608926792d775381e54d8632c14b3ce702f90639481722392c", "vout": 1,
↪ "scriptSig": {"asm": "", "hex": ""}, "sequence": "4294967295"}], "vout": [{
↪"value": "0.00001000", "n": 0, "scriptPubKey": {"asm": "OP_HASH160␣
↪971894c58d85981c16c2059d422bcde0b156d044 OP_EQUAL", "hex":
↪"a914971894c58d85981c16c2059d422bcde0b156d04487", "type": "p2sh", "address":
↪"2N729UBGZB3xjsGFRgKivy4bSjkaJGMVSpB"}}, {"value": "0.00010662", "n": 1,
↪"scriptPubKey": {"asm": "OP_DUP OP_HASH160␣
↪6bce65e58a50b97989930e9a4ff1ac1a77515ef1 OP_EQUALVERIFY OP_CHECKSIG", "hex":
↪"76a9146bce65e58a50b97989930e9a4ff1ac1a77515ef188ac", "type": "p2pkh",
↪"address": "mqLyrNDjpENRMZAoDpspH7kR9RtgvhWzYE"}}]}
```

raw() → str

Get Bitcoin main transaction raw.

Returns str – Bitcoin transaction raw.

```
>>> from swap.providers.bitcoin.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction("testnet")
>>> withdraw_transaction.build_transaction(address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
>>> withdraw_transaction.raw()

↪"02000000012c392217483906f902e73c4bc132864de58153772d79268960998162266634be0100000000ffffff
↪"
```

type() → str

Get Bitcoin signature transaction type.

Returns str – Bitcoin signature transaction type.

```
>>> from swap.providers.bitcoin.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"testnet")
>>> withdraw_transaction.build_transaction(address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
>>> withdraw_transaction.type()
"bitcoin_withdraw_unsigned"
```

6.3.1 FundTransaction

class swap.providers.bitcoin.transaction.**FundTransaction**(*network: str = 'mainnet'*, *version: int = 2*)
Bitcoin Fund transaction.

Parameters

- **network** (*str*) – Bitcoin network, defaults to `mainnet`.
- **version** (*int*) – Bitcoin transaction version, defaults to `2`.

Returns FundTransaction – Bitcoin fund transaction instance.

Warning: Do not forget to build transaction after initialize fund transaction.

build_transaction(*address: str*, *htlc: swap.providers.bitcoin.htlc.HTLC*, *amount: Optional[Union[int, float]]*, *unit: str = 'Satoshi'*, *locktime: int = 0*) → *swap.providers.bitcoin.transaction.FundTransaction*
Build Bitcoin fund transaction.

Parameters

- **address** (*str*) – Bitcoin sender address.
- **htlc** (`bitcoin.htlc.HTLC`) – Bitcoin HTLC instance.
- **amount** (*int, float*) – Bitcoin amount, default to `None`.
- **unit** (*str*) – Bitcoin unit, default to `Satoshi`.
- **locktime** (*int*) – Bitcoin transaction lock time, defaults to `0`.

Returns FundTransaction – Bitcoin fund transaction instance.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.providers.bitcoin.transaction import FundTransaction
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", sender_address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", endtime=1624687630)
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", htlc=htlc, amount=0.001, unit="BTC")
<swap.providers.bitcoin.transaction.FundTransaction object at 0x0409DAF0>
```

sign(*solver: swap.providers.bitcoin.solver.FundSolver*) → *swap.providers.bitcoin.transaction.FundTransaction*
Sign Bitcoin fund transaction.

Parameters **solver** (`bitcoin.solver.FundSolver`) – Bitcoin fund solver.

Returns FundTransaction – Bitcoin fund transaction instance.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.providers.bitcoin.transaction import FundTransaction
>>> from swap.providers.bitcoin.solver import FundSolver
>>> from swap.utils import sha256
```

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```
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", sender_address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", endtime=1624687630)
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", htlc=htlc, amount=0.001, unit="BTC")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTv
↪")
>>> fund_transaction.sign(solver=fund_solver)
<swap.providers.bitcoin.transaction.FundTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Bitcoin fund transaction raw.

Returns str – Bitcoin fund transaction raw.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.providers.bitcoin.transaction import FundTransaction
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", sender_address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", endtime=1624687630)
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", htlc=htlc, amount=0.001, unit="BTC")
>>> fund_transaction.transaction_raw()

↪"eyJmZWUiOiAxMTIyLCAicmF3IjogIjAyMDAwMDAwMDIzMWZiNzZhMGMzOGQ1NzM4MWIzMTEwZTRmNWVlOWI1MjgxZGN
↪"
```

6.3.2 WithdrawTransaction

class swap.providers.bitcoin.transaction.**WithdrawTransaction**(*network: str = 'mainnet'*, *version: int = 2*)

Bitcoin Withdraw transaction.

Parameters

- **network** (*str*) – Bitcoin network, defaults to `mainnet`.
- **version** (*int*) – Bitcoin transaction version, defaults to 2.

Returns WithdrawTransaction – Bitcoin withdraw transaction instance.

Warning: Do not forget to build transaction after initialize withdraw transaction.

build_transaction(*address: str*, *transaction_hash: str*, *locktime: int = 0*) → *swap.providers.bitcoin.transaction.WithdrawTransaction*

Build Bitcoin withdraw transaction.

Parameters

- **address** (*str*) – Bitcoin recipient address.
- **transaction_hash** (*str*) – Bitcoin funded transaction hash/id.
- **locktime** (*int*) – Bitcoin transaction lock time, defaults to `0`.

Returns WithdrawTransaction – Bitcoin withdraw transaction instance.

```
>>> from swap.providers.bitcoin.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction("testnet")
>>> withdraw_transaction.build_transaction(address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
<swap.providers.bitcoin.transaction.WithdrawTransaction object at 0x0409DAF0>
```

sign(*solver: swap.providers.bitcoin.solver.WithdrawSolver*) → *swap.providers.bitcoin.transaction.WithdrawTransaction*

Sign Bitcoin withdraw transaction.

Parameters **solver** (`bitcoin.solver.WithdrawSolver`) – Bitcoin withdraw solver.

Returns WithdrawTransaction – Bitcoin withdraw transaction instance.

```
>>> from swap.providers.bitcoin.transaction import WithdrawTransaction
>>> from swap.providers.bitcoin.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction("testnet")
>>> withdraw_transaction.build_transaction(address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140a0a6590e6ba4
↪"
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPf949JcuVFLXPJ5m4VKe33gVX3FYVZYVHr2dChU8K66aEQcPdHpUgACq5GQu81Z4e3QN1vxCrV4p
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> withdraw_transaction.sign(solver=withdraw_solver)
<swap.providers.bitcoin.transaction.WithdrawTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Bitcoin withdraw transaction raw.

Returns str – Bitcoin withdraw transaction raw.

```
>>> from swap.providers.bitcoin.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction("testnet")
>>> withdraw_transaction.build_transaction(address=
↪"mgS3WMHp9nvdUPeDJxr5iCF2P5HuFZSR3V", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
>>> withdraw_transaction.transaction_raw()

↪"eyJmZWUiOiA1NzYsICJyYXciOiAiMDIwMDAwMDAwMTMxZmI3NmEwYzM4ZDU3MzgxYjMxMTBlNGY1ZWU5YjUyODFkY2Y
↪"
```

6.3.3 RefundTransaction

class swap.providers.bitcoin.transaction.**RefundTransaction**(*network: str = 'mainnet'*, *version: int = 2*)

Bitcoin Refund transaction.

Parameters

- **network** (*str*) – Bitcoin network, defaults to `mainnet`.
- **version** (*int*) – Bitcoin transaction version, defaults to `2`.

Returns RefundTransaction – Bitcoin refund transaction instance.

Warning: Do not forget to build transaction after initialize refund transaction.

build_transaction(*address: str*, *transaction_hash: str*, *locktime: int = 0*) → *swap.providers.bitcoin.transaction.RefundTransaction*

Build Bitcoin refund transaction.

Parameters

- **address** (*str*) – Bitcoin sender address.
- **transaction_hash** (*str*) – Bitcoin funded transaction hash/id.
- **locktime** (*int*) – Bitcoin transaction lock time, defaults to `0`.

Returns RefundTransaction – Bitcoin refund transaction instance.

```
>>> from swap.providers.bitcoin.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction("testnet")
>>> refund_transaction.build_transaction(address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
<swap.providers.bitcoin.transaction.RefundTransaction object at 0x0409DAF0>
```

sign(*solver:* swap.providers.bitcoin.solver.RefundSolver) → *swap.providers.bitcoin.transaction.RefundTransaction*

Sign Bitcoin refund transaction.

Parameters **solver** (`bitcoin.solver.RefundSolver`) – Bitcoin refund solver.

Returns RefundTransaction – Bitcoin refund transaction instance.

```
>>> from swap.providers.bitcoin.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction("testnet")
>>> refund_transaction.build_transaction(address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140a0a6590e6ba4
↪"
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTv
↪", bytecode=bytecode, endtime=1624687630)
>>> refund_transaction.sign(solver=refund_solver)
<swap.providers.bitcoin.transaction.RefundTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Bitcoin refund transaction raw.

Returns str – Bitcoin refund transaction raw.

```
>>> from swap.providers.bitcoin.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction("testnet")
>>> refund_transaction.build_transaction(address=
↪"n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", transaction_hash=
↪"a211d21110756b266925fee2fbf2dc81529beef5e410311b38578dc3a076fb31")
>>> refund_transaction.transaction_raw()

↪"eyJmZWUiOiA1NzYsICJyYXciOiAiMDIwMDAwMDAwMTMxZmI3NmEwYzM4ZDU3MzgxYjMxMTBlNGY1ZWU5YjUyODFkY2Y
↪"
```

6.4 Solver

Bitcoin solver.

6.4.1 FundSolver

class swap.providers.bitcoin.solver.**FundSolver**(*xprivate_key: str*, *account: int = 0*, *change: bool = False*, *address: int = 0*, *path: Optional[str] = None*, *strict: bool = True*)

Bitcoin Fund solver.

Parameters

- **xprivate_key** (*str*) – Bitcoin sender root xprivate key.
- **account** (*int*) – Bitcoin derivation account, defaults to `0`.
- **change** (*bool*) – Bitcoin derivation change, defaults to `False`.
- **address** (*int*) – Bitcoin derivation address, defaults to `0`.
- **path** (*str*) – Bitcoin derivation path, defaults to `None`.
- **strict** (*bool*) – Strict for must be root xprivate key, default to `True`.

Returns FundSolver – Bitcoin fund solver instance.

```
>>> from swap.providers.bitcoin.solver import FundSolver
>>> sender_xprivate_key: str =
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvgVQvI
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=sender_xprivate_key, path="m/
↪44'/1'/0'/0/0")
<swap.providers.bitcoin.solver.FundSolver object at 0x03FCCA60>
```

6.4.2 WithdrawSolver

class swap.providers.bitcoin.solver.**WithdrawSolver**(*xprivate_key: str*, *secret_key: str*, *bytecode: str*, *account: int = 0*, *change: bool = False*, *address: int = 0*, *path: Optional[str] = None*, *strict: bool = True*)

Bitcoin Withdraw solver.

Parameters

- **xprivate_key** (*str*) – Bitcoin recipient root xprivate key.
- **secret_key** (*str*) – Secret password/passphrase.
- **bytecode** (*str*) – Bitcoin witness HTLC bytecode.
- **account** (*int*) – Bitcoin derivation account, defaults to `0`.
- **change** (*bool*) – Bitcoin derivation change, defaults to `False`.
- **address** (*int*) – Bitcoin derivation address, defaults to `0`.
- **path** (*str*) – Bitcoin derivation path, defaults to `None`.
- **strict** (*bool*) – Strict for must be root xprivate key, default to `True`.

Returns WithdrawSolver – Bitcoin withdraw solver instance.

```
>>> from swap.providers.bitcoin.solver import WithdrawSolver
>>> recipient_xprivate_key: str =
↪"tprv8ZgxMBicQKsPf949JcuVFLXPJ5m4VKe33gVX3FYVZYVHr2dChU8K66aEQcPdHpUgACq5GQu81Z4e3QN1vxCrV4pxcUcX
↪"
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140e259e08f2ec9fc99a
↪"
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=recipient_
↪xprivate_key, secret_key="Hello Meheret!", bytecode=bytecode, path="m/44'/1'/0'/0/
↪0")
<swap.providers.bitcoin.solver.WithdrawSolver object at 0x03FCCA60>
```

6.4.3 RefundSolver

class swap.providers.bitcoin.solver.**RefundSolver**(*xprivate_key: str*, *bytecode: str*, *endtime: int*, *account: int = 0*, *change: bool = False*, *address: int = 0*, *path: Optional[str] = None*, *strict: bool = True*)

Bitcoin Refund solver.

Parameters

- **xprivate_key** (*str*) – Bitcoin sender root xprivate key.
- **bytecode** (*str*) – Bitcoin witness HTLC bytecode..
- **endtime** (*int*) – Bitcoin witness expiration block timestamp.
- **account** (*int*) – Bitcoin derivation account, defaults to `0`.
- **change** (*bool*) – Bitcoin derivation change, defaults to `False`.
- **address** (*int*) – Bitcoin derivation address, defaults to `0`.
- **path** (*str*) – Bitcoin derivation path, defaults to `None`.

- **strict** (*bool*) – Strict for must be root xprivate key, default to True.

Returns RefundSolver – Bitcoin refund solver instance.

```
>>> from swap.providers.bitcoin.solver import RefundSolver
>>> sender_xprivate_key: str =
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvgVQvE
↪"
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140e259e08f2ec9fc99a
↪"
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=sender_xprivate_key,␣
↪bytecode=bytecode, endtime=1000, path="m/44'/1'/0'/0/0")
<swap.providers.bitcoin.solver.RefundSolver object at 0x03FCCA60>
```

6.5 Signature

Bitcoin signature.

class swap.providers.bitcoin.signature.**Signature**(*network: str = 'mainnet'*, *version: int = 2*)
Bitcoin Signature.

Parameters

- **network** (*str*) – Bitcoin network, defaults to mainnet.
- **version** (*int*) – Bitcoin transaction version, defaults to 2.

Returns Signature – Bitcoin signature instance.

Note: Bitcoin has only two networks, mainnet and testnet.

---

fee(*unit: str = 'Satoshi'*) → Union[int, float]
Get Bitcoin transaction fee.

Parameters unit (*str*) – Bitcoin unit, default to Satoshi.

Returns int, float – Bitcoin transaction fee.

```
>>> from swap.providers.bitcoin.signature import Signature
>>> from swap.providers.bitcoin.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiAxMTIyLCAicmF3IjogIjAyMDAwMDAwMDIzMWZiNzZhMGMzOGQ1NzM4MWIzMTEwZTRmNWVlOWI1MjgxZGNm
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvg
↪")
>>> signature: Signature = Signature(network="testnet")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.fee(unit="Satoshi")
678
```

hash() → str
Get Bitcoin signature transaction hash.

Returns str – Bitcoin signature transaction hash or transaction id.

```
>>> from swap.providers.bitcoin.signature import Signature
>>> from swap.providers.bitcoin.solver import WithdrawSolver
>>> unsigned_withdraw_transaction_raw: str =
↪"eyJmZWUiOiA1NzYsICJyYXciOiAiMDIwMDAwMDAwMTMxZmI3NmEwYzM4ZDU3MzgxYjMxMTBlNGY1ZWU5YjUyODFkY2Y
↪"
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140a0a6590e6ba4b
↪"
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPf949JcuVFLXPJ5m4VKe33gVX3FYVZYVHr2dChU8K66aEQcPdHpUgACq5GQu81Z4e3QN1vxCrV4px
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> signature: Signature = Signature(network="testnet")
>>> signature.sign(transaction_raw=unsigned_withdraw_transaction_raw,␣
↪solver=withdraw_solver)
>>> signature.hash()
"29c7ac0ec049687e1b952cefdaf2f1f52957e6f42f35826af21ec6bd3edf60ce"
```

json() → dict

Get Bitcoin signature transaction json format.

Returns str – Bitcoin signature transaction json format.

```
>>> from swap.providers.bitcoin.signature import Signature
>>> from swap.providers.bitcoin.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiAxMTIyLCAicmF3IjogIjAyMDAwMDAwMDIzMWZiNzZhMGMzOGQ1NzM4MWIzMTEwZTRmNWVlOWI1MjgxZGNm
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvg
↪")
>>> signature: Signature = Signature(network="testnet")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.json()
{"hex":
↪"02000000010825e00ba596ab11126cd89203b882bce60a7db019e51217056c471f510cfd85000000006b4830450
↪", "txid": "29c7ac0ec049687e1b952cefdaf2f1f52957e6f42f35826af21ec6bd3edf60ce",
↪ "hash": "29c7ac0ec049687e1b952cefdaf2f1f52957e6f42f35826af21ec6bd3edf60ce",
↪"size": 224, "vsize": 224, "version": 2, "locktime": 0, "vin": [{"txid":
↪"85fd0c511f476c051712e519b07d0ae6bc82b80392d86c1211ab96a50be02508", "vout": 0,
↪ "scriptSig": {"asm":
↪"30450221009ac6afb68728eee53050ea7a301b6fb836e13b782cd52c29be2f8b0cc71f4427022069671a0a3df14
↪02065e8cb5fa76699079860a450bddd0e37e0ad3dbf2ddfd01d7b600231e6cde8e", "hex":
↪"4830450221009ac6afb68728eee53050ea7a301b6fb836e13b782cd52c29be2f8b0cc71f4427022069671a0a3df
↪"}, "sequence": "4294967295"}], "vout": [{"value": "0.00010000", "n": 0,
↪"scriptPubKey": {"asm": "OP_HASH160 4695127b1d17c454f4bae9c41cb8e3cdb5e89d24␣
↪OP_EQUAL", "hex": "a9144695127b1d17c454f4bae9c41cb8e3cdb5e89d2487", "type":
↪"p2sh", "address": "2MygRsRs6En1RCj8a88FfsK1QBeissBTswL"}}, {"value": "0.
↪00089322", "n": 1, "scriptPubKey": {"asm": "OP_DUP OP_HASH160␣
↪33ecab3d67f0e2bde43e52f41ec1ecbdc73f11f8 OP_EQUALVERIFY OP_CHECKSIG", "hex":
↪"76a91433ecab3d67f0e2bde43e52f41ec1ecbdc73f11f888ac", "type": "p2pkh",
↪"address": "mkFWGt4hT11XS8dJKzzRFsTrqjjAwZfQAC"}}]}
```

raw() → str

Get Bitcoin main transaction raw.

Returns str – Bitcoin signature transaction raw.

```
>>> from swap.providers.bitcoin.signature import Signature
>>> from swap.providers.bitcoin.solver import RefundSolver
>>> unsigned_refund_transaction_raw: str =
↪"eyJmZWUiOiA1NzYsICJyYXciOiAiMDIwMDAwMDAwMTMxZmI3NmEwYzM4ZDU3MzgxYjMxMTBlNGY1ZWU5YjUyODFkY2Y
↪"
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140a0a6590e6ba4b
↪"
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvg
↪", bytecode=bytecode, endtime=1624687630)
>>> signature: Signature = Signature(network="testnet")
>>> signature.sign(transaction_raw=unsigned_refund_transaction_raw,␣
↪solver=refund_solver)
>>> signature.raw()

↪"02000000011823f39a8c5f6f27845dd13a65e03fe2ef5108d235e7a36edb6eb267b0459c5a00000000ca4730440
↪"
```

type() → str

Get Bitcoin signature transaction type.

Returns str – Bitcoin signature transaction type.

```
>>> from swap.providers.bitcoin.signature import Signature
>>> from swap.providers.bitcoin.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiAxMTIyLCAicmF3IjogIjAyMDAwMDAwMDIzMWZiNzZhMGMzOGQ1NzM4MWIzMTEwZTRmNWVlOWI1MjgxZGNm
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvg
↪")
>>> signature: Signature = Signature(network="testnet")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.type()
"bitcoin_fund_signed"
```

sign(*transaction_raw: str*, *solver: Union[*swap.providers.bitcoin.solver.FundSolver, swap.providers.bitcoin.solver.WithdrawSolver, swap.providers.bitcoin.solver.RefundSolver*]*) → Union[*swap.providers.bitcoin.signature.FundSignature*, *swap.providers.bitcoin.signature.WithdrawSignature*, *swap.providers.bitcoin.signature.RefundSignature*]

Sign unsigned transaction raw.

Parameters

- **transaction_raw** (*str*) – Bitcoin unsigned transaction raw.
- **solver** (`bitcoin.solver.FundSolver`, `bitcoin.solver.WithdrawSolver`, `bitcoin.solver.RefundSolver`) – Bitcoin solver

Returns FundSignature, WithdrawSignature, RefundSignature – Bitcoin signature instance.

```
>>> from swap.providers.bitcoin.signature import Signature
>>> from swap.providers.bitcoin.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiAxMTIyLCAicmF3IjogIjAyMDAwMDAwMDIzMWZiNzZhMGMzOGQ1NzM4MWIzMTEwZTRmNWVlOWI1MjgxZGNm
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvg
↪")
>>> signature: Signature = Signature(network="testnet")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
<swap.providers.bitcoin.signature.FundSignature object at 0x0409DAF0>
```

transaction_raw() → str

Get Bitcoin transaction raw.

Returns str – Bitcoin transaction raw.

```
>>> from swap.providers.bitcoin.signature import Signature
>>> from swap.providers.bitcoin.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiAxMTIyLCAicmF3IjogIjAyMDAwMDAwMDIzMWZiNzZhMGMzOGQ1NzM4MWIzMTEwZTRmNWVlOWI1MjgxZGNm
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvg
↪")
>>> signature: Signature = Signature(network="testnet")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.transaction_raw()

↪"eyJyYXciOiAiMDIwMDAwMDAwMTA4MjVlMDBiYTU5NmFiMTExMjZjZDg5MjAzYjg4MmJjZTYwYTdkYjAxOWU1MTIxNzA
↪"
```

6.5.1 FundSignature

class swap.providers.bitcoin.signature.**FundSignature**(*network: str = 'mainnet'*, *version: int = 2*)

Bitcoin Fund signature.

Parameters

- **network** (*str*) – Bitcoin network, defaults to mainnet.
- **version** (*int*) – Bitcoin transaction version, defaults to 2.

Returns FundSignature – Bitcoin fund signature instance.

sign(*transaction_raw: str*, *solver:* swap.providers.bitcoin.solver.FundSolver) → *swap.providers.bitcoin.signature.FundSignature*

Sign unsigned fund transaction raw.

Parameters

- **transaction_raw** (*str*) – Bitcoin unsigned fund transaction raw.

- **solver** (`bitcoin.solver.FundSolver`) – Bitcoin fund solver.

Returns FundSignature – Bitcoin fund signature instance.

```
>>> from swap.providers.bitcoin.signature import FundSignature
>>> from swap.providers.bitcoin.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiAxMTIyLCAicmF3IjogIjAyMDAwMDAwMDIzMWZiNzZhMGMzOGQ1NzM4MWIzMTEwZTRmNWVlOWI1MjgxZGNm
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvg
↪")
>>> fund_signature: FundSignature = FundSignature(network="testnet")
>>> fund_signature.sign(transaction_raw=unsigned_fund_transaction_raw,␣
↪solver=fund_solver)
<swap.providers.bitcoin.signature.FundSignature object at 0x0409DAF0>
```

6.5.2 WithdrawSignature

class `swap.providers.bitcoin.signature.`**`WithdrawSignature`**(*network: str = 'mainnet'*, *version: int = 2*)

Bitcoin Withdraw signature.

Parameters

- **network** (*str*) – Bitcoin network, defaults to mainnet.
- **version** (*int*) – Bitcoin transaction version, defaults to 2.

Returns WithdrawSignature – Bitcoin withdraw signature instance.

sign(*transaction_raw: str*, *solver: swap.providers.bitcoin.solver.WithdrawSolver*) → *swap.providers.bitcoin.signature.WithdrawSignature*

Sign unsigned withdraw transaction raw.

Parameters

- **transaction_raw** (*str*) – Bitcoin unsigned withdraw transaction raw.
- **solver** (`bitcoin.solver.WithdrawSolver`) – Bitcoin withdraw solver.

Returns WithdrawSignature – Bitcoin withdraw signature instance.

```
>>> from swap.providers.bitcoin.signature import WithdrawSignature
>>> from swap.providers.bitcoin.solver import WithdrawSolver
>>> unsigned_withdraw_transaction_raw: str =
↪"eyJmZWUiOiA1NzYsICJyYXciOiAiMDIwMDAwMDAwMTMxZmI3NmEwYzM4ZDU3MzgxYjMxMTBlNGY1ZWU5YjUyODFkY2Yy
↪"
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140a0a6590e6ba4b
↪"
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPf949JcuVFLXPJ5m4VKe33gVX3FYVZYVHr2dChU8K66aEQcPdHpUgACq5GQu81Z4e3QN1vxCrV4px
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> withdraw_signature: WithdrawSignature = WithdrawSignature(network="testnet")
>>> withdraw_signature.sign(transaction_raw=unsigned_withdraw_transaction_raw,␣
↪solver=withdraw_solver)
<swap.providers.bitcoin.signature.WithdrawSignature object at 0x0409DAF0>
```

6.5.3 RefundSignature

class swap.providers.bitcoin.signature.**RefundSignature**(*network: str = 'mainnet'*, *version: int = 2*)

Bitcoin Refund signature.

Parameters

- **network** (*str*) – Bitcoin network, defaults to mainnet.
- **version** (*int*) – Bitcoin transaction version, defaults to 2.

Returns RefundSignature – Bitcoin refund signature instance.

sign(*transaction_raw: str*, *solver: swap.providers.bitcoin.solver.RefundSolver*) → *swap.providers.bitcoin.signature.RefundSignature*

Sign unsigned refund transaction raw.

Parameters

- **transaction_raw** (*str*) – Bitcoin unsigned refund transaction raw.
- **solver** (bitcoin.solver.RefundSolver) – Bitcoin refund solver.

Returns RefundSignature – Bitcoin refund signature instance.

```
>>> from swap.providers.bitcoin.signature import Signature
>>> from swap.providers.bitcoin.solver import RefundSolver
>>> unsigned_refund_transaction_raw: str =
↪"eyJmZWUiOiA1NzYsICJyYXciOiAiMDIwMDAwMDAwMTMxZmI3NmEwYzM4ZDU3MzgxYjMxMTBlNGY1ZWU5YjUyODFkY2Y
↪"
>>> bytecode: str =
↪"63aa20821124b554d13f247b1e5d10b84e44fb1296f18f38bbaa1bea34a12c843e01588876a9140a0a6590e6ba4b
↪"
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"tprv8ZgxMBicQKsPeMHMJAc6uWGYiGqi1MVM2ybmzXL2TAoDpQe85uyDpdT7mv7Nhdu5rTCBEKLZsd9KyP2LQZJzZTvg
↪", bytecode=bytecode, endtime=1624687630)
>>> refund_signature: RefundSignature = RefundSignature(network="testnet")
>>> refund_signature.sign(transaction_raw=unsigned_refund_transaction_raw,␣
↪solver=refund_solver)
<swap.providers.bitcoin.signature.RefundSignature object at 0x0409DAF0>
```

6.6 Remote Procedure Call (RPC)

Bitcoin remote procedure call.

swap.providers.bitcoin.rpc.**get_balance**(*address: str*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → int

Get Bitcoin balance.

Parameters

- **address** (*str*) – Bitcoin address.
- **network** (*str*) – Bitcoin network, defaults to mainnet.
- **headers** (*dict*) – Request headers, default to common headers.

- **timeout** (*int*) – Request timeout, default to 60.

Returns int – Bitcoin balance (Satoshi amount).

```
>>> from swap.providers.bitcoin.rpc import get_balance
>>> get_balance(address="n1wgm6kkzMcNfAtJmes8YhpvtDzdNhDY5a", network="testnet")
1394238
```

`swap.providers.bitcoin.rpc.`**`get_utxos`**(*address: str, network: str = 'mainnet', include_script: bool = True, limit: int = 15, headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → list

Get Bitcoin unspent transaction outputs (UTXO's).

Parameters

- **address** (*str*) – Bitcoin address.
- **network** (*str*) – Bitcoin network, defaults to testnet.
- **include_script** (*bool*) – Bitcoin include script, defaults to True.
- **limit** (*int*) – Bitcoin utxo's limit, defaults to 15.
- **headers** (*dict*) – Request headers, default to common headers.
- **timeout** (*int*) – Request timeout, default to 60.

Returns list – Bitcoin unspent transaction outputs (UTXO's).

```
>>> from swap.providers.bitcoin.rpc import get_utxos
>>> get_utxos(address="mkFWGt4hT11XS8dJKzzRFsTrqjjAwZfQAC", network="testnet")
[{'tx_hash': '98c6a3d4e136d32d0848126e08325c94da2e8217593e92236471b11b42ee7999',
↪'block_height': 1890810, 'tx_input_n': -1, 'tx_output_n': 1, 'value': 67966, 'ref_
↪balance': 146610, 'spent': False, 'confirmations': 5278, 'confirmed': '2020-11-
↪09T08:53:01Z', 'double_spend': False, 'script':
↪'76a91433ecab3d67f0e2bde43e52f41ec1ecbdc73f11f888ac'}]
```

`swap.providers.bitcoin.rpc.`**`get_transaction`**(*transaction_hash: str, network: str = 'mainnet', headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → dict

Get Bitcoin transaction detail.

Parameters

- **transaction_hash** (*str*) – Bitcoin transaction hash/id.
- **network** (*str*) – Bitcoin network, defaults to testnet.
- **headers** (*dict*) – Request headers, default to common headers.
- **timeout** (*int*) – Request timeout, default to 60.

Returns dict – Bitcoin transaction detail.

```
>>> from swap.providers.bitcoin.rpc import get_transaction
>>> get_transaction(transaction_hash=
↪"4e91bca76db112d3a356c17366df93e364a4922993414225f65390220730d0c1", network=
↪"testnet")
{'block_hash': '000000000000006fb2aec57209181feb54750319e47263c48eca24369bdbee86',
↪'block_height': 1890810, 'block_index': 37, 'hash':
↪'98c6a3d4e136d32d0848126e08325c94da2e8217593e92236471b11b42ee7999', 'addresses': [
↪'2N1NiQVBaSXmdZVATeST9sMQWVPeL5oA8Ks', 'mkFWGt4hT11XS8dJKzzRFsTrqjjAwZfQAC'],
↪'total': 77066, 'fees': 678, 'size': 224, 'preference': 'low', 'relayed_by': '104.
↪197.28.151:18333', 'confirmed': '2020-11-09T08:53:01Z', 'received': '2020-11-
↪09T08:47:10.889Z', 'ver': 2, 'double_spend': False, 'vin_sz': 1, 'vout_sz': 2,
↪'confirmations': 5279, 'confidence': 1, 'inputs': [{'prev_hash':
↪'9825b68e57c8a924285828dde37869c2eca3bb3784b171353962f0d7e7577da1', 'output_index
```

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```
```

`swap.providers.bitcoin.rpc.`**`find_p2sh_utxo`**(*transaction: dict*) → Optional[dict]

Find Bitcoin pay to script hash UTXO info's.

Parameters **`transaction`** (*`dict`*) – Bitcoin transaction detail.

Returns dict – Pay to Script Hash (P2SH) UTXO info's.

```
>>> from swap.providers.bitcoin.rpc import find_p2sh_utxo, get_transaction
>>> find_p2sh_utxo(transaction=get_transaction(
↪"868f81fd172b8f1d24e0c195af011489c3a7948513521d4b6257b8b5fb2ef409", "testnet"))
{'value': 10050780, 'script': 'a9149418feed4647e156d6663db3e0cef7c050d0386787',
↪'addresses': ['2N6kHwQy6Ph5EdKNgzGrcW2WhGHKGfmP5ae'], 'script_type': 'pay-to-
↪script-hash'}
```

`swap.providers.bitcoin.rpc.`**`decode_raw`**(*raw: str, network: str = 'mainnet', offline: bool = True, headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → dict

Decode original Bitcoin raw.

Parameters

- **`raw`** (*`str`*) – Bitcoin transaction raw.
- **`network`** (*`str`*) – Bitcoin network, defaults to mainnet.
- **`offline`** (*`bool`*) – Offline decode, defaults to True.
- **`headers`** (*`dict`*) – Request headers, default to common headers.
- **`timeout`** (*`int`*) – Request timeout, default to 60.

Returns dict – Bitcoin decoded transaction raw.

```
>>> from swap.providers.bitcoin.rpc import decode_raw
>>> decode_raw(raw=
↪"02000000011823f39a8c5f6f27845dd13a65e03fe2ef5108d235e7a36edb6eb267b0459c5a010000006a47304402207
↪", network="testnet")
{'hex':
↪'02000000011823f39a8c5f6f27845dd13a65e03fe2ef5108d235e7a36edb6eb267b0459c5a010000006a47304402207
↪', 'txid': '6e5c80f600f45acda3c3101128bb3075bf2cf7af4bab0d99c9d856ebfb4b0953',
↪'hash': '6e5c80f600f45acda3c3101128bb3075bf2cf7af4bab0d99c9d856ebfb4b0953', 'size
↪': 223, 'vsize': 223, 'version': 2, 'locktime': 0, 'vin': [{'txid':
↪'5a9c45b067b26edb6ea3e735d20851efe23fe0653ad15d84276f5f8c9af32318', 'vout': 1,
↪'scriptSig': {'asm':
↪'304402207018b7fd1ba6624fe9bb0f16cd65fa243d202e32fdff452699f56465b61ab648022009f0dc1a0a63109246c
↪027f0dc0894bd690635412af782d05e4f79d3d40bf568978c650f3f1ca1a96cf36', 'hex':
↪'47304402207018b7fd1ba6624fe9bb0f16cd65fa243d202e32fdff452699f56465b61ab648022009f0dc1a0a6310924
↪'}, 'sequence': '4294967295'}], 'vout': [{'value': '0.00010000', 'n': 0,
↪'scriptPubKey': {'asm': 'OP_HASH160 9418feed4647e156d6663db3e0cef7c050d03867 OP_
↪EQUAL', 'hex': 'a9149418feed4647e156d6663db3e0cef7c050d0386787', 'type': 'p2sh',
↪'address': '2N6kHwQy6Ph5EdKNgzGrcW2WhGHKGfmP5ae'}}, {'value': '0.00078644', 'n':␣
↪1, 'scriptPubKey': {'asm': 'OP_DUP OP_HASH160␣
↪33ecab3d67f0e2bde43e52f41ec1ecbdc73f11f8 OP_EQUALVERIFY OP_CHECKSIG', 'hex':
↪'76a91433ecab3d67f0e2bde43e52f41ec1ecbdc73f11f888ac', 'type': 'p2pkh', 'address':
↪'mkFWGt4hT11XS8dJKzzRFsTrqjjAwZfQAC'}}]}
```

`swap.providers.bitcoin.rpc.`**`submit_raw`**(*raw: str*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → str

Submit original Bitcoin raw into blockchain.

Parameters

- **raw** (*str*) – Bitcoin transaction raw.
- **network** (*str*) – Bitcoin network, defaults to mainnet.
- **headers** (*dict*) – Request headers, default to common headers.
- **timeout** (*int*) – Request timeout, default to 60.

Returns dict – Bitcoin submitted transaction id/hash.

```
>>> from swap.providers.bitcoin.rpc import submit_raw
>>> submit_raw(raw=
↪"02000000011823f39a8c5f6f27845dd13a65e03fe2ef5108d235e7a36edb6eb267b0459c5a010000006a473044022070
↪", network="testnet")
"167faa4043ff622e7860ee5228d1ad6d763c5a6cfce79dbc3b9b5fc7bded6394"
```

6.7 Utils

Bitcoin Utils.

`swap.providers.bitcoin.utils.`**`fee_calculator`**(*transaction_input: int = 1*, *transaction_output: int = 1*) → int

Bitcoin fee calculator.

Parameters

- **transaction_input** (*int*) – transaction input numbers, defaults to 1.
- **transaction_output** (*int*) – transaction output numbers, defaults to 1.

Returns int – Bitcoin fee (Satoshi amount).

```
>>> from swap.providers.bitcoin.utils import fee_calculator
>>> fee_calculator(transaction_input=2, transaction_output=9)
1836
```

`swap.providers.bitcoin.utils.`**`get_address_type`**(*address: str*) → str

Get Bitcoin address type.

Parameters **address** (*str*) – Bitcoin address.

Returns str – Bitcoin address type (P2PKH, P2SH).

```
>>> from swap.providers.bitcoin.utils import get_address_type
>>> get_address_type(address="mrmtGq2HMmqAogSsGDjCtXUpxrb7rHThFH")
"p2pkh"
```

`swap.providers.bitcoin.utils.`**`is_network`**(*network: str*) → bool

Check Bitcoin network.

Parameters **network** (*str*) – Bitcoin network.

Returns bool – Bitcoin valid/invalid network.

```
>>> from swap.providers.bitcoin.utils import is_network
>>> is_network(network="testnet")
True
```

swap.providers.bitcoin.utils.**is_address**(*address: str*, *network: Optional[str] = None*, *address_type: Optional[str] = None*) → bool

Check Bitcoin address.

Parameters

- **address** (*str*) – Bitcoin address.
- **network** (*str*) – Bitcoin network, defaults to None.
- **address_type** (*str*) – Bitcoin address type, defaults to None.

Returns bool – Bitcoin valid/invalid address.

```
>>> from swap.providers.bitcoin.utils import is_address
>>> is_address(address="mrmtGq2HMmqAogSsGDjCtXUpxrb7rHThFH", network="testnet")
True
```

swap.providers.bitcoin.utils.**is_transaction_raw**(*transaction_raw: str*) → bool

Check Bitcoin transaction raw.

Parameters **transaction_raw** (*str*) – Bitcoin transaction raw.

Returns bool – Bitcoin valid/invalid transaction raw.

```
>>> from swap.providers.bitcoin.utils import is_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiA2NzgsICJyYXciOiAiMDIwMDAwMDAwMTg4OGJlN2VjMDY1MDk3ZDk1NjY0NzYzZjI3NmQ0MjU1NTJkNzM1ZmIx
↪"
>>> is_transaction_raw(transaction_raw=transaction_raw)
True
```

swap.providers.bitcoin.utils.**amount_unit_converter**(*amount: Union[int, float]*, *unit_from: str = 'Satoshi2BTC'*) → Union[int, float]

Bitcoin amount unit converter

Parameters

- **amount** (*Union[int, float]*) – Bitcoin any amount.
- **unit_from** (*str*) – Bitcoin unit convert from symbol, default to Satoshi2BTC.

Returns int, float – BTC asset amount.

```
>>> from swap.providers.bitcoin.utils import amount_unit_converter
>>> amount_unit_converter(amount=10_000_000, unit_from="Satoshi2BTC")
0.1
```

swap.providers.bitcoin.utils.**decode_transaction_raw**(*transaction_raw: str*, *offline: bool = True*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Decode Bitcoin transaction raw.

Parameters

- **transaction_raw** (*str*) – Bitcoin transaction raw.
- **offline** (*bool*) – Offline decode, defaults to True.
- **headers** (*dict*) – Request headers, default to common headers.
- **timeout** (*int*) – Request timeout, default to 60.

Returns dict – Decoded Bitcoin transaction raw.

```
>>> from swap.providers.bitcoin.utils import decode_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiA2NzgsICJyYXciOiAiMDIwMDAwMDAwMTg4OGJlN2VjMDY1MDk3ZDk1NjY0NzYzZjI3NmQ0MjU1NTJkNzM1ZmIx
↪"
>>> decode_transaction_raw(transaction_raw=transaction_raw)
{'fee': 678, 'type': 'bitcoin_fund_unsigned', 'tx': {'hex':
↪'0200000001888be7ec065097d95664763f276d425552d735fb1d974ae78bf72106dca0f3910100000000ffffffff021
↪', 'txid': 'abc70fd3466aec9478ea3115200a84f993204ad1f614fe08e92ecc5997a0d3ba',
↪'hash': 'abc70fd3466aec9478ea3115200a84f993204ad1f614fe08e92ecc5997a0d3ba', 'size
↪': 117, 'vsize': 117, 'version': 2, 'locktime': 0, 'vin': [{'txid':
↪'91f3a0dc0621f78be74a971dfb35d75255426d273f766456d9975006ece78b88', 'vout': 1,
↪'scriptSig': {'asm': '', 'hex': ''}, 'sequence': '4294967295'}], 'vout': [{'value
↪': '0.00010000', 'n': 0, 'scriptPubKey': {'asm': 'OP_HASH160␣
↪2bb013c3e4beb08421dedcf815cb65a5c388178b OP_EQUAL', 'hex':
↪'a9142bb013c3e4beb08421dedcf815cb65a5c388178b87', 'type': 'p2sh', 'address':
↪'2MwEDybGC34949zgzWX4M9FHmE3crDSUydP'}}, {'value': '0.00974268', 'n': 1,
↪'scriptPubKey': {'asm': 'OP_DUP OP_HASH160␣
↪64a8390b0b1685fcbf2d4b457118dc8da92d5534 OP_EQUALVERIFY OP_CHECKSIG', 'hex':
↪'76a91464a8390b0b1685fcbf2d4b457118dc8da92d553488ac', 'type': 'p2pkh', 'address':
↪'mphBPZf15cRFcL5tUq6mCbE84XobZ1vg7Q'}}]}, 'network': 'testnet'}
```

swap.providers.bitcoin.utils.**submit_transaction_raw**(*transaction_raw: str*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Submit transaction raw to Bitcoin blockchain.

Parameters

- **transaction_raw** (*str*) – Bitcoin transaction raw.
- **headers** (*dict*) – Request headers, default to common headers.
- **timeout** (*int*) – Request timeout, default to 60.

Returns dict – Bitcoin submitted transaction id, fee, type and date.

```
>>> from swap.providers.bitcoin.utils import submit_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiA2NzgsICJyYXciOiAiMDIwMDAwMDAwMTg4OGJlN2VjMDY1MDk3ZDk1NjY0NzYzZjI3NmQ0MjU1NTJkNzM1ZmIx
↪"
>>> submit_transaction_raw(transaction_raw=transaction_raw)
{'fee': '...', 'type': '...', 'transaction_id': '...', 'network': '...', 'date': '..
↪.'}
```

`swap.providers.bitcoin.utils.`**`get_address_hash`**(*address: str*, *script: bool = False*) → Union[str, btcpy.structs.script.P2pkhScript, btcpy.structs.script.P2shScript]

Get Bitcoin address hash.

Parameters

- **`address`** (*`str`*) – Bitcoin address.
- **`script`** (*`bool`*) – Return script (P2pkhScript, P2shScript), default to False.

Returns str – Bitcoin address hash.

```
>>> from swap.providers.bitcoin.utils import get_address_hash
>>> get_address_hash(address="mrmtGq2HMmqAogSsGDjCtXUpxrb7rHThFH", script=False)
"7b7c4431a43b612a72f8229935c469f1f6903658"
```

CHAPTER

SEVEN

BYTOM

Bytom is a protocol of multiple byte assets. Heterogeneous byte-assets operate in different forms on the Bytom Blockchain and atomic assets (warrants, securities, dividends, bonds, intelligence information, forecasting information and other information that exist in the physical world) can be registered, exchanged, gambled via Bytom.

For more https://bytom.io

7.1 Wallet

The implementation of Hierarchical Deterministic (HD) wallets generator for Bytom blockchain.

class `swap.providers.bytom.wallet.`**`Wallet`**(*network: str = 'mainnet'*)

Bytom Wallet class.

Parameters **`network`** (`str`) – Bytom network, defaults to `mainnet`.

Returns Wallet – Bytom wallet instance.

Note: Bytom has only two networks, `mainnet`, `solonet` and `testnet`.

`from_entropy`(*entropy: str, language: str = 'english', passphrase: Optional[str] = None*) → *swap.providers.bytom.wallet.Wallet*

Initiate Bytom wallet from entropy.

Parameters

- **`entropy`** (`str`) – Bytom entropy hex string.
- **`language`** (`str`) – Bytom wallet language, default to `english`.
- **`passphrase`** (`str`) – Bytom wallet passphrase, default to `None`.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
<swap.providers.bytom.wallet.Wallet object at 0x040DA268>
```

`from_mnemonic`(*mnemonic: str, language: Optional[str] = None, passphrase: Optional[str] = None*) → *swap.providers.bytom.wallet.Wallet*

Initialize Bytom wallet from mnemonic.

Parameters

- **mnemonic** (*str*) – Bytom mnemonic words.
- **language** (*str*) – Bytom wallet language, default to `english`.
- **passphrase** (*str*) – Bytom wallet passphrase, default to `None`.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_mnemonic(mnemonic="unfair divorce remind addict add roof park␣
↪clown build renew illness fault")
<swap.providers.bytom.wallet.Wallet object at 0x040DA268>
```

from_seed(*seed: str*) → *swap.providers.bytom.wallet.Wallet*
Initialize Bytom wallet from seed.

Parameters **seed** (*str*) – Bytom Seed hex string.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_seed(seed=
↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪")
<swap.providers.bytom.wallet.Wallet object at 0x040DA268>
```

from_xprivate_key(*xprivate_key: str*) → *swap.providers.bytom.wallet.Wallet*
Initiate Bytom wallet from xprivate key.

Parameters **xprivate_key** (*str*) – Bytom XPrivate key.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
<swap.providers.bytom.wallet.Wallet object at 0x040DA268>
```

from_private_key(*private_key: str*) → *swap.providers.bytom.wallet.Wallet*
Initialize Bytom wallet from private key.

Parameters **private_key** (*str*) – Bytom Private key.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_private_key(private_key=
↪"b0f9552e4fedac7f2e750ae984e36a97cf2b24609f7ec43f35606ed65eec6e46db35f71c405fd5948ecffa2c512
↪")
<swap.providers.bytom.wallet.Wallet object at 0x040DA268>
```

from_path(*path: str*) → *swap.providers.bytom.wallet.Wallet*
Drive Bytom wallet from path.

Parameters **path** (*str*) – Bytom derivation path.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
<swap.providers.bytom.wallet.Wallet object at 0x040DA268>
```

from_indexes(*indexes: List[str]*) → *swap.providers.bytom.wallet.Wallet*
Drive Bytom wallet from indexes.

Parameters **indexes** (*list*) – Bytom derivation indexes.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> wallet.from_indexes(indexes=["2c000000", "99000000", "01000000", "00000000",
↪ "01000000"])
<swap.providers.bytom.wallet.Wallet object at 0x040DA268>
```

from_index(*index: int*, *hardened: bool = False*) → *swap.providers.bytom.wallet.Wallet*
Drive Bytom wallet from index.

Parameters

- **index** (*int*) – Bytom wallet index.
- **hardened** (*bool*) – Use hardened, default to `False`.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_index(index=44)
>>> wallet.from_index(index=153)
>>> wallet.from_index(index=1)
>>> wallet.from_index(index=0)
>>> wallet.from_index(index=1)
<swap.providers.bytom.wallet.Wallet object at 0x040DA268>
```

clean_derivation() → *swap.providers.bytom.wallet.Wallet*
Clean derivation Bytom wallet.

Returns Wallet – Bytom wallet instance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.indexes()
["2c000000", "99000000", "01000000", "00000000", "01000000"]
>>> wallet.path()
```

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```
"m/44/153/1/0/1"
>>> wallet.clean_derivation()
>>> wallet.indexes()
[]
>>> wallet.path()
None
```

strength() → Optional[int]
Get Bytom wallet strength.

Returns int – Bytom wallet strength.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.strength()
128
```

entropy() → Optional[str]
Get Bytom wallet entropy.

Returns str – Bytom wallet entropy.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.entropy()
"ed0802d701a033776811601dd6c5c4a9"
```

mnemonic() → Optional[str]
Get Bytom wallet mnemonic.

Returns str – Bytom wallet mnemonic.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.mnemonic()
"unfair divorce remind addict add roof park clown build renew illness fault"
```

passphrase() → Optional[str]
Get Bytom wallet passphrase.

Returns str – Bytom wallet passphrase.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9", passphrase=
↪"meherett")
>>> wallet.passphrase()
"meherett"
```

language() → Optional[str]
Get Bytom wallet language.

Returns str – Bytom wallet language.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.language()
"english"
```

seed() → Optional[str]
Get Bytom wallet seed.

Returns str – Bytom wallet seed.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.seed()

↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪"
```

path() → Optional[str]
Get Bytom wallet derivation path.

Returns str – Bytom derivation path.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet = Wallet(network="mainnet", change=True, address=3)
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.path()
"m/44/153/1/0/1"
```

indexes() → list
Get Bytom wallet derivation indexes.

Returns list – Bytom derivation indexes.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.indexes()
['2c000000', '99000000', '01000000', '00000000', '01000000']
```

xprivate_key() → Optional[str]
Get Bytom wallet xprivate key.

Returns str – Bytom xprivate key.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.xprivate_key()

↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪"
```

xpublic_key() → Optional[str]
Get Bytom wallet xpublic key.

Returns str – Bytom xpublic key.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.xpublic_key()

↪"f80a401807fde1ee5727ae032ee144e4b757e69431e68e6cd732eda3c8cd3936daedfdd0fd8f8df14e2084c7e8d
↪"
```

expand_xprivate_key() → Optional[str]
Get Bytom wallet expand xprivate key.

Returns str – Bytom expand xprivate key.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.expand_xprivate_key()

↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e465c68d75d8a29eb3ffd7e8213808
↪"
```

child_xprivate_key() → Optional[str]
Get Bytom child wallet xprivate key.

Returns str – Bytom child xprivate key.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.child_xprivate_key()

↪"b0f9552e4fedac7f2e750ae984e36a97cf2b24609f7ec43f35606ed65eec6e46db35f71c405fd5948ecffa2c512
↪"
```

child_xpublic_key() → Optional[str]
Get Bytom child wallet xpublic key.

Returns str – Bytom child xpublic key.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.child_xpublic_key()

↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212db35f71c405fd5948ecffa2c512
↪"
```

guid() → Optional[str]
Get Bytom wallet Blockcenter GUID.

Returns str – Bytom Blockcenter GUID.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.guid()
"9ed61a9b-e7b6-4cb7-94fb-932b738e4f66"
```

private_key() → str

Get Bytom wallet private key.

Returns str – Bytom private key.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.private_key()

↪"b0f9552e4fedac7f2e750ae984e36a97cf2b24609f7ec43f35606ed65eec6e46db35f71c405fd5948ecffa2c512a
↪"
```

public_key() → str

Get Bytom wallet public key.

Returns str – Bytom public key.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.public_key()
"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212"
```

program() → str

Get Bytom wallet control program.

Returns str – Bytom control program.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.program()
"0014b1592acbb917f13937166c2a9b6ce973296ebb60"
```

address(*network: Optional[str] = None*) → str

Get Bytom wallet address.

Parameters **network** (*str*) – Bytom network, defaults to `mainnet`.

Returns str – Bytom wallet address.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_indexes(indexes=["2c000000", "99000000", "01000000", "00000000",
↪ "01000000"])
```

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```
>>> wallet.address(network="mainnet")
"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx"
```

balance(*asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', unit: str = 'NEU'*) → Union[int, float]

Get Bytom wallet balance.

Parameters

- **asset** (*str, bytom.assets.AssetNamespace*) – Bytom asset id, defaults to `BTM asset`.
- **unit** (*str*) – Bytom unit, default to `NEU`.

Returns int, float – Bytom wallet balance.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.balance(unit="BTM")
2.0
```

utxos(*asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', limit: int = 15*) → list

Get Bytom wallet unspent transaction output (UTXO's).

Parameters

- **asset** (*str, bytom.assets.AssetNamespace*) – Bytom asset id, defaults to `BTM asset`.
- **limit** (*int*) – Limit of UTXO's, default is `15`.

Returns list – Bytom unspent transaction outputs.

```
>>> from swap.providers.bytom.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.utxos()
[{'hash': '9843c9b9130bd87a9683f2c4e66456326beeefb2522c3352326de870c5c1329e',
↪'asset': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 200000000}]
```

7.2 Hash Time Lock Contract (HTLC)

Bytom Hash Time Lock Contract (HTLC).

class swap.providers.bytom.htlc.**HTLC**(*network: str = 'mainnet', contract_address: Optional[str] = None*)

Bytom Hash Time Lock Contract (HTLC).

Parameters **network** (*str*) – Bytom network, defaults to `mainnet`.

Returns HTLC – Bytom HTLC instance.

Note: Bytom has only three networks, `mainnet`, `solonet` and `testnet`.

build_htlc(*secret_hash: str*, *recipient_public_key: str*, *sender_public_key: str*, *endblock: int*, *use_script: bool = False*) → *swap.providers.bytom.htlc.HTLC*

Build Bytom Hash Time Lock Contract (HTLC).

Parameters

- **secret_hash** (*str*) – secret sha-256 hash.
- **recipient_public_key** (*str*) – Bytom recipient public key.
- **sender_public_key** (*str*) – Bytom sender public key.
- **endblock** (*int*) – Bytom expiration block height.
- **use_script** (*bool*) – Initialize HTLC by using script, default to `False`.

Returns HTLC – Bytom Hash Time Lock Contract (HTLC) instance.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.providers.bytom.rpc import get_current_block_height
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=get_current_block_height(plus=100), use_script=False)
<swap.providers.bytom.htlc.HTLC object at 0x0409DAF0>
```

from_bytecode(*bytecode: str*) → *swap.providers.bytom.htlc.HTLC*

Initialize Bytom Hash Time Lock Contract (HTLC) from bytecode.

Parameters **bytecode** (*str*) – Bytom bytecode.

Returns HTLC – Bytom Hash Time Lock Contract (HTLC) instance.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
>>> htlc.from_bytecode(bytecode=bytecode)
<swap.providers.bytom.htlc.HTLC object at 0x0409DAF0>
```

bytecode() → str

Get Bytom Hash Time Lock Contract (HTLC) bytecode.

Returns str – Bytom HTLC bytecode.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=679208)
```

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```
>>> htlc.bytecode()

↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
```

opcode() → Optional[str]

Get Bytom Hash Time Lock Contract (HTLC) OP_Code.

Returns str – Bytom HTLC opcode.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=679208)
>>> htlc.opcode()
"0x285d0a 0xfe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212␣
↪0x3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e␣
↪0x3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb DEPTH␣
↪0x547a6416000000557aa888537a7cae7cac631f000000537acd9f6972ae7cac FALSE␣
↪CHECKPREDICATE"
```

hash() → str

Get Bytom Hash Time Lock Contract (HTLC) hash.

Returns str – Bytom HTLC hash.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=679208)
>>> htlc.hash()
"e7f4a9815f3a36c616c5666b97fb7fdacd3720c117d078c429494d1b617fe7d4"
```

contract_address() → str

Get Bytom Hash Time Lock Contract (HTLC) address.

Returns str – Bytom HTLC address.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=679208)
>>> htlc.contract_address()
"bm1qul62nq2l8gmvv9k9ve4e07mlmtxnwgxpzlg833pff9x3kctlul2q727jyy"
```

balance(*asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', unit: str = 'NEU'*) → Union[int, float]

Get Bytom HTLC balance.

Parameters

- **asset** (*str, bytom.assets.AssetNamespace, bytom.assets.AssetNamespace*) – Bytom asset id, defaults to `BTM`.
- **unit** (*str*) – Bytom unit, default to `NEU`.

Returns int, float – Bytom HTLC balance.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=679208)
>>> htlc.balance(asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
0.1
```

utxos(*asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', limit: int = 15*) → list

Get Bytom HTLC unspent transaction output (UTXO's).

Parameters

- **asset** (*str, bytom.assets.AssetNamespace*) – Bytom asset id, defaults to `BTM`.
- **limit** (*int*) – Limit of UTXO's, default is `15`.

Returns list – Bytom unspent transaction outputs.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=679208)
>>> htlc.utxos(asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
[{'hash': '1aaf7df33c1d41bc6108c93d8b6da6af1d7f68632f54516408a03ff86494a1f0',
↪'asset': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 10000000}]
```

7.3 Transaction

Bytom transaction in blockchain network.

class `swap.providers.bytom.transaction.`**`Transaction`**(*network: str = 'mainnet'*)

Bytom Transaction.

Parameters **`network`** (*`str`*) – Bytom network, defaults to mainnet.

Returns Transaction – Bytom transaction instance.

Note: Bytom has only three networks, `mainnet`. `solonet` and `mainnet`.

`fee`(*unit: str = 'NEU'*) → Union[int, float]

Get Bytom transaction fee.

Parameters **`unit`** (*`str`*) – Bytom unit, default to NEU.

Returns int, float – Bytom transaction fee.

```
>>> from swap.providers.bytom.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"bm1q3plwvmvy4qhjmp5zffzmk50aagpujt6f5je85p", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> withdraw_transaction.fee(unit="NEU")
509000
```

`hash`() → str

Get Bytom transaction hash.

returns str – Bytom transaction id/hash.

```
>>> from swap.providers.bytom.htlc import HTLC
 >>> from swap.providers.bytom.transaction import FundTransaction
 >>> htlc: HTLC = HTLC(network="mainnet")
 >>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=679208)
 >>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
 >>> fund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
 >>> fund_transaction.hash()
 "a3078af0810c68a7bb6f2f42cd67dce9dea3d77028ca0c527224e4524038abc4"
```

`json`() → dict

Get Bytom transaction json format.

Returns dict – Bytom transaction json format.

```
>>> from swap.providers.bytom.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> refund_transaction.json()
{"tx_id": "1722aa930f6f93b4c87788ea55f49055f26f86821bcd11a64d42bcb9e3b8a96d",
↪"version": 1, "size": 179, "time_range": 0, "inputs": [{"type": "spend",
↪"asset_id": "ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
↪", "asset_definition": {}, "amount": 10000000, "control_program":
↪"0020e7f4a9815f3a36c616c5666b97fb7fdacd3720c117d078c429494d1b617fe7d4",
↪"address": "bm1qul62nq2l8gmvv9k9ve4e07mlmtxnwgxpzlg833pff9x3kctlul2q727jyy",
↪"spent_output_id":
↪"1aaf7df33c1d41bc6108c93d8b6da6af1d7f68632f54516408a03ff86494a1f0", "input_id
↪": "6ccb3abb96d713fcaf27548ed76dadc695259fb7570b38ab9cde23f7ec261d60",
↪"witness_arguments": null, "sign_data":
↪"cc78c1fb648f8826e4dd4f85f885ac75866c0233b0af6581753d858304b8e04b"}], "outputs
↪": [{"type": "control", "id":
↪"6f831e2f958252a20b8d5aa9242c7bda229cb0e35bd2101978ea7df6cd7cc728", "position
↪": 0, "asset_id":
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", "asset_
↪definition": {}, "amount": 9491000, "control_program":
↪"0014b1592acbb917f13937166c2a9b6ce973296ebb60", "address":
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx"}], "fee": 509000}
```

raw() → str

Get Bytom transaction raw.

Returns str – Bytom transaction raw.

```
>>> from swap.providers.bytom.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"bm1q3plwvmvy4qhjmp5zffzmk50aagpujt6f5je85p", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> withdraw_transaction.raw()

↪"07010001016b0169f7df4d06a3fe3c8ac6438f25f9c97744a10455357857775526c3e6c752fb69eaffffffffff
↪"
```

type() → str

Get Bytom signature transaction type.

Returns str – Bytom signature transaction type.

```
>>> from swap.providers.bytom.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"bm1q3plwvmvy4qhjmp5zffzmk50aagpujt6f5je85p", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
```

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```
>>> withdraw_transaction.type()
"bytom_withdraw_unsigned"
```

unsigned_datas(*detail: bool = False*) → List[dict]

Get Bytom transaction unsigned datas(messages) with instruction.

Parameters **detail** (*bool*) – Bytom unsigned datas to see detail, defaults to False.

Returns list – Bytom transaction unsigned datas.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.providers.bytom.transaction import FundTransaction
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=679208)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
>>> fund_transaction.unsigned_datas()
[{"datas": ["f42a2b6e15585b88da8b34237c7a6fd83af12ee6971813d66cf794a63ebcc16f"],
↪ "public_key":
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212", "network
↪": "mainnet", "path": "m/44/153/1/0/1"}]
```

signatures() → List[List[str]]

Get Bytom transaction signatures(signed datas).

Returns list – Bytom transaction signatures.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.providers.bytom.transaction import FundTransaction
>>> from swap.providers.bytom.solver import FundSolver
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=679208)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", path="m/44/153/1/0/1")
>>> fund_transaction.sign(solver=fund_solver)
```

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```
>>> fund_transaction.signatures()
[[
↪'b82e97abc4b70f7ffe7f783254c63e61436d6a7ad15da89b1fb791f91d1d6aa0bab7ff86328eabd2959f5475dde4
↪']]
```

7.3.1 FundTransaction

class swap.providers.bytom.transaction.**FundTransaction**(*network: str = 'mainnet'*)
Bytom Fund transaction.

Parameters **network** (*str*) – Bytom network, defaults to mainnet.

Returns FundTransaction – Bytom fund transaction instance.

Warning: Do not forget to build transaction after initialize fund transaction.

build_transaction(*address: str, htlc: swap.providers.bytom.htlc.HTLC, amount: int, asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', unit: str = 'NEU'*) → *swap.providers.bytom.transaction.FundTransaction*
Build Bytom fund transaction.

Parameters

- **address** (*str*) – Bytom sender wallet address.
- **htlc** (*str*) – Bytom Hash Time Lock Contract (HTLC) instance.
- **amount** (*int, float*) – Bytom amount to fund.
- **asset** (*str, bytom.assets.AssetNamespace*) – Bytom asset id, defaults to BTM.
- **unit** (*str*) – Bytom unit, default to NEU.

Returns FundTransaction – Bytom fund transaction instance.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.providers.bytom.transaction import FundTransaction
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=679208)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
<swap.providers.bytom.transaction.FundTransaction object at 0x0409DAF0>
```

sign(*solver:* swap.providers.bytom.solver.FundSolver) → *swap.providers.bytom.transaction.FundTransaction*
Sign Bytom fund transaction.

Parameters **solver** (`bytom.solver.FundSolver`) – Bytom fund solver.

Returns FundTransaction – Bytom fund transaction instance.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.providers.bytom.transaction import FundTransaction
>>> from swap.providers.bytom.solver import FundSolver
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=679208)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", path="m/44/153/1/0/1")
>>> fund_transaction.sign(solver=fund_solver)
<swap.providers.bytom.transaction.FundTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Bytom fund transaction raw.

Returns str – Bytom fund transaction raw.

```
>>> from swap.providers.bytom.htlc import HTLC
>>> from swap.providers.bytom.transaction import FundTransaction
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=679208)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
>>> fund_transaction.transaction_raw()

↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcTlxcnV
↪"
```

7.3.2 WithdrawTransaction

class `swap.providers.bytom.transaction.`**`WithdrawTransaction`**(*network: str = 'mainnet'*)

Bytom Withdraw transaction.

Parameters **`network`** (*`str`*) – Bytom network, defaults to `mainnet`.

Returns WithdrawTransaction – Bytom withdraw transaction instance.

> **Warning:** Do not forget to build transaction after initialize withdraw transaction.

`build_transaction`(*address: str*, *transaction_hash: str*, *asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*) → *swap.providers.bytom.transaction.WithdrawTransaction*

Build Bytom withdraw transaction.

Parameters

- **`address`** (*`str`*) – Bytom recipient wallet address.
- **`transaction_hash`** (*`str`*) – Bytom funded transaction hash/id.
- **`asset`** (*`str, bytom.assets.AssetNamespace`*) – Bytom asset id, defaults to `BTM`.

Returns WithdrawTransaction – Bytom withdraw transaction instance.

```
>>> from swap.providers.bytom.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"bm1q3plwvmvy4qhjmp5zffzmk50aagpujt6f5je85p", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
<swap.providers.bytom.transaction.WithdrawTransaction object at 0x0409DAF0>
```

`sign`(*solver: swap.providers.bytom.solver.WithdrawSolver*) → *swap.providers.bytom.transaction.WithdrawTransaction*

Sign Bytom withdraw transaction.

Parameters **`solver`** (`bytom.solver.WithdrawSolver`) – Bytom withdraw solver.

Returns WithdrawTransaction – Bytom withdraw transaction instance.

```
>>> from swap.providers.bytom.transaction import WithdrawTransaction
>>> from swap.providers.bytom.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"bm1q3plwvmvy4qhjmp5zffzmk50aagpujt6f5je85p", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9
↪", secret_key="Hello Meheret!", bytecode=bytecode)
```

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```
>>> withdraw_transaction.sign(solver=withdraw_solver)
<swap.providers.bytom.transaction.WithdrawTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Bytom withdraw transaction raw.

Returns str – Bytom withdraw transaction raw.

```
>>> from swap.providers.bytom.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"bm1q3plwvmvy4qhjmp5zffzmk50aagpujt6f5je85p", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> withdraw_transaction.transaction_raw()

↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogImJtMXF1bDYybnEybDhnbXZ2OWs5dmU0ZTA3bWxtdHhud2d4cHpsZzg
↪"
```

7.3.3 RefundTransaction

class swap.providers.bytom.transaction.**RefundTransaction**(*network: str = 'mainnet'*)

Bytom Refund transaction.

Parameters **network** (*str*) – Bytom network, defaults to `mainnet`.

Returns RefundTransaction – Bytom refund transaction instance.

Warning: Do not forget to build transaction after initialize refund transaction.

build_transaction(*address: str, transaction_hash: str, asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*) → *swap.providers.bytom.transaction.RefundTransaction*

Build Bytom refund transaction.

Parameters

- **address** (*str*) – Bytom sender wallet address.
- **transaction_hash** (*str*) – Bytom funded transaction hash/id
- **asset** (*str, bytom.assets.AssetNamespace*) – Bytom asset id, defaults to BTM.

Returns RefundTransaction – Bytom refund transaction instance.

```
>>> from swap.providers.bytom.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
<swap.providers.bytom.transaction.RefundTransaction object at 0x0409DAF0>
```

sign(*solver: swap.providers.bytom.solver.RefundSolver*) → *swap.providers.bytom.transaction.RefundTransaction*

Sign Bytom refund transaction.

Parameters **solver** (`bytom.solver.RefundSolver`) – Bytom refund solver.

Returns RefundTransaction – Bytom refund transaction instance.

```
>>> from swap.providers.bytom.transaction import RefundTransaction
>>> from swap.providers.bytom.solver import RefundSolver
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", bytecode=bytecode)
>>> refund_transaction.sign(solver=refund_solver)
<swap.providers.bytom.transaction.RefundTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Bytom refund transaction raw.

Returns str – Bytom refund transaction raw.

```
>>> from swap.providers.bytom.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(address=
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", transaction_hash=
↪"59b1e43b57cba1afa5834eb9886e4a9fba031c9880ce7ae29d32c36f6b47496f", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> refund_transaction.transaction_raw()

↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogImJtMXF1bDYybnEybDhnbXZ2OWs5dmU0ZTA3bWxtdHhud2d4cHpsZzg
↪"
```

7.4 Solver

Bytom solver.

7.4.1 FundSolver

`class swap.providers.bytom.solver.FundSolver`(*xprivate_key: str*, *account: int = 1*, *change: bool = False*, *address: int = 1*, *path: Optional[str] = None*, *indexes: Optional[List[str]] = None*)

Bytom Fund solver.

Parameters

- **xprivate_key** (*str*) – Bytom sender xprivate key.
- **account** (*int*) – Bytom derivation account, defaults to 1.
- **change** (*bool*) – Bytom derivation change, defaults to `False`.
- **address** (*int*) – Bytom derivation address, defaults to 1.
- **path** (*str*) – Bytom derivation path, defaults to `None`.
- **indexes** (*list*) – Bytom derivation indexes, defaults to `None`.

Returns FundSolver – Bytom fund solver instance.

```
>>> from swap.providers.bytom.solver import FundSolver
>>> sender_xprivate_key: str =
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8df4701
↪"
>>> fund_solver = FundSolver(xprivate_key=sender_xprivate_key)
<swap.providers.bytom.solver.FundSolver object at 0x03FCCA60>
```

7.4.2 WithdrawSolver

`class swap.providers.bytom.solver.WithdrawSolver`(*xprivate_key: str*, *secret_key: str*, *bytecode: str*, *account: int = 1*, *change: bool = False*, *address: int = 1*, *path: Optional[str] = None*, *indexes: Optional[List[str]] = None*)

Bytom Withdraw solver.

Parameters

- **xprivate_key** (*str*) – Bytom sender xprivate key.
- **secret_key** (*str*) – Secret password/passphrase.
- **bytecode** (*str*) – Bytom witness HTLC bytecode.
- **account** (*int*) – Bytom derivation account, defaults to 1.
- **change** (*bool*) – Bytom derivation change, defaults to `False`.
- **address** (*int*) – Bytom derivation address, defaults to 1.
- **path** (*str*) – Bytom derivation path, defaults to `None`.
- **indexes** (*list*) – Bytom derivation indexes, defaults to `None`.

Returns WithdrawSolver – Bytom withdraw solver instance.

```
>>> from swap.providers.bytom.solver import WithdrawSolver
>>> recipient_xprivate_key: str =
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9f650b
↪"
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa031d455
↪"
>>> withdraw_solver = WithdrawSolver(xprivate_key=recipient_xprivate_key, secret_
↪key="Hello Meheret!", bytecode=bytecode)
<swap.providers.bytom.solver.WithdrawSolver object at 0x03FCCA60>
```

7.4.3 RefundSolver

class swap.providers.bytom.solver.**RefundSolver**(*xprivate_key: str*, *bytecode: str*, *account: int = 1*, *change: bool = False*, *address: int = 1*, *path: Optional[str] = None*, *indexes: Optional[List[str]] = None*)

Bytom Refund solver.

Parameters

- **xprivate_key** (*str*) – Bytom sender xprivate key.
- **bytecode** (*str*) – Bytom witness HTLC bytecode.
- **account** (*int*) – Bytom derivation account, defaults to 1.
- **change** (*bool*) – Bytom derivation change, defaults to `False`.
- **address** (*int*) – Bytom derivation address, defaults to 1.
- **path** (*str*) – Bytom derivation path, defaults to `None`.
- **indexes** (*list*) – Bytom derivation indexes, defaults to `None`.

Returns RefundSolver – Bytom refund solver instance.

```
>>> from swap.providers.bytom.solver import RefundSolver
>>> sender_xprivate_key: str =
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8df4701
↪"
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa031d455
↪"
>>> refund_solver = RefundSolver(xprivate_key=sender_xprivate_key,␣
↪bytecode=bytecode)
<swap.providers.bytom.solver.RefundSolver object at 0x03FCCA60>
```

7.5 Signature

Bytom signature.

class swap.providers.bytom.signature.**Signature**(*network: str = 'mainnet'*)
Bytom Signature.

Parameters **network** (*str*) – Bytom network, defaults to mainnet.

Returns Signature – Bytom signature instance.

Note: Bytom has only three networks, `mainnet`, `solonet` and `testnet`.

---

fee(*unit: str = 'NEU'*) → Union[int, float]
Get Bytom transaction fee.

Parameters **unit** (*str*) – Bytom unit, default to `NEU`.

Returns int, float – Bytom transaction fee.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcTlxcnV
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.fee(unit="NEU")
449000
```

hash() → str
Get Bytom signature transaction hash.

Returns str – Bytom signature transaction hash or transaction id.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import WithdrawSolver
>>> unsigned_withdraw_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogImJtMXF1bDYybnEybDhnbXZ2OWs5dmU0ZTA3bWxtdHhud2d4cHpsZzg
↪"
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> signature.sign(transaction_raw=unsigned_withdraw_transaction_raw,␣
↪solver=withdraw_solver)
>>> signature.hash()
"d1e84c37f41056f4df398523f84ecf079377fd85e4561c10ec03818cd4db7ec0"
```

json() → dict

Get Bytom signature transaction json format.

Returns dict – Bytom signature transaction json format.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcTlxcnVm
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.json()
{"tx_id": "a3078af0810c68a7bb6f2f42cd67dce9dea3d77028ca0c527224e4524038abc4",
↪"version": 1, "size": 275, "time_range": 0, "inputs": [{"type": "spend",
↪"asset_id": "ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
↪", "asset_definition": {}, "amount": 189551000, "control_program":
↪"0014b1592acbb917f13937166c2a9b6ce973296ebb60", "address":
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", "spent_output_id":
↪"dd12e69d28a3e581b8b4501f9979ad39ba1e6b7e2163fe112a54a81fc2e8d6e3", "input_id
↪": "e55412ce943b72860ea06f7bc4c7ca4d9913b3dd736f8915279741c9a8c3bb2d",
↪"witness_arguments": [
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212"], "sign_
↪data": "f42a2b6e15585b88da8b34237c7a6fd83af12ee6971813d66cf794a63ebcc16f"}],
↪"outputs": [{"type": "control", "id":
↪"ecbd05faf0c2bec7706fb1d5230768d86eddc4d65fae2e4b0f995e6aa278c278", "position
↪": 0, "asset_id":
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", "asset_
↪definition": {}, "amount": 10000000, "control_program":
↪"0020e7f4a9815f3a36c616c5666b97fb7fdacd3720c117d078c429494d1b617fe7d4",
↪"address": "bm1qul62nq2l8gmvv9k9ve4e07mlmtxnwgxpzlg833pff9x3kctlul2q727jyy"},
↪{"type": "control", "id":
↪"9b13259cf0ddfebeb6f616e1f5f52a7372b20bd3d7ba694cdbc5490cdc675538", "position
↪": 1, "asset_id":
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", "asset_
↪definition": {}, "amount": 179102000, "control_program":
↪"0014b1592acbb917f13937166c2a9b6ce973296ebb60", "address":
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx"}], "fee": 449000}
```

raw() → str

Get Bytom signature transaction raw.

Returns str – Bytom signature transaction raw.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcTlxcnVm
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
```

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```
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.raw()

↪"07010001015f015df7df4d06a3fe3c8ac6438f25f9c97744a10455357857775526c3e6c752fb69eaffffffffff
↪"
```

type() → str
Get Bytom signature transaction type.

Returns str – Bytom signature transaction type.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import RefundSolver
>>> unsigned_refund_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogImJtMXF1bDYybnEybDhnbXZ2OWs5dmU0ZTA3bWxtdHhud2d4cHpsZzg
↪"
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", bytecode=bytecode)
>>> signature.sign(transaction_raw=unsigned_refund_transaction_raw,␣
↪solver=refund_solver)
>>> signature.type()
"bytom_refund_signed"
```

sign(*transaction_raw: str*, *solver: Union[swap.providers.bytom.solver.FundSolver, swap.providers.bytom.solver.WithdrawSolver, swap.providers.bytom.solver.RefundSolver]*) → Union[*swap.providers.bytom.signature.FundSignature*, *swap.providers.bytom.signature.WithdrawSignature*, *swap.providers.bytom.signature.RefundSignature*]
Sign unsigned transaction raw.

Parameters

- **transaction_raw** (*str*) – Bytom unsigned transaction raw.
- **solver** (*bytom.solver.NormalSolver*, bytom.solver.FundSolver, bytom.solver.WithdrawSolver, bytom.solver.RefundSolver) – Bytom solver

Returns FundSignature, WithdrawSignature, RefundSignature – Bytom signature instance.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtTlxcnVm
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
```

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```
<swap.providers.bytom.signature.FundSignature object at 0x0409DAF0>
```

unsigned_datas() → List[dict]
Get Bytom transaction unsigned datas with instruction.

Returns list – Bytom transaction unsigned datas.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import WithdrawSolver
>>> unsigned_withdraw_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogImJtMXF1bDYybnEybDhnbXZ2OWs5dmU0ZTA3bWxtdHhud2d4cHpsZzg
↪"
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> signature.sign(transaction_raw=unsigned_withdraw_transaction_raw,␣
↪solver=withdraw_solver)
>>> signature.unsigned_datas()
[{"datas": ["45d1746a1ec0695d3e06059c413872040d24f86499ddafab48177368e5c72883"],
↪ "network": "mainnet", "path": null}]
```

signatures() → List[List[str]]
Get Bytom transaction signatures(signed datas).

Returns list – Bytom transaction signatures.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcTlxcnV
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.signatures()
[[
↪"b82e97abc4b70f7ffe7f783254c63e61436d6a7ad15da89b1fb791f91d1d6aa0bab7ff86328eabd2959f5475dde
↪"]]
```

transaction_raw() → str
Get Bytom signed transaction raw.

Returns str – Bytom signed transaction raw.

```
>>> from swap.providers.bytom.signature import Signature
>>> from swap.providers.bytom.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcTlxcnV
↪"
```

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```
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.transaction_raw()

↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcTlxcnV
↪"
```

7.5.1 FundSignature

class `swap.providers.bytom.signature.`**`FundSignature`**(*network: str = 'mainnet'*)

Bytom Fund signature.

Parameters **`network`** (*`str`*) – Bytom network, defaults to `mainnet`.

Returns FundSignature – Bytom fund signature instance.

`sign`(*transaction_raw: str*, *solver: swap.providers.bytom.solver.FundSolver*) → *swap.providers.bytom.signature.FundSignature*

Sign unsigned fund transaction raw.

Parameters

- **`transaction_raw`** (*`str`*) – Bytom unsigned fund transaction raw.
- **`solver`** (`bytom.solver.FundSolver`) – Bytom fund solver.

Returns FundSignature – Bytom fund signature instance.

```
>>> from swap.providers.bytom.signature import FundSignature
>>> from swap.providers.bytom.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogImJtMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcTlxcnV
↪"
>>> fund_signature: FundSignature = FundSignature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> fund_signature.sign(transaction_raw=unsigned_fund_transaction_raw,␣
↪solver=fund_solver)
<swap.providers.bytom.signature.FundSignature object at 0x0409DAF0>
```

7.5.2 WithdrawSignature

class swap.providers.bytom.signature.**WithdrawSignature**(*network: str = 'mainnet'*)

Bytom Withdraw signature.

Parameters **network** (*str*) – Bytom network, defaults to mainnet.

Returns WithdrawSignature – Bytom withdraw signature instance.

sign(*transaction_raw: str*, *solver: swap.providers.bytom.solver.WithdrawSolver*) → *swap.providers.bytom.signature.WithdrawSignature*

Sign unsigned withdraw transaction raw.

Parameters

- **transaction_raw** (*str*) – Bytom unsigned withdraw transaction raw.
- **solver** (bytom.solver.WithdrawSolver) – Bytom withdraw solver.

Returns WithdrawSignature – Bytom withdraw signature instance.

```
>>> from swap.providers.bytom.signature import WithdrawSignature
>>> from swap.providers.bytom.solver import WithdrawSolver
>>> unsigned_withdraw_transaction_raw: str =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcTNwbHd2bXZ5NHFoam1wNXpmZnptazUwYWFncHVqdDZmNWp
↪"
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
>>> withdraw_signature: WithdrawSignature = WithdrawSignature(network="mainnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> withdraw_signature.sign(transaction_raw=unsigned_withdraw_transaction_raw,␣
↪solver=withdraw_solver)
<swap.providers.bytom.signature.WithdrawSignature object at 0x0409DAF0>
```

7.5.3 RefundSignature

class swap.providers.bytom.signature.**RefundSignature**(*network: str = 'mainnet'*)

Bytom Refund signature.

Parameters **network** (*str*) – Bytom network, defaults to mainnet.

Returns RefundSignature – Bytom withdraw signature instance.

sign(*transaction_raw: str*, *solver: swap.providers.bytom.solver.RefundSolver*) → *swap.providers.bytom.signature.RefundSignature*

Sign unsigned refund transaction raw.

Parameters

- **transaction_raw** (*str*) – Bytom unsigned refund transaction raw.
- **solver** (bytom.solver.RefundSolver) – Bytom refund solver.

Returns RefundSignature – Bytom refund signature instance.

```
>>> from swap.providers.bytom.signature import RefundSignature
>>> from swap.providers.bytom.solver import RefundSolver
>>> unsigned_refund_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogImJtMXF1bDYybnEybDhnbXZ2OWs5dmU0ZTA3bWxtdHhud2d4cHpsZzg
↪"
>>> bytecode: str =
↪"03285d0a20fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa03
↪"
>>> refund_signature: RefundSignature = RefundSignature(network="mainnet")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", bytecode=bytecode)
>>> refund_signature.sign(transaction_raw=unsigned_refund_transaction_raw,␣
↪solver=refund_solver)
<swap.providers.bytom.signature.RefundSignature object at 0x0409DAF0>
```

7.6 Remote Procedure Call (RPC)

Bytom remote procedure call.

`swap.providers.bytom.rpc.`**`get_balance`**(*address: str*, *asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → int

Get Bytom balance.

Parameters

- **address** (*str*) – Bytom address.
- **asset** (*str, bytom.assets.AssetNamespace*) – Bytom asset, default to `BTM`.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns int – Bytom asset balance (NEU amount).

```
>>> from swap.providers.bytom.rpc import get_balance
>>> from swap.providers.bytom.assets import BTM as ASSET
>>> get_balance(address="bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", asset=ASSET,␣
↪network="mainnet")
71560900
```

`swap.providers.bytom.rpc.`**`get_utxos`**(*program: str*, *network: str = 'mainnet'*, *asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*, *limit: int = 15*, *by: str = 'amount'*, *order: str = 'desc'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → list

Get Bytom unspent transaction outputs (UTXO’s).

Parameters

- **program** (*str*) – Bytom control program.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **asset** (*str, bytom.assets.AssetNamespace*) – Bytom asset id, defaults to `BTM`.
- **limit** (*int*) – Bytom utxo's limit, defaults to `15`.
- **by** (*str*) – Sort by, defaults to `amount`.
- **order** (*str*) – Sort order, defaults to `desc`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns list – Bytom unspent transaction outputs (UTXO's).

```
>>> from swap.providers.bytom.rpc import get_utxos
>>> get_utxos(program="00142cda4f99ea8112e6fa61cdd26157ed6dc408332a", network=
↪"mainnet")
[{'hash': '7c1e20e6ff719176a3ed6f5332ec3ff665ab28754d2511950e591267e0e675df', 'asset
↪': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪71510800}, {'hash':
↪'01b07c3523085b75f1e047be3a73b263635d0b86f9b751457a51b26c5a97a110', 'asset':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪50000}, {'hash': 'e46cfecc1f1a26413172ce81c78affb19408e613915642fa5fb04d3b0a4ffa65
↪', 'asset': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 100}]
```

`swap.providers.bytom.rpc.`**`estimate_transaction_fee`**(*address: str, amount: int, asset: Union[str, swap.providers.bytom.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', confirmations: int = 1, network: str = 'mainnet', headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → int

Estimate Bytom transaction fee.

Parameters

- **address** (*str*) – Bytom address.
- **amount** (*int*) – Bytom amount (NEU amount).
- **asset** (*str, bytom.assets.AssetNamespace*) – Bytom asset id, default to `BTM`.
- **confirmations** (*int*) – Bytom confirmations, default to `1`.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – request timeout, default to `60`.

Returns str – Estimated transaction fee (NEU amount).

```
>>> from swap.providers.bytom.rpc import estimate_transaction_fee
>>> from swap.providers.bytom.assets import BTM as ASSET
```

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```
>>> estimate_transaction_fee(address="bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx",␣
↪asset=ASSET, amount=100_000, confirmations=100, network="mainnet")
449000
```

swap.providers.bytom.rpc.**account_create**(*xpublic_key: str*, *label: str = '1st address'*, *account_index: int = 1*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Create account in blockcenter.

Parameters

- **xpublic_key** (*str*) – Bytom xpublic key.
- **label** (*str*) – Bytom limit, defaults to `1st address`.
- **account_index** (*str*) – Account index, defaults to 1.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – request timeout, default to `60`.

Returns dict – Bytom blockcenter guid, address and label.

```
>>> from swap.providers.bytom.rpc import account_create
>>> account_create(xpublic_key=
↪"f80a401807fde1ee5727ae032ee144e4b757e69431e68e6cd732eda3c8cd3936daedfdd0fd8f8df14e2084c7e8df4701
↪", network="mainnet")
{"guid": "9ed61a9b-e7b6-4cb7-94fb-932b738e4f66", "address":
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", "label": "1st address"}
```

swap.providers.bytom.rpc.**build_transaction**(*address: str*, *transaction: dict*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Build Bytom transaction.

Parameters

- **address** (*str*) – Bytom address.
- **transaction** (*dict*) – Bytom transaction (inputs, outputs, fee, confirmations & forbid_chain_tx).
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns dict – Bytom builted transaction.

```
>>> from swap.providers.bytom.rpc import build_transaction
>>> build_transaction(address="bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx",␣
↪transaction={"fee": "0.1", "confirmations": 1, "inputs": [{"type": "spend_wallet",
↪ "amount": "0.0001", "asset":
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff"}], "outputs": [
↪{"type": "control_address", "amount": "0.0001", "asset":
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", "address":
↪"bm1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07q3yf5q8"}]}, network=
↪"mainnet")
```

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```
{'tx': {'hash': '5d4ae68487953863783599045f99eb8740b5745376ed8d8926d68de695e72476',
↪'status': True, 'size': 404, 'submission_timestamp': 0, 'memo': '', 'inputs': [{
↪'script': '00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx', 'asset': {'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'decimals': 0,
↪ 'unit': 'BTM'}, 'amount': '0.0005', 'type': 'spend'}, {'script':
↪'00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx', 'asset': {'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'decimals': 0,
↪ 'unit': 'BTM'}, 'amount': '0.715108', 'type': 'spend'}], 'outputs': [{'utxo_id':
↪'0d5c097b8e75f711765ff63017fe8a4a987d8b50f7ca3a5d1873120af5f46116', 'script':
↪'00204f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'address
↪': 'bm1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07q3yf5q8', 'asset': {
↪'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'decimals': 0, 'unit': 'BTM'}, 'amount': '0.0001', 'type': 'control'}, {'utxo_id
↪': 'c49da44ef15d227ca978191e91d5d8915a3f92baf6b5778b7377deb2bddca554', 'script':
↪'00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx', 'asset': {'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'decimals': 0,
↪ 'unit': 'BTM'}, 'amount': '0.615908', 'type': 'control'}], 'fee': '0.0996',
↪'balances': [{'asset': {'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'decimals': 0,
↪ 'unit': 'BTM'}, 'amount': '-0.0001'}], 'types': ['ordinary'], 'min_veto_height':␣
↪0}, 'raw_transaction':
↪'07010002015e015c88650475abf87eb364f93c608db879ad71643fbc7725ded246e8883e79c75a78ffffffffffffff
↪', 'signing_instructions': [{'derivation_path': ['2c000000', '99000000', '01000000
↪', '00000000', '01000000'], 'sign_data': [
↪'a5da2ae06bfaea9854423fe9cc544d775854cf57827c8c2ab606418452d30209'], 'pubkey':
↪'91ff7f525ff40874c4f47f0cab42e46e3bf53adad59adef9558ad1b6448f22e2'}, {'derivation_
↪path': ['2c000000', '99000000', '01000000', '00000000', '01000000'], 'sign_data':␣
↪['3e44203712c4e981783810875fa67f2efe0afda38afe229fd09da0d113c3d885'], 'pubkey':
↪'91ff7f525ff40874c4f47f0cab42e46e3bf53adad59adef9558ad1b6448f22e2'}]}
```

`swap.providers.bytom.rpc.`**`get_transaction`**(*transaction_hash: str*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Get Bytom transaction detail.

Parameters

- **transaction_hash** (*str*) – Bytom transaction hash/id.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns dict – Bytom transaction detail.

```
>>> from swap.providers.bytom.rpc import get_transaction
>>> get_transaction(transaction_hash=
↪"bc935995cb3408b51aa3d05e7e77226840eb68340b229f9c561edae31ebc8b95", network=
↪"mainnet")
```

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```
{'id': 'bc935995cb3408b51aa3d05e7e77226840eb68340b229f9c561edae31ebc8b95',
↪'timestamp': 1524765978, 'block_height': 3487, 'trx_amount': 41249562600, 'trx_fee
↪': 437400, 'status_fail': False, 'coinbase': False, 'size': 332, 'chain_status':
↪'mainnet', 'time_range': 0, 'index_id': 3489, 'mux_id':
↪'305a28d8d34b40c65936810f9e9c1f8bc9c793ec2e72c70f9203fbbeb0a56db9', 'inputs': [{
↪'txtype': 'spend', 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪41250000000, 'control_program': '0014151df3db084d909ccb55d45d4e59db2e17e5f237',
↪'address': 'bm1qz5wl8kcgfkgfej6463w5ukwm9ct7tu3ht8p7te', 'spent_output_id':
↪'6def8e6a7c29ccff4c5596a37a6698b71f392bf713bc67bb3fa0af54bf50f815', 'input_id':
↪'fb226e3ad39e38341f0d232c910065b76ef7c267faa3ea4e49a31836405b6747', 'witness_
↪arguments': [
↪'1848cb550620b971fd244eb625ccf4507ccd9944da65b47674550397c983247e1bd3ff880782beca963a81c34c17c8e
↪', '268402537b02d91fafdcdeb6eda3aa542548d77cd6cccb38ecd7ea7ce8a22cf7'], 'asset_
↪name': 'BTM', 'asset_definition': '{}', 'cross_chain_asset': False, 'asset_
↪decimals': 8}], 'outputs': [{'txtype': 'control', 'id':
↪'a8a7b5363379dee8ff77da7c4acf63dc3469a79ebaade079fc1842543964c6e9', 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪41239562600, 'control_program': '0014fc22634a713ac1e6f831c56184f847b7546fbda4',
↪'address': 'bm1qls3xxjn38tq7d7p3c4scf7z8ka2xl0dyppj52k', 'asset_name': 'BTM',
↪'asset_definition': '{}', 'cross_chain_asset': False, 'position': 0, 'asset_
↪decimals': 8}, {'txtype': 'control', 'id':
↪'84287fb5b2b461dbd3b937a9013d89c0d54a21768e31fb8345b02d57a7992533', 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪10000000, 'control_program': '00140e43a92a9e8aca788eb1551c316448c2e3f78215',
↪'address': 'bm1qpep6j2573t983r4325wrzezgct3l0qs4q04pem', 'asset_name': 'BTM',
↪'asset_definition': '{}', 'cross_chain_asset': False, 'position': 1, 'asset_
↪decimals': 8}], 'confirmations': 558509}
```

`swap.providers.bytom.rpc.`**`get_current_block_height`**(*plus: int = 0*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → int

Get Bytom transaction detail.

Parameters

- **`plus`** (*`int`*) – Add block number on current block height, default to `0`.
- **`network`** (*`str`*) – Bytom network, defaults to `mainnet`.
- **`headers`** (*`dict`*) – Request headers, default to `common headers`.
- **`timeout`** (*`int`*) – Request timeout, default to `60`.

Returns int – Bytom current block height.

```
>>> from swap.providers.bytom.rpc import get_current_block_height
>>> get_current_block_height(plus=0)
678722
```

`swap.providers.bytom.rpc.`**`find_p2wsh_utxo`**(*transaction: dict*) → Optional[dict]

Find Bytom pay to witness script hash UTXO info's.

Parameters **`transaction`** (*`dict`*) – Bytom transaction detail.

Returns dict – Pay to Witness Secript Hash (P2WSH) UTXO info's.

```
>>> from swap.providers.bytom.rpc import find_p2wsh_utxo, get_transaction
>>> find_p2wsh_utxo(transaction=get_transaction(transaction_hash=
↪"b6d12407bbd238938941246fd0dd3e5234f1e3c370bef3fcbc1f60ebee022e76", network=
↪"mainnet"))
{'txtype': 'control', 'id':
↪'a1c5cce9df9343a10dafa582dea04e61c402ee8398b5268ba5c9c3aefd58017a', 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪10499000, 'control_program':
↪'00204f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'address
↪': 'bm1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07q3yf5q8', 'asset_name
↪': 'BTM', 'asset_definition': '{}', 'cross_chain_asset': False, 'position': 0,
↪'asset_decimals': 8}
```

swap.providers.bytom.rpc.**decode_raw**(*raw: str*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Decode original Bytom raw.

Parameters

- **raw** (*str*) – Bytom transaction raw.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns dict – Bytom decoded transaction raw.

```
>>> from swap.providers.bytom.rpc import decode_raw
>>> decode_raw(raw=
↪"07010002015e015c88650475abf87eb364f93c608db879ad71643fbc7725ded246e8883e79c75a78fffffffffffff
↪", network="testnet")
{'tx_id': '5d4ae68487953863783599045f99eb8740b5745376ed8d8926d68de695e72476',
↪'version': 1, 'size': 404, 'time_range': 0, 'inputs': [{'type': 'spend', 'asset_id
↪': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'asset_
↪definition': {}, 'amount': 50000, 'control_program':
↪'00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx', 'spent_output_id':
↪'01b07c3523085b75f1e047be3a73b263635d0b86f9b751457a51b26c5a97a110', 'input_id':
↪'de193c78772c93356f81a5061a90d8dcfba84d03ae4d78b2a57a9201f88c38af', 'witness_
↪arguments': ['91ff7f525ff40874c4f47f0cab42e46e3bf53adad59adef9558ad1b6448f22e2'],
↪'sign_data': 'a5da2ae06bfaea9854423fe9cc544d775854cf57827c8c2ab606418452d30209'},
↪{'type': 'spend', 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'asset_
↪definition': {}, 'amount': 71510800, 'control_program':
↪'00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx', 'spent_output_id':
↪'7c1e20e6ff719176a3ed6f5332ec3ff665ab28754d2511950e591267e0e675df', 'input_id':
↪'de2c7bcf9caf00f78ca8e316cf37cf88c86b0457e47cf58e2465d783151abd0e', 'witness_
↪arguments': ['91ff7f525ff40874c4f47f0cab42e46e3bf53adad59adef9558ad1b6448f22e2'],
↪'sign_data': '3e44203712c4e981783810875fa67f2efe0afda38afe229fd09da0d113c3d885'}],
↪ 'outputs': [{'type': 'control', 'id':
↪'0d5c097b8e75f711765ff63017fe8a4a987d8b50f7ca3a5d1873120af5f46116', 'position': 0,
↪ 'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'asset_definition': {}, 'amount': 10000, 'control_program':
↪'00204f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'address
↪': 'bm1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07q3yf5q8'}, {'type':
↪'control', 'id': 'c49da44ef15d227ca978191e91d5d8915a3f92baf6b5778b7377deb2bddca554
↪', 'position': 1, 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'asset_
↪definition': {}, 'amount': 61590800, 'control_program':
```

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```
```

swap.providers.bytom.rpc.**submit_raw**(*address: str*, *raw: str*, *signatures: list*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → str

Submit original Bytom raw into blockchain.

Parameters

- **address** (*str*) – Bytom address.
- **raw** (*str*) – Bytom transaction raw.
- **signatures** (*list*) – Bytom signed massage datas.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns str – Bytom submitted transaction id/hash.

```
>>> from swap.providers.bytom.rpc import submit_raw
>>> submit_raw(address="bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", raw=
↪"07010002015e015c88650475abf87eb364f93c608db879ad71643fbc7725ded246e8883e79c75a78ffffffffffffff
↪", signatures=[[
↪"f8466336a79d166e47fb5d64f1e7ec01b203b59b3ee86686492bd1e4d0bdd642dfe4a575049071a052a441635c33670
↪"], [
↪"ebf33fbda5c2f3d144e90c3b763b1e7e42d501e595216fcd2b310b089918bae2ef4c7b8a2e1f650ee741578aba79607
↪"]], network="mainnet")
"2993414225f65390220730d0c1a356c14e91bca76db112d37366df93e364a492"
```

7.7 Utils

Bytom Utils.

swap.providers.bytom.utils.**get_address_type**(*address: str*) → Optional[str]
Get Bytom address type.

Parameters **address** (*str*) – Bytom address.

Returns str – Bytom address type (P2WPKH, P2WSH).

```
>>> from swap.providers.bytom.utils import get_address_type
>>> get_address_type(address="bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx")
"p2wpkh"
```

swap.providers.bytom.utils.**is_network**(*network: str*) → bool
Check Bytom network.

Parameters **network** (*str*) – Bytom network.

Returns bool – Bytom valid/invalid network.

```
>>> from swap.providers.bytom.utils import is_network
>>> is_network(network="solonet")
True
```

`swap.providers.bytom.utils.`**`is_address`**(*address: str*, *network: Optional[str] = None*, *address_type: Optional[str] = None*) → bool

Check Bytom address.

Parameters

- **`address`** (*`str`*) – Bytom address.
- **`network`** (*`str`*) – Bytom network, defaults to `None`.
- **`address_type`** (*`str`*) – Bytom address type, defaults to `None`.

Returns bool – Bytom valid/invalid address.

```
>>> from swap.providers.bytom.utils import is_address
>>> is_address(address="bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", network=
↪"mainnet")
True
```

`swap.providers.bytom.utils.`**`is_transaction_raw`**(*transaction_raw: str*) → bool

Check Bytom transaction raw.

Parameters **`transaction_raw`** (*`str`*) – Bytom transaction raw.

Returns bool – Bytom valid/invalid transaction raw.

```
>>> from swap.providers.bytom.utils import is_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3lI
↪"
>>> is_transaction_raw(transaction_raw=transaction_raw)
True
```

`swap.providers.bytom.utils.`**`amount_unit_converter`**(*amount: Union[int, float]*, *unit_from: str = 'NEU2BTM'*) → Union[int, float]

Bytom amount unit converter

Parameters

- **`amount`** (*`int, float`*) – Bytom any amount.
- **`unit_from`** (*`str`*) – Bytom unit convert from symbol, default to `NEU2BTM`.

Returns int, float – BTM asset amount.

```
>>> from swap.providers.bytom.utils import amount_unit_converter
>>> amount_unit_converter(amount=10_000_000, unit_from="NEU2BTM")
0.1
```

`swap.providers.bytom.utils.`**`estimate_endblock`**(*endtime: int*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → int

Estimate Bytom expiration block height.

Parameters

- **endtime** (*int*) – Expiration block timestamp.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns str – Estimated Vapor endblock.

```
>>> from swap.providers.bytom.utils import estimate_endblock
>>> from swap.utils import get_current_timestamp
>>> estimate_endblock(endtime=get_current_timestamp(plus=3600))
680854
```

`swap.providers.bytom.utils.`**`decode_transaction_raw`**(*transaction_raw: str, headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → dict

Decode Bytom transaction raw.

Parameters

- **transaction_raw** (*str*) – Bytom transaction raw.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns dict – Decoded Bytom transaction raw.

```
>>> from swap.providers.bytom.utils import decode_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3l
↪"
>>> decode_transaction_raw(transaction_raw=transaction_raw)
{'fee': ..., 'type': '...', 'address': '...', 'transaction': {...}, 'unsigned_datas
↪': [...], 'signatures': [...], 'network': '...'}
```

`swap.providers.bytom.utils.`**`submit_transaction_raw`**(*transaction_raw: str, headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → dict

Submit Bytom transaction raw.

Parameters

- **transaction_raw** (*str*) – Bytom transaction raw.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns dict – Bytom submitted transaction id, fee, type and date.

```
>>> from swap.providers.bytom.utils import submit_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3l
↪"
>>> submit_transaction_raw(transaction_raw=transaction_raw)
{'fee': ..., 'type': '...', 'transaction_id': '...', 'network': '...', 'date': '...
↪'}
```

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```
```

CHAPTER

EIGHT

ETHEREUM

Ethereum is a decentralized, open-source blockchain with smart contract functionality. Ether is the native cryptocurrency of the platform. After Bitcoin, it is the second-largest cryptocurrency by market capitalization. Ethereum is the most actively used blockchain.

For more https://ethereum.org

8.1 Wallet

The implementation of Hierarchical Deterministic (HD) wallets generator for Ethereum blockchain.

class swap.providers.ethereum.wallet.**Wallet**(*network: str = 'mainnet', provider: str = 'http', token: Optional[str] = None*)

Ethereum Wallet class.

Parameters

- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns Wallet – Ethereum wallet instance.

Note: Ethereum has only five networks, `mainnet`, `ropsten`, `kovan`, `rinkeby` and `testnet`.

from_entropy(*entropy: str, language: str = 'english', passphrase: Optional[str] = None*) → *swap.providers.ethereum.wallet.Wallet*

Initialize wallet from entropy.

Parameters

- **entropy** (*str*) – Ethereum wallet entropy.
- **language** (*str*) – Ethereum wallet language, default to `english`.
- **passphrase** (*str*) – Ethereum wallet passphrase, default to `None`.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
```

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```
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

from_mnemonic(*mnemonic: str*, *language: Optional[str] = None*, *passphrase: Optional[str] = None*) → *swap.providers.ethereum.wallet.Wallet*

Initialize wallet from mnemonic.

Parameters

- **mnemonic** (*str*) – Ethereum wallet mnemonic.
- **language** (*str*) – Ethereum wallet language, default to `english`.
- **passphrase** (*str*) – Ethereum wallet passphrase, default to `None`.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_mnemonic(mnemonic="unfair divorce remind addict add roof park␣
↪clown build renew illness fault")
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

from_seed(*seed: str*) → *swap.providers.ethereum.wallet.Wallet*

Initialize wallet from seed.

Parameters **seed** (*str*) – Ethereum wallet seed.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_seed(seed=
↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪")
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

from_root_xprivate_key(*xprivate_key: str*, *strict: bool = True*) → *swap.providers.ethereum.wallet.Wallet*

Initialize wallet from root xprivate key.

Parameters

- **xprivate_key** (*str*) – Ethereum wallet root xprivate key.
- **strict** (*bool*) – Strict for must be root xprivate key, default to `True`.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_root_xprivate_key(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

from_xprivate_key(*xprivate_key: str*) → *swap.providers.ethereum.wallet.Wallet*

Initialize wallet from xprivate key.

Parameters **xprivate_key** (*str*) – Ethereum wallet xprivate key.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"xprvA3xrxQQVw6Kvc786WAccK4H7dLHhnb9XRsMUMqU3bJoZf5bWxtd5VePTNnn854tEbvV57ggjqkGHXc2u4Jx2veJ
↪")
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

from_wif(*wif: str*) → *swap.providers.ethereum.wallet.Wallet*
Initialize wallet from wallet important format (WIF).

Parameters **wif** (*str*) – Ethereum wallet important format.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_wif(wif="L4AfqFc8aoBWYNTKU6PkiFbP9kbXRfVHXZWde6SpAdTewwJMc5VZ")
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

from_private_key(*private_key*) → *swap.providers.ethereum.wallet.Wallet*
Initialize wallet from private key.

Parameters **private_key** (*str*) – Ethereum wallet private key.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_private_key(private_key=
↪"cf4c2fb2b88a556c211d5fe79335dcee6dd11403bbbc5b47a530e9cf56ee3aee")
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

from_path(*path: str*) → *swap.providers.ethereum.wallet.Wallet*
Drive Ethereum wallet from path.

Parameters **path** (*str*) – Ethereum wallet path.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

from_index(*index: int*, *hardened: bool = False*) → *swap.providers.ethereum.wallet.Wallet*
Drive Ethereum wallet from index.

Parameters

- **index** (*int*) – Ethereum wallet index.
- **hardened** (*bool*) – Use hardened index, default to `False`.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_index(44, harden=True)
>>> wallet.from_index(60, harden=True)
>>> wallet.from_index(0, harden=True)
>>> wallet.from_index(0)
>>> wallet.from_index(0)
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
```

`clean_derivation()` → *swap.providers.ethereum.wallet.Wallet*

Clean derivation Ethereum wallet.

Returns Wallet – Ethereum wallet instance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/60'/0'/0/0")
>>> wallet.path()
"m/44'/60'/0'/0/0"
>>> wallet.clean_derivation()
<swap.providers.ethereum.wallet.Wallet object at 0x040DA268>
>>> wallet.path()
None
```

`strength()` → Optional[int]

Get Ethereum wallet strength.

Returns int – Ethereum wallet strength.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.strength()
128
```

`entropy()` → Optional[str]

Get Ethereum wallet entropy.

Returns str – Ethereum wallet entropy.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.entropy()
"ed0802d701a033776811601dd6c5c4a9"
```

`mnemonic()` → Optional[str]

Get Ethereum wallet mnemonic.

Returns str – Ethereum wallet mnemonic.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
```

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```
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.mnemonic()
"unfair divorce remind addict add roof park clown build renew illness fault"
```

passphrase() → Optional[str]

Get Ethereum wallet passphrase.

Returns str – Ethereum wallet passphrase.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9", passphrase=
↪"meherett")
>>> wallet.passphrase()
"meherett"
```

language() → Optional[str]

Get Ethereum wallet language.

Returns str – Ethereum wallet language.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.language()
"english"
```

seed() → Optional[str]

Get Ethereum wallet seed.

Returns str – Ethereum wallet seed.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.seed()

↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪"
```

root_xprivate_key(*encoded: bool = True*) → Optional[str]

Get Ethereum wallet root xprivate key.

Parameters **encoded** (*bool*) – Encoded root xprivate key, default to `True`.

Returns str – Ethereum wallet root xprivate key.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.root_xprivate_key()

↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪"
```

root_xpublic_key(*encoded: bool = True*) → Optional[str]

Get Ethereum wallet root xpublic key.

Parameters **encoded** (*bool*) – Encoded root xprivate key, default to True.

Returns str – Ethereum wallet root xpublic key.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.root_xpublic_key()

↪"xpub661MyMwAqRbcG28HjdHc6zbHxBFzBJBC4ecFvVKBXXqiucEBe5wirgQ9hzY2WQMjnurVjJbTjMWRskHi7jnSRkJ
↪"
```

xprivate_key(*encoded=True*) → Optional[str]

Get Ethereum wallet xprivate key.

Parameters **encoded** (*bool*) – Encoded xprivate key, default to True.

Returns str – Ethereum wallet xprivate key.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.xprivate_key()

↪"xprvA3xrxQQVw6Kvc786WAccK4H7dLHhnb9XRsMUMqU3bJoZf5bWxtd5VePTNnn854tEbvV57ggjqkGHXc2u4Jx2veJ
↪"
```

xpublic_key(*encoded: bool = True*) → Optional[str]

Get Ethereum wallet xpublic key.

Parameters **encoded** (*bool*) – Encoded xprivate key, default to True.

Returns str – Ethereum wallet xpublic key.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.xpublic_key()

↪"xpub6GxDMuwPmTtDpbCZcC9cgCDrBN8CC3sNo6H5ADsf9eLYXsvfWRwL3ShwE5u4gxbPPcZj1yjSDrvvLxsHEPdjtFH
↪"
```

uncompressed() → str

Get Ethereum wallet uncompressed public key.

Returns str – Ethereum wallet uncompressed public key.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.uncompressed()
```

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```
↪"e270f9d51cad2977c0a28182b9320bb5edc3c70e6d84ff5837f8d407ed9d676d447e195e1aff5494d1a0c8dc310
↪"
```

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```
```

compressed() → str

Get Ethereum wallet compressed public key.

Returns str – Ethereum wallet compressed public key.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.compressed()
"03e270f9d51cad2977c0a28182b9320bb5edc3c70e6d84ff5837f8d407ed9d676d"
```

chain_code() → str

Get Ethereum wallet chain code.

Returns str – Ethereum wallet chain code.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.chain_code()
"9e5c492fa0a5c5cc649922c34ac3468a08473f3b61f59bba61b52cce364d6b0c"
```

private_key() → str

Get Ethereum wallet private key.

Returns str – Ethereum wallet private key.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.private_key()
"cf4c2fb2b88a556c211d5fe79335dcee6dd11403bbbc5b47a530e9cf56ee3aee"
```

public_key() → str

Get Ethereum wallet public key.

Returns str – Ethereum wallet public key.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/60'/0'/0/0")
>>> wallet.public_key()
"03e270f9d51cad2977c0a28182b9320bb5edc3c70e6d84ff5837f8d407ed9d676d"
```

path() → Optional[str]

Get Ethereum wallet path.

Returns str – Ethereum wallet path.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.path()
"m/44'/60'/0'/0/0"
```

address() → str

Get Ethereum wallet address.

Returns str – Ethereum wallet address.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.address()
"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C"
```

wif() → str

Get Ethereum wallet important format (WIF).

Returns str – Ethereum wallet important format.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.wif()
"L4AfqFc8aoBWYNTKU6PkiFbP9kbXRfVHXZWde6SpAdTewwJMc5VZ"
```

hash(*private_key: Optional[str] = None*) → str

Get Ethereum wallet public key/address hash.

Returns str – Ethereum wallet public key/address hash.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.hash()
"184847379abdde6617e8438fd4ff0d8fdf512cc2"
```

balance(*unit: str = 'Wei'*) → Union[Wei, int, float]

Get Ethereum wallet balance.

Parameters **unit** (*str*) – Ethereum unit, default to `Wei`.

Returns Wei, int, float – Ethereum wallet balance.

```
>>> from swap.providers.ethereum.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/60'/0'/0/0")
>>> wallet.balance(unit="Ether")
96.96263982
```

8.2 Hash Time Lock Contract (HTLC)

Ethereum Hash Time Lock Contract (HTLC).

class `swap.providers.ethereum.htlc.`**`HTLC`**(*contract_address: Optional[str] = None*, *network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*, *use_script: bool = False*)

Ethereum Hash Time Lock Contract (HTLC).

Parameters

- **`contract_address`** (*`str`*) – Ethereum HTLC contract address, defaults to `None`.
- **`network`** (*`str`*) – Ethereum network, defaults to `mainnet`.
- **`provider`** (*`str`*) – Ethereum network provider, defaults to `http`.
- **`token`** (*`str`*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.
- **`use_script`** (*`bool`*) – Initialize HTLC by using script, default to `False`.

Returns HTLC – Ethereum HTLC instance.

Note: Ethereum has only five networks, `mainnet`, `ropsten`, `kovan`, `rinkeby` and `testnet`.

`build_transaction`(*address: str*) → *swap.providers.ethereum.htlc.HTLC*

Build Ethereum HTLC transaction.

Parameters **`address`** (*`str`*) – Ethereum address.

Returns HTLC – Ethereum HTLC instance.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C")
<swap.providers.ethereum.htlc.HTLC object at 0x0409DAF0>
```

`sign_transaction`(*private_key: str*) → *swap.providers.ethereum.htlc.HTLC*

Sign Ethereum HTLC transaction.

Parameters **`private_key`** (*`str`*) – Ethereum private key.

Returns HTLC – Ethereum HTLC instance.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C")
>>> htlc.sign_transaction(private_key=
↪"cf4c2fb2b88a556c211d5fe79335dcee6dd11403bbbc5b47a530e9cf56ee3aee")
<swap.providers.ethereum.htlc.HTLC object at 0x0409DAF0>
```

`fee`(*unit: str = 'Wei'*) → Union[Wei, int, float]

Get Ethereum HTLC transaction fee.

Parameters **`unit`** (*`str`*) – Ethereum unit, default to `Wie`.

Returns Wei, int, float – Ethereum transaction fee.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C")
>>> htlc.fee(unit="Wei")
1532774
```

hash() → Optional[str]
Get Ethereum HTLC transaction hash.

Returns str – Ethereum transaction hash.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C")
>>> htlc.sign_transaction(private_key=
↪"cf4c2fb2b88a556c211d5fe79335dcee6dd11403bbbc5b47a530e9cf56ee3aee")
>>> htlc.hash()
"0x500953d43ff95604f5ffeb8f6c0e565d9080aa6aa31d8924a8d9df78c1f27879"
```

json() → dict
Get Ethereum HTLC transaction json.

Returns dict – Ethereum transaction json.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C")
>>> htlc.json()
{'chainId': 1337, 'from': '0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C', 'value
↪': 0, 'nonce': 6, 'gas': 1532774, 'gasPrice': 20000000000, 'data':
↪'0x608060405234801561001057600080fd5b50611ae980610020600039600 0f3fe6080604052600436106100 3f5
↪', 'to': b''}
```

raw() → Optional[str]
Get Ethereum HTLC transaction raw.

Returns str – Ethereum transaction raw.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C")
>>> htlc.sign_transaction(private_key=
↪"cf4c2fb2b88a556c211d5fe79335dcee6dd11403bbbc5b47a530e9cf56ee3aee")
>>> htlc.raw()

↪"0xf91b5e058504a817c800831763668080b91b096080604052348015610010576000 80fd5b50611ae980610020 6
↪"
```

contract_address() → ChecksumAddress
Get Ethereum HTLC contract address.

Returns ChecksumAddress – Ethereum HTLC contract address.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> htlc: HTLC = HTLC(contract_address=
↪"0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40", network="testnet")
```

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```
>>> htlc.contract_address()
"0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40"
```

build_htlc(*secret_hash: str*, *recipient_address: str*, *sender_address: str*, *endtime: int*) → *swap.providers.ethereum.htlc.HTLC*

Build Ethereum Hash Time Lock Contract (HTLC).

Parameters

- **secret_hash** (*str*) – Secret sha-256 hash.
- **recipient_address** (*str*) – Ethereum recipient address.
- **sender_address** (*str*) – Ethereum sender address.
- **endtime** (*int*) – Expiration block timestamp.

Returns HTLC – Ethereum HTLC instance.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
<swap.providers.ethereum.htlc.HTLC object at 0x0409DAF0>
```

abi() → list

Get Ethereum HTLC ABI.

Returns list – Ethereum HTLC ABI.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> htlc.abi()
[{'anonymous': False, 'inputs': [{'indexed': True, 'internalType': 'bytes32',
↪'name': 'locked_contract_id', 'type': 'bytes32'}, {'indexed': False,
↪'internalType': 'bytes32', 'name': 'secret_hash', 'type': 'bytes32'}, {
↪'indexed': True, 'internalType': 'address', 'name': 'recipient', 'type':
↪'address'}, {'indexed': True, 'internalType': 'address', 'name': 'sender',
↪'type': 'address'}, {'indexed': False, 'internalType': 'uint256', 'name':
↪'endtime', 'type': 'uint256'}, {'indexed': False, 'internalType': 'uint256',
↪'name': 'amount', 'type': 'uint256'}], 'name': 'log_fund', 'type': 'event'}, {
↪'anonymous': False, 'inputs': [{'indexed': True, 'internalType': 'bytes32',
↪'name': 'locked_contract_id', 'type': 'bytes32'}], 'name': 'log_refund', 'type
↪': 'event'}, {'anonymous': False, 'inputs': [{'indexed': True, 'internalType
↪': 'bytes32', 'name': 'locked_contract_id', 'type': 'bytes32'}], 'name': 'log_
↪withdraw', 'type': 'event'}, {'inputs': [{'internalType': 'bytes32', 'name':
↪'_secret_hash', 'type': 'bytes32'}, {'internalType': 'address payable', 'name
↪': '_recipient', 'type': 'address'}, {'internalType': 'address payable', 'name
↪': '_sender', 'type': 'address'}, {'internalType': 'uint256', 'name': '_
↪endtime', 'type': 'uint256'}], 'name': 'fund', 'outputs': [{'internalType':
↪'bytes32', 'name': 'locked_contract_id', 'type': 'bytes32'}], 'stateMutability
↪': 'payable', 'type': 'function'}, {'inputs': [{'internalType': 'bytes32',
↪'name': '_locked_contract_id', 'type': 'bytes32'}], 'name': 'get_locked_
```

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```
```

bytecode() → str

Get Ethereum HTLC bytecode.

Returns str – Ethereum HTLC bytecode.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> htlc.bytecode()

↪"608060405234801561001057600080fd5b50611ae98061002060003960000f3fe608060405260043610610003f576
↪"
```

bytecode_runtime() → str

Get Ethereum HTLC bytecode runtime.

Returns str – Ethereum HTLC bytecode runtime.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> htlc.bytecode_runtime()

↪"608060405260043610610003f5760003560e01c806306a53665146100445780637249fbb614610081578063cfd4b
↪"
```

opcode() → str

Get Ethereum HTLC opcode.

Returns str – Ethereum HTLC opcode.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> htlc.bytecode_runtime()
"PUSH1 0x80 PUSH1 0x40 MSTORE CALLVALUE DUP1 ISZERO PUSH2 0x10 JUMPI PUSH1 0x0␣
↪DUP1 REVERT JUMPDEST POP PUSH2 0x1AE9 DUP1 PUSH2 0x20 PUSH1 0x0 CODECOPY␣
↪PUSH1 0x0 RETURN INVALID PUSH1 0x80 PUSH1 0x40 MSTORE PUSH1 0x4 CALLDATASIZE␣
↪LT PUSH2 0x3F JUMPI PUSH1 0x0 CALLDATALOAD PUSH1 0xE0 SHR DUP1 PUSH4␣
↪0x6A53665 EQ PUSH2 0x44 JUMPI DUP1 PUSH4 0x7249FBB6 EQ PUSH2 0x81 JUMPI DUP1␣
↪PUSH4 0xCFD4B66E EQ PUSH2 0xBE JUMPI DUP1 PUSH4 0xF4FD3062 EQ PUSH2 0x103␣
↪JUMPI JUMPDEST PUSH1 0x0 DUP1 REVERT JUMPDEST CALLVALUE DUP1 ISZERO PUSH2␣
↪0x50 JUMPI PUSH1 0x0 DUP1 REVERT JUMPDEST POP PUSH2 0x6B PUSH1 0x4 DUP1␣
↪CALLDATASIZE SUB DUP2 ADD SWAP1 PUSH2 0x66 SWAP2 SWAP1 PUSH2 0xF29 JUMP␣
↪JUMPDEST PUSH2 0x133 JUMP JUMPDEST PUSH1 0x40 MLOAD PUSH2 0x78 SWAP2 SWAP1␣
```

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```
```

balance(*unit: str = 'Wei'*) → Union[Wei, int, float]
Get Ethereum HTLC balance.

Parameters **unit** (*str*) – Ethereum unit, default to Ether.

Returns int, float – Ethereum HTLC balance.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(contract_address=
↪"0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40", network="testnet")
>>> htlc.balance(unit="Ether")
1.56
```

8.3 Transaction

Ethereum transaction in blockchain network.

class swap.providers.ethereum.transaction.**Transaction**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*)
Ethereum Transaction.

Parameters

- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns Transaction – Ethereum transaction instance.

Note: Ethereum has only five networks, `mainnet`, `ropsten`, `kovan`, `rinkeby` and `testnet`.

fee(*unit: str = 'Wei'*) → Union[Wei, int, float]
Get Ethereum transaction fee.

Parameters **unit** (*str*) – Ethereum unit, default to `Wei`.

Returns Wei, int, float – Ethereum transaction fee.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.providers.ethereum.transaction import FundTransaction
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", htlc=htlc, amount=100_000_000)
```

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```
>>> fund_transaction.fee(unit="Wei")
1532774
```

hash() → Optional[str]

Get Ethereum transaction hash.

Returns str – Ethereum transaction hash.

```
>>> from swap.providers.ethereum.transaction import WithdrawTransaction
>>> from swap.providers.ethereum.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(transaction_hash=
↪"0xe49ff507739f8d916ae2c9fd51dd63764658ffa42a5288a49d93bc70a933edc4", secret_
↪key="Hello Meheret!", address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C",␣
↪contract_address="0x67324d402ffc103d061dAfA9096ff639f0676378")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", address=1)
>>> withdraw_transaction.sign(solver=withdraw_solver)
>>> withdraw_transaction.hash()
"0x9bbf83e56fea4cd9d23e000e8273551ba28317e4d3c311a49be919b305feb711"
```

json() → dict

Get Ethereum transaction fee.

Returns Wei, int, float – Ethereum transaction fee.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.providers.ethereum.transaction import FundTransaction
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", htlc=htlc, amount=100_000_000)
>>> fund_transaction.json()
{'chainId': 1337, 'from': '0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C', 'value
↪': 3000000000000000000, 'nonce': 0, 'gas': 22488, 'gasPrice': 20000000000, 'to
↪': '0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40', 'data':
↪'0xf4fd30623a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb00000000000000000
↪'}
```

raw() → Optional[str]

Get Ethereum transaction hash.

Returns str – Ethereum transaction hash.

```
>>> from swap.providers.ethereum.transaction import RefundTransaction
>>> from swap.providers.ethereum.solver import RefundSolver
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
```

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```
>>> refund_transaction.build_transaction(transaction_hash=
↪"0xe49ff507739f8d916ae2c9fd51dd63764658ffa42a5288a49d93bc70a933edc4", address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", contract_address=
↪"0x67324d402ffc103d061dAfA9096ff639f0676378")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", address=0)
>>> refund_transaction.sign(solver=refund_solver)
>>> refund_transaction.hash()
"0x9bbf83e56fea4cd9d23e000e8273551ba28317e4d3c311a49be919b305feb711"
```

type() → str
Get Ethereum transaction hash.

Returns str – Ethereum transaction hash.

```
>>> from swap.providers.ethereum.transaction import WithdrawTransaction
>>> from swap.providers.ethereum.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(transaction_hash=
↪"0xe49ff507739f8d916ae2c9fd51dd63764658ffa42a5288a49d93bc70a933edc4", secret_
↪key="Hello Meheret!", address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C",␣
↪contract_address="0x67324d402ffc103d061dAfA9096ff639f0676378")
>>> withdraw_transaction.type()
"ethereum_withdraw_unsigned"
```

signature() → dict
Get Ethereum transaction hash.

Returns str – Ethereum transaction hash.

```
>>> from swap.providers.ethereum.transaction import RefundTransaction
>>> from swap.providers.ethereum.solver import RefundSolver
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(transaction_hash=
↪"0xe49ff507739f8d916ae2c9fd51dd63764658ffa42a5288a49d93bc70a933edc4", address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", contract_address=
↪"0x67324d402ffc103d061dAfA9096ff639f0676378")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", address=0)
>>> refund_transaction.sign(solver=refund_solver)
>>> refund_transaction.signature()
{'hash': '0x120241e6e89b54d90dc3a3f73d6353f83818c3d404c991d3b74691f000583396',
↪'rawTransaction':
↪'0xf8f4018504a817c80083021cd094eaeac81da5e386e8ca4de1e64d40a10e468a5b408829a2241af62c0000b88
↪', 'r':␣
↪42223337416619984402386667584480976881779168344975798352755076934920973937908,
↪ 's':␣
↪45155461792159514883067068644058913853180508583163102385805265017506142956847,
↪ 'v': 2709}
```

transaction_raw() → str

Get Ethereum fund transaction raw.

Returns str – Ethereum fund transaction raw.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.providers.ethereum.transaction import FundTransaction
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", htlc=htlc, amount=100_000_000)
>>> fund_transaction.transaction_raw()

↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪"
```

8.3.1 FundTransaction

class swap.providers.ethereum.transaction.**FundTransaction**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*)

Ethereum Fund transaction.

Parameters

- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns FundTransaction – Ethereum fund transaction instance.

Warning: Do not forget to build transaction after initialize fund transaction.

build_transaction(*address: str*, *htlc: swap.providers.ethereum.htlc.HTLC*, *amount: Union[Wei, int]*, *unit: str = 'Wei'*) → *swap.providers.ethereum.transaction.FundTransaction*

Build Ethereum fund transaction.

Parameters

- **htlc** (`ethereum.htlc.HTLC`) – Ethereum HTLC instance.
- **address** (*str*) – Ethereum sender address.
- **amount** (*Wei, int*) – Ethereum amount.
- **unit** (*str*) – Ethereum unit, default to `Wei`.

Returns FundTransaction – Ethereum fund transaction instance.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.providers.ethereum.transaction import FundTransaction
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", htlc=htlc, amount=100_000_000)
<swap.providers.ethereum.transaction.FundTransaction object at 0x0409DAF0>
```

sign(*solver: swap.providers.ethereum.solver.FundSolver*) → *swap.providers.ethereum.transaction.FundTransaction*

Sign Ethereum fund transaction.

Parameters **solver** (`ethereum.solver.FundSolver`) – Ethereum fund solver.

Returns FundTransaction – Ethereum fund transaction instance.

```
>>> from swap.providers.ethereum.htlc import HTLC
>>> from swap.providers.ethereum.transaction import FundTransaction
>>> from swap.providers.ethereum.solver import FundSolver
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"0xd77E0d2Eef905cfB39c3C4b952Ed278d58f96E1f", sender_address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", htlc=htlc, amount=100_000_000)
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", address=0)
>>> fund_transaction.sign(solver=fund_solver)
<swap.providers.ethereum.transaction.FundTransaction object at 0x0409DAF0>
```

8.3.2 WithdrawTransaction

class `swap.providers.ethereum.transaction.`**`WithdrawTransaction`**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*)

Ethereum Withdraw transaction.

Parameters

- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns WithdrawTransaction – Ethereum withdraw transaction instance.

> **Warning:** Do not forget to build transaction after initialize withdraw transaction.

build_transaction(*transaction_hash: str*, *address: str*, *secret_key: str*, *contract_address: Optional[str] = None*) → *swap.providers.ethereum.transaction.WithdrawTransaction*

Build Ethereum withdraw transaction.

Parameters

- **transaction_hash** (*str*) – Ethereum HTLC funded transaction hash.
- **address** (*str*) – Ethereum recipient address.
- **secret_key** (*str*) – Secret password/passphrase.
- **contract_address** (*str*) – Ethereum HTLC contract address, defaults to `None`.

Returns WithdrawTransaction – Ethereum withdraw transaction instance.

```
>>> from swap.providers.ethereum.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(transaction_hash=
↪"0xe49ff507739f8d916ae2c9fd51dd63764658ffa42a5288a49d93bc70a933edc4", secret_
↪key="Hello Meheret!", address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C",␣
↪contract_address="0x67324d402ffc103d061dAfA9096ff639f0676378")
<swap.providers.ethereum.transaction.WithdrawTransaction object at 0x0409DAF0>
```

sign(*solver:* swap.providers.ethereum.solver.WithdrawSolver) → *swap.providers.ethereum.transaction.WithdrawTransaction*

Sign Ethereum withdraw transaction.

Parameters **solver** (`ethereum.solver.WithdrawSolver`) – Ethereum withdraw solver.

Returns WithdrawTransaction – Ethereum withdraw transaction instance.

```
>>> from swap.providers.ethereum.transaction import WithdrawTransaction
>>> from swap.providers.ethereum.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(transaction_hash=
↪"0xe49ff507739f8d916ae2c9fd51dd63764658ffa42a5288a49d93bc70a933edc4", secret_
↪key="Hello Meheret!", address="0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C",␣
↪contract_address="0x67324d402ffc103d061dAfA9096ff639f0676378")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", address=1)
>>> withdraw_transaction.sign(solver=withdraw_solver)
<swap.providers.ethereum.transaction.WithdrawTransaction object at 0x0409DAF0>
```

8.3.3 RefundTransaction

class `swap.providers.ethereum.transaction.`**`RefundTransaction`**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*)

Ethereum Refund transaction.

Parameters

- **`network`** (*`str`*) – Ethereum network, defaults to `mainnet`.
- **`provider`** (*`str`*) – Ethereum network provider, defaults to `http`.
- **`token`** (*`str`*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns RefundTransaction – Ethereum refund transaction instance.

> **Warning:** Do not forget to build transaction after initialize refund transaction.

`build_transaction`(*transaction_hash: str*, *address: str*, *contract_address: Optional[str] = None*) → *swap.providers.ethereum.transaction.RefundTransaction*

Build Ethereum refund transaction.

Parameters

- **`transaction_hash`** (*`str`*) – Ethereum HTLC funded transaction hash.
- **`address`** (*`str`*) – Ethereum sender address.
- **`contract_address`** (*`str`*) – Ethereum HTLC contract address, defaults to `None`.

Returns RefundTransaction – Ethereum refund transaction instance.

```
>>> from swap.providers.ethereum.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(transaction_hash=
↪"0xe49ff507739f8d916ae2c9fd51dd63764658ffa42a5288a49d93bc70a933edc4", address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", contract_address=
↪"0x67324d402ffc103d061dAfA9096ff639f0676378")
<swap.providers.ethereum.transaction.RefundTransaction object at 0x0409DAF0>
```

`sign`(*solver: swap.providers.ethereum.solver.RefundSolver*) → *swap.providers.ethereum.transaction.RefundTransaction*

Sign Ethereum refund transaction.

Parameters **`solver`** (`ethereum.solver.RefundSolver`) – Ethereum refund solver.

Returns RefundTransaction – Ethereum refund transaction instance.

```
>>> from swap.providers.ethereum.transaction import RefundTransaction
>>> from swap.providers.ethereum.solver import RefundSolver
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(transaction_hash=
↪"0xe49ff507739f8d916ae2c9fd51dd63764658ffa42a5288a49d93bc70a933edc4", address=
↪"0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C", contract_address=
↪"0x67324d402ffc103d061dAfA9096ff639f0676378")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", address=0)
```

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```
>>> refund_transaction.sign(solver=refund_solver)
<swap.providers.ethereum.transaction.RefundTransaction object at 0x0409DAF0>
```

8.4 Solver

Ethereum solver.

8.4.1 FundSolver

class swap.providers.ethereum.solver.**FundSolver**(*xprivate_key: str*, *account: int = 0*, *change: bool = False*, *address: int = 0*, *path: Optional[str] = None*)

Ethereum Fund solver.

Parameters

- **xprivate_key** (*str*) – Ethereum sender xprivate key.
- **account** (*int*) – Ethereum derivation account, defaults to 0.
- **change** (*bool*) – Ethereum derivation change, defaults to False.
- **address** (*int*) – Ethereum derivation address, defaults to 0.
- **path** (*str*) – Ethereum derivation path, defaults to None.

Returns FundSolver – Ethereum fund solver instance.

```
>>> from swap.providers.ethereum.solver import FundSolver
>>> sender_root_xprivate_key: str =
↪"xprv9s21ZrQH143K3XihXQBN8Uar2WBtrjSzK2oRDEGQ25pA2kKAADoQXaiiVXht163ZTrdtTXfM4GqNRE9gWQHky25BpvBQ
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=sender_root_xprivate_key)
<swap.providers.ethereum.solver.FundSolver object at 0x03FCCA60>
```

8.4.2 WithdrawSolver

class swap.providers.ethereum.solver.**WithdrawSolver**(*xprivate_key: str*, *account: int = 0*, *change: bool = False*, *address: int = 0*, *path: Optional[str] = None*)

Ethereum Withdraw solver.

Parameters

- **xprivate_key** (*str*) – Ethereum sender xprivate key.
- **account** (*int*) – Ethereum derivation account, defaults to 0.
- **change** (*bool*) – Ethereum derivation change, defaults to False.
- **address** (*int*) – Ethereum derivation address, defaults to 0.
- **path** (*str*) – Ethereum derivation path, defaults to None.

Returns WithdrawSolver – Ethereum withdraw solver instance.

```
>>> from swap.providers.ethereum.solver import WithdrawSolver
>>> recipient_root_xprivate_key: str =
↪"xprv9s21ZrQH143K3XihXQBN8Uar2WBtrjSzK2oRDEGQ25pA2kKAADoQXaiiVXht163ZTrdtTXfM4GqNRE9gWQHky25BpvBQ
↪"
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=recipient_root_
↪xprivate_key)
<swap.providers.ethereum.solver.WithdrawSolver object at 0x03FCCA60>
```

8.4.3 RefundSolver

class swap.providers.ethereum.solver.**RefundSolver**(*xprivate_key: str, account: int = 0, change: bool = False, address: int = 0, path: Optional[str] = None*)

Ethereum Refund solver.

Parameters

- **xprivate_key** (*str*) – Ethereum sender xprivate key.
- **account** (*int*) – Ethereum derivation account, defaults to 0.
- **change** (*bool*) – Ethereum derivation change, defaults to False.
- **address** (*int*) – Ethereum derivation address, defaults to 0.
- **path** (*str*) – Ethereum derivation path, defaults to None.

Returns RefundSolver – Ethereum refund solver instance.

```
>>> from swap.providers.ethereum.solver import RefundSolver
>>> sender_root_xprivate_key: str =
↪"xprv9s21ZrQH143K3XihXQBN8Uar2WBtrjSzK2oRDEGQ25pA2kKAADoQXaiiVXht163ZTrdtTXfM4GqNRE9gWQHky25BpvBQ
↪"
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=sender_root_xprivate_
↪key)
<swap.providers.ethereum.solver.RefundSolver object at 0x03FCCA60>
```

8.5 Signature

Ethereum signature.

class swap.providers.ethereum.signature.**Signature**(*network: str = 'mainnet', provider: str = 'http', token: Optional[str] = None*)

Ethereum Signature.

Parameters

- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns Signature – Ethereum signature instance.

Note: Ethereum has only five networks, `mainnet`, `ropsten`, `kovan`, `rinkeby` and `testnet`.

fee(*unit: str = 'Wei'*) → Union[Wei, int, float]
Get Ethereum signature fee.

Parameters **unit** (*str*) – Ethereum unit, default to `Wie`.

Returns Wei, int, float – Ethereum signature fee.

```
>>> from swap.providers.ethereum.signature import Signature
>>> from swap.providers.ethereum.solver import FundSolver
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
>>> signature.fee(unit="Wei")
1532774
```

hash() → Optional[str]
Get Ethereum signature has.

Returns str – Ethereum signature hash.

```
>>> from swap.providers.ethereum.signature import Signature
>>> from swap.providers.ethereum.solver import FundSolver
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
>>> signature.hash()
"0xe87b1aefec9fecbb7699e16d101e757e4825db157eb94d2e71ecfaf17fd3d75d"
```

json() → dict
Get Ethereum signature json.

Returns dict – Ethereum signature json.

```
>>> from swap.providers.ethereum.signature import Signature
>>> from swap.providers.ethereum.solver import FundSolver
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
>>> signature.json()
{'chainId': 1337, 'from': '0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C', 'value
↪': 3000000000000000000, 'nonce': 1, 'gas': 138448, 'gasPrice': 20000000000,
↪'to': '0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40', 'data':
↪'0xf4fd30623a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb000000000000000000
↪'}
```

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raw() → Optional[str]

Get Ethereum signature raw.

Returns str – Ethereum signature raw.

```
>>> from swap.providers.ethereum.signature import Signature
>>> from swap.providers.ethereum.solver import FundSolver
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf5
↪")
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
>>> signature.raw()

↪"0xf8f4018504a817c80083021cd094eaeac81da5e386e8ca4de1e64d40a10e468a5b408829a2241af62c0000b884
↪"
```

type() → str

Get Ethereum signature type.

Returns str – Ethereum signature type.

```
>>> from swap.providers.ethereum.signature import Signature
>>> from swap.providers.ethereum.solver import FundSolver
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf5
↪")
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
>>> signature.type()
"ethereum_fund_signed"
```

sign(*transaction_raw: str*, *solver: Union[*swap.providers.ethereum.solver.FundSolver, swap.providers.ethereum.solver.WithdrawSolver, swap.providers.ethereum.solver.RefundSolver*]*) → Union[*swap.providers.ethereum.signature.FundSignature*, *swap.providers.ethereum.signature.WithdrawSignature*, *swap.providers.ethereum.signature.RefundSignature*]

Sign Ethereum unsigned transaction raw.

Parameters

- **transaction_raw** (*str*) – Ethereum unsigned transaction raw.
- **solver** (ethereum.solver.FundSolver, ethereum.solver.WithdrawSolver, ethereum.solver.RefundSolver) – Ethereum solver.

Returns FundSignature, WithdrawSignature, RefundSignature – Ethereum signature instance.

```
>>> from swap.providers.ethereum.signature import Signature
>>> from swap.providers.ethereum.solver import FundSolver
```

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```
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
<swap.providers.ethereum.signature.FundSignature object at 0x0409DAF0>
```

signature() → dict

Get Ethereum signature.

Returns dict – Ethereum signature.

```
>>> from swap.providers.ethereum.signature import Signature
>>> from swap.providers.ethereum.solver import FundSolver
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
>>> signature.signature()
{'hash': '0xe87b1aefec9fecbb7699e16d101e757e4825db157eb94d2e71ecfaf17fd3d75d',
↪'rawTransaction':
↪'0xf8f4018504a817c80083021cd094eaeac81da5e386e8ca4de1e64d40a10e468a5b408829a2241af62c0000b88
↪', 'r':␣
↪49669210517760089961057755545670916457545361634072315135726343721882166945149,
↪ 's':␣
↪39373327445767756604614462296774202164268870502915897592346222361951457550066,
↪ 'v': 2709}
```

transaction_raw() → str

Get Ethereum signed transaction raw.

Returns str – Ethereum signed transaction raw.

```
>>> from swap.providers.ethereum.signature import Signature
>>> from swap.providers.ethereum.solver import FundSolver
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
>>> signature.transaction_raw()

↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪"
```

8.5.1 FundSignature

class `swap.providers.ethereum.signature.`**`FundSignature`**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*)

Ethereum Fund signature.

Parameters

- **`network`** (*`str`*) – Ethereum network, defaults to `mainnet`.
- **`provider`** (*`str`*) – Ethereum network provider, defaults to `http`.
- **`token`** (*`str`*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns FundSignature – Ethereum fund signature instance.

Note: Ethereum has only five networks, `mainnet`, `ropsten`, `kovan`, `rinkeby` and `testnet`.

`sign`(*transaction_raw: str*, *solver: swap.providers.ethereum.solver.FundSolver*) → *swap.providers.ethereum.signature.FundSignature*

Sign Ethereum unsigned fund transaction raw.

Parameters

- **`transaction_raw`** (*`str`*) – Ethereum unsigned fund transaction raw.
- **`solver`** (`ethereum.solver.FundSolver`) – Ethereum solver.

Returns FundSignature – Ethereum fund signature instance.

```
>>> from swap.providers.ethereum.signature import FundSignature
>>> from swap.providers.ethereum.solver import FundSolver
>>> fund_signature: FundSignature = FundSignature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> fund_signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=fund_solver)
<swap.providers.ethereum.signature.FundSignature object at 0x0409DAF0>
```

8.5.2 WithdrawSignature

class `swap.providers.ethereum.signature.`**`WithdrawSignature`**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*)

Ethereum Withdraw signature.

Parameters

- **`network`** (*`str`*) – Ethereum network, defaults to `mainnet`.
- **`provider`** (*`str`*) – Ethereum network provider, defaults to `http`.
- **`token`** (*`str`*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns WithdrawSignature – Ethereum withdraw signature instance.

Note: Ethereum has only five networks, `mainnet`, `ropsten`, `kovan`, `rinkeby` and `testnet`.

sign(*transaction_raw: str*, *solver: swap.providers.ethereum.solver.WithdrawSolver*) → *swap.providers.ethereum.signature.WithdrawSignature*

Sign Ethereum unsigned withdraw transaction raw.

Parameters

- **transaction_raw** (*str*) – Ethereum unsigned withdraw transaction raw.
- **solver** (`ethereum.solver.WithdrawSolver`) – Ethereum withdraw solver.

Returns WithdrawSignature – Ethereum withdraw signature instance.

```
>>> from swap.providers.ethereum.signature import WithdrawSignature
>>> from swap.providers.ethereum.solver import WithdrawSolver
>>> withdraw_signature: WithdrawSignature = WithdrawSignature(network="mainnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> withdraw_signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=withdraw_solver)
<swap.providers.ethereum.signature.WithdrawSignature object at 0x0409DAF0>
```

8.5.3 RefundSignature

class swap.providers.ethereum.signature.**RefundSignature**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*)

Ethereum Refund signature.

Parameters

- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns RefundSignature – Ethereum refund signature instance.

Note: Ethereum has only five networks, `mainnet`, `ropsten`, `kovan`, `rinkeby` and `testnet`.

sign(*transaction_raw: str*, *solver: swap.providers.ethereum.solver.RefundSolver*) → *swap.providers.ethereum.signature.RefundSignature*

Sign Ethereum unsigned refund transaction raw.

Parameters

- **transaction_raw** (*str*) – Ethereum unsigned refund transaction raw.
- **solver** (`ethereum.solver.RefundSolver`) – Ethereum refund solver.

Returns RefundSignature – Ethereum refund signature instance.

```
>>> from swap.providers.ethereum.signature import RefundSignature
>>> from swap.providers.ethereum.solver import RefundSolver
>>> refund_signature: RefundSignature = RefundSignature(network="mainnet")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
>>> refund_signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE
↪", solver=refund_solver)
<swap.providers.ethereum.signature.RefundSignature object at 0x0409DAF0>
```

8.6 Remote Procedure Call (RPC)

Ethereum remote procedure call.

`swap.providers.ethereum.rpc.`**`get_web3`**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*) → web3.main.Web3

Get Ethereum Web3 instance.

Parameters

- **`network`** (*`str`*) – Ethereum network, defaults to `mainnet`.
- **`provider`** (*`str`*) – Ethereum network provider, defaults to `http`.
- **`token`** (*`str`*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns Web3 – Ethereum Web3 instance.

```
>>> from swap.providers.ethereum.rpc import get_web3
>>> get_web3(network="testnet", provider="http", token="infura endpoint token ...")
<web3.main.Web3 object at 0x000001DDECCD0640>
```

`swap.providers.ethereum.rpc.`**`get_balance`**(*address: str*, *network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*) → Wei

Get Ethereum balance.

Parameters

- **`address`** (*`str`*) – Ethereum address.
- **`network`** (*`str`*) – Ethereum network, defaults to `mainnet`.
- **`provider`** (*`str`*) – Ethereum network provider, defaults to `http`.
- **`token`** (*`str`*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns Wei – Ethereum balance (Wei).

```
>>> from swap.providers.ethereum.rpc import get_balance
>>> get_balance("0x70c1eb09363603a3b6391deb2daa6d2561a62f52", "ropsten")
25800000
```

`swap.providers.ethereum.rpc.`**`get_transaction`**(*transaction_hash: str*, *network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*) → dict

Get Ethereum transaction detail.

Parameters

- **transaction_hash** (*str*) – Ethereum transaction hash/id.
- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns dict – Ethereum transaction detail.

```
>>> from swap.providers.ethereum.rpc import get_transaction
>>> get_transaction(transaction_hash=
↪"0xa4d57071427e3310b3e2fb16e7712f8d8aaaafb31ce5fcd6534fc50848905948")
{'hash': '0xa4d57071427e3310b3e2fb16e7712f8d8aaaafb31ce5fcd6534fc50848905948',
↪'nonce': 0, 'blockHash':
↪'0xb33a804ae10713bf549db8ec749f7d650347613ac784db1a8d17e0cb03741bf0', 'blockNumber
↪': 1, 'transactionIndex': 0, 'from': '0x96cA14396341480E3b6384D1d1397d1f7f5a0AB7',
↪ 'to': None, 'value': 0, 'gas': 367400, 'gasPrice': 250000000, 'input':
↪'0x608060405234801561001057600080fd5b5060405180604001604052806005815260200017f48656c6c6f000000000
↪', 'v': 28, 'r':
↪'0xa593dcfd7f7b17f8b22907e9c4b03721312a4d00dfd99f8f7267ccd5eb7d4613', 's':
↪'0x70cd172ae92de7a046dfe28de1db8657f8c3b3ed00c060392fb1d5080646927b'}
```

`swap.providers.ethereum.rpc.`**`get_transaction_receipt`**(*transaction_hash: str, network: str = 'mainnet', provider: str = 'http', token: Optional[str] = None*) → Optional[dict]

Get Ethereum transaction receipt.

Parameters

- **transaction_hash** (*str*) – Ethereum transaction hash/id.
- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns dict – Ethereum transaction receipt.

```
>>> from swap.providers.ethereum.rpc import get_transaction_receipt
>>> get_transaction_receipt(transaction_hash=
↪"d26220f61ff4207837ee3cf5ab2a551b2476389ae76cf1ccd2005d304bdc308d", network=
↪"testnet")
{'transactionHash':
↪'0xd26220f61ff4207837ee3cf5ab2a551b2476389ae76cf1ccd2005d304bdc308d',
↪'transactionIndex': 0, 'blockHash':
↪'0xb325934bfb333b5ca77634081cfeaedfa53598771dcfcb482ed3ace789ec5843', 'blockNumber
↪': 1, 'from': '0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C', 'to': None, 'gasUsed
↪': 1582730, 'cumulativeGasUsed': 1582730, 'contractAddress':
↪'0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40', 'logs': [], 'status': 1, 'logsBloom
↪':
↪'0x0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
↪'}
```

`swap.providers.ethereum.rpc.`**`wait_for_transaction_receipt`**(*transaction_hash: str*, *timeout: int = 60*, *network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*) → dict

Wait for Ethereum transaction receipt.

Parameters

- **transaction_hash** (*str*) – Ethereum transaction hash/id.
- **timeout** (*int*) – Request timeout, default to 60.
- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns dict – Ethereum transaction receipt.

```
>>> from swap.providers.ethereum.rpc import wait_for_transaction_receipt
>>> wait_for_transaction_receipt(transaction_hash=
↪"d26220f61ff4207837ee3cf5ab2a551b2476389ae76cf1ccd2005d304bdc308d", timeout=120,␣
↪network="testnet")
{'transactionHash':
↪'0xd26220f61ff4207837ee3cf5ab2a551b2476389ae76cf1ccd2005d304bdc308d',
↪'transactionIndex': 0, 'blockHash':
↪'0xb325934bfb333b5ca77634081cfeaedfa53598771dcfcb482ed3ace789ec5843', 'blockNumber
↪': 1, 'from': '0x69e04fe16c9A6A83076B3c2dc4b4Bc21b5d9A20C', 'to': None, 'gasUsed
↪': 1582730, 'cumulativeGasUsed': 1582730, 'contractAddress':
↪'0xeaEaC81da5E386E8Ca4De1e64d40a10E468A5b40', 'logs': [], 'status': 1, 'logsBloom
↪':
↪'0x000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
↪'}
```

`swap.providers.ethereum.rpc.`**`decode_raw`**(*transaction_raw: str*) → dict

Decode original Ethereum raw into blockchain.

Parameters **transaction_raw** (*str*) – Ethereum transaction raw.

Returns dict – Ethereum decoded transaction hash.

```
>>> from swap.providers.ethereum.rpc import decode_raw
>>> decode_raw(transaction_raw=
↪"0xf86c02840ee6b280825208943e0a9b2ee8f8341a1aead3e7531d75f1e395f24b8901236efcbcbb340000801ba03084
↪")
{'hash': '0x04b3bfb804f2b3329555c6f3a17a794b3f099b6435a9cf58c78609ed93853907', 'from
↪': '0x3769F63e3b694cD2e973e28af59bdFd751303273', 'to':
↪'0x3e0a9B2Ee8F8341A1aEaD3E7531d75f1e395F24b', 'nonce': 2, 'gas': 21000, 'gas_price
↪': 250000000, 'value': 21000000000000000000, 'data': '0x', 'chain_id': -4, 'r':
↪'0x3084982e4a9dd897d3cc1b2c8cc2d1b106b9d302eb23f6fae7d0e57e53e043f8', 's':
↪'0x116f13f9ab385f6b53e7821b3335ced924a1ceb88303347cd0af4aa75e6bfb73', 'v': 27}
```

`swap.providers.ethereum.rpc.`**`submit_raw`**(*transaction_raw: str*, *network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*) → str

Submit original Ethereum raw into blockchain.

Parameters

- **transaction_raw** (*str*) – Ethereum transaction raw.
- **network** (*str*) – Ethereum network, defaults to `mainnet`.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns str – Ethereum submitted transaction hash/id.

```
>>> from swap.providers.ethereum.rpc import submit_raw
>>> submit_raw(transaction_raw=
↪"0xf86c02840ee6b280825208943e0a9b2ee8f8341a1aead3e7531d75f1e395f24b8901236efcbcbb340000801ba0308
↪", network="testnet")
"0x04b3bfb804f2b3329555c6f3a17a794b3f099b6435a9cf58c78609ed93853907"
```

8.7 Utils

Ethereum Utils.

`swap.providers.ethereum.utils.`**`is_network`**`(`*network: str*`)` → bool

Check Ethereum network.

Parameters **network** (*str*) – Ethereum network.

Returns bool – Ethereum valid/invalid network.

```
>>> from swap.providers.ethereum.utils import is_network
>>> is_network(network="kovan")
True
```

`swap.providers.ethereum.utils.`**`is_address`**`(`*address: str*`)` → bool

Check Ethereum address.

Parameters **address** (*str*) – Ethereum address.

Returns bool – Ethereum valid/invalid address.

```
>>> from swap.providers.ethereum.utils import is_address
>>> is_address(address="0x1ee11011ae12103a488a82dc33e03f337bc93ba7")
True
```

`swap.providers.ethereum.utils.`**`is_checksum_address`**`(`*address: str*`)` → bool

Check Ethereum checksum address.

Parameters **address** (*str*) – Ethereum address.

Returns bool – Ethereum valid/invalid checksum address.

```
>>> from swap.providers.ethereum.utils import is_checksum_address
>>> is_checksum_address(address="0x1ee11011ae12103a488a82dc33e03f337bc93ba7")
False
>>> is_checksum_address(address="0x1Ee11011ae12103a488A82DC33e03f337Bc93ba7")
True
```

`swap.providers.ethereum.utils.`**`to_checksum_address`**`(`*address: str*`)` → ChecksumAddress

Change Ethereum address to checksum address.

Parameters **address** (*ChecksumAddress*) – Ethereum address.

Returns str – Ethereum checksum address.

```
>>> from swap.providers.ethereum.utils import to_checksum_address
>>>  is_checksum_address(address="0x1ee11011ae12103a488a82dc33e03f337bc93ba7")
"0x1Ee11011ae12103a488A82DC33e03f337Bc93ba7"
```

swap.providers.ethereum.utils.**is_transaction_raw**(*transaction_raw: str*) → bool

Check Ethereum transaction raw.

Parameters **transaction_raw** (*str*) – Ethereum transaction raw.

Returns bool – Ethereum valid/invalid transaction raw.

```
>>> from swap.providers.ethereum.utils import is_transaction_raw
>>> transaction_raw: str =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3l
↪"
>>> is_transaction_raw(transaction_raw=transaction_raw)
True
```

swap.providers.ethereum.utils.**decode_transaction_raw**(*transaction_raw: str*) → dict

Decode Ethereum transaction raw.

Parameters **transaction_raw** (*str*) – Ethereum transaction raw.

Returns dict – Decoded ethereum transaction raw.

```
>>> from swap.providers.ethereum.utils import decode_transaction_raw
>>> transaction_raw: str =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3l
↪"
>>> decode_transaction_raw(transaction_raw=transaction_raw)
{'fee': ..., 'type': '...', 'address': '...', 'transaction': {...}, 'unsigned_datas
↪': [...], 'signatures': [...], 'network': '...'}
```

swap.providers.ethereum.utils.**submit_transaction_raw**(*transaction_raw: str*, *provider: str = 'http'*, *token: Optional[str] = None*) → dict

Submit Ethereum transaction raw.

Parameters

- **transaction_raw** (*str*) – Ethereum transaction raw.
- **provider** (*str*) – Ethereum network provider, defaults to `http`.
- **token** (*str*) – Infura API endpoint token, defaults to `4414fea5f7454211956b1627621450b4`.

Returns dict – Ethereum submitted transaction id, fee, type and date.

```
>>> from swap.providers.ethereum.utils import submit_transaction_raw
>>> transaction_raw: str =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3l
↪"
>>> submit_transaction_raw(transaction_raw=transaction_raw)
{'fee': ..., 'type': '...', 'transaction_id': '...', 'network': '...', 'date': '...
↪'}
```

`swap.providers.ethereum.utils.`**`amount_unit_converter`**(*amount: Union[int, float], unit: str = 'Wei2Ether'*) → Union[int, float]

XinFin amount unit converter.

Parameters

- **`amount`** (*`int, float`*) – XinFIn amount.
- **`unit`** (*`str`*) – XinFIn unit, default to Wei2Ether

Returns int, float – XinFin amount.

```
>>> from swap.providers.ethereum.utils import amount_unit_converter
>>> amount_unit_converter(amount=100_000_000, unit="Wei2Ether")
0.1
```

CHAPTER

NINE

VAPOR

Vapor is a layer 2 scalability solution that uses cross-chain technology to interact with the Bytom mainchain. Compared to Ethereum, the Vapor sidechain boasts faster transactions, lower costs, and less risk of congestion.

For more https://bytom.io/en/sidechain/

9.1 Wallet

The implementation of Hierarchical Deterministic (HD) wallets generator for Vapor blockchain.

class `swap.providers.vapor.wallet.`**`Wallet`**(*network: str = 'mainnet'*)

Vapor Wallet class.

Parameters **`network`** (`str`) – Vapor network, defaults to `mainnet`.

Returns Wallet – Vapor wallet instance.

Note: Vapor has only two networks, `mainnet`, `solonet` and `testnet`.

`from_entropy`(*entropy: str, language: str = 'english', passphrase: Optional[str] = None*) → *swap.providers.vapor.wallet.Wallet*

Initiate Vapor wallet from entropy.

Parameters

- **`entropy`** (`str`) – Vapor entropy hex string.
- **`language`** (`str`) – Vapor wallet language, default to `english`.
- **`passphrase`** (`str`) – Vapor wallet passphrase, default to `None`.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
<swap.providers.vapor.wallet.Wallet object at 0x040DA268>
```

`from_mnemonic`(*mnemonic: str, language: Optional[str] = None, passphrase: Optional[str] = None*) → *swap.providers.vapor.wallet.Wallet*

Initialize Vapor wallet from mnemonic.

Parameters

- **`mnemonic`** (`str`) – Vapor mnemonic words.

- **`language`** (*str*) – Vapor wallet language, default to `english`.
- **`passphrase`** (*str*) – Vapor wallet passphrase, default to `None`.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_mnemonic(mnemonic="unfair divorce remind addict add roof park␣
↪clown build renew illness fault")
<swap.providers.vapor.wallet.Wallet object at 0x040DA268>
```

`from_seed`(*seed: str*) → *swap.providers.vapor.wallet.Wallet*

Initialize Vapor wallet from seed.

Parameters **`seed`** (*str*) – Vapor Seed hex string.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_seed(seed=
↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪")
<swap.providers.vapor.wallet.Wallet object at 0x040DA268>
```

`from_xprivate_key`(*xprivate_key: str*) → *swap.providers.vapor.wallet.Wallet*

Initiate Vapor wallet from xprivate key.

Parameters **`xprivate_key`** (*str*) – Vapor XPrivate key.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
<swap.providers.vapor.wallet.Wallet object at 0x040DA268>
```

`from_private_key`(*private_key: str*) → *swap.providers.vapor.wallet.Wallet*

Initialize Vapor wallet from private key.

Parameters **`private_key`** (*str*) – Vapor Private key.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_private_key(private_key=
↪"b0f9552e4fedac7f2e750ae984e36a97cf2b24609f7ec43f35606ed65eec6e46db35f71c405fd5948ecffa2c512
↪")
<swap.providers.vapor.wallet.Wallet object at 0x040DA268>
```

`from_path`(*path: str*) → *swap.providers.vapor.wallet.Wallet*

Drive Vapor wallet from path.

Parameters **`path`** (*str*) – Vapor derivation path.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
<swap.providers.vapor.wallet.Wallet object at 0x040DA268>
```

from_indexes(*indexes: List[str]*) → *swap.providers.vapor.wallet.Wallet*
Drive Vapor wallet from indexes.

Parameters **indexes** (*list*) – Vapor derivation indexes.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> wallet.from_indexes(indexes=["2c000000", "99000000", "01000000", "00000000",
↪ "01000000"])
<swap.providers.vapor.wallet.Wallet object at 0x040DA268>
```

from_index(*index: int*, *hardened: bool = False*) → *swap.providers.vapor.wallet.Wallet*
Drive Vapor wallet from index.

Parameters

- **index** (*int*) – Vapor wallet index.
- **hardened** (*bool*) – Use hardened, default to False.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_index(index=44)
>>> wallet.from_index(index=153)
>>> wallet.from_index(index=1)
>>> wallet.from_index(index=0)
>>> wallet.from_index(index=1)
<swap.providers.vapor.wallet.Wallet object at 0x040DA268>
```

clean_derivation() → *swap.providers.vapor.wallet.Wallet*
Clean derivation Vapor wallet.

Returns Wallet – Vapor wallet instance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.indexes()
["2c000000", "99000000", "01000000", "00000000", "01000000"]
>>> wallet.path()
"m/44/153/1/0/1"
>>> wallet.clean_derivation()
```

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```
>>> wallet.indexes()
[]
>>> wallet.path()
None
```

strength() → Optional[int]
Get Vapor wallet strength.

Returns int – Vapor wallet strength.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.strength()
128
```

entropy() → Optional[str]
Get Vapor wallet entropy.

Returns str – Vapor wallet entropy.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.entropy()
"ed0802d701a033776811601dd6c5c4a9"
```

mnemonic() → Optional[str]
Get Vapor wallet mnemonic.

Returns str – Vapor wallet mnemonic.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.mnemonic()
"unfair divorce remind addict add roof park clown build renew illness fault"
```

passphrase() → Optional[str]
Get Vapor wallet passphrase.

Returns str – Vapor wallet passphrase.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9", passphrase=
↪"meherett")
>>> wallet.passphrase()
"meherett"
```

language() → Optional[str]
Get Vapor wallet language.

Returns str – Vapor wallet language.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.language()
"english"
```

seed() → Optional[str]

Get Vapor wallet seed.

Returns str – Vapor wallet seed.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.seed()

↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪"
```

path() → Optional[str]

Get Vapor wallet derivation path.

Returns str – Vapor derivation path.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet = Wallet(network="mainnet", change=True, address=3)
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.path()
"m/44/153/1/0/1"
```

indexes() → list

Get Vapor wallet derivation indexes.

Returns list – Vapor derivation indexes.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.indexes()
['2c000000', '99000000', '01000000', '00000000', '01000000']
```

xprivate_key() → Optional[str]

Get Vapor wallet xprivate key.

Returns str – Vapor xprivate key.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.xprivate_key()

↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪"
```

xpublic_key() → Optional[str]

Get Vapor wallet xpublic key.

Returns str – Vapor xpublic key.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.xpublic_key()

↪"f80a401807fde1ee5727ae032ee144e4b757e69431e68e6cd732eda3c8cd3936daedfdd0fd8f8df14e2084c7e8d
↪"
```

expand_xprivate_key() → Optional[str]

Get Vapor wallet expand xprivate key.

Returns str – Vapor expand xprivate key.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.expand_xprivate_key()

↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e465c68d75d8a29eb3ffd7e8213808
↪"
```

child_xprivate_key() → Optional[str]

Get Vapor child wallet xprivate key.

Returns str – Vapor child xprivate key.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.child_xprivate_key()

↪"b0f9552e4fedac7f2e750ae984e36a97cf2b24609f7ec43f35606ed65eec6e46db35f71c405fd5948ecffa2c512
↪"
```

child_xpublic_key() → Optional[str]

Get Vapor child wallet xpublic key.

Returns str – Vapor child xpublic key.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.child_xpublic_key()

↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212db35f71c405fd5948ecffa2c512
↪"
```

guid() → Optional[str]

Get Vapor wallet Blockcenter GUID.

Returns str – Vapor Blockcenter GUID.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.guid()
"9ed61a9b-e7b6-4cb7-94fb-932b738e4f66"
```

private_key() → str

Get Vapor wallet private key.

Returns str – Vapor private key.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.private_key()

↪"b0f9552e4fedac7f2e750ae984e36a97cf2b24609f7ec43f35606ed65eec6e46db35f71c405fd5948ecffa2c512a
↪"
```

public_key() → str

Get Vapor wallet public key.

Returns str – Vapor public key.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.public_key()
"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212"
```

program() → str

Get Vapor wallet control program.

Returns str – Vapor control program.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.program()
"0014b1592acbb917f13937166c2a9b6ce973296ebb60"
```

address(*network: Optional[str] = None*) → str

Get Vapor wallet address.

Parameters **network** (*str*) – Vapor network, defaults to `mainnet`.

Returns str – Vapor wallet address.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_indexes(indexes=["2c000000", "99000000", "01000000", "00000000",
↪ "01000000"])
```

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```
>>> wallet.address(network="mainnet")
"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx"
```

balance(*asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', unit: str = 'NEU'*) → Union[int, float]

Get Vapor wallet balance.

Parameters

- **asset** (*str, vapor.assets.AssetNamespace*) – Vapor asset id, defaults to `BTM asset`.
- **unit** (*str*) – Vapor unit, default to `NEU`.

Returns int, float – Vapor wallet balance.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.balance(unit="BTM")
2.0
```

utxos(*asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', limit: int = 15*) → list

Get Vapor wallet unspent transaction output (UTXO's).

Parameters

- **asset** (*str, vapor.assets.AssetNamespace*) – Vapor asset id, defaults to `BTM asset`.
- **limit** (*int*) – Limit of UTXO's, default is `15`.

Returns list – Vapor unspent transaction outputs.

```
>>> from swap.providers.vapor.wallet import Wallet
>>> wallet: Wallet = Wallet(network="mainnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44/153/1/0/1")
>>> wallet.utxos()
[{'hash': '9843c9b9130bd87a9683f2c4e66456326beeefb2522c3352326de870c5c1329e',
↪'asset': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 200000000}]
```

9.2 Hash Time Lock Contract (HTLC)

Vapor Hash Time Lock Contract (HTLC).

class `swap.providers.vapor.htlc.`**HTLC**(*network: str = 'mainnet', contract_address: Optional[str] = None*)

Vapor Hash Time Lock Contract (HTLC).

Parameters network (*str*) – Vapor network, defaults to `mainnet`.

Returns HTLC – Vapor HTLC instance.

Note: Vapor has only three networks, `mainnet`, `solonet` and `testnet`.

build_htlc(*secret_hash: str*, *recipient_public_key: str*, *sender_public_key: str*, *endblock: int*, *use_script: bool = False*) → *swap.providers.vapor.htlc.HTLC*

Build Vapor Hash Time Lock Contract (HTLC).

Parameters

- **secret_hash** (*str*) – secret sha-256 hash.
- **recipient_public_key** (*str*) – Vapor recipient public key.
- **sender_public_key** (*str*) – Vapor sender public key.
- **endblock** (*int*) – Vapor expiration block height.
- **use_script** (*bool*) – Initialize HTLC by using script, default to `False`.

Returns HTLC – Vapor Hash Time Lock Contract (HTLC) instance.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.providers.vapor.rpc import get_current_block_height
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=get_current_block_height(plus=1000), use_script=False)
<swap.providers.vapor.htlc.HTLC object at 0x0409DAF0>
```

from_bytecode(*bytecode: str*) → *swap.providers.vapor.htlc.HTLC*

Initialize Vapor Hash Time Lock Contract (HTLC) from bytecode.

Parameters **bytecode** (*str*) – Vapor bytecode.

Returns HTLC – Vapor Hash Time Lock Contract (HTLC) instance.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa
↪"
>>> htlc.from_bytecode(bytecode=bytecode)
<swap.providers.vapor.htlc.HTLC object at 0x0409DAF0>
```

bytecode() → str

Get Vapor Hash Time Lock Contract (HTLC) bytecode.

Returns str – Vapor HTLC bytecode.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=120723497)
```

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```
>>> htlc.bytecode()

↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa
↪"
```

opcode() → Optional[str]
Get Vapor Hash Time Lock Contract (HTLC) OP_Code.

Returns str – Vapor HTLC opcode.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=120723497)
>>> htlc.opcode()
"0x29183207 0xfe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212␣
↪0x3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e␣
↪0x3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb DEPTH␣
↪0x547a6416000000557aa888537a7cae7cac631f000000537acd9f6972ae7cac FALSE␣
↪CHECKPREDICATE"
```

hash() → str
Get Vapor Hash Time Lock Contract (HTLC) hash.

Returns str – Vapor HTLC hash.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=120723497)
>>> htlc.hash()
"34a3db50301b941b8ed43dcfdbd3381df1b739fa64ab77e4264f703a45e0be31"
```

contract_address() → str
Get Vapor Hash Time Lock Contract (HTLC) address.

Returns str – Vapor HTLC address.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=120723497)
>>> htlc.contract_address()
"vp1qxj3ak5psrw2phrk58h8ah5ecrhcmww06vj4h0epxfacr530qhccs4pczgc"
```

balance(*asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*, *unit: str = 'NEU'*) → Union[int, float]

Get Vapor HTLC balance.

Parameters

- **asset** (*str, vapor.assets.AssetNamespace, vapor.assets.AssetNamespace*) – Vapor asset id, defaults to `BTM`.
- **unit** (*str*) – Vapor unit, default to `NEU`.

Returns int, float – Vapor HTLC balance.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=120723497)
>>> htlc.balance(asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
0.1
```

utxos(*asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*, *limit: int = 15*) → list

Get Vapor HTLC unspent transaction output (UTXO's).

Parameters

- **asset** (*str, vapor.assets.AssetNamespace*) – Vapor asset id, defaults to `BTM`.
- **limit** (*int*) – Limit of UTXO's, default is `15`.

Returns list – Vapor unspent transaction outputs.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_public_key=
↪"3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e", sender_
↪public_key="fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",
↪ endblock=120723497)
>>> htlc.utxos(asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
[{'hash': '144dd8355cae0d9aea6ca3fb1ff685fb7b455b1f9cb0c5992c9035844c664ad1',
↪'asset': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 10000000}]
```

9.3 Transaction

Bitcoin transaction in blockchain network.

class swap.providers.vapor.transaction.**Transaction**(*network: str = 'mainnet'*)
Vapor Transaction.

Parameters **network** (*str*) – Vapor network, defaults to mainnet.

Returns Transaction – Vapor transaction instance.

Note: Vapor has only three networks, `mainnet`. `solonet` and `mainnet`.

fee(*unit: str = 'NEU'*) → Union[int, float]
Get Vapor transaction fee.

Parameters **unit** (*str*) – Vapor unit, default to NEU.

Returns int, float – Vapor transaction fee.

```
>>> from swap.providers.vapor.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"vp1q3plwvmvy4qhjmp5zffzmk50aagpujt6flnf63h", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> withdraw_transaction.fee(unit="NEU")
509000
```

hash() → str

Get Vapor transaction hash.

returns str – Vapor transaction id/hash.

```
>>> from swap.providers.vapor.htlc import HTLC
 >>> from swap.providers.vapor.transaction import FundTransaction
 >>> htlc: HTLC = HTLC(network="mainnet")
 >>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=120723497)
 >>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
 >>> fund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
 >>> fund_transaction.hash()
 "a09f3093aaff6c8c8f1a372eac68571ceea4928ccc8b9b54954863758447dec1"
```

json() → dict
Get Vapor transaction json format.

Returns dict – Vapor transaction json format.

```
>>> from swap.providers.vapor.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> refund_transaction.json()
{'tx_id': '6d9642222bafb9d6968ee2eed988c837b1da56fcec6fd96329fff8c0d5518f92',
↪'version': 1, 'size': 181, 'time_range': 0, 'inputs': [{'type': 'spend',
↪'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
↪', 'asset_definition': {}, 'amount': 10000000, 'control_program':
↪'002034a3db50301b941b8ed43dcfdbd3381df1b739fa64ab77e4264f703a45e0be31',
↪'address': 'vp1qxj3ak5psrw2phrk58h8ah5ecrhcmww06vj4h0epxfacr530qhccs4pczgc',
↪'spent_output_id':
↪'144dd8355cae0d9aea6ca3fb1ff685fb7b455b1f9cb0c5992c9035844c664ad1', 'input_id
↪': '576edbd5cf8682fb82eb8fb61ba3d6f25a9490777be607d2e75b2dbcbbceb89e',
↪'witness_arguments': None}], 'outputs': [{'type': 'control', 'id':
↪'b6a843f8257fc06ad922a69fa2cfa413277703ffb04512a35799d3c8a2c5d7a2', 'position
↪': 0, 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'asset_
↪definition': {}, 'amount': 9491000, 'control_program':
↪'0014b1592acbb917f13937166c2a9b6ce973296ebb60', 'address':
↪'vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs'}], 'fee': 509000}
```

raw() → str

Get Vapor transaction raw.

Returns str – Vapor transaction raw.

```
>>> from swap.providers.vapor.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"vp1q3plwvmvy4qhjmp5zffzmk50aagpujt6flnf63h", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> withdraw_transaction.raw()

↪"07010001016b0169df82cf7c7927786a6956937744ee82354c481b0f211ac52a5c1d744c4e3e7866ffffffffff
↪"
```

type() → str

Get Vapor signature transaction type.

Returns str – Vapor signature transaction type.

```
>>> from swap.providers.vapor.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"vp1q3plwvmvy4qhjmp5zffzmk50aagpujt6flnf63h", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
```

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```
>>> withdraw_transaction.type()
"vapor_withdraw_unsigned"
```

unsigned_datas(*detail: bool = False*) → List[dict]
Get Vapor transaction unsigned datas(messages) with instruction.

Parameters **detail** (*bool*) – Vapor unsigned datas to see detail, defaults to False.

Returns list – Vapor transaction unsigned datas.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.providers.vapor.transaction import FundTransaction
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=120723497)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
>>> fund_transaction.unsigned_datas()
[{'datas': ['d7107257ef5fbfb04fc4747d6887f230a30676ecd6703a58015878b54f1f7b4f'],
↪ 'public_key':
↪'fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212', 'network
↪': 'mainnet', 'path': 'm/44/153/1/0/1'}]
```

signatures() → List[List[str]]
Get Vapor transaction signatures(signed datas).

Returns list – Vapor transaction signatures.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.providers.vapor.transaction import FundTransaction
>>> from swap.providers.vapor.solver import FundSolver
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=120723497)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", path="m/44/153/1/0/1")
>>> fund_transaction.sign(solver=fund_solver)
```

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```
>>> fund_transaction.signatures()
[[
↪'0d2e4e42fcee863e74195dceab1dfccf368055b171196faa90c53eaa2cea649bb43cc132354edad970b356aae5d
↪']]
```

9.3.1 FundTransaction

class swap.providers.vapor.transaction.**FundTransaction**(*network: str = 'mainnet'*)

Vapor Fund transaction.

Parameters **network** (*str*) – Vapor network, defaults to mainnet.

Returns FundTransaction – Vapor fund transaction instance.

Warning: Do not forget to build transaction after initialize fund transaction.

build_transaction(*address: str*, *htlc:* swap.providers.vapor.htlc.HTLC, *amount: int*, *asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*, *unit: str = 'NEU'*) → *swap.providers.vapor.transaction.FundTransaction*

Build Vapor fund transaction.

Parameters

- **address** (*str*) – Vapor sender wallet address.
- **htlc** (*str*) – Vapor Hash Time Lock Contract (HTLC) instance.
- **amount** (*int, float*) – Vapor amount to fund.
- **asset** (*str, vapor.assets.AssetNamespace*) – Vapor asset id, defaults to BTM.
- **unit** (*str*) – Vapor unit, default to NEU.

Returns FundTransaction – Vapor fund transaction instance.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.providers.vapor.transaction import FundTransaction
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=120723497)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
<swap.providers.vapor.transaction.FundTransaction object at 0x0409DAF0>
```

sign(*solver:* swap.providers.vapor.solver.FundSolver) → *swap.providers.vapor.transaction.FundTransaction*

Sign Vapor fund transaction.

Parameters **solver** (vapor.solver.FundSolver) – Vapor fund solver.

Returns FundTransaction – Vapor fund transaction instance.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.providers.vapor.transaction import FundTransaction
>>> from swap.providers.vapor.solver import FundSolver
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=120723497)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", path="m/44/153/1/0/1")
>>> fund_transaction.sign(solver=fund_solver)
<swap.providers.vapor.transaction.FundTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Vapor fund transaction raw.

Returns str – Vapor fund transaction raw.

```
>>> from swap.providers.vapor.htlc import HTLC
>>> from swap.providers.vapor.transaction import FundTransaction
>>> htlc: HTLC = HTLC(network="mainnet")
>>> htlc.build_htlc(secret_hash=
↪"3a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb", recipient_
↪public_key="3e0a377ae4afa031d4551599d9bb7d5b27f4736d77f78cac4d476f0ffba5ae3e",
↪ sender_public_key=
↪"fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212",␣
↪endblock=120723497)
>>> fund_transaction: FundTransaction = FundTransaction(network="mainnet")
>>> fund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", htlc=htlc, amount=0.1, asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", unit="BTM
↪")
>>> fund_transaction.transaction_raw()

↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnB
↪"
```

9.3.2 WithdrawTransaction

class `swap.providers.vapor.transaction.`**`WithdrawTransaction`**(*network: str = 'mainnet'*)

Vapor Withdraw transaction.

Parameters **`network`** (*`str`*) – Vapor network, defaults to `mainnet`.

Returns WithdrawTransaction – Vapor withdraw transaction instance.

Warning: Do not forget to build transaction after initialize withdraw transaction.

`build_transaction`(*address: str*, *transaction_hash: str*, *asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*) → *swap.providers.vapor.transaction.WithdrawTransaction*

Build Vapor withdraw transaction.

Parameters

- **`address`** (*`str`*) – Vapor recipient wallet address.
- **`transaction_hash`** (*`str`*) – Vapor funded transaction hash/id.
- **`asset`** (*`str, vapor.assets.AssetNamespace`*) – Vapor asset id, defaults to `BTM`.

Returns WithdrawTransaction – Vapor withdraw transaction instance.

```
>>> from swap.providers.vapor.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"vp1q3plwvmvy4qhjmp5zffzmk50aagpujt6flnf63h", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
<swap.providers.vapor.transaction.WithdrawTransaction object at 0x0409DAF0>
```

`sign`(*solver:* swap.providers.vapor.solver.WithdrawSolver) → *swap.providers.vapor.transaction.WithdrawTransaction*

Sign Vapor withdraw transaction.

Parameters **`solver`** (`vapor.solver.WithdrawSolver`) – Vapor withdraw solver.

Returns WithdrawTransaction – Vapor withdraw transaction instance.

```
>>> from swap.providers.vapor.transaction import WithdrawTransaction
>>> from swap.providers.vapor.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"vp1q3plwvmvy4qhjmp5zffzmk50aagpujt6flnf63h", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226122203e0a377ae4afa
↪"
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9
↪", secret_key="Hello Meheret!", bytecode=bytecode)
```

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```
>>> withdraw_transaction.sign(solver=withdraw_solver)
<swap.providers.vapor.transaction.WithdrawTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Vapor withdraw transaction raw.

Returns str – Vapor withdraw transaction raw.

```
>>> from swap.providers.vapor.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"mainnet")
>>> withdraw_transaction.build_transaction(address=
↪"vp1q3plwvmvy4qhjmp5zffzmk50aagpujt6flnf63h", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> withdraw_transaction.transaction_raw()

↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogInZwMXF4ajNhazVwc3J3MnBocms1OGg4YWg1ZWNyaGNtd3cwNnZqNGg
↪"
```

9.3.3 RefundTransaction

class swap.providers.vapor.transaction.**RefundTransaction**(*network: str = 'mainnet'*)

Vapor Refund transaction.

Parameters **network** (*str*) – Vapor network, defaults to mainnet.

Returns RefundTransaction – Vapor refund transaction instance.

Warning: Do not forget to build transaction after initialize refund transaction.

build_transaction(*address: str*, *transaction_hash: str*, *asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*) → *swap.providers.vapor.transaction.RefundTransaction*

Build Vapor refund transaction.

Parameters

- **address** (*str*) – Vapor sender wallet address.
- **transaction_hash** (*str*) – Vapor funded transaction hash/id
- **asset** (*str, vapor.assets.AssetNamespace*) – Vapor asset id, defaults to BTM.

Returns RefundTransaction – Vapor refund transaction instance.

```
>>> from swap.providers.vapor.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
<swap.providers.vapor.transaction.RefundTransaction object at 0x0409DAF0>
```

sign(*solver: swap.providers.vapor.solver.RefundSolver*) → *swap.providers.vapor.transaction.RefundTransaction*

Sign Vapor refund transaction.

Parameters **solver** (`vapor.solver.RefundSolver`) – Vapor refund solver.

Returns RefundTransaction – Vapor refund transaction instance.

```
>>> from swap.providers.vapor.transaction import RefundTransaction
>>> from swap.providers.vapor.solver import RefundSolver
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa
↪"
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", bytecode=bytecode)
>>> refund_transaction.sign(solver=refund_solver)
<swap.providers.vapor.transaction.RefundTransaction object at 0x0409DAF0>
```

transaction_raw() → str

Get Vapor refund transaction raw.

Returns str – Vapor refund transaction raw.

```
>>> from swap.providers.vapor.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="mainnet")
>>> refund_transaction.build_transaction(address=
↪"vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", transaction_hash=
↪"37b36d7be5dfda0cc5dc3c918705464ff901dc5eadb6f4f049db03a679e02bfe", asset=
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff")
>>> refund_transaction.transaction_raw()

↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogInZwMXF4ajNhazVwc3J3MnBocms1OGg4YWg1ZWNyaGNtd3cwNnZqNGg
↪"
```

9.4 Solver

Vapor solver.

9.4.1 FundSolver

class swap.providers.vapor.solver.**FundSolver**(*xprivate_key: str*, *account: int = 1*, *change: bool = False*, *address: int = 1*, *path: Optional[str] = None*, *indexes: Optional[List[str]] = None*)

Vapor Fund solver.

Parameters

- **xprivate_key** (*str*) – Vapor sender xprivate key.
- **account** (*int*) – Vapor derivation account, defaults to 1.
- **change** (*bool*) – Vapor derivation change, defaults to `False`.
- **address** (*int*) – Vapor derivation address, defaults to 1.
- **path** (*str*) – Vapor derivation path, defaults to `None`.
- **indexes** (*list*) – Vapor derivation indexes, defaults to `None`.

Returns FundSolver – Vapor fund solver instance.

```
>>> from swap.providers.vapor.solver import FundSolver
>>> sender_xprivate_key: str =
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8df4701
↪"
>>> fund_solver = FundSolver(xprivate_key=sender_xprivate_key)
<swap.providers.vapor.solver.FundSolver object at 0x03FCCA60>
```

9.4.2 WithdrawSolver

class swap.providers.vapor.solver.**WithdrawSolver**(*xprivate_key: str*, *secret_key: str*, *bytecode: str*, *account: int = 1*, *change: bool = False*, *address: int = 1*, *path: Optional[str] = None*, *indexes: Optional[List[str]] = None*)

Vapor Withdraw solver.

Parameters

- **xprivate_key** (*str*) – Vapor sender xprivate key.
- **secret_key** (*str*) – Secret password/passphrase.
- **bytecode** (*str*) – Vapor witness HTLC bytecode.
- **account** (*int*) – Vapor derivation account, defaults to 1.
- **change** (*bool*) – Vapor derivation change, defaults to `False`.
- **address** (*int*) – Vapor derivation address, defaults to 1.
- **path** (*str*) – Vapor derivation path, defaults to `None`.
- **indexes** (*list*) – Vapor derivation indexes, defaults to `None`.

Returns WithdrawSolver – Vapor withdraw solver instance.

```
>>> from swap.providers.vapor.solver import WithdrawSolver
>>> recipient_xprivate_key: str =
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9f650b
↪"
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa031d4
↪"
>>> withdraw_solver = WithdrawSolver(xprivate_key=recipient_xprivate_key, secret_
↪key="Hello Meheret!", bytecode=bytecode)
<swap.providers.vapor.solver.WithdrawSolver object at 0x03FCCA60>
```

9.4.3 RefundSolver

class swap.providers.vapor.solver.**RefundSolver**(*xprivate_key: str*, *bytecode: str*, *account: int = 1*, *change: bool = False*, *address: int = 1*, *path: Optional[str] = None*, *indexes: Optional[List[str]] = None*)

Vapor Refund solver.

Parameters

- **xprivate_key** (*str*) – Vapor sender xprivate key.
- **bytecode** (*str*) – Vapor witness HTLC bytecode.
- **account** (*int*) – Vapor derivation account, defaults to 1.
- **change** (*bool*) – Vapor derivation change, defaults to `False`.
- **address** (*int*) – Vapor derivation address, defaults to 1.
- **path** (*str*) – Vapor derivation path, defaults to `None`.
- **indexes** (*list*) – Vapor derivation indexes, defaults to `None`.

Returns RefundSolver – Vapor refund solver instance.

```
>>> from swap.providers.vapor.solver import RefundSolver
>>> sender_xprivate_key: str =
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8df4701
↪"
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212203e0a377ae4afa031d4
↪"
>>> refund_solver = RefundSolver(xprivate_key=sender_xprivate_key,␣
↪bytecode=bytecode)
<swap.providers.vapor.solver.RefundSolver object at 0x03FCCA60>
```

9.5 Signature

Vapor signature.

class `swap.providers.vapor.signature.`**`Signature`**(*network: str = 'mainnet'*)

Vapor Signature.

Parameters **`network`** (*str*) – Vapor network, defaults to mainnet.

Returns Signature – Vapor signature instance.

Note: Vapor has only three networks, `mainnet`, `solonet` and `testnet`.

`fee`(*unit: str = 'NEU'*) → Union[int, float]

Get Vapor transaction fee.

Parameters **`unit`** (*str*) – Vapor unit, default to `NEU`.

Returns int, float – Vapor transaction fee.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnBZ
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.fee(unit="NEU")
449000
```

`hash`() → str

Get Vapor signature transaction hash.

Returns str – Vapor signature transaction hash or transaction id.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import WithdrawSolver
>>> unsigned_withdraw_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogImJtMXF1bDYybnEybDhnbXZ2OWs5dmU0ZTA3bWxtdHhud2d4cHpsZzg
↪"
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a11822612203e0a377ae4afa
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> signature.sign(transaction_raw=unsigned_withdraw_transaction_raw,␣
↪solver=withdraw_solver)
>>> signature.hash()
"904aeda199f05cbb7671e0d9ec95b3091f3c131cef8d634ae17216b9c2fea48c"
```

json() → dict
Get Vapor signature transaction json format.

Returns dict – Vapor signature transaction json format.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnB
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.json()
{'tx_id': 'a09f3093aaff6c8c8f1a372eac68571ceea4928ccc8b9b54954863758447dec1',
↪'version': 1, 'size': 279, 'time_range': 0, 'inputs': [{'type': 'spend',
↪'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
↪', 'asset_definition': {}, 'amount': 88653000, 'control_program':
↪'0014b1592acbb917f13937166c2a9b6ce973296ebb60', 'address':
↪'vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs', 'spent_output_id':
↪'baa1fa7702447b83ceea10d075534638b4acd93074bb420d3a5399e35c35c8e9', 'input_id
↪': '294506b8df5389141854f6826b625cd7eac43f30fccf6118ae163e34b6b7fc1b',
↪'witness_arguments': [
↪'fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a118226212']}],
↪'outputs': [{'type': 'control', 'id':
↪'3e7369a5063743ca88961fe5745860c42e3b949c6baa99df08696063e8066996', 'position
↪': 0, 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'asset_
↪definition': {}, 'amount': 10000000, 'control_program':
↪'002034a3db50301b941b8ed43dcfdbd3381df1b739fa64ab77e4264f703a45e0be31',
↪'address': 'vp1qxj3ak5psrw2phrk58h8ah5ecrhcmww06vj4h0epxfacr530qhccs4pczgc'},
↪{'type': 'control', 'id':
↪'0a96063f04da56945b3ffa57a195527e25e40d53b42c3c7a4251896e82946aa3', 'position
↪': 1, 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'asset_
↪definition': {}, 'amount': 78204000, 'control_program':
↪'0014b1592acbb917f13937166c2a9b6ce973296ebb60', 'address':
↪'vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs'}], 'fee': 449000}
```

raw() → str
Get Vapor signature transaction raw.

Returns str – Vapor signature transaction raw.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnB
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
```

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```
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.raw()

↪"07010001015f015ddf82cf7c7927786a6956937744ee82354c481b0f211ac52a5c1d744c4e3e7866ffffffffff
↪"
```

type() → str
Get Vapor signature transaction type.

Returns str – Vapor signature transaction type.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import RefundSolver
>>> unsigned_refund_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogInZwMXF4ajNhazVwc3J3MnBocms1OGg4YWg1ZWNyaGNtd3cwNnZqNGg
↪"
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a11822621220 3e0a377ae4afa
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", bytecode=bytecode)
>>> signature.sign(transaction_raw=unsigned_refund_transaction_raw,␣
↪solver=refund_solver)
>>> signature.type()
"vapor_refund_signed"
```

sign(*transaction_raw: str*, *solver: Union[*swap.providers.vapor.solver.FundSolver, swap.providers.vapor.solver.WithdrawSolver, swap.providers.vapor.solver.RefundSolver*]*) → Union[*swap.providers.vapor.signature.FundSignature*, *swap.providers.vapor.signature.WithdrawSignature*, *swap.providers.vapor.signature.RefundSignature*]
Sign unsigned transaction raw.

Parameters

- **transaction_raw** (*str*) – Vapor unsigned transaction raw.
- **solver** (*vapor.solver.NormalSolver*, `vapor.solver.FundSolver`, `vapor.solver.WithdrawSolver`, `vapor.solver.RefundSolver`) – Vapor solver

Returns FundSignature, WithdrawSignature, RefundSignature – Vapor signature instance.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnB
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
```

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```
<swap.providers.vapor.signature.FundSignature object at 0x0409DAF0>
```

unsigned_datas() → List[dict]

Get Vapor transaction unsigned datas with instruction.

Returns list – Vapor transaction unsigned datas.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import WithdrawSolver
>>> unsigned_withdraw_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogInZwMXF4ajNhazVwc3J3MnBocms1OGg4YWg1ZWNyaGNtd3cwNnZqNGg
↪"
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a11822621220 3e0a377ae4afa
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> signature.sign(transaction_raw=unsigned_withdraw_transaction_raw,␣
↪solver=withdraw_solver)
>>> signature.unsigned_datas()
[{'datas': ['3a123fd809d3ad845a92ad3e5a1f0cc103de511adf95cf30240d9164d6ff1964'],
↪ 'network': 'mainnet', 'path': None}]
```

signatures() → List[List[str]]

Get Vapor transaction signatures(signed datas).

Returns list – Vapor transaction signatures.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnB
↪"
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.signatures()
[[
↪'0d2e4e42fcee863e74195dceab1dfccf368055b171196faa90c53eaa2cea649bb43cc132354edad970b356aae5d
↪']]
```

transaction_raw() → str

Get Vapor signed transaction raw.

Returns str – Vapor signed transaction raw.

```
>>> from swap.providers.vapor.signature import Signature
>>> from swap.providers.vapor.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnB
↪"
```

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```
>>> signature: Signature = Signature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> signature.sign(transaction_raw=unsigned_fund_transaction_raw, solver=fund_
↪solver)
>>> signature.transaction_raw()

↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnB
↪"
```

9.5.1 FundSignature

class swap.providers.vapor.signature.**FundSignature**(*network: str = 'mainnet'*)

Vapor Fund signature.

Parameters **network** (*str*) – Vapor network, defaults to mainnet.

Returns FundSignature – Vapor fund signature instance.

sign(*transaction_raw: str*, *solver:* swap.providers.vapor.solver.FundSolver) → *swap.providers.vapor.signature.FundSignature*

Sign unsigned fund transaction raw.

Parameters

- **transaction_raw** (*str*) – Vapor unsigned fund transaction raw.
- **solver** (vapor.solver.FundSolver) – Vapor fund solver.

Returns FundSignature – Vapor fund signature instance.

```
>>> from swap.providers.vapor.signature import FundSignature
>>> from swap.providers.vapor.solver import FundSolver
>>> unsigned_fund_transaction_raw: str =
↪"eyJmZWUiOiA0NDkwMDAsICJhZGRyZXNzIjogInZwMXFrOXZqNGphZXpsY25qZGNrZHM0ZmttOGZ3djVrYXdtcXdwbnB
↪"
>>> fund_signature: FundSignature = FundSignature(network="mainnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪")
>>> fund_signature.sign(transaction_raw=unsigned_fund_transaction_raw,␣
↪solver=fund_solver)
<swap.providers.vapor.signature.FundSignature object at 0x0409DAF0>
```

9.5.2 WithdrawSignature

class `swap.providers.vapor.signature.`**`WithdrawSignature`**(*network: str = 'mainnet'*)

Vapor Withdraw signature.

Parameters **`network`** (*`str`*) – Vapor network, defaults to `mainnet`.

Returns WithdrawSignature – Vapor withdraw signature instance.

`sign`(*transaction_raw: str*, *solver:* swap.providers.vapor.solver.WithdrawSolver) → *swap.providers.vapor.signature.WithdrawSignature*

Sign unsigned withdraw transaction raw.

Parameters

- **`transaction_raw`** (*`str`*) – Vapor unsigned withdraw transaction raw.
- **`solver`** (`vapor.solver.WithdrawSolver`) – Vapor withdraw solver.

Returns WithdrawSignature – Vapor withdraw signature instance.

```
>>> from swap.providers.vapor.signature import WithdrawSignature
>>> from swap.providers.vapor.solver import WithdrawSolver
>>> unsigned_withdraw_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogInZwMXF4ajNhazVwc3J3MnBocms1OGg4YWg1ZWNyaGNtd3cwNnZqNGg
↪"
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a11822621220 3e0a377ae4afa
↪"
>>> withdraw_signature: WithdrawSignature = WithdrawSignature(network="mainnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"58dd4094155bbebf2868189231c47e4e0edbd9f74545f843c9537259e1d7a656983aef283d0ccebecc2d33577a9
↪", secret_key="Hello Meheret!", bytecode=bytecode)
>>> withdraw_signature.sign(transaction_raw=unsigned_withdraw_transaction_raw,␣
↪solver=withdraw_solver)
<swap.providers.vapor.signature.WithdrawSignature object at 0x0409DAF0>
```

9.5.3 RefundSignature

class `swap.providers.vapor.signature.`**`RefundSignature`**(*network: str = 'mainnet'*)

Vapor Refund signature.

Parameters **`network`** (*`str`*) – Vapor network, defaults to `mainnet`.

Returns RefundSignature – Vapor withdraw signature instance.

`sign`(*transaction_raw: str*, *solver:* swap.providers.vapor.solver.RefundSolver) → *swap.providers.vapor.signature.RefundSignature*

Sign unsigned refund transaction raw.

Parameters

- **`transaction_raw`** (*`str`*) – Vapor unsigned refund transaction raw.
- **`solver`** (`vapor.solver.RefundSolver`) – Vapor refund solver.

Returns RefundSignature – Vapor refund signature instance.

```
>>> from swap.providers.vapor.signature import RefundSignature
>>> from swap.providers.vapor.solver import RefundSolver
>>> unsigned_refund_transaction_raw: str =
↪"eyJmZWUiOiA1MDkwMDAsICJhZGRyZXNzIjogInZwMXF4ajNhazVwc3J3MnBocms1OGg4YWg1ZWNyaGNtd3cwNnZqNGgw
↪"
>>> bytecode: str =
↪"042918320720fe6b3fd4458291b19605d92837ae1060cc0237e68022b2eb9faf01a11822621220 3e0a377ae4afa
↪"
>>> refund_signature: RefundSignature = RefundSignature(network="mainnet")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"58775359b7b3588dcdc1bcf373489fa1272cacc03909f78469657b0208e66e46daedfdd0fd8f8df14e2084c7e8d
↪", bytecode=bytecode)
>>> refund_signature.sign(transaction_raw=unsigned_refund_transaction_raw,␣
↪solver=refund_solver)
<swap.providers.vapor.signature.RefundSignature object at 0x0409DAF0>
```

9.6 Remote Procedure Call (RPC)

Vapor remote procedure call.

`swap.providers.vapor.rpc.get_balance`(*address: str, asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', network: str = 'mainnet', headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → int

Get Vapor balance.

Parameters

- **address** (*str*) – Vapor address.
- **asset** (*str, vapor.assets.AssetNamespace*) – Vapor asset, default to `BTM`.
- **network** (*str*) – Vapor network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns int – Vapor asset balance (NEU amount).

```
>>> from swap.providers.vapor.rpc import get_balance
>>> from swap.providers.vapor.assets import BTM as ASSET
>>> get_balance(address="vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag", asset=ASSET,␣
↪network="mainnet")
97000000
```

`swap.providers.vapor.rpc.`**`get_utxos`**(*program: str*, *asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*, *network: str = 'mainnet'*, *limit: int = 15*, *by: str = 'amount'*, *order: str = 'desc'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → list

Get Vapor unspent transaction outputs (UTXO's).

Parameters

- **program** (*str*) – Vapor control program.
- **asset** (*str, vapor.assets.AssetNamespace*) – Vapor asset id, defaults to `BTM`.
- **network** (*str*) – Vapor network, defaults to `mainnet`.
- **limit** (*int*) – Vapor utxo's limit, defaults to `15`.
- **by** (*str*) – Sort by, defaults to `amount`.
- **order** (*str*) – Sort order, defaults to `desc`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns list – Vapor unspent transaction outputs (UTXO's).

```
>>> from swap.providers.vapor.rpc import get_utxos
>>> from swap.providers.vapor.assets import BTM as ASSET
>>> get_utxos(program="00142cda4f99ea8112e6fa61cdd26157ed6dc408332a", asset=ASSET,␣
↪network="mainnet")
[{'hash': 'e152f88d33c6659ad823d15c5c65b2ed946d207c42430022cba9bb9b9d70a7a4', 'asset
↪': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪587639800}, {'hash':
↪'88289fa4c7633574931be7ce4102aeb24def0de20e38e7d69a5ddd6efc116b95', 'asset':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪8160000}, {'hash':
↪'f71c68f921b434cc2bcd469d26e7927aa6db7500e4cdeef814884f11c10f5de2', 'asset':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪10000}, {'hash': 'e46cfecc1f1a26413172ce81c78affb19408e613915642fa5fb04d3b0a4ffa65
↪', 'asset': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 100}]
```

`swap.providers.vapor.rpc.`**`estimate_transaction_fee`**(*address: str*, *amount: int*, *asset: Union[str, swap.providers.vapor.assets.AssetNamespace] = 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff'*, *confirmations: int = 1*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → int

Estimate Vapor transaction fee.

Parameters

- **address** (*str*) – Vapor address.
- **amount** (*int*) – Vapor amount (NEU amount).

- **asset** (*str, vapor.assets.AssetNamespace*) – Vapor asset id, default to `BTM`.
- **confirmations** (*int*) – Vapor confirmations, default to 1.
- **network** (*str*) – Vapor network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – request timeout, default to `60`.

Returns str – Estimated transaction fee (NEU amount).

```
>>> from swap.providers.vapor.rpc import estimate_transaction_fee
>>> from swap.providers.vapor.assets import BTM as ASSET
>>> estimate_transaction_fee(address="vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag",␣
↪asset=ASSET, amount=100_000, confirmations=100, network="mainnet")
449000
```

`swap.providers.vapor.rpc.`**`account_create`**(*xpublic_key: str*, *label: str = '1st address'*, *account_index: int = 1*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Create account in blockcenter.

Parameters

- **xpublic_key** (*str*) – Bytom xpublic key.
- **label** (*str*) – Bytom limit, defaults to `1st address`.
- **account_index** (*str*) – Account index, defaults to 1.
- **network** (*str*) – Bytom network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – request timeout, default to `60`.

Returns dict – Bytom blockcenter guid, address and label.

```
>>> from swap.providers.bytom.rpc import account_create
>>> account_create(xpublic_key=
↪"f80a401807fde1ee5727ae032ee144e4b757e69431e68e6cd732eda3c8cd3936daedfdd0fd8f8df14e2084c7e8df4701
↪", network="mainnet")
{"guid": "9ed61a9b-e7b6-4cb7-94fb-932b738e4f66", "address":
↪"bm1qk9vj4jaezlcnjdckds4fkm8fwv5kawmq9qrufx", "label": "1st address"}
```

`swap.providers.vapor.rpc.`**`build_transaction`**(*address: str*, *transaction: dict*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Build Vapor transaction.

Parameters

- **address** (*str*) – Vapor address.
- **transaction** (*dict*) – Vapor transaction (inputs, outputs, fee, confirmations & forbid_chain_tx).
- **network** (*str*) – Vapor network, defaults to `mainnet`.

- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns dict – Vapor builted transaction.

```
>>> from swap.providers.vapor.rpc import build_transaction
>>> build_transaction(address="vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag",␣
↪transaction={"fee": "0.1", "confirmations": 1, "inputs": [{"type": "spend_wallet",
↪ "amount": "0.1", "asset":
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff"}], "outputs": [
↪{"type": "control_address", "amount": "0.1", "asset":
↪"ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff", "address":
↪"vp1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07qcyvk37"}]}, network=
↪"mainnet")
{'tx': {'hash': 'f6b35e2f37862bc9a2cfbc9f21440102599fc5860ed73ba5c3f44e17408e2c8c',
↪'status': True, 'size': 279, 'submission_timestamp': 0, 'memo': '', 'inputs': [{
↪'script': '00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag', 'asset': {'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'decimals': 0,
↪ 'unit': 'BTM'}, 'amount': '0.9', 'type': 'spend'}], 'outputs': [{'utxo_id':
↪'793540933493c531efdc0dfd89d95041badc4e1efaf938d9916cdc7834984c74', 'script':
↪'00204f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'address
↪': 'vp1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07qcyvk37', 'asset': {
↪'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'decimals': 0, 'unit': 'BTM'}, 'amount': '0.1', 'type': 'control'}, {'utxo_id':
↪'62c391358a7bccac6a3a1b9efd5339eb7207660372290ceb8718af2284467ba0', 'script':
↪'00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag', 'asset': {'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'decimals': 0,
↪ 'unit': 'BTM'}, 'amount': '0.7', 'type': 'control'}], 'fee': '0.1', 'balances': [
↪{'asset': {'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'decimals': 0,
↪ 'unit': 'BTM'}, 'amount': '-0.1'}], 'types': ['ordinary'], 'min_veto_height': 0},
↪ 'raw_transaction':
↪'07010001015f015d0c8382b6aadd32748d0a9490259bf9ba5b55f6ac283535f8752cf5d51621801cffffffffffffff
↪', 'signing_instructions': [{'derivation_path': ['2c000000', '99000000', '01000000
↪', '00000000', '01000000'], 'sign_data': [
↪'4491d22111d3b75faa8f65ab23cd4b221fd14c99b1260239e3398ab3c347a769'], 'pubkey':
↪'91ff7f525ff40874c4f47f0cab42e46e3bf53adad59adef9558ad1b6448f22e2'}]}
```

`swap.providers.vapor.rpc.`**`get_transaction`**(*transaction_hash: str, network: str = 'mainnet', headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → dict

Get Vapor transaction detail.

Parameters

- **transaction_hash** (*str*) – Vapor transaction hash/id.
- **network** (*str*) – Vapor network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns dict – Vapor transaction detail.

```
>>> from swap.providers.vapor.rpc import get_transaction
>>> get_transaction(transaction_hash=
↪"4e91bca76db112d3a356c17366df93e364a4922993414225f65390220730d0c1", network=
↪"mainnet")
{'tx_id': '961d984b04214dc202fb40f4c48466d10a2813a138a31e1d2877ad3b6af0ef4c',
↪'timestamp': 1606993457000, 'block_hash':
↪'440e791390f61c615b974c9292ac1d43bad67368076ef6d86a77cab22f1c2119', 'block_height
↪': 85098064, 'trx_amount': 0, 'trx_fee': 10000000, 'status_fail': False, 'is_vote
↪': False, 'is_cross_chain': False, 'coinbase': 0, 'size': 646, 'chain_status':
↪'mainnet', 'index_id': 18811685, 'mux_id':
↪'97fdbe17d62ae8f8f2024ebc6a231183e8ce7c4e8fde5645b9a3c973f8d0d3ad', 'inputs': [{
↪'type': 'spend', 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪10000, 'control_program':
↪'00204f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'address
↪': 'vp1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07qcyvk37', 'spent_
↪output_id': 'c30e26caef4ad3436542700c5b32a91cdf0622c60a6c8a6e11cb1c0b250bc65f',
↪'input_id': 'c470139ab9f9e81829e51096c57365392195ea2e90d7fb19e9eb2b309df22425',
↪'witness_arguments': [
↪'db718488496e0823b1cfd9ce64f226ffc4e9debd30eac0b751aa6bd28f694908ae0c0f5d39dd6ed697cae9b0857832f
↪', '01',
↪'02e8032091ff7f525ff40874c4f47f0cab42e46e3bf53adad59adef9558ad1b6448f22e2203e0a377ae4afa031d45515
↪'], 'decode_program': ['DUP ', 'SHA3 ', 'DATA_32␣
↪4f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'EQUALVERIFY ',
↪ 'DATA_8 ffffffffffffffff', 'SWAP ', 'FALSE ', 'CHECKPREDICATE '], 'decimals': 8,
↪'unit': 'BTM'}, {'type': 'spend', 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'amount':␣
↪16990000, 'control_program': '00142cda4f99ea8112e6fa61cdd26157ed6dc408332a',
↪'address': 'vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag', 'spent_output_id':
↪'1a7f2357f2ec272ea2d96413aee511d2077447731a799110cef97de177739181', 'input_id':
↪'4f50c438b5006eafc547cc48128cb94d2e39430ef30f117aa85e6f30ac92ce09', 'witness_
↪arguments': [
↪'e31abbf90f8b20cb41f4daedc2f558dedcbc258fcfb9a36ae1f8c0b4b80f448a78d1d835adb02cc918374c71df8c02c5
↪', '91ff7f525ff40874c4f47f0cab42e46e3bf53adad59adef9558ad1b6448f22e2'], 'decode_
↪program': ['DUP ', 'HASH160 ', 'DATA_20 2cda4f99ea8112e6fa61cdd26157ed6dc408332a',
↪ 'EQUALVERIFY ', 'TXSIGHASH ', 'SWAP ', 'CHECKSIG '], 'decimals': 8, 'unit': 'BTM
↪'}], 'outputs': [{'type': 'control', 'id':
↪'20c00b6f9f4fc4f22ccee6c5f8b471a72b1f514f821b1c9c3d1f3243ff011cf1', 'position': 0,
↪ 'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 10000, 'control_program': '00142cda4f99ea8112e6fa61cdd26157ed6dc408332a
↪', 'address': 'vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag', 'decimals': 8,
↪'decode_program': ['DUP ', 'HASH160 ', 'DATA_20␣
↪2cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'EQUALVERIFY ', 'TXSIGHASH ', 'SWAP ',
↪'CHECKSIG '], 'unit': 'BTM'}, {'type': 'control', 'id':
↪'f7a36ebce7001e83510eb16c13ff0e5ef311179c25e8cf7bcb599ff8d17e23b2', 'position': 1,
↪ 'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 6990000, 'control_program':
↪'00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag', 'decimals': 8, 'decode_program': [
↪'DUP ', 'HASH160 ', 'DATA_20 2cda4f99ea8112e6fa61cdd26157ed6dc408332a',
↪'EQUALVERIFY ', 'TXSIGHASH ', 'SWAP ', 'CHECKSIG '], 'unit': 'BTM'}], 'mov_type':
↪''}
```

swap.providers.vapor.rpc.**get_current_block_height**(*plus: int = 0*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → int

Get Vapor transaction detail.

Parameters

- **plus** (*int*) – Add block number on current block height, default to `0`.
- **network** (*str*) – Vapor network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns int – Vapor current block height.

```
>>> from swap.providers.vapor.rpc import get_current_block_height
>>> get_current_block_height(plus=0)
678722
```

swap.providers.vapor.rpc.**find_p2wsh_utxo**(*transaction: dict*) → Optional[dict]

Find Vapor pay to witness script hash UTXO info's.

Parameters **transaction** (*dict*) – Vapor transaction detail.

Returns dict – Pay to Witness Script Hash (P2WSH) UTXO info's.

```
>>> from swap.providers.vapor.rpc import find_p2wsh_utxo, get_transaction
>>> find_p2wsh_utxo(transaction=get_transaction(
↪"28168825b2eaded02973313b1c4152a6362157590ec8cd3f530306259eb390ce", "mainnet"))
{'type': 'control', 'id':
↪'e99f811f25837d0472321e4e237631f40912bf4ca40766a46c8064ccff77d03a', 'position': 0,
↪ 'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'amount': 10499000, 'control_program':
↪'00204f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'address
↪': 'vp1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07qcyvk37', 'decimals':␣
↪8, 'decode_program': ['DUP ', 'SHA3 ', 'DATA_32␣
↪4f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'EQUALVERIFY ',
↪ 'DATA_8 ffffffffffffffff', 'SWAP ', 'FALSE ', 'CHECKPREDICATE '], 'unit': 'BTM'}
```

swap.providers.vapor.rpc.**decode_raw**(*raw: str*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → dict

Decode original Vapor raw.

Parameters

- **raw** (*str*) – Vapor transaction raw.
- **network** (*str*) – Vapor network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns dict – Vapor decoded transaction raw.

```
>>> from swap.providers.vapor.rpc import decode_raw
>>> decode_raw(raw=
↪"07010001015f015d0c8382b6aadd32748d0a9490259bf9ba5b55f6ac283535f8752cf5d51621801cffffffffffffff
↪", network="testnet")
{'tx_id': 'f6b35e2f37862bc9a2cfbc9f21440102599fc5860ed73ba5c3f44e17408e2c8c',
↪'version': 1, 'size': 279, 'time_range': 0, 'inputs': [{'type': 'spend', 'asset_id
↪': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'asset_
↪definition': {}, 'amount': 90000000, 'control_program':
↪'00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag', 'spent_output_id':
↪'f337ffe5333849636e7f6ca01b8a3aa0ef8cc50fadf875730cd40786bb504f80', 'input_id':
↪'437cebc2dbdff6f5c821fbf6895455192685411bca64f796ff389554e0c23f44', 'witness_
↪arguments': ['91ff7f525ff40874c4f47f0cab42e46e3bf53adad59adef9558ad1b6448f22e2']}
↪], 'outputs': [{'type': 'control', 'id':
↪'793540933493c531efdc0dfd89d95041badc4e1efaf938d9916cdc7834984c74', 'position': 0,
↪ 'asset_id': 'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff',
↪'asset_definition': {}, 'amount': 10000000, 'control_program':
↪'00204f8f0e88d0a44b3d884b07b6dd4536518ffcbb596a91ca0e6b2f37e96463bbfc', 'address
↪': 'vp1qf78sazxs539nmzztq7md63fk2x8lew6ed2gu5rnt9um7jerrh07qcyvk37'}, {'type':
↪'control', 'id': '62c391358a7bccac6a3a1b9efd5339eb7207660372290ceb8718af2284467ba0
↪', 'position': 1, 'asset_id':
↪'ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff', 'asset_
↪definition': {}, 'amount': 70000000, 'control_program':
↪'00142cda4f99ea8112e6fa61cdd26157ed6dc408332a', 'address':
↪'vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag'}], 'fee': 10000000}
```

`swap.providers.vapor.rpc.`**`submit_raw`**(*address: str*, *raw: str*, *signatures: list*, *network: str = 'mainnet'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → str

Submit original Vapor raw into blockchain.

Parameters

- **address** (*str*) – Vapor address.
- **raw** (*str*) – Vapor transaction raw.
- **signatures** (*list*) – Vapor signed massage datas.
- **network** (*str*) – Vapor network, defaults to `mainnet`.
- **headers** (*dict*) – Request headers, default to `common headers`.
- **timeout** (*int*) – Request timeout, default to `60`.

Returns str – Vapor submitted transaction id/hash.

```
>>> from swap.providers.vapor.rpc import submit_raw
>>> submit_raw(address="vp1q9ndylx02syfwd7npehfxz4lddhzqsve2za23ag", raw=
↪"07010001015f015d0c8382b6aadd32748d0a9490259bf9ba5b55f6ac283535f8752cf5d51621801cffffffffffffff
↪", signatures=[[
↪"31818788bd6cfd255643242212efc1239db8f9dcd91b0e07ef1ddd38d8edf98c420da5578ec195ff7a5ddd72605a197
↪"]], network="mainnet")
"2993414225f65390220730d0c1a356c14e91bca76db112d37366df93e364a492"
```

9.7 Utils

Vapor Utils.

`swap.providers.vapor.utils.`**`get_address_type`**`(`*address: str*`)` → Optional[str]

Get Vapor address type.

Parameters **`address`** (*`str`*) – Vapor address.

Returns str – Vapor address type (P2WPKH, P2WSH).

```
>>> from swap.providers.vapor.utils import get_address_type
>>> get_address_type(address="vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs")
"p2wpkh"
```

`swap.providers.vapor.utils.`**`is_network`**`(`*network: str*`)` → bool

Check Vapor network.

Parameters **`network`** (*`str`*) – Vapor network.

Returns bool – Vapor valid/invalid network.

```
>>> from swap.providers.vapor.utils import is_network
>>> is_network(network="solonet")
True
```

`swap.providers.vapor.utils.`**`is_address`**`(`*address: str*, *network: Optional[str] = None*, *address_type: Optional[str] = None*`)` → bool

Check Vapor address.

Parameters

- **`address`** (*`str`*) – Vapor address.
- **`network`** (*`str`*) – Vapor network, defaults to `None`.
- **`address_type`** (*`str`*) – Vapor address type, defaults to `None`.

Returns bool – Vapor valid/invalid address.

```
>>> from swap.providers.vapor.utils import is_address
>>> is_address(address="vp1qk9vj4jaezlcnjdckds4fkm8fwv5kawmqwpnpvs", network=
↪"mainnet")
True
```

`swap.providers.vapor.utils.`**`is_transaction_raw`**`(`*transaction_raw: str*`)` → bool

Check Vapor transaction raw.

Parameters **`transaction_raw`** (*`str`*) – Vapor transaction raw.

Returns bool – Vapor valid/invalid transaction raw.

```
>>> from swap.providers.vapor.utils import is_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3lI
↪"
>>> is_transaction_raw(transaction_raw=transaction_raw)
True
```

`swap.providers.vapor.utils.`**`amount_unit_converter`**(*amount: Union[int, float], unit_from: str = 'NEU2BTM'*) → Union[int, float]

Vapor amount unit converter

Parameters

- **`amount`** (*`int, float`*) – Vapor any amount.
- **`unit_from`** (*`str`*) – Vapor unit convert from symbol, default to `NEU2BTM`.

Returns int, float – BTM asset amount.

```
>>> from swap.providers.vapor.utils import amount_unit_converter
>>> amount_unit_converter(amount=10_000_000, unit_from="NEU2BTM")
0.1
```

`swap.providers.vapor.utils.`**`estimate_endblock`**(*endtime: int, network: str = 'mainnet', headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → int

Estimate Vapor expiration block height.

Parameters

- **`endtime`** (*`int`*) – Expiration block timestamp.
- **`network`** (*`str`*) – Vapor network, defaults to `mainnet`.
- **`headers`** (*`dict`*) – Request headers, default to `common headers`.
- **`timeout`** (*`int`*) – Request timeout, default to `60`.

Returns str – Estimated Vapor endblock.

```
>>> from swap.providers.vapor.utils import estimate_endblock
>>> from swap.utils import get_current_timestamp
>>> estimate_endblock(endtime=get_current_timestamp(plus=3600))
680854
```

`swap.providers.vapor.utils.`**`decode_transaction_raw`**(*transaction_raw: str, headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → dict

Decode Vapor transaction raw.

Parameters

- **`transaction_raw`** (*`str`*) – Vapor transaction raw.
- **`headers`** (*`dict`*) – Request headers, default to `common headers`.
- **`timeout`** (*`int`*) – Request timeout, default to `60`.

Returns dict – Decoded Vapor transaction raw.

```
>>> from swap.providers.vapor.utils import decode_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3lI
↪"
>>> decode_transaction_raw(transaction_raw=transaction_raw)
{'fee': ..., 'type': '...', 'address': '...', 'transaction': {...}, 'unsigned_datas
↪': [...], 'signatures': [...], 'network': '...'}
```

`swap.providers.vapor.utils.`**`submit_transaction_raw`**(*transaction_raw: str, headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}, timeout: int = 60*) → dict

Submit Vapor transaction raw.

Parameters

- **`transaction_raw`** (*`str`*) – Vapor transaction raw.
- **`headers`** (*`dict`*) – Request headers, default to `common headers`.
- **`timeout`** (*`int`*) – Request timeout, default to `60`.

Returns dict – Vapor submitted transaction id, fee, type and date.

```
>>> from swap.providers.vapor.utils import submit_transaction_raw
>>> transaction_raw =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3lI
↪"
>>> submit_transaction_raw(transaction_raw=transaction_raw)
{'fee': ..., 'type': '...', 'transaction_hash': '...', 'network': '...', 'date': '..
↪.'}
```

CHAPTER

TEN

XINFIN

eXchange inFinite (XinFin), is a Delegated Proof of Stake Consensus network (XDPoS), enabling Hybrid Relay Bridges, Instant Block Finality and Interoperability with ISO20022 messaging standards, making XinFin's Hybrid Architecture Developer friendly.

For more https://xinfin.org

10.1 Wallet

The implementation of Hierarchical Deterministic (HD) wallets generator for XinFin blockchain.

class `swap.providers.xinfin.wallet.`**`Wallet`**(*network: str = 'mainnet'*, *provider: str = 'http'*)

XinFin Wallet class.

Parameters

- **`network`** (*str*) – XinFin network, defaults to `mainnet`.
- **`provider`** (*str*) – XinFin network provider, defaults to `http`.

Returns Wallet – XinFin wallet instance.

Note: XinFin has only two networks, `mainnet` and `testnet`.

`from_entropy`(*entropy: str*, *language: str = 'english'*, *passphrase: Optional[str] = None*) → *swap.providers.xinfin.wallet.Wallet*

Initialize wallet from entropy.

Parameters

- **`entropy`** (*str*) – XinFin wallet entropy.
- **`language`** (*str*) – XinFin wallet language, default to `english`.
- **`passphrase`** (*str*) – XinFin wallet passphrase, default to `None`.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

from_mnemonic(*mnemonic: str*, *language: Optional[str] = None*, *passphrase: Optional[str] = None*) → *swap.providers.xinfin.wallet.Wallet*

Initialize wallet from mnemonic.

Parameters

- **mnemonic** (*str*) – XinFin wallet mnemonic.
- **language** (*str*) – XinFin wallet language, default to `english`.
- **passphrase** (*str*) – XinFin wallet passphrase, default to `None`.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_mnemonic(mnemonic="unfair divorce remind addict add roof park␣
↪clown build renew illness fault")
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

from_seed(*seed: str*) → *swap.providers.xinfin.wallet.Wallet*

Initialize wallet from seed.

Parameters **seed** (*str*) – XinFin wallet seed.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_seed(seed=
↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪")
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

from_root_xprivate_key(*xprivate_key: str*, *strict: bool = True*) → *swap.providers.xinfin.wallet.Wallet*

Initialize wallet from root xprivate key.

Parameters

- **xprivate_key** (*str*) – XinFin wallet root xprivate key.
- **strict** (*bool*) – Strict for must be root xprivate key, default to `True`.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_root_xprivate_key(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪")
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

from_xprivate_key(*xprivate_key: str*) → *swap.providers.xinfin.wallet.Wallet*

Initialize wallet from xprivate key.

Parameters **xprivate_key** (*str*) – XinFin wallet xprivate key.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_xprivate_key(xprivate_key=
↪"xprvA3QFrUVTkKpfRhqjgPq897uDFAYtt9VhMdDuZVbPboVf9uPMcMmr7W8sTsrd8nFCsVGSBCpGC3jreRpu8Zs1xsG
↪")
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

from_wif(*wif: str*) → *swap.providers.xinfin.wallet.Wallet*
Initialize wallet from wallet important format (WIF).

Parameters **wif** (*str*) – XinFin wallet important format.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_wif(wif="L1rYHjuxQtgTeU4qMUP6qnGqW9nstFt5drQktRuFGFSuGcCpZoJq")
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

from_private_key(*private_key*) → *swap.providers.xinfin.wallet.Wallet*
Initialize wallet from private key.

Parameters **private_key** (*str*) – XinFin wallet private key.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_private_key(private_key=
↪"8a4bc8131e99a5d1064cdbca6949aa2ec16152967b19f2cee3096daefd5ca857")
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

from_path(*path: str*) → *swap.providers.xinfin.wallet.Wallet*
Drive XinFin wallet from path.

Parameters **path** (*str*) – XinFin wallet path.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

from_index(*index: int*, *hardened: bool = False*) → *swap.providers.xinfin.wallet.Wallet*
Drive XinFin wallet from index.

Parameters

- **index** (*int*) – XinFin wallet index.
- **hardened** (*bool*) – Use hardened index, default to `False`.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
```

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```
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_index(44, harden=True)
>>> wallet.from_index(550, harden=True)
>>> wallet.from_index(0, harden=True)
>>> wallet.from_index(0)
>>> wallet.from_index(0)
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
```

clean_derivation() → *swap.providers.xinfin.wallet.Wallet*
Clean derivation XinFin wallet.

Returns Wallet – XinFin wallet instance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/550'/0'/0/0")
>>> wallet.path()
"m/44'/550'/0'/0/0"
>>> wallet.clean_derivation()
<swap.providers.xinfin.wallet.Wallet object at 0x040DA268>
>>> wallet.path()
None
```

strength() → Optional[int]
Get XinFin wallet strength.

Returns int – XinFin wallet strength.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.strength()
128
```

entropy() → Optional[str]
Get XinFin wallet entropy.

Returns str – XinFin wallet entropy.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.entropy()
"ed0802d701a033776811601dd6c5c4a9"
```

mnemonic() → Optional[str]
Get XinFin wallet mnemonic.

Returns str – XinFin wallet mnemonic.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
```

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```
>>> wallet.mnemonic()
"unfair divorce remind addict add roof park clown build renew illness fault"
```

passphrase() → Optional[str]

Get XinFin wallet passphrase.

Returns str – XinFin wallet passphrase.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9", passphrase=
↪"meherett")
>>> wallet.passphrase()
"meherett"
```

language() → Optional[str]

Get XinFin wallet language.

Returns str – XinFin wallet language.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.language()
"english"
```

seed() → Optional[str]

Get XinFin wallet seed.

Returns str – XinFin wallet seed.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.seed()

↪"1cfd5df8a523d53a36cee369a93fac4e9efab5e4e138d479da2fb6df730697574409d572fe8325ec22e8ed25dea
↪"
```

root_xprivate_key(*encoded: bool = True*) → Optional[str]

Get XinFin wallet root xprivate key.

Parameters **encoded** (*bool*) – Encoded root xprivate key, default to `True`.

Returns str – XinFin wallet root xprivate key.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.root_xprivate_key()

↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪"
```

root_xpublic_key(*encoded: bool = True*) → Optional[str]

Get XinFin wallet root xpublic key.

Parameters **encoded** (*bool*) – Encoded root xprivate key, default to `True`.

Returns str – XinFin wallet root xpublic key.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.root_xpublic_key()

↪"xpub661MyMwAqRbcG28HjdHc6zbHxBFzBJBC4ecFvVKBXXqiucEBe5wirgQ9hzY2WQMjnurVjJbTjMWRskHi7jnSRkJ
↪"
```

xprivate_key(*encoded=True*) → Optional[str]
Get XinFin wallet xprivate key.

Parameters **encoded** (*bool*) – Encoded xprivate key, default to True.

Returns str – XinFin wallet xprivate key.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.xprivate_key()

↪"xprvA3QFrUVTkKpfRhqjgPq897uDFAYtt9VhMdDuZVbPboVf9uPMcMmr7W8sTsrd8nFCsVGSBCpGC3jreRpu8Zs1xsG
↪"
```

xpublic_key(*encoded: bool = True*) → Optional[str]
Get XinFin wallet xpublic key.

Parameters **encoded** (*bool*) – Encoded xprivate key, default to `True`.

Returns str – XinFin wallet xpublic key.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.xpublic_key()

↪"xpub6GPcFz2MahNxeBvCnRN8WFqwoCPPHcDYir9WMt11A92e2hiW9u66fJTMKAB81ns7kpAT3vsKi4QHWVSNt7V6crG
↪"
```

uncompressed() → str
Get XinFin wallet uncompressed public key.

Returns str – XinFin wallet uncompressed public key.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.uncompressed()

↪"33fbc2f498d145a1827ee894a2ed5f14928523712047ad9fffc59cdda7d314e6707f731cc5b9a5018878fdfd503
↪"
```

compressed() → str

Get XinFin wallet compressed public key.

Returns str – XinFin wallet compressed public key.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.compressed()
"0333fbc2f498d145a1827ee894a2ed5f14928523712047ad9fffc59cdda7d314e6"
```

chain_code() → str

Get XinFin wallet chain code.

Returns str – XinFin wallet chain code.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.chain_code()
"ba8572f00241c17616903b07fed8ddcc1442677fa54ccd38e85049eee2310246"
```

private_key() → str

Get XinFin wallet private key.

Returns str – XinFin wallet private key.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.private_key()
"8a4bc8131e99a5d1064cdbca6949aa2ec16152967b19f2cee3096daefd5ca857"
```

public_key() → str

Get XinFin wallet public key.

Returns str – XinFin wallet public key.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path("m/44'/550'/0'/0/0")
>>> wallet.public_key()
"0333fbc2f498d145a1827ee894a2ed5f14928523712047ad9fffc59cdda7d314e6"
```

path() → Optional[str]

Get XinFin wallet path.

Returns str – XinFin wallet path.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
```

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```
>>> wallet.path()
"m/44'/550'/0'/0/0"
```

address() → str
Get XinFin wallet address.

Returns str – XinFin wallet address.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.address()
"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232"
```

wif() → str
Get XinFin wallet important format (WIF).

Returns str – XinFin wallet important format.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.wif()
"L1rYHjuxQtgTeU4qMUP6qnGqW9nstFt5drQktRuFGFSuGcCpZoJq"
```

hash(*private_key: Optional[str] = None*) → str
Get XinFin wallet public key/address hash.

Returns str – XinFin wallet public key/address hash.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.hash()
"dc8f505fccd7cb6f6ba93fd3795174f97efb43ae"
```

balance(*unit: str = 'Wei'*) → Union[Wei, int, float]
Get XinFin wallet balance.

Parameters **unit** (*str*) – XinFin unit, default to `Wei`.

Returns Wei, int, float – XinFin wallet balance.

```
>>> from swap.providers.xinfin.wallet import Wallet
>>> wallet: Wallet = Wallet(network="testnet")
>>> wallet.from_entropy(entropy="ed0802d701a033776811601dd6c5c4a9")
>>> wallet.from_path(path="m/44'/550'/0'/0/0")
>>> wallet.balance(unit="XDC")
96.96263982
```

10.2 Hash Time Lock Contract (HTLC)

XinFin Hash Time Lock Contract (HTLC).

class swap.providers.xinfin.htlc.**HTLC**(*contract_address: Optional[str] = None*, *network: str = 'mainnet'*, *provider: str = 'http'*, *use_script: bool = False*)

XinFin Hash Time Lock Contract (HTLC).

Parameters

- **contract_address** (*str*) – XinFin HTLC contract address, defaults to `None`.
- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.
- **use_script** (*bool*) – Initialize HTLC by using script, default to `False`.

Returns HTLC – XinFin HTLC instance.

Note: XinFin has only two networks, `mainnet` and `testnet`.

build_transaction(*address: str*) → *swap.providers.xinfin.htlc.HTLC*

Build XinFin HTLC transaction.

Parameters **address** (*str*) – XinFin address.

Returns HTLC – XinFin HTLC instance.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232
↪")
<swap.providers.xinfin.htlc.HTLC object at 0x0409DAF0>
```

sign_transaction(*private_key: str*) → *swap.providers.xinfin.htlc.HTLC*

Sign XinFin HTLC transaction.

Parameters **private_key** (*str*) – XinFin private key.

Returns HTLC – XinFin HTLC instance.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232
↪")
>>> htlc.sign_transaction(private_key=
↪"8a4bc8131e99a5d1064cdbca6949aa2ec16152967b19f2cee3096daefd5ca857")
<swap.providers.xinfin.htlc.HTLC object at 0x0409DAF0>
```

fee(*unit: str = 'Wei'*) → Union[Wei, int, float]

Get XinFin HTLC transaction fee.

Parameters **unit** (*str*) – XinFin unit, default to `Wie`.

Returns Wei, int, float – XinFin transaction fee.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232
↪")
>>> htlc.fee(unit="Wei")
1532786
```

hash() → Optional[str]

Get XinFin HTLC transaction hash.

Returns str – XinFin transaction hash.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232
↪")
>>> htlc.sign_transaction(private_key=
↪"8a4bc8131e99a5d1064cdbca6949aa2ec16152967b19f2cee3096daefd5ca857")
>>> htlc.hash()
"0x2f5a724c9eda4f5ae8fde2d02417f17d9b9c8f5319bb8b79bbb9e5728f3896cc"
```

json() → dict

Get XinFin HTLC transaction json.

Returns dict – XinFin transaction json.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232
↪")
>>> htlc.json()
{'chainId': 1337, 'from': '0x2224caA2235DF8Da3D2016d2AB1137D2d548A232', 'value
↪': 0, 'nonce': 0, 'gas': 1532786, 'gasPrice': 20000000000, 'data':
↪'0x608060405234801561001057600080fd5b50611ae98061002060003960000f3fe608060405260043610610003f5
↪', 'to': b''}
```

raw() → Optional[str]

Get XinFin HTLC transaction raw.

Returns str – XinFin transaction raw.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> htlc: HTLC = HTLC(network="testnet")
>>> htlc.build_transaction(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232
↪")
>>> htlc.sign_transaction(private_key=
↪"8a4bc8131e99a5d1064cdbca6949aa2ec16152967b19f2cee3096daefd5ca857")
>>> htlc.raw()

↪"0xf91b5e808504a817c800831763728080b91b09608060405234801561001057600080fd5b50611ae98061002060
↪"
```

contract_address(*prefix: str = 'xdc'*) → str

Get XinFin HTLC contract address.

Parameters **prefix** (*str*) – XinFin address prefix, default to xdc.

Returns ChecksumAddress – XinFin HTLC contract address.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.contract_address()
"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7"
```

build_htlc(*secret_hash: str*, *recipient_address: str*, *sender_address: str*, *endtime: int*) → *swap.providers.xinfin.htlc.HTLC*

Build XinFin Hash Time Lock Contract (HTLC).

Parameters

- **secret_hash** (*str*) – Secret sha-256 hash.
- **recipient_address** (*str*) – XinFin recipient address.
- **sender_address** (*str*) – XinFin sender address.
- **endtime** (*int*) – Expiration block time (Seconds).

Returns HTLC – XinFin HTLC instance.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
<swap.providers.xinfin.htlc.HTLC object at 0x0409DAF0>
```

abi() → list

Get XinFin HTLC ABI.

Returns list – XinFin HTLC ABI.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> htlc.abi()
[{'anonymous': False, 'inputs': [{'indexed': True, 'internalType': 'bytes32',
↪'name': 'locked_contract_id', 'type': 'bytes32'}, {'indexed': False,
↪'internalType': 'bytes32', 'name': 'secret_hash', 'type': 'bytes32'}, {
↪'indexed': True, 'internalType': 'address', 'name': 'recipient', 'type':
↪'address'}, {'indexed': True, 'internalType': 'address', 'name': 'sender',
↪'type': 'address'}, {'indexed': False, 'internalType': 'uint256', 'name':
↪'endtime', 'type': 'uint256'}, {'indexed': False, 'internalType': 'uint256',
↪'name': 'amount', 'type': 'uint256'}], 'name': 'log_fund', 'type': 'event'}, {
↪'anonymous': False, 'inputs': [{'indexed': True, 'internalType': 'bytes32',
↪'name': 'locked_contract_id', 'type': 'bytes32'}], 'name': 'log_refund', 'type
↪': 'event'}, {'anonymous': False, 'inputs': [{'indexed': True, 'internalType
↪': 'bytes32', 'name': 'locked_contract_id', 'type': 'bytes32'}], 'name': 'log_
↪withdraw', 'type': 'event'}, {'inputs': [{'internalType': 'bytes32', 'name':
↪'_secret_hash', 'type': 'bytes32'}, {'internalType': 'address payable', 'name
↪': '_recipient', 'type': 'address'}, {'internalType': 'address payable', 'name
↪': '_sender', 'type': 'address'}, {'internalType': 'uint256', 'name': '_
↪endtime', 'type': 'uint256'}], 'name': 'fund', 'outputs': [{'internalType':
```

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bytecode() → str

Get XinFin HTLC bytecode.

Returns str – XinFin HTLC bytecode.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> htlc.bytecode()

↪"608060405234801561001057600080fd5b50611ae980610020600039600f3fe60806040526004361061003f576
↪"
```

bytecode_runtime() → str

Get XinFin HTLC bytecode runtime.

Returns str – XinFin HTLC bytecode runtime.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> htlc.bytecode_runtime()

↪"60806040526004361061003f5760003560e01c806306a53665146100445780637249fbb614610081578063cfd4b
↪"
```

opcode() → str

Get XinFin HTLC opcode.

Returns str – XinFin HTLC opcode.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> htlc.bytecode_runtime()
"PUSH1 0x80 PUSH1 0x40 MSTORE CALLVALUE DUP1 ISZERO PUSH2 0x10 JUMPI PUSH1 0x0␣
↪DUP1 REVERT JUMPDEST POP PUSH2 0x1AE9 DUP1 PUSH2 0x20 PUSH1 0x0 CODECOPY␣
↪PUSH1 0x0 RETURN INVALID PUSH1 0x80 PUSH1 0x40 MSTORE PUSH1 0x4 CALLDATASIZE␣
↪LT PUSH2 0x3F JUMPI PUSH1 0x0 CALLDATALOAD PUSH1 0xE0 SHR DUP1 PUSH4␣
↪0x6A53665 EQ PUSH2 0x44 JUMPI DUP1 PUSH4 0x7249FBB6 EQ PUSH2 0x81 JUMPI DUP1␣
↪PUSH4 0xCFD4B66E EQ PUSH2 0xBE JUMPI DUP1 PUSH4 0xF4FD3062 EQ PUSH2 0x103␣
↪JUMPI JUMPDEST PUSH1 0x0 DUP1 REVERT JUMPDEST CALLVALUE DUP1 ISZERO PUSH2␣
↪0x50 JUMPI PUSH1 0x0 DUP1 REVERT JUMPDEST POP PUSH2 0x6B PUSH1 0x4 DUP1␣
↪CALLDATASIZE SUB DUP2 ADD SWAP1 PUSH2 0x66 SWAP2 SWAP1 PUSH2 0xF29 JUMP␣
↪JUMPDEST PUSH2 0x133 JUMP JUMPDEST PUSH1 0x40 MLOAD PUSH2 0x78 SWAP2 SWAP1␣
```

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```
```

balance(*unit: str = 'Wei'*) → Union[Wei, int, float]

Get XinFin HTLC balance.

Parameters **unit** (*str*) – XinFin unit, default to XDC.

Returns int, float – XinFin HTLC balance.

```
>>> from swap.providers.bitcoin.htlc import HTLC
>>> from swap.utils import sha256
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.balance(unit="XDC")
1.56
```

10.3 Transaction

XinFin transaction in blockchain network.

class swap.providers.xinfin.transaction.**Transaction**(*network: str = 'mainnet'*, *provider: str = 'http'*, *token: Optional[str] = None*)

XinFin Transaction.

Parameters

- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns Transaction – XinFin transaction instance.

Note: XinFin has only three networks, `mainnet` and `testnet`.

fee(*unit: str = 'Wei'*) → Union[Wei, int, float]

Get XinFin transaction fee.

Parameters **unit** (*str*) – XinFin unit, default to `Wei`.

Returns Wei, int, float – XinFin transaction fee.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.providers.xinfin.transaction import FundTransaction
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", htlc=htlc, amount=3, unit="XDC
↪")
```

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```
>>> fund_transaction.fee(unit="Wei")
138436
```

hash() → Optional[str]
Get XinFin transaction hash.

Returns str – XinFin transaction hash.

```
>>> from swap.providers.xinfin.transaction import WithdrawTransaction
>>> from swap.providers.xinfin.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"testnet")
>>> withdraw_transaction.build_transaction(transaction_hash=
↪"0x0d4c93546aa3e5e476455931a63f1a97a2624e3b516e3fd8e3a582cb20aaeef9", secret_
↪key="Hello Meheret!", address="xdcf8D43806260CFc6cC79fB408BA1897054667F81C",␣
↪contract_address="xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K4Kpce43z5guPyxLrFoc2i8aQAq835Zzp4Rt7i6nZaMCnVSDyHT6MnmJJGKHMrCUqaYpGojrug1Z
↪", path="m/44'/550'/0'/0/0")
>>> withdraw_transaction.sign(solver=withdraw_solver)
>>> withdraw_transaction.hash()
"0xe8e8738c791385738661573ad4de63dd81b77d240b6138ca476ea8cdcbb29a21"
```

json() → dict
Get XinFin transaction fee.

Returns Wei, int, float – XinFin transaction fee.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.providers.xinfin.transaction import FundTransaction
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", htlc=htlc, amount=3, unit="XDC
↪")
>>> fund_transaction.json()
{'chainId': 1337, 'from': '0x2224caA2235DF8Da3D2016d2AB1137D2d548A232', 'value
↪': 3000000000000000000, 'nonce': 2, 'gas': 138436, 'gasPrice': 20000000000,
↪'to': '0xdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7', 'data':
↪'0xf4fd30623a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb0000000000000000
↪'}
```

raw() → Optional[str]
Get XinFin transaction hash.

Returns str – XinFin transaction hash.

```
>>> from swap.providers.xinfin.transaction import RefundTransaction
>>> from swap.providers.xinfin.solver import RefundSolver
>>> refund_transaction: RefundTransaction = RefundTransaction(network="testnet")
>>> refund_transaction.build_transaction(transaction_hash=
↪"0x0d4c93546aa3e5e476455931a63f1a97a2624e3b516e3fd8e3a582cb20aaeef9", address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", path="m/44'/550'/0'/0/0")
>>> refund_transaction.sign(solver=refund_solver)
>>> refund_transaction.hash()

↪"0xf88a028504a817c80082e76094de06b10c67765c8c0b9f64e0ef423b45eb86b8e780a47249fbb61909575c436
↪"
```

type() → str
Get XinFin transaction hash.

Returns str – XinFin transaction hash.

```
>>> from swap.providers.xinfin.transaction import WithdrawTransaction
>>> from swap.providers.xinfin.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"testnet")
>>> withdraw_transaction.build_transaction(transaction_hash=
↪"0x0d4c93546aa3e5e476455931a63f1a97a2624e3b516e3fd8e3a582cb20aaeef9", secret_
↪key="Hello Meheret!", address="xdcf8D43806260CFc6cC79fB408BA1897054667F81C",␣
↪contract_address="xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7")
>>> withdraw_transaction.type()
"xinfin_withdraw_unsigned"
```

signature() → dict
Get XinFin transaction hash.

Returns str – XinFin transaction hash.

```
>>> from swap.providers.xinfin.transaction import RefundTransaction
>>> from swap.providers.xinfin.solver import RefundSolver
>>> refund_transaction: RefundTransaction = RefundTransaction(network="testnet")
>>> refund_transaction.build_transaction(transaction_hash=
↪"0x0d4c93546aa3e5e476455931a63f1a97a2624e3b516e3fd8e3a582cb20aaeef9", address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", path="m/44'/550'/0'/0/0")
>>> refund_transaction.sign(solver=refund_solver)
>>> refund_transaction.signature()
{'hash': '0x90449ab8e3736feae4980554bb129b408f88d0003e569022cf8e00817cc2a7d9',
↪'rawTransaction':
↪'0xf88a028504a817c80082e76094de06b10c67765c8c0b9f64e0ef423b45eb86b8e780a47249fbb61909575c436
↪', 'r':␣
↪42895942847608608192932856733711858695420995837709512084644654454168196927042,
↪ 's':␣
↪23849944468865388317715121201379699989753020274517556595896033163737398323890,
↪ 'v': 2709}
```

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transaction_raw() → str

Get XinFin fund transaction raw.

Returns str – XinFin fund transaction raw.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.providers.xinfin.transaction import FundTransaction
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", htlc=htlc, amount=3, unit="XDC
↪")
>>> fund_transaction.transaction_raw()

↪"eyJmZWUiOiAxMzg0MzYsICJ0eXBlIjogInhpbmZpbl9mdW5kX3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJjaGF
↪"
```

10.3.1 FundTransaction

class swap.providers.xinfin.transaction.**FundTransaction**(*network: str = 'mainnet'*, *provider: str = 'http'*)

XinFin Fund transaction.

Parameters

- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns FundTransaction – XinFin fund transaction instance.

Warning: Do not forget to build transaction after initialize fund transaction.

build_transaction(*address: str*, *htlc: swap.providers.xinfin.htlc.HTLC*, *amount: Union[Wei, int, float]*, *unit: str = 'Wei'*) → *swap.providers.xinfin.transaction.FundTransaction*

Build XinFin fund transaction.

Parameters

- **htlc** (`xinfin.htlc.HTLC`) – XinFin HTLC instance.
- **address** (*str*) – XinFin sender address.
- **amount** (*Wei, int, float*) – XinFin amount.
- **unit** (*str*) – XinFin unit, default to `Wei`.

Returns FundTransaction – XinFin fund transaction instance.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.providers.xinfin.transaction import FundTransaction
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", htlc=htlc, amount=3, unit="XDC
↪")
<swap.providers.xinfin.transaction.FundTransaction object at 0x0409DAF0>
```

sign(*solver:* swap.providers.xinfin.solver.FundSolver) → *swap.providers.xinfin.transaction.FundTransaction*

Sign XinFin fund transaction.

Parameters **solver** (`xinfin.solver.FundSolver`) – XinFin fund solver.

Returns FundTransaction – XinFin fund transaction instance.

```
>>> from swap.providers.xinfin.htlc import HTLC
>>> from swap.providers.xinfin.transaction import FundTransaction
>>> from swap.providers.xinfin.solver import FundSolver
>>> from swap.utils import sha256, get_current_timestamp
>>> htlc: HTLC = HTLC(contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7", network="testnet")
>>> htlc.build_htlc(secret_hash=sha256("Hello Meheret!"), recipient_address=
↪"xdcf8D43806260CFc6cC79fB408BA1897054667F81C", sender_address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", endtime=get_current_
↪timestamp(plus=3600))
>>> fund_transaction: FundTransaction = FundTransaction(network="testnet")
>>> fund_transaction.build_transaction(address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", htlc=htlc, amount=3, unit="XDC
↪")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", path="m/44'/550'/0'/0/0")
>>> fund_transaction.sign(solver=fund_solver)
<swap.providers.xinfin.transaction.FundTransaction object at 0x0409DAF0>
```

10.3.2 WithdrawTransaction

class `swap.providers.xinfin.transaction.`**`WithdrawTransaction`**(*network: str = 'mainnet'*, *provider: str = 'http'*)

XinFin Withdraw transaction.

Parameters

- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns WithdrawTransaction – XinFin withdraw transaction instance.

> **Warning:** Do not forget to build transaction after initialize withdraw transaction.

build_transaction(*transaction_hash: str, address: str, secret_key: str, contract_address: Optional[str] = None*) → *swap.providers.xinfin.transaction.WithdrawTransaction*

Build XinFin withdraw transaction.

Parameters

- **transaction_hash** (*str*) – XinFin HTLC funded transaction hash.
- **address** (*str*) – XinFin recipient address.
- **secret_key** (*str*) – Secret password/passphrase.
- **contract_address** (*str*) – XinFin HTLC contract address, defaults to `None`.

Returns WithdrawTransaction – XinFin withdraw transaction instance.

```
>>> from swap.providers.xinfin.transaction import WithdrawTransaction
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"testnet")
>>> withdraw_transaction.build_transaction(transaction_hash=
↪"0x0d4c93546aa3e5e476455931a63f1a97a2624e3b516e3fd8e3a582cb20aaeef9", secret_
↪key="Hello Meheret!", address="xdcf8D43806260CFc6cC79fB408BA1897054667F81C",␣
↪contract_address="xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7")
<swap.providers.xinfin.transaction.WithdrawTransaction object at 0x0409DAF0>
```

sign(*solver:* swap.providers.xinfin.solver.WithdrawSolver) → *swap.providers.xinfin.transaction.WithdrawTransaction*

Sign XinFin withdraw transaction.

Parameters **solver** (`xinfin.solver.WithdrawSolver`) – XinFin withdraw solver.

Returns WithdrawTransaction – XinFin withdraw transaction instance.

```
>>> from swap.providers.xinfin.transaction import WithdrawTransaction
>>> from swap.providers.xinfin.solver import WithdrawSolver
>>> withdraw_transaction: WithdrawTransaction = WithdrawTransaction(network=
↪"testnet")
>>> withdraw_transaction.build_transaction(transaction_hash=
↪"0x0d4c93546aa3e5e476455931a63f1a97a2624e3b516e3fd8e3a582cb20aaeef9", secret_
↪key="Hello Meheret!", address="xdcf8D43806260CFc6cC79fB408BA1897054667F81C",␣
↪contract_address="xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K4Kpce43z5guPyxLrFoc2i8aQAq835Zzp4Rt7i6nZaMCnVSDyHT6MnmJJGKHMrCUqaYpGojrug1Z
↪", path="m/44'/550'/0'/0/0")
>>> withdraw_transaction.sign(solver=withdraw_solver)
<swap.providers.xinfin.transaction.WithdrawTransaction object at 0x0409DAF0>
```

10.3.3 RefundTransaction

class swap.providers.xinfin.transaction.**RefundTransaction**(*network: str = 'mainnet'*, *provider: str = 'http'*)

XinFin Refund transaction.

Parameters

- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns RefundTransaction – XinFin refund transaction instance.

Warning: Do not forget to build transaction after initialize refund transaction.

build_transaction(*transaction_hash: str*, *address: str*, *contract_address: Optional[str] = None*) → *swap.providers.xinfin.transaction.RefundTransaction*

Build XinFin refund transaction.

Parameters

- **transaction_hash** (*str*) – XinFin HTLC funded transaction hash.
- **address** (*str*) – XinFin sender address.
- **contract_address** (*str*) – XinFin HTLC contract address, defaults to `None`.

Returns RefundTransaction – XinFin refund transaction instance.

```
>>> from swap.providers.xinfin.transaction import RefundTransaction
>>> refund_transaction: RefundTransaction = RefundTransaction(network="testnet")
>>> refund_transaction.build_transaction(transaction_hash=
↪"0x0d4c93546aa3e5e476455931a63f1a97a2624e3b516e3fd8e3a582cb20aaeef9", address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7")
<swap.providers.xinfin.transaction.RefundTransaction object at 0x0409DAF0>
```

sign(*solver:* swap.providers.xinfin.solver.RefundSolver) → *swap.providers.xinfin.transaction.RefundTransaction*

Sign XinFin refund transaction.

Parameters **solver** (`xinfin.solver.RefundSolver`) – XinFin refund solver.

Returns RefundTransaction – XinFin refund transaction instance.

```
>>> from swap.providers.xinfin.transaction import RefundTransaction
>>> from swap.providers.xinfin.solver import RefundSolver
>>> refund_transaction: RefundTransaction = RefundTransaction(network="testnet")
>>> refund_transaction.build_transaction(transaction_hash=
↪"0x0d4c93546aa3e5e476455931a63f1a97a2624e3b516e3fd8e3a582cb20aaeef9", address=
↪"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232", contract_address=
↪"xdcdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", path="m/44'/550'/0'/0/0")
>>> refund_transaction.sign(solver=refund_solver)
<swap.providers.xinfin.transaction.RefundTransaction object at 0x0409DAF0>
```

10.4 Solver

XinFin solver.

10.4.1 FundSolver

class swap.providers.xinfin.solver.**FundSolver**(*xprivate_key: str*, *account: int = 0*, *change: bool = False*, *address: int = 0*, *path: Optional[str] = None*)

XinFin Fund solver.

Parameters

- **xprivate_key** (*str*) – XinFin sender xprivate key.
- **account** (*int*) – XinFin derivation account, defaults to `0`.
- **change** (*bool*) – XinFin derivation change, defaults to `False`.
- **address** (*int*) – XinFin derivation address, defaults to `0`.
- **path** (*str*) – XinFin derivation path, defaults to `None`.

Returns FundSolver – XinFin fund solver instance.

```
>>> from swap.providers.xinfin.solver import FundSolver
>>> sender_root_xprivate_key: str =
↪"xprv9s21ZrQH143K3XihXQBN8Uar2WBtrjSzK2oRDEGQ25pA2kKAADoQXaiiVXht163ZTrdtTXfM4GqNRE9gWQHky25BpvBC
↪"
>>> fund_solver: FundSolver = FundSolver(xprivate_key=sender_root_xprivate_key,␣
↪path="m/44'/550'/0'/0/0")
<swap.providers.xinfin.solver.FundSolver object at 0x03FCCA60>
```

10.4.2 WithdrawSolver

class swap.providers.xinfin.solver.**WithdrawSolver**(*xprivate_key: str*, *account: int = 0*, *change: bool = False*, *address: int = 0*, *path: Optional[str] = None*)

XinFin Withdraw solver.

Parameters

- **xprivate_key** (*str*) – XinFin sender xprivate key.
- **account** (*int*) – XinFin derivation account, defaults to `0`.
- **change** (*bool*) – XinFin derivation change, defaults to `False`.
- **address** (*int*) – XinFin derivation address, defaults to `0`.
- **path** (*str*) – XinFin derivation path, defaults to `None`.

Returns WithdrawSolver – XinFin withdraw solver instance.

```
>>> from swap.providers.xinfin.solver import WithdrawSolver
>>> recipient_root_xprivate_key: str =
↪"xprv9s21ZrQH143K4Kpce43z5guPyxLrFoc2i8aQAq835Zzp4Rt7i6nZaMCnVSDyHT6MnmJJGKHMrCUqaYpGojrug1ZN5qQD
↪"
```

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```
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=recipient_root_
↪xprivate_key, path="m/44'/550'/0'/0/0")
<swap.providers.xinfin.solver.WithdrawSolver object at 0x03FCCA60>
```

10.4.3 RefundSolver

class `swap.providers.xinfin.solver.`**`RefundSolver`**(*xprivate_key: str*, *account: int = 0*, *change: bool = False*, *address: int = 0*, *path: Optional[str] = None*)

XinFin Refund solver.

Parameters

- **xprivate_key** (*str*) – XinFin sender xprivate key.
- **account** (*int*) – XinFin derivation account, defaults to `0`.
- **change** (*bool*) – XinFin derivation change, defaults to `False`.
- **address** (*int*) – XinFin derivation address, defaults to `0`.
- **path** (*str*) – XinFin derivation path, defaults to `None`.

Returns RefundSolver – XinFin refund solver instance.

```
>>> from swap.providers.xinfin.solver import RefundSolver
>>> sender_root_xprivate_key: str =
↪"xprv9s21ZrQH143K3XihXQBN8Uar2WBtrjSzK2oRDEGQ25pA2kKAADoQXaiiVXht163ZTrdtTXfM4GqNRE9gWQHky25BpvBC
↪"
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=sender_root_xprivate_
↪key, path="m/44'/550'/0'/0/0")
<swap.providers.xinfin.solver.RefundSolver object at 0x03FCCA60>
```

10.5 Signature

XinFin signature.

class `swap.providers.xinfin.signature.`**`Signature`**(*network: str = 'mainnet'*, *provider: str = 'http'*)

XinFin Signature.

Parameters

- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns Signature – XinFin signature instance.

Note: XinFin has only two networks, `mainnet` and `testnet`.

`fee`(*unit: str = 'Wei'*) → Union[Wei, int, float]

Get XinFin signature fee.

Parameters **unit** (*str*) – XinFin unit, default to `Wie`.

Returns Wei, int, float – XinFin signature fee.

```
>>> from swap.providers.xinfin.signature import Signature
>>> from swap.providers.xinfin.solver import WithdrawSolver
>>> signature: Signature = Signature(network="testnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K4Kpce43z5guPyxLrFoc2i8aQAq835Zzp4Rt7i6nZaMCnVSDyHT6MnmJJGKHMrCUqaYpGojrug1ZN
↪", account=0, change=False, address=0)
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiA4MjY4OSwgInR5cGUiOiAieGluZmluX3dpdGhkcmF3X3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJj
↪", solver=withdraw_solver)
>>> signature.fee(unit="Wei")
82689
```

hash() → Optional[str]
Get XinFin signature has.

Returns str – XinFin signature hash.

```
>>> from swap.providers.xinfin.signature import Signature
>>> from swap.providers.xinfin.solver import RefundSolver
>>> signature: Signature = Signature(network="testnet")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf5
↪", account=0, change=False, address=0)
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiA1OTIzMiwgInR5cGUiOiAieGluZmluX3JlZnVuZF91bnNpZ25lZCIsICJ0cmFuc2FjdGlvbiI6IHsiY2hh
↪", solver=refund_solver)
>>> signature.hash()
"0x90449ab8e3736feae4980554bb129b408f88d0003e569022cf8e00817cc2a7d9"
```

json() → dict
Get XinFin signature json.

Returns dict – XinFin signature json.

```
>>> from swap.providers.xinfin.signature import Signature
>>> from swap.providers.xinfin.solver import FundSolver
>>> signature: Signature = Signature(network="testnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf5
↪", account=0, change=False, address=0)
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5JZCI6IDEzMzcsICJmcm9tIjogIjB4NjllMDRmZTE2
↪", solver=fund_solver)
>>> signature.json()
{'chainId': 1337, 'from': '0x2224caA2235DF8Da3D2016d2AB1137D2d548A232', 'value
↪': 10000000000000000000, 'nonce': 2, 'gas': 138448, 'gasPrice': 20000000000,
↪'to': '0xdE06b10c67765c8C0b9F64E0eF423b45Eb86b8e7', 'data':
↪'0xf4fd30623a26da82ead15a80533a02696656b14b5dbfd84eb14790f2e1be5e9e45820eeb000000000000000000
↪'}
```

raw() → Optional[str]
Get XinFin signature raw.

Returns str – XinFin signature raw.

```
>>> from swap.providers.xinfin.signature import Signature
>>> from swap.providers.xinfin.solver import WithdrawSolver
>>> signature: Signature = Signature(network="testnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K4Kpce43z5guPyxLrFoc2i8aQAq835Zzp4Rt7i6nZaMCnVSDyHT6MnmJJGKHMrCUqaYpGojrug1Z
↪", account=0, change=False, address=0)
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiA4MjY4OSwgInR5cGUiOiAieGluZmluX3dpdGhkcmF3X3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJ
↪", solver=withdraw_solver)
>>> signature.raw()

↪"0xf8ec808504a817c8008301430194de06b10c67765c8c0b9f64e0ef423b45eb86b8e780b88406a536651909575
↪"
```

type() → str
Get XinFin signature type.

Returns str – XinFin signature type.

```
>>> from swap.providers.xinfin.signature import Signature
>>> from swap.providers.xinfin.solver import FundSolver
>>> signature: Signature = Signature(network="testnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", account=0, change=False, address=0)
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0eXBlIjogInhpbmZpbl9mdW5kX3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJjaGF
↪", solver=fund_solver)
>>> signature.type()
"xinfin_fund_signed"
```

sign(*transaction_raw: str, solver: Union[*swap.providers.xinfin.solver.FundSolver, swap.providers.xinfin.solver.WithdrawSolver, swap.providers.xinfin.solver.RefundSolver*]*) → Union[*swap.providers.xinfin.signature.FundSignature*, *swap.providers.xinfin.signature.WithdrawSignature*, *swap.providers.xinfin.signature.RefundSignature*]
Sign XinFin unsigned transaction raw.

Parameters

- **transaction_raw** (*str*) – XinFin unsigned transaction raw.
- **solver** (xinfin.solver.FundSolver, xinfin.solver.WithdrawSolver, xinfin.solver.RefundSolver) – XinFin solver.

Returns FundSignature, WithdrawSignature, RefundSignature – XinFin signature instance.

```
>>> from swap.providers.xinfin.signature import Signature
>>> from swap.providers.xinfin.solver import FundSolver
>>> signature: Signature = Signature(network="testnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", account=0, change=False, address=0)
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0eXBlIjogInhpbmZpbl9mdW5kX3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJjaGF
↪", solver=fund_solver)
<swap.providers.xinfin.signature.FundSignature object at 0x0409DAF0>
```

signature() → dict
Get XinFin signature.

Returns dict – XinFin signature.

```
>>> from swap.providers.xinfin.signature import Signature
>>> from swap.providers.xinfin.solver import WithdrawSolver
>>> signature: Signature = Signature(network="testnet")
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K4Kpce43z5guPyxLrFoc2i8aQAq835Zzp4Rt7i6nZaMCnVSDyHT6MnmJJGKHMrCUqaYpGojrug1ZN
↪", account=0, change=False, address=0)
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiA4MjY4OSwgInR5cGUiOiAieGluZmluX3dpdGhkcmF3X3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJj
↪", solver=withdraw_solver)
>>> signature.signature()
{'hash': '0xe8e8738c791385738661573ad4de63dd81b77d240b6138ca476ea8cdcbb29a21',
↪'rawTransaction':
↪'0xf8ec808504a817c8008301430194de06b10c67765c8c0b9f64e0ef423b45eb86b8e780b88406a536651909575
↪', 'r':␣
↪115683075740172584287236173170973052486872064110718784013746063807450268107094,
↪ 's':␣
↪109873265875223033021529730557638064932811578786376209471888586047505283449 64,
↪ 'v': 2709}
```

transaction_raw() → str
Get XinFin signed transaction raw.

Returns str – XinFin signed transaction raw.

```
>>> from swap.providers.xinfin.signature import Signature
>>> from swap.providers.xinfin.solver import FundSolver
>>> signature: Signature = Signature(network="testnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf5
↪", account=0, change=False, address=0)
>>> signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0eXBlIjogInhpbmZpbl9mdW5kX3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJjaGFp
↪", solver=fund_solver)
>>> signature.transaction_raw()

↪"eyJmZWUiOiAxMzg0NDgsICJ0eXBlIjogInhpbmZpbl9mdW5kX3NpZ25lZCIsICJ0cmFuc2FjdGlvbiI6IHsiY2hhaW5J
↪"
```

10.5.1 FundSignature

class swap.providers.xinfin.signature.**FundSignature**(*network: str = 'mainnet', provider: str = 'http', token: Optional[str] = None*)

XinFin Fund signature.

Parameters

- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns FundSignature – XinFin fund signature instance.

Note: XinFin has only two networks, `mainnet` and `testnet`.

sign(*transaction_raw: str*, *solver: swap.providers.xinfin.solver.FundSolver*) → *swap.providers.xinfin.signature.FundSignature*

Sign XinFin unsigned fund transaction raw.

Parameters

- **transaction_raw** (*str*) – XinFin unsigned fund transaction raw.
- **solver** (`xinfin.solver.FundSolver`) – XinFin solver.

Returns FundSignature – XinFin fund signature instance.

```
>>> from swap.providers.xinfin.signature import FundSignature
>>> from swap.providers.xinfin.solver import FundSolver
>>> fund_signature: FundSignature = FundSignature(network="testnet")
>>> fund_solver: FundSolver = FundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", account=0, change=False, address=0)
>>> fund_signature.sign(transaction_raw=
↪"eyJmZWUiOiAxMzg0NDgsICJ0eXBlIjogInhpbmZpbl9mdW5kX3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJjaGF
↪", solver=fund_solver)
<swap.providers.xinfin.signature.FundSignature object at 0x0409DAF0>
```

10.5.2 WithdrawSignature

class swap.providers.xinfin.signature.**WithdrawSignature**(*network: str = 'mainnet'*, *provider: str = 'http'*)

XinFin Withdraw signature.

Parameters

- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns WithdrawSignature – XinFin withdraw signature instance.

Note: XinFin has only two networks, `mainnet` and `testnet`.

sign(*transaction_raw: str*, *solver: swap.providers.xinfin.solver.WithdrawSolver*) → *swap.providers.xinfin.signature.WithdrawSignature*

Sign XinFin unsigned withdraw transaction raw.

Parameters

- **transaction_raw** (*str*) – XinFin unsigned withdraw transaction raw.
- **solver** (`xinfin.solver.WithdrawSolver`) – XinFin withdraw solver.

Returns WithdrawSignature – XinFin withdraw signature instance.

```
>>> from swap.providers.xinfin.signature import WithdrawSignature
>>> from swap.providers.xinfin.solver import WithdrawSolver
>>> withdraw_signature: WithdrawSignature = WithdrawSignature(network="testnet")
```

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```
>>> withdraw_solver: WithdrawSolver = WithdrawSolver(xprivate_key=
↪"xprv9s21ZrQH143K4Kpce43z5guPyxLrFoc2i8aQAq835Zzp4Rt7i6nZaMCnVSDyHT6MnmJJGKHMrCUqaYpGojrug1Z
↪", account=0, change=False, address=0)
>>> withdraw_signature.sign(transaction_raw=
↪"eyJmZWUiOiA4MjY4OSwgInR5cGUiOiAieGluZmluX3dpdGhkcmF3X3Vuc2lnbmVkIiwgInRyYW5zYWN0aW9uIjogeyJ
↪", solver=withdraw_solver)
<swap.providers.xinfin.signature.WithdrawSignature object at 0x0409DAF0>
```

10.5.3 RefundSignature

class swap.providers.xinfin.signature.**RefundSignature**(*network: str = 'mainnet'*, *provider: str = 'http'*)

XinFin Refund signature.

Parameters

- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns RefundSignature – XinFin refund signature instance.

Note: XinFin has only two networks, `mainnet` and `testnet`.

sign(*transaction_raw: str*, *solver: swap.providers.xinfin.solver.RefundSolver*) → *swap.providers.xinfin.signature.RefundSignature*

Sign XinFin unsigned refund transaction raw.

Parameters

- **transaction_raw** (*str*) – XinFin unsigned refund transaction raw.
- **solver** (`xinfin.solver.RefundSolver`) – XinFin refund solver.

Returns RefundSignature – XinFin refund signature instance.

```
>>> from swap.providers.xinfin.signature import RefundSignature
>>> from swap.providers.xinfin.solver import RefundSolver
>>> refund_signature: RefundSignature = RefundSignature(network="testnet")
>>> refund_solver: RefundSolver = RefundSolver(xprivate_key=
↪"xprv9s21ZrQH143K3Y3pdbkbjreZQ9RVmqTLhRgf86uZyCJk2ou36YdUJt5frjwihGWmV1fQEDioiGZXWXUbHLy3kQf
↪", account=0, change=False, address=0)
>>> refund_signature.sign(transaction_raw=
↪"eyJmZWUiOiA1OTIzMiwgInR5cGUiOiAieGluZmluX3JlZnVuZF91bnNpZ25lZCIsICJ0cmFuc2FjdGlvbiI6IHsiY2h
↪", solver=refund_solver)
<swap.providers.xinfin.signature.RefundSignature object at 0x0409DAF0>
```

10.6 Remote Procedure Call (RPC)

XinFin remote procedure call.

`swap.providers.xinfin.rpc.`**`get_web3`**`(`*network: str = 'mainnet', provider: str = 'http'*`)` → web3.main.Web3

Get XinFin Web3 instance.

Parameters

- **`network`** (*`str`*) – XinFin network, defaults to `mainnet`.
- **`provider`** (*`str`*) – XinFin network provider, defaults to `http`.

Returns Web3 – XinFin Web3 instance.

```
>>> from swap.providers.xinfin.rpc import get_web3
>>> get_web3(network="testnet", provider="http")
<web3.main.Web3 object at 0x000001DDECCD0640>
```

`swap.providers.xinfin.rpc.`**`get_balance`**`(`*address: str, network: str = 'mainnet', provider: str = 'http'*`)` → Wei

Get XinFin balance.

Parameters

- **`address`** (*`str`*) – XinFin address.
- **`network`** (*`str`*) – XinFin network, defaults to `mainnet`.
- **`provider`** (*`str`*) – XinFin network provider, defaults to `http`.

Returns Wei – XinFin balance (Wei).

```
>>> from swap.providers.xinfin.rpc import get_balance
>>> get_balance("xdc70c1eb09363603a3b6391deb2daa6d2561a62f52", "mainnet")
71560900
```

`swap.providers.xinfin.rpc.`**`get_transaction`**`(`*transaction_hash: str, network: str = 'mainnet', provider: str = 'http'*`)` → dict

Get XinFin transaction detail.

Parameters

- **`transaction_hash`** (*`str`*) – XinFin transaction hash/id.
- **`network`** (*`str`*) – XinFin network, defaults to `mainnet`.
- **`provider`** (*`str`*) – XinFin network provider, defaults to `http`.

Returns dict – XinFin transaction detail.

```
>>> from swap.providers.xinfin.rpc import get_transaction
>>> get_transaction(transaction_hash=
↪"0xa4d57071427e3310b3e2fb16e7712f8d8aaaafb31ce5fcd6534fc50848905948")
{'hash': '0xa4d57071427e3310b3e2fb16e7712f8d8aaaafb31ce5fcd6534fc50848905948',
↪'nonce': 0, 'blockHash':
↪'0xb33a804ae10713bf549db8ec749f7d650347613ac784db1a8d17e0cb03741bf0', 'blockNumber
↪': 1, 'transactionIndex': 0, 'from': '0x96cA14396341480E3b6384D1d1397d1f7f5a0AB7',
↪ 'to': None, 'value': 0, 'gas': 367400, 'gasPrice': 250000000, 'input':
↪'0x608060405234801561001057600080fd5b506040518060400160405280600581526020017f48656c6c6f000000000
↪', 'v': 28, 'r':
↪'0xa593dcfd7f7b17f8b22907e9c4b03721312a4d00dfd99f8f7267ccd5eb7d4613', 's':
↪'0x70cd172ae92de7a046dfe28de1db8657f8c3b3ed00c060392fb1d5080646927b'}
```

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```
```

`swap.providers.xinfin.rpc.`**`get_transaction_receipt`**(*transaction_hash: str*, *network: str = 'mainnet'*, *provider: str = 'http'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*, *timeout: int = 60*) → Optional[dict]

Get XinFin transaction receipt.

Parameters

- **`transaction_hash`** (*`str`*) – XinFin transaction hash/id.
- **`network`** (*`str`*) – XinFin network, defaults to `mainnet`.
- **`provider`** (*`str`*) – XinFin network provider, defaults to `http`.
- **`headers`** (*`dict`*) – Request headers, default to `common headers`.
- **`timeout`** (*`int`*) – request timeout, default to `60`.

Returns dict – XinFin transaction receipt.

```
>>> from swap.providers.xinfin.rpc import get_transaction_receipt
>>> get_transaction_receipt(transaction_hash=
↪"0x5f4b11c11553cf040131b273c2bbc8c93d217269dd9b28393d5d0a3d623c1fcc", network=
↪"testnet")
{'blockHash': '0x08d711ba038b97d0622d2c08b74dd2d9d2d00492116ead11452c12688618dcbc',
↪'blockNumber': '0x1e93914', 'contractAddress': None, 'cumulativeGasUsed': '0x5208
↪', 'from': 'xdc95e80fc8ef98b92fe71514168c2e4b8f0ce38169', 'gasUsed': '0x5208',
↪'logs': [], 'logsBloom':
↪'0x00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
↪', 'status': '0x1', 'to': 'xdc2224caa2235df8da3d2016d2ab1137d2d548a232',
↪'transactionHash':
↪'0x5f4b11c11553cf040131b273c2bbc8c93d217269dd9b28393d5d0a3d623c1fcc',
↪'transactionIndex': '0x0'}
```

`swap.providers.xinfin.rpc.`**`wait_for_transaction_receipt`**(*transaction_hash: str*, *network: str = 'mainnet'*, *timeout: int = 60*, *provider: str = 'http'*, *headers: dict = {'accept': 'application/json', 'content-type': 'application/json; charset=utf-8', 'user-agent': 'Swap User-Agent 0.4.0'}*) → dict

Wait for XinFin transaction receipt.

Parameters

- **`transaction_hash`** (*`str`*) – XinFin transaction hash/id.
- **`network`** (*`str`*) – XinFin network, defaults to `mainnet`.
- **`timeout`** (*`int`*) – request timeout, default to `60`.
- **`provider`** (*`str`*) – XinFin network provider, defaults to `http`.
- **`headers`** (*`dict`*) – Request headers, default to `common headers`.

Returns dict – XinFin transaction receipt.

```
>>> from swap.providers.xinfin.rpc import wait_for_transaction_receipt
>>> wait_for_transaction_receipt(transaction_hash=
↪"0x5f4b11c11553cf040131b273c2bbc8c93d217269dd9b28393d5d0a3d623c1fcc", timeout=120,
↪ network="testnet")
{'blockHash': '0x08d711ba038b97d0622d2c08b74dd2d9d2d00492116ead11452c12688618dcbc',
↪'blockNumber': '0x1e93914', 'contractAddress': None, 'cumulativeGasUsed': '0x5208
↪', 'from': 'xdc95e80fc8ef98b92fe71514168c2e4b8f0ce38169', 'gasUsed': '0x5208',
↪'logs': [], 'logsBloom':
↪'0x0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
↪', 'status': '0x1', 'to': 'xdc2224caa2235df8da3d2016d2ab1137d2d548a232',
↪'transactionHash':
↪'0x5f4b11c11553cf040131b273c2bbc8c93d217269dd9b28393d5d0a3d623c1fcc',
↪'transactionIndex': '0x0'}
```

swap.providers.xinfin.rpc.**decode_raw**(*transaction_raw: str*) → dict
Decode original XinFin raw into blockchain.

Parameters **transaction_raw** (*str*) – XinFin transaction raw.

Returns dict – XinFin decoded transaction hash.

```
>>> from swap.providers.xinfin.rpc import decode_raw
>>> decode_raw(transaction_raw=
↪"0xf86c02840ee6b280825208943e0a9b2ee8f8341a1aead3e7531d75f1e395f24b8901236efcbcbb340000801ba03084
↪")
{'hash': '0x04b3bfb804f2b3329555c6f3a17a794b3f099b6435a9cf58c78609ed93853907', 'from
↪': '0x3769F63e3b694cD2e973e28af59bdFd751303273', 'to':
↪'0x3e0a9B2Ee8F8341A1aEaD3E7531d75f1e395F24b', 'nonce': 2, 'gas': 21000, 'gas_price
↪': 250000000, 'value': 21000000000000000000, 'data': '0x', 'chain_id': -4, 'r':
↪'0x3084982e4a9dd897d3cc1b2c8cc2d1b106b9d302eb23f6fae7d0e57e53e043f8', 's':
↪'0x116f13f9ab385f6b53e7821b3335ced924a1ceb88303347cd0af4aa75e6bfb73', 'v': 27}
```

swap.providers.xinfin.rpc.**submit_raw**(*transaction_raw: str*, *network: str = 'mainnet'*, *provider: str = 'http'*) → str
Submit original XinFin raw into blockchain.

Parameters

- **transaction_raw** (*str*) – XinFin transaction raw.
- **network** (*str*) – XinFin network, defaults to `mainnet`.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns str – XinFin submitted transaction hash/id.

```
>>> from swap.providers.xinfin.rpc import submit_raw
>>> submit_raw(transaction_raw=
↪"0xf86c02840ee6b280825208943e0a9b2ee8f8341a1aead3e7531d75f1e395f24b8901236efcbcbb340000801ba03084
↪", network="testnet")
"0x04b3bfb804f2b3329555c6f3a17a794b3f099b6435a9cf58c78609ed93853907"
```

10.7 Utils

XinFin Utils.

`swap.providers.xinfin.utils.`**`is_network`**`(`*network: str*`)` → bool
Check XinFin network.

Parameters **`network`** (*`str`*) – XinFin network.

Returns bool – XinFin valid/invalid network.

```
>>> from swap.providers.xinfin.utils import is_network
>>> is_network(network="kovan")
True
```

`swap.providers.xinfin.utils.`**`is_address`**`(`*address: str*`)` → bool
Check XinFin address.

Parameters **`address`** (*`str`*) – XinFin address.

Returns bool – XinFin valid/invalid address.

```
>>> from swap.providers.xinfin.utils import is_address
>>> is_address(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232")
True
```

`swap.providers.xinfin.utils.`**`is_checksum_address`**`(`*address: str*`)` → bool
Check XinFin checksum address.

Parameters **`address`** (*`str`*) – XinFin address.

Returns bool – XinFin valid/invalid checksum address.

```
>>> from swap.providers.xinfin.utils import is_checksum_address
>>> is_checksum_address(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232")
False
>>> is_checksum_address(address="xdc1Ee11011ae12103a488A82DC33e03f337Bc93ba7")
True
```

`swap.providers.xinfin.utils.`**`to_checksum_address`**`(`*address: str, prefix: str = 'xdc'*`)` → str
Change XinFin address to checksum address.

Parameters

- **`address`** (*`str`*) – XinFin address.
- **`prefix`** (*`str`*) – XinFin address prefix, default to `xdc`.

Returns str – XinFin checksum address.

```
>>> from swap.providers.xinfin.utils import to_checksum_address
>>>  to_checksum_address(address="xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232")
"xdc2224caA2235DF8Da3D2016d2AB1137D2d548A232"
```

`swap.providers.xinfin.utils.`**`is_transaction_raw`**`(`*transaction_raw: str*`)` → bool
Check XinFin transaction raw.

Parameters **`transaction_raw`** (*`str`*) – XinFin transaction raw.

Returns bool – XinFin valid/invalid transaction raw.

```
>>> from swap.providers.xinfin.utils import is_transaction_raw
>>> transaction_raw: str =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3lI
↪"
>>> is_transaction_raw(transaction_raw=transaction_raw)
True
```

swap.providers.xinfin.utils.**decode_transaction_raw**(*transaction_raw: str*) → dict

Decode XinFin transaction raw.

Parameters **transaction_raw** (*str*) – XinFin transaction raw.

Returns dict – Decoded xinfin transaction raw.

```
>>> from swap.providers.xinfin.utils import decode_transaction_raw
>>> transaction_raw: str =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3lI
↪"
>>> decode_transaction_raw(transaction_raw=transaction_raw)
{'fee': ..., 'type': '...', 'address': '...', 'transaction': {...}, 'unsigned_datas
↪': [...], 'signatures': [...], 'network': '...'}
```

swap.providers.xinfin.utils.**submit_transaction_raw**(*transaction_raw: str*, *provider: str = 'http'*) → dict

Submit XinFin transaction raw.

Parameters

- **transaction_raw** (*str*) – XinFin transaction raw.
- **provider** (*str*) – XinFin network provider, defaults to `http`.

Returns dict – XinFin submitted transaction id, fee, type and date.

```
>>> from swap.providers.xinfin.utils import submit_transaction_raw
>>> transaction_raw: str =
↪"eyJmZWUiOiAxMDAwMDAwMCwgImFkZHJlc3MiOiAiYm0xcWU5MHFqdDl3NG04cnQzdG51dTBwenAyNGRrZmZlbHlzOHpjd3lI
↪"
>>> submit_transaction_raw(transaction_raw=transaction_raw)
{'fee': ..., 'type': '...', 'transaction_id': '...', 'network': '...', 'date': '...
↪'}
```

swap.providers.xinfin.utils.**amount_unit_converter**(*amount: Union[int, float]*, *unit_from: str = 'Wei2XDC'*) → Union[int, float]

XinFin amount unit converter.

Parameters

- **amount** (*int, float*) – XinFIn amount.
- **unit_from** (*str*) – XinFIn unit from, default to `Wei2XDC`

Returns int, float – XinFin amount.

```
>>> from swap.providers.xinfin.utils import amount_unit_converter
>>> amount_unit_converter(amount=100_000_000, unit_from="Wei2XDC")
0.1
```

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