ITU – NBTC Training
On

“Building Distributed Ledger Technologies (Blockchain) Projects”

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Session 7:

“DLT Programming: Tokens”

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Contents

- Tokens
  - Basics
  - Types of tokens
  - Standards
  - Distribution
- Wallets
- Trading
  - Exchanges
  - Peer to peer

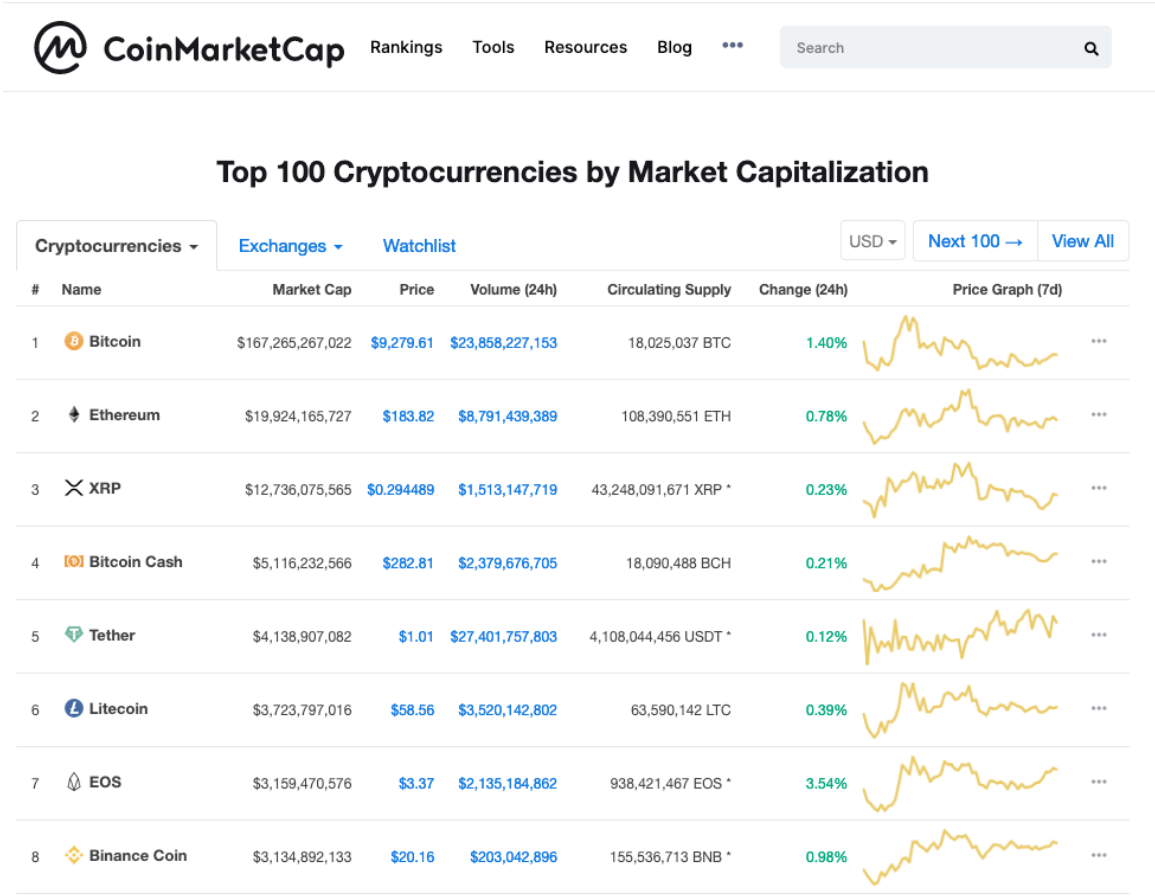
Tokens

Cryptographic tokens are programmable assets, managed by a smart contract and an underlying distributed ledger.

As of April 2019, Coinmarketcap has listed an ecosystem of over 2200 publicly traded crypto assets.

Digital assets are not new, but cryptographic tokens on the blockchain have lower issuance and management costs involved. They can be easily issued and securely traded on a blockchain, without an intermediary or escrow service.

Whereas state-of-the-art digital assets are controlled by centralized entities, they can now be issued with a few lines of code, and managed by a public and verifiable infrastructure like a blockchain.



Types of Tokens

Currency

- A token which is traded as currency (cryptocurrency)

Asset

- A token which represents a digital asset

Utility

- Power aspects of the network

Token Standards

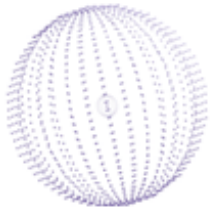
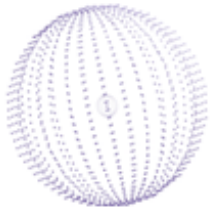
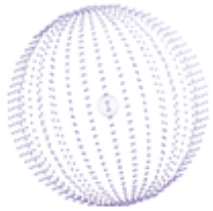
Why was standardization needed?

- Many different standards for how tokens are created
- Exchanges and wallets need to accommodate many different ways to do standard tasks like:
  - Get name
  - Get symbol
  - Get balance
  - Transfers

https://eips.ethereum.org/EIPS/eip-20
https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20.sol

ERC-20

ERC-20: A CLASS OF IDENTICAL TOKENS

ERC-20 is a free, open standard that describes how to build fungible on the Ethereum blockchain. The most common use-case is for creating cryptocurrencies or utility tokens.

https://eips.ethereum.org/EIPS/eip-20
https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/token/ERC20/ERC20.sol

ERC-721

ERC-721: A CLASS OF UNIQUE TOKENS



ERC-721 is a free, open standard that describes how to build non-fungible or unique tokens on the Ethereum blockchain. While most tokens are fungible, ERC-721 tokens are all unique.

ERC-721 tokens are often used for digital assets. See CryptoKitties

https://github.com/0xcert/ethereum-erc721
http://erc721.org/

Token Distribution

How do you get your tokens in peoples' hands?

1. Presale
2. Initial Coin Offering (ICO)
3. Security Token Offering (STO)
4. Exchange listing

Presale

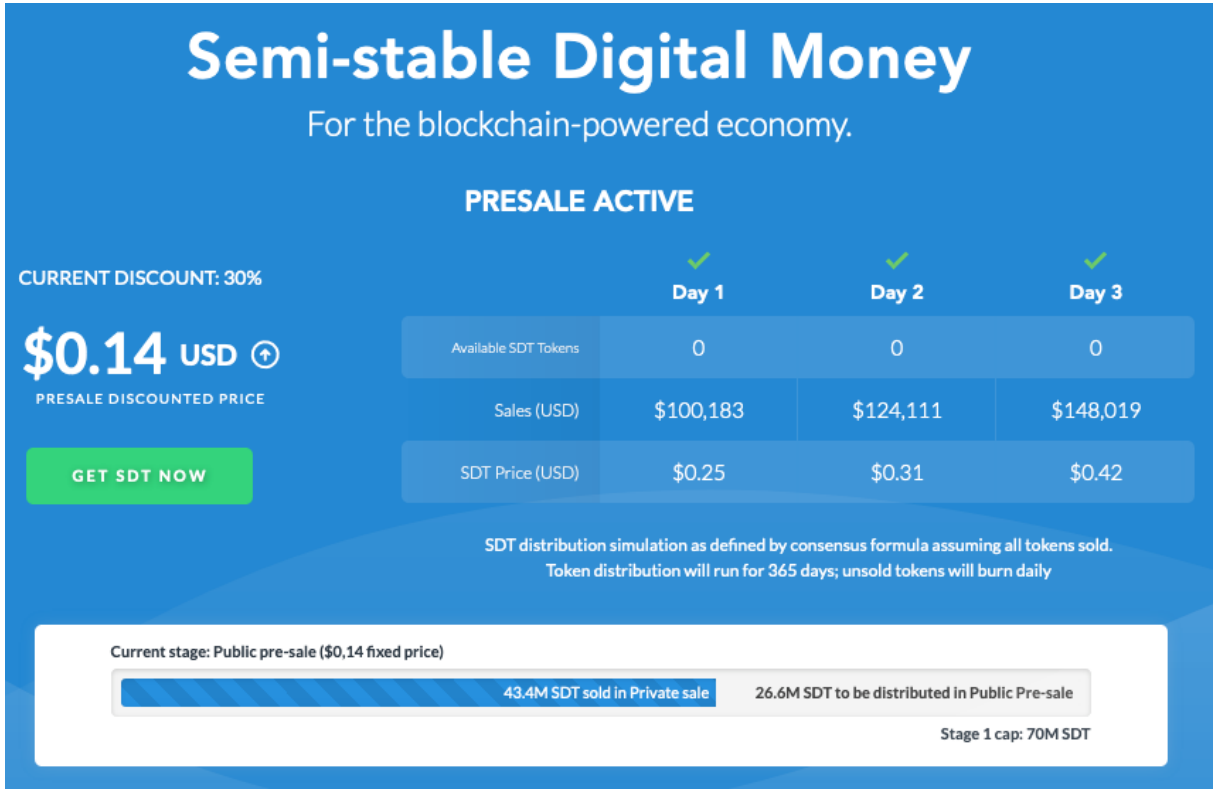
Before launching your token into the public, sell a proportion for a discount.

This adds an initial level of liquidity and proof of value.

Normally precedes an ICO or STO sale event

Example: Send Protocol

https://www.sendprotocol.com/

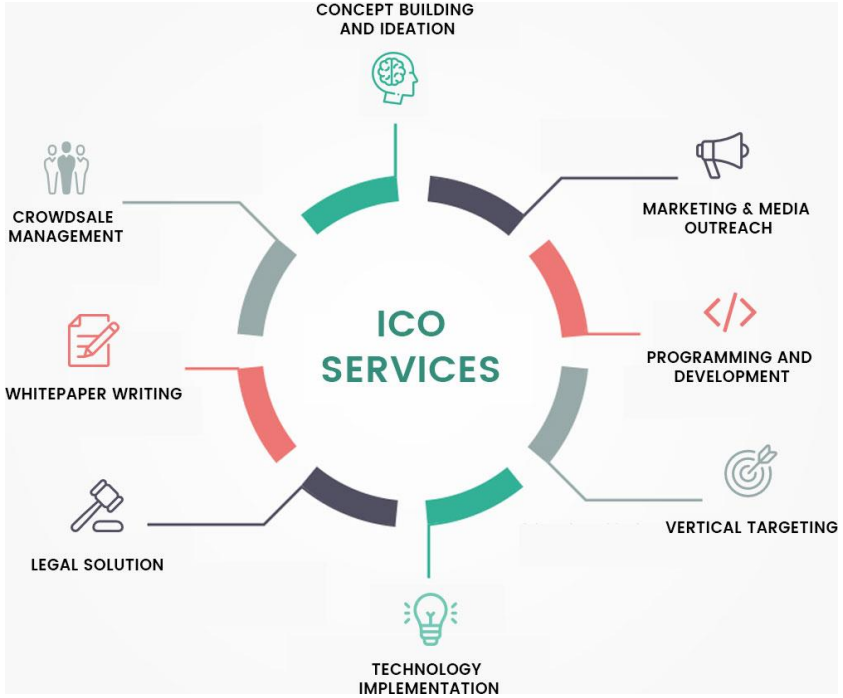


Initial Coin Offering

An ICO is one of the most popular mechanisms to launch a new token. Similar to an IPO, an ICO opens up purchases of tokens to the public.

The purchase of the majority of ICOs to date is to fundraise so that the company in question can build the protocol on which the tokens are used.

Due to the negative connotations of the 2018 ICO rush, ICOs are not as popular.



The ICO rush launched a consulting industry around launching ICOs

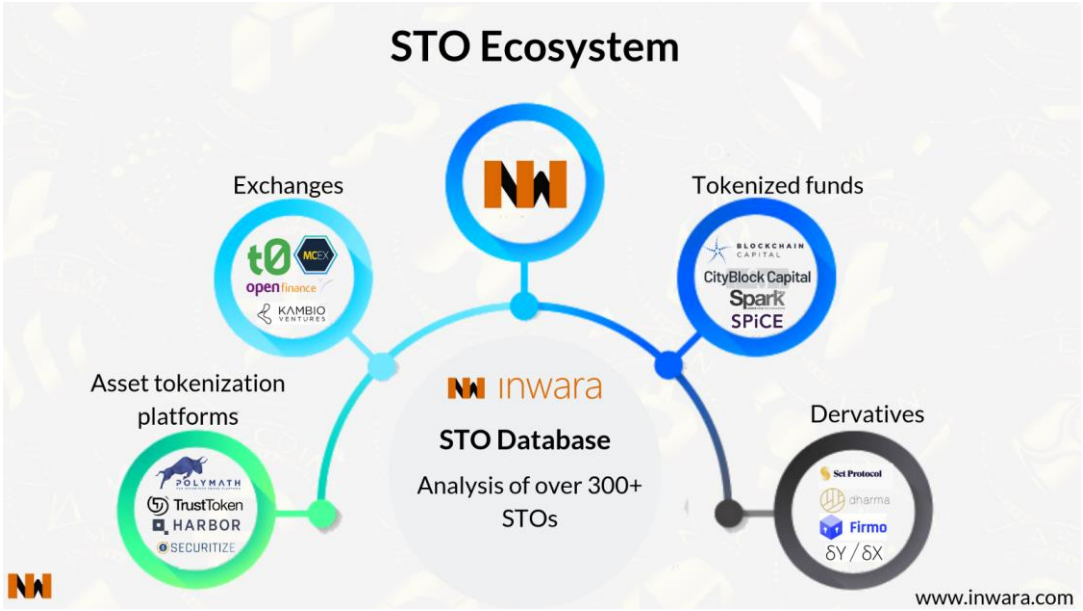
Security Token Offering

What is a security?

- A traditional financial security is a fungible instrument that holds value and can represent either debt or equity.

STOs have opened an opportunity for businesses to raise funds by issuing digital security tokens to investors in a regulatory-compliant manner.

The advantages exist for both the investor and the issuer, while also providing much better assurances against fraud compared to an ICO.

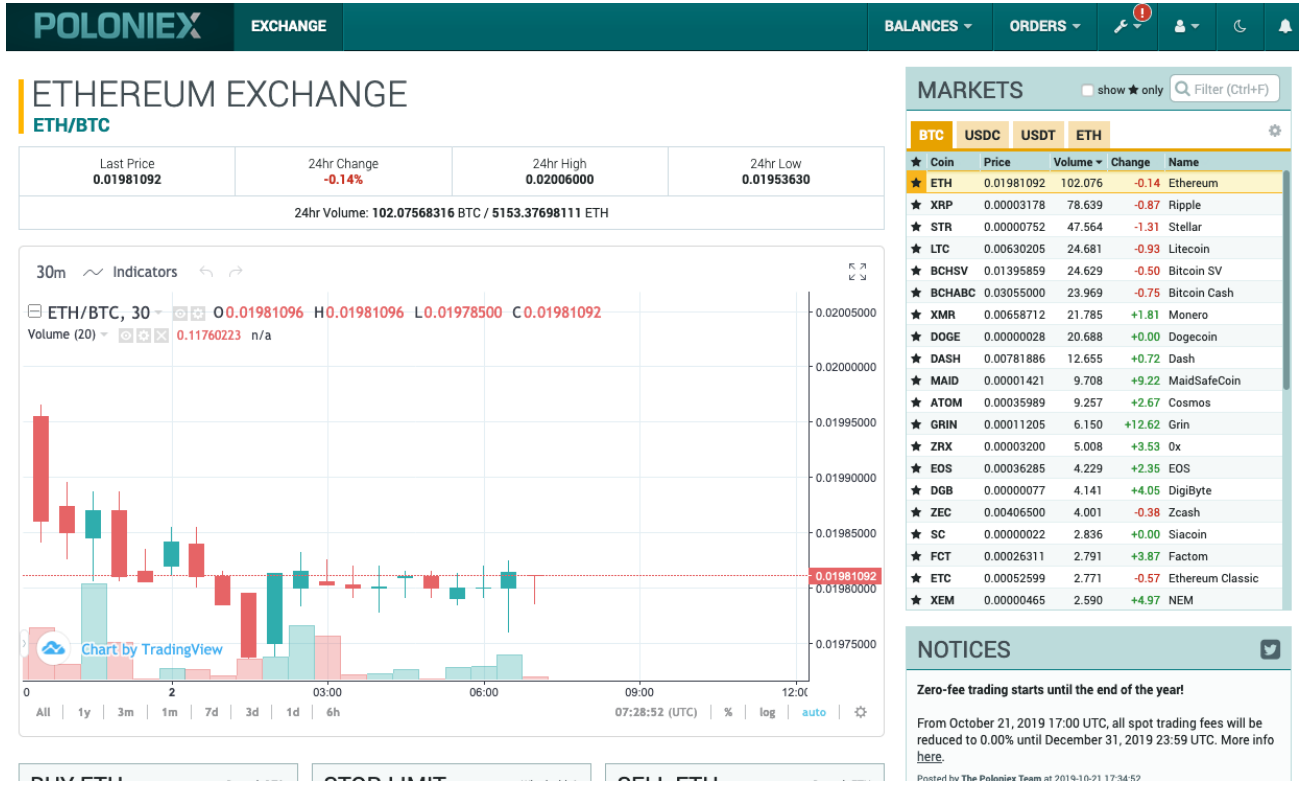


Exchange Listing

Exchanges are open marketplaces to trade DLT-backed tokens. These could be any type of token but are normally best for fungible tokens like cryptocurrencies.

Having your token listed on an exchange gives it liquidity and a certain element of trust.

It can be very difficult to get onto the most popular exchanges.



Wallets

A cryptocurrency wallet is a software program that stores your DLT-backed tokens. Access to a wallet is secured with a combination of public and private keys.

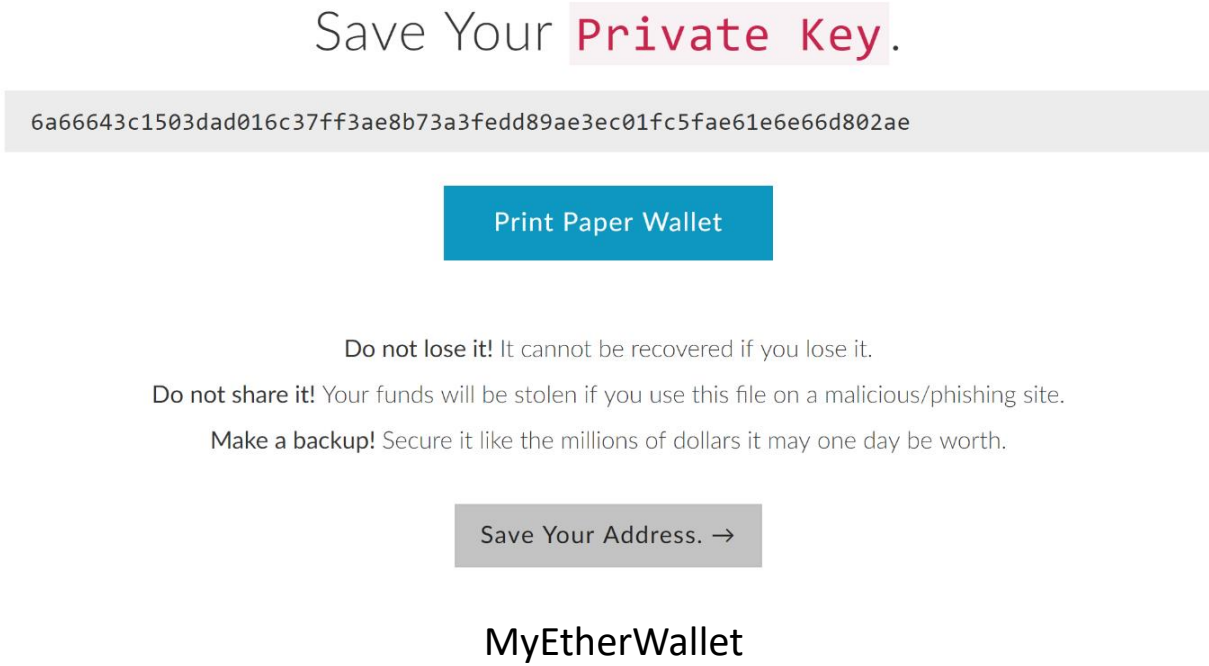
- A public key is like your home address
- A private key is your secret password to enter

Several different types of wallets exist with varying levels of security and accessibility

Includes interface to transfer tokens to another person

May store just one token protocol or many

A wallet can hold multiple accounts which all live on the ledger



MyEtherWallet

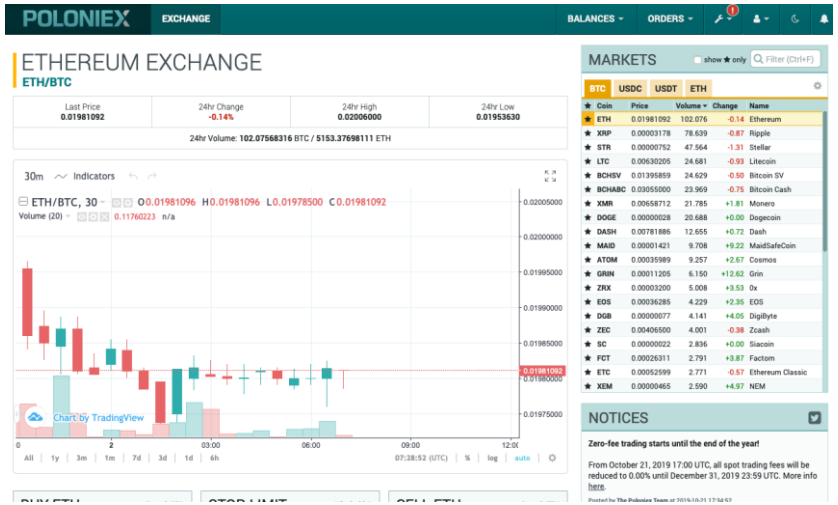
Top Accounts
https://etherscan.io/accounts

Types of Wallets

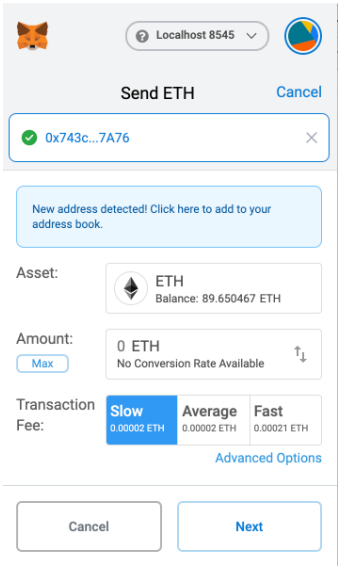
Web	Website-based wallets may also offer Chrome extensions, PWA (progressive web application) or browser-integrated variants.
Desktop	Desktop wallets are applications installed on the computer. Some consider desktop apps to be safer than web wallets, but this is arguable: you still need to be online for transactions to go through, and a PWA from a web wallet can serve much the same purpose as a desktop app (namely, prevent you from going to a phishing site by accident).
Hardware	Hardware wallets, used in combination with a web interface, are the highest standard of security in crypto. They will keep your private keys from being exposed on the Internet without the need for an offline computer.
Mobile	Depending on design and philosophy (custodial vs non-custodial), mobile wallet apps can vary considerably by level of security and the amount of control over your funds.
Paper	A method of ‘cold storage’ – wallets that are always kept offline. A paper wallet is a private-public key pair (or, a mnemonic phrase) printed on a card and kept stored in a safe location, without ever accessing it online.

Trading

Exchanges



Peer to peer



Exchanges

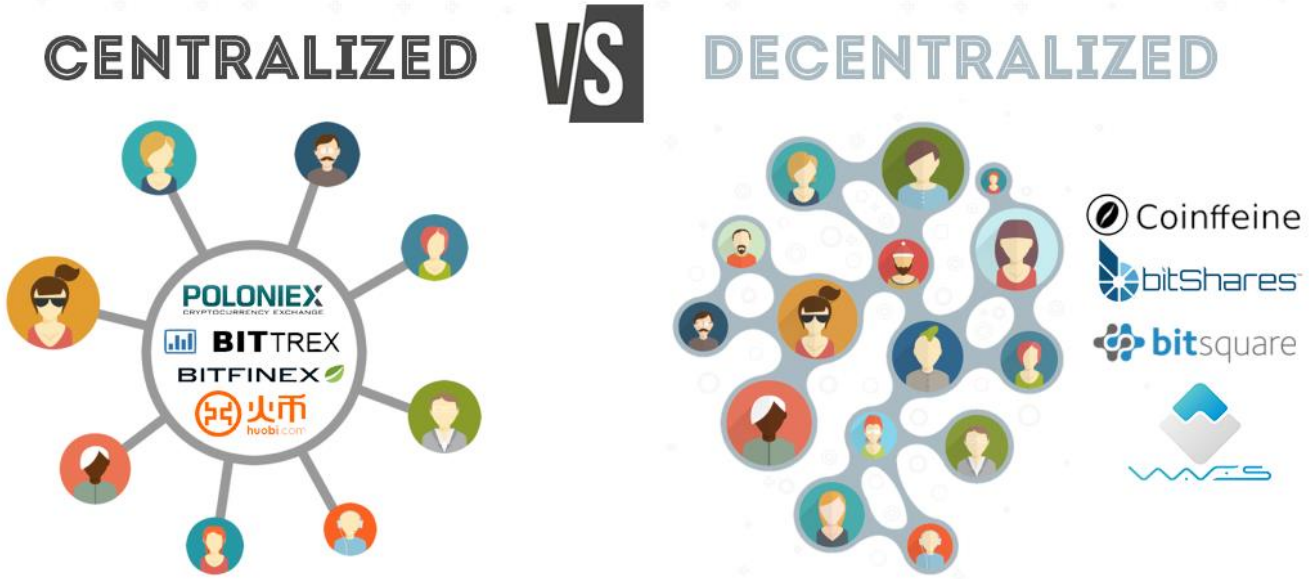
Exchanges are platforms to trade DLT assets with other people.

Split into 2 main types:

- Centralised – controlled by a central entity
- Decentralised – controlled by a Smart Contract

To use an exchange all you need is a starting balance of a DLT asset such as Bitcoin or Ether, and to complete the KYC process.

Most exchanges have trading and withdrawal limits depending on how much KYC you have submitted. KYC is used globally to reduce money laundering.



Peer to peer

Wallets allow you to trade your DLT-backed tokens to any other address.

All you need is the recipient's address

e.g. 0x743cfB8FAd7F66b48488bFF1eb32c029f5307A76

Services exist to connect human-readable names to account addresses, similar to how url domains make ip addresses more readable.

0x743cfB8FAd7F66b48488bFF1eb32c029f5307A76

becomes

alice.mywallet.eth

Thank You