Solidity Smart Contracts

Solidity smart contracts are a central aspect of the DexGrid product because of their ability to handle funds in the most optimal manner for DexGrid needs.

Key properties required:

1. Stable means of exchange
2. Scalable for high frequency transactions
3. Consistent transaction capability, never gets slowed down
4. Auditable by people unfamiliar with blockchain technology
5. Operate seamlessly with Lattice1 by GridPlus
6. Low Ether gas costs per transaction
7. Elegant to keep attack surface small while providing all functionality necessary for DexGrid utility needs
8. Modular to avoid an attack on one section from affecting the rest of the market
9. Easy to deploy and connect with for every customer
10. Dummy proof against customers unfamiliar with blockchain technology
11. Upgradeable according to discovered needs during rollout of DexGrid platforms
12. Adjustable according to each new grid's needs, as DexGrid will service a wide variety of different grid systems

Contract List:

- Order_Contract.sol
- Wallet.sol
- Electricity_Sale.sol
- Market.sol
- Battery.sol
- Home_Solar.sol
- Car.sol
- PREC.sol

Solidity Smart Contracts

Order_Contract

A proxy contract through which DexGrid Lattice1 customers can interact with the virtual electric market contracts to buy or sell their electricity.

Holds memory of which devices are approved for the market

Facilitates packaging of market orders to market.sol

Contract through which customers can signal other messages (to be built into the platform later) to other entities over the Ethereum ledger

Allows for upgradability/patching without disrupting the market itself

Most similar contracts:

Gnosis Proxy
- OWL Proxy
- DX Proxy
- MGN Proxy

MKR Voting Proxy

Solidity Smart Contracts

Wallet.sol

Contract for holding funds, primarily those of retail customers and generators.

Receives newly minted RECs in the name of the wallet owner

Stores data for DERs that the user owns and operates

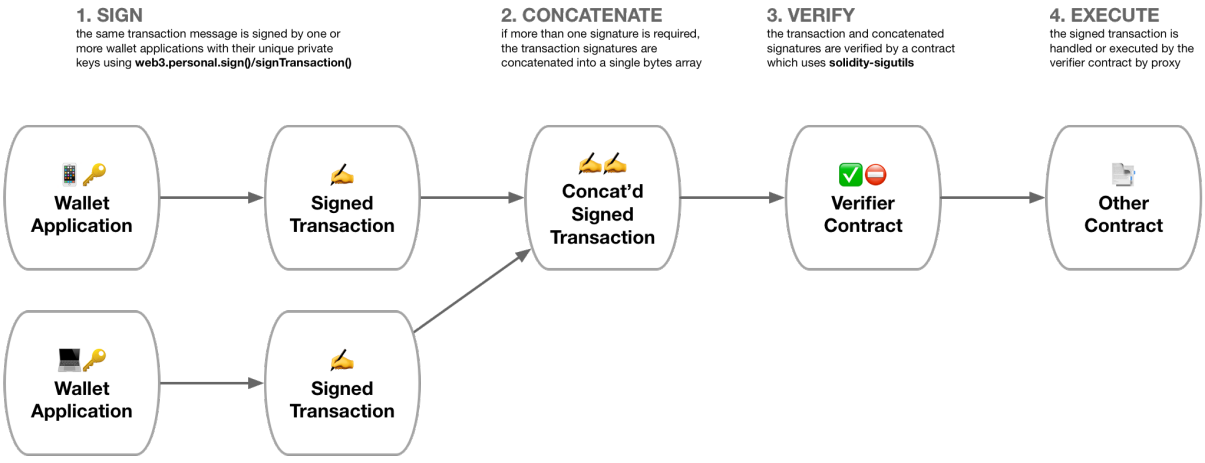
Connects to proxy contract to deliver market orders and fund or receive from those orders

Multi signature using the hardware that comes with the GridPlus IoT package

Formation of these contracts is facilitated now by EIP191 and EIP1077

Most similar contracts:

- Gnosis multi signature
- Parity multi signature
- Solidity-sigutils: https://github.com/dsys/solidity-sigutils



Multi signature layout illustrated by Distributed Systems

Solidity Smart Contracts

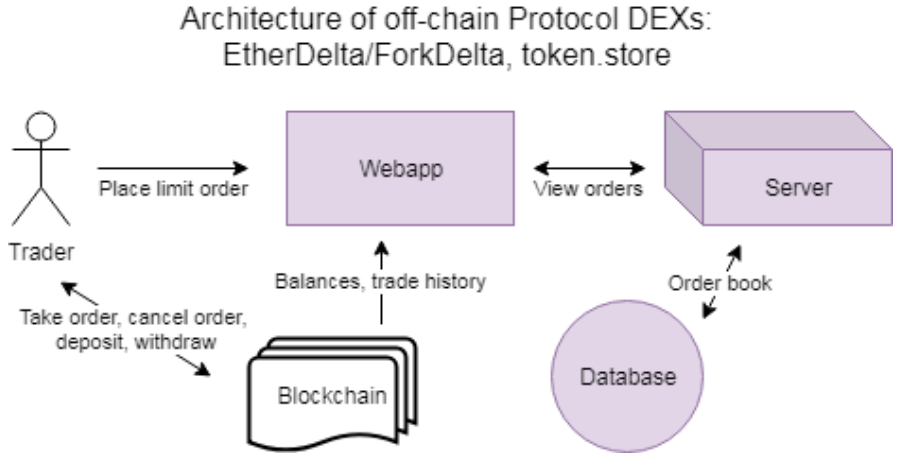
Market.sol

The central market contract for pairing buy and sell orders for electrical kilowatt-hours.

Progression will likely be from a slow market process, where a certain volume of orders will need to stack up before execution, consistently over to a market mechanism where it is capable of handling the smallest order size desirable for market participants and their automated market making tools.

Most likely going to be derived from current exchange contracts that pair buy and sell orders.

Unknown whether the market mechanism will require tokenization of electricity or if meta transactions or some other more elegant method would reduce friction.



Architecture of off-chain protocol exchanges (such as EtherDelta/ForkDelta, token.store)

Most similar contracts:

- GnosisX
- Radar Relay
- IDEX
- Uniswap
- Kyber
- 0x protocol
- ForkDelta
- EtherDelta
- Oasis Dex
- Bancor
- Airswap
- The Ocean