Genesis Block

```
{
    "nonce": "0x0000000000000042",
    "timestamp": "0x0",
    "parentHash": "0x0000000000000000000000000000000000000000000000000000000000000000",
    "extraData": "0x0",
    "gasLimit": "0x8000000",
    "difficulty": "0x400",
    "mixhash": "0x0000000000000000000000000000000000000000000000000000000000000000",
    "coinbase": "0x3333333333333333333333333333333333333333",
    "alloc": {
    }
}
```

Test Nets

- Identical to the main net functionality
  - Copy of the protocol with controlled risk
  - Testnet Ether has no value -> TX's are free
- Minor difference in network/client parameters
  - Different genesis block
  - Different network ID
  - Lower block difficulty

Private vs. Public

- Public
  - More realistic latency
  - Point to endpoint, setup is done
  - Most obtain ether from faucet
- Private
  - More control over parameters
  - Faster
  - Operating on a bare database

Ethereum Nodes

- A node is a machine running an Ethereum client
- A node can be running a light client or a full node
  - A full node contains a full copy of the blockchain
  - A light client contains only the block headers but can still query full nodes to verify transactions based on the merkle proofs
- There are many different implementations of Ethereum clients
  - Geth
  - Parity
  - cpp-ethereum

Geth vs. Parity

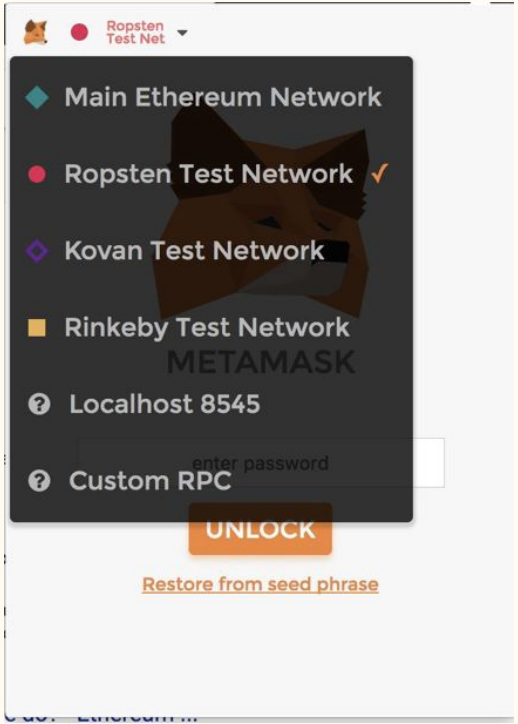
- Parity (written in Rust)
  - With the pruning algorithm, hard drive usage does not grow exponentially
  - Cool browser-based GUI
  - Passive mode to reduce CPU and network load on leaf nodes
  - Warp sync allows you to sync from scratch hours as opposed to days
- Geth (written in Go-lang)
  - Has the clique consensus implemented to access Rinkeby testnet (or build your own private Ethereum-based enterprise network)
  - Large community

List of Public Networks

- 0: Olympic, Ethereum public pre-release testnet
- 1: Frontier, Homestead, Metropolis, the Ethereum public main network
- 1: Classic, the (un)forked public Ethereum Classic main network, chain ID 61
- 1: Expanse, an alternative Ethereum implementation, chain ID 2
- 2: Morden, the public Ethereum testnet, now Ethereum Classic testnet
- 3: Ropsten, the public cross-client Ethereum testnet
- 4: Rinkeby, the public Geth Ethereum testnet
- 42: Kovan, the public Parity Ethereum testnet

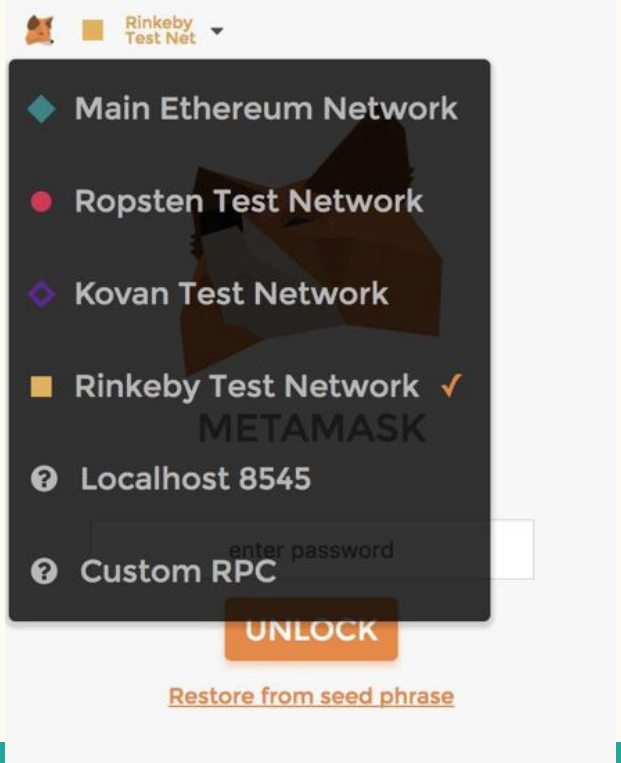
ROPSTEN

- Older testnet
- Uses proof of work
- Slow block times
- Often subjected to spam attacks



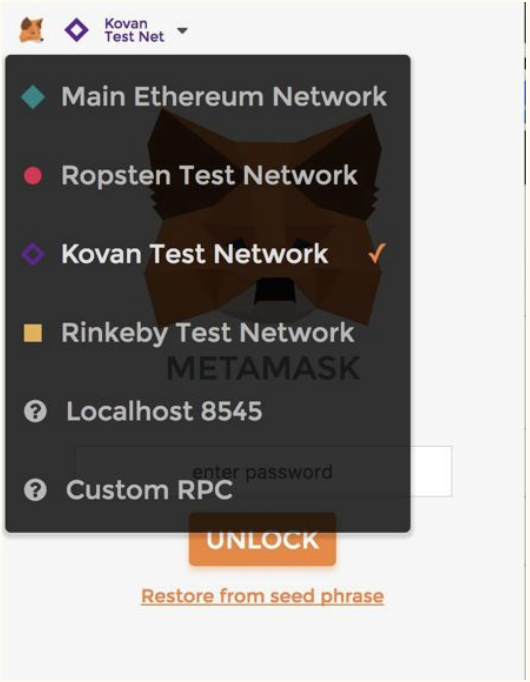
RINKEBY

- Newer, official Ethereum testnet
- Uses of Proof of Authority
  - Rely on trusted validators to ensure that valid transactions are added to blocks, processed and executed by the EVM faithfully
- ~4 second block time



KOVAN

- Uses proof of authority consensus engine from Parity client (not compatible with geth)



FAUCETS

- Allows users to request funds
  - Used to test smart contracts
- No value on the regular network
- Convenient
- Safeguarded against spam attacks

https://faucet.ropsten.be/

Forks

- Soft Fork -> preserves compatibility
- Hard Fork -> all previous version are incompatible
  - Technically a 51% attack
- Ethereum & Ethereum Classic