

Blockchain Course Wiki

Geth Ethereum Node basics.

There's a notion of a chain data directory where all the data related to the blockchain is stored including the blocks themselves and your account data (public/private keys). If you lose or delete your public keys that account is gone and not recoverable. First we'll learn how to create and back up an account.

Note: with many of these commands on Windows the "/" at the start can or must be omitted (it's a unix thing).

Specify a chain data directory with geth:

```
$ ./geth --datadir "/path/to/your/chaindata/directory/you/chose"
```

IF YOU ARE RUNNING WINDOWS DO THE FOLLOWING:

```
geth --datadir "/path/to/your/chaindata/directory/you/chose"
```

press ctrl+c to quit geth. otherwise configured this way, it will download the ethereum blockchain.

You should see something like the following:

```
blockchainlab:BlockchainCourse Marek$ ./geth --datadir "/Users/Marek/Documents/blockchain_course/"
WARN [11-04|16:02:57] No etherbase set and no accounts found as default
INFO [11-04|16:02:57] Starting peer-to-peer node instance=Geth/v1.7.2-stable-1db4ecdc/darwin-amd64/go1.9
INFO [11-04|16:02:57] Allocated cache and file handles database=/Users/Marek/Documents/blockchain_course/chaindata cache=128 handles=1024
INFO [11-04|16:02:58] Initialised chain configuration config="{ChainID: 1 Homestead: 1150000 DAO: 1200000 DAOsupport: true EIP150: 2463000 EIP155: 2675000 EIP158: 2675000 Byzantium: 4370000 Engine: ethash}"
INFO [11-04|16:02:58] Disk storage enabled for ethash caches dir=/Users/Marek/Documents/blockchain_course/geth/ethash count=3
INFO [11-04|16:02:58] Disk storage enabled for ethash DAGs dir=/Users/Marek/.ethash count=2
INFO [11-04|16:02:58] Initialising Ethereum protocol versions="[63 62]" network=1
INFO [11-04|16:02:58] Loaded most recent local header number=0 hash=d4e567...cb8fa3 td=17179869184
INFO [11-04|16:02:58] Loaded most recent local full block number=0 hash=d4e567...cb8fa3 td=17179869184
INFO [11-04|16:02:58] Loaded most recent local fast block number=0 hash=d4e567...cb8fa3 td=17179869184
INFO [11-04|16:02:58] Loaded local transaction journal transactions=0 dropped=0
INFO [11-04|16:02:58] Regenerated local transaction journal transactions=0 accounts=0
INFO [11-04|16:02:58] Starting P2P networking
INFO [11-04|16:03:00] UDP listener up self=enode://1c1ae42dade07051e05c93ef01886cce5686e5bdab7977b04340d1b5ccdfdd73b79e37762fda4fff6a32dce5ede7a693fda7b36d3d1a91602b5123d84f59c512@[:]:30303
INFO [11-04|16:03:00] RLPx listener up self=enode://1c1ae42dade07051e05c93ef01886cce5686e5bdab7977b04340d1b5ccdfdd73b79e37762fda4fff6a32dce5ede7a693fda7b36d3d1a91602b5123d84f59c512@[:]:30303
INFO [11-04|16:03:00] IPC endpoint opened: /Users/Marek/Documents/blockchain_course/geth.ipc
INFO [11-04|16:03:02] Mapped network port proto=udp extport=30303 intport=30303 interface="UPNP IGDv2-PPP1"
```

creating an account

```
$ ./geth --datadir "/path/to/your/chaindata/directory/you/chose" account new
```

You should see similar output to the below, and find your key file inside the /keystore directory inside the specified datadir directory.

```
blockchainlab:BlockchainCourse Marek$ ./geth account new
WARN [11-04|16:14:02] No etherbase set and no accounts found as default
Your new account is locked with a password. Please give a password. Do not forget this password.
Passphrase:
Repeat passphrase:
Address: {22b134c85a4cb2dae41ca15ffae9571e690f8a51}
blockchainlab:BlockchainCourse Marek$ ./geth --datadir "/Users/Marek/Documents/blockchain_course/" account new
WARN [11-04|16:18:12] No etherbase set and no accounts found as default
Your new account is locked with a password. Please give a password. Do not forget this password.
Passphrase:
Repeat passphrase:
Address: {8531613da84ce2df4ebc8e905d0485fa4537d16a}
blockchainlab:BlockchainCourse Marek$
```

Your file will be named something like UTC<date and time>, and have contents similar to the following:

```
{ "address": "8531613da84ce2df4ebc8e905d0485fa4537d16a", "crypto": { "cipher": "aes-128-ctr", "ciphertext": "a9b9a46117fb813948f532efd7f90c221150c2d44e13c690395c4b36d810e4bf", "cipherparams": { "iv": "d1f8614a094cf6b8e5fdb53770a802a1" }, "kdf": "scrypt", "kdfparams": { "dklen": 32, "n": 262144, "p": 1, "r": 8, "salt": "4cd025155840c5cd85ca9d774086fcc008c4f2cc7af27644d001707bb888f706" }, "mac": "d6c5e79d1f56eda2" }
```

```
c108258d2a2b534e60657b46e68b494c787830b72e5f1cc5"},"id":"39b73b60-4ef0-4403-8401-f37248ab4164","version":3}
```

Which contains your public key and your private key which has been encrypted using the password you provided when you created the account.

Initialize the blockchain:

Save the genesis.json file contents in the same directory you have your geth client downloaded to (note: not the datadir directory).

Then, run the following:

```
$ ./geth --datadir "/path/to/your/chaindata/directory/you/chose" init genesis.json
```

example json file

genesis.json

```
blockchainlab:BlockchainCourse Marek$ ./geth --datadir "/Users/Marek/Documents/blockchain_course/" init genesis.json
WARN [11-04|16:39:18] No etherbase set and no accounts found as default
INFO [11-04|16:39:18] Allocated cache and file handles      database=/Users/Marek/Documents/blockchain_course/chaindata
INFO [11-04|16:39:18] Writing custom genesis block
INFO [11-04|16:39:18] Successfully wrote genesis state      database=chaindata
                                hash=834001...88bb95
INFO [11-04|16:39:18] Allocated cache and file handles      database=/Users/Marek/Documents/blockchain_course/lightchaindata
INFO [11-04|16:39:18] Writing custom genesis block
INFO [11-04|16:39:18] Successfully wrote genesis state      database=lightchaindata
                                hash=834001...88bb95
blockchainlab:BlockchainCourse Marek$
```

Running geth on our custom private network:

```
$ ./geth --datadir "/path/to/your/chaindata/directory/you/chose" --networkid 20171104 console
```

(note the above should be all on one line...)

You should see something like this:

```
blockchainlab:BlockchainCourse Marek$ ./geth --datadir "/Users/Marek/Documents/blockchain_course/" --networkid 20171104 console
INFO [11-04|16:54:32] Starting peer-to-peer node      instance=Geth/v1.7.2-stable-1db4ecdc/darwin-amd64/go1.9
INFO [11-04|16:54:32] Allocated cache and file handles      database=/Users/Marek/Documents/blockchain_course/chaindata
WARN [11-04|16:54:32] Upgrading database to use lookup entries
INFO [11-04|16:54:32] Initialised chain configuration      config="{ChainID: 20171104 Homestead: 0 DAO: <nil> DAOSupport: false EIP150: <nil> EIP155: 0 EIP158: 0 Byzantium: <nil> Engine: unknown}"
INFO [11-04|16:54:32] Disk storage enabled for ethash caches      dir=/Users/Marek/Documents/blockchain_course/ethash
INFO [11-04|16:54:32] Database deduplication successful      deduped=0
INFO [11-04|16:54:32] Disk storage enabled for ethash DAGs      dir=/Users/Marek/.ethash
INFO [11-04|16:54:32] Initialising Ethereum protocol      versions="[63 62]" network=20171104
INFO [11-04|16:54:32] Loaded most recent local header      number=0 hash=834001...88bb95 td=8388608
INFO [11-04|16:54:32] Loaded most recent local full block   number=0 hash=834001...88bb95 td=8388608
INFO [11-04|16:54:32] Loaded most recent local fast block   number=0 hash=834001...88bb95 td=8388608
INFO [11-04|16:54:32] Regenerated local transaction journal   transactions=0 accounts=0
INFO [11-04|16:54:32] Starting P2P networking
INFO [11-04|16:54:34] UDP listener up                    self=enode://e0ea869eee6352d6c46a2aa4427ba5e07b0a6823ce40b574856a886aa86e8af3834130efc5fff0f305cf87e5f3b0b6aecc6dd883f627236fee411837b7135259@[:]:30303
INFO [11-04|16:54:34] RLPx listener up                  self=enode://e0ea869eee6352d6c46a2aa4427ba5e07b0a6823ce40b574856a886aa86e8af3834130efc5fff0f305cf87e5f3b0b6aecc6dd883f627236fee411837b7135259@[:]:30303
INFO [11-04|16:54:34] IPC endpoint opened: /Users/Marek/Documents/blockchain_course/geth.ipc
Welcome to the Geth JavaScript console!

instance: Geth/v1.7.2-stable-1db4ecdc/darwin-amd64/go1.9
coinbase: 0x8531613da84ce2df4ebc8e905d0485fa4537d16a
at block: 0 (Wed, 31 Dec 1969 19:00:00 EST)
datadir: /Users/Marek/Documents/blockchain_course
modules: admin:1.0 debug:1.0 eth:1.0 miner:1.0 net:1.0 personal:1.0 rpc:1.0 txpool:1.0 web3:1.0
```

To start mining at this point type:

```
miner.start()
```

You should see something like the following:

```
* miner.start()
INFO [11-04|18:14:22] Updated mining threads          threads=0
INFO [11-04|18:14:22] Transaction pool price threshold updated price=18000000000
INFO [11-04|18:14:22] Starting mining operation
null
* INFO [11-04|18:14:22] Commit new mining work          number=4 txs=0 uncles=0 elapsed=195.863µs
INFO [11-04|18:14:24] Generating DAG in progress        epoch=1 percentage=0 elapsed=1.052s
INFO [11-04|18:14:25] Generating DAG in progress        epoch=1 percentage=1 elapsed=2.023s
INFO [11-04|18:14:26] Generating DAG in progress        epoch=1 percentage=2 elapsed=2.971s
INFO [11-04|18:14:27] Generating DAG in progress        epoch=1 percentage=3 elapsed=3.937s
INFO [11-04|18:14:28] Generating DAG in progress        epoch=1 percentage=4 elapsed=4.977s
INFO [11-04|18:14:29] Generating DAG in progress        epoch=1 percentage=5 elapsed=6.045s
INFO [11-04|18:14:31] Generating DAG in progress        epoch=1 percentage=6 elapsed=7.095s
```