Running an Ethereum Network Consisting of a Single node.

Let's start by the end… For clarity, this is what you are supposed to get when you will have completed this section. That's the folder structure at the end.

```
c:\geth
|   genesis.json
|   password.txt
|
+---data
    |
    +---geth
    |
    +---keystore
```

To run an Ethereum network with a single node we need to do the following things:

1. Install Geth
2. Create a Work Space
3. Create your account (Coinbase)
4. The genesis file
5. Initialize your node
6. Make it live

Step 1: Install Geth

Note: The following installation instruction is for the Ubuntu users. You can follow the instruction for Mac OS X platforms to install Geth in the below link

https://github.com/ethereum/go-ethereum/wiki/Installation-Instructions-for-Mac

Installing from PPA

```
> sudo apt-get install software-properties-common
> sudo add-apt-repository -y ppa:ethereum/ethereum
> sudo apt-get update
> sudo apt-get install ethereum
```

Step 2: Create a Work Space

```
> mkdir geth
> cd geth
```

Step 3: Create your account (Coinbase)

The accounts (also called wallet) hold a private-public key pair that are required for interacting with any blockchain. Any mining node needs to be able to sign transactions (using their private key) and to identify itself on the network (the address is derived from the public key). This account will receive the mining rewards.

```
> geth --datadir data account new
```

Create a "**password.txt**" file under **geth** folder that contains the password you configured for the first account on miner, in plain text.

This creates the **keystore**/ folder containing your account file. Notice that the last part of the file name in **keystore**/ is the address of your account (also displayed on the terminal).

I suggest copying these two addresses from the terminal screen and to save them in a text file. That will ease some copy-pasting job later. However, remember that you can read those addresses from the **UTC-datetime-address** file in **keystore**/.

Step 4: Genesis file

A genesis file is the file used to initialize the blockchain. The very first block, called the genesis block, is crafted based on the parameters in the **genesis.json** file.

Create a file under **geth**, called "genesis.json", with the following content:

```
{
"difficulty": "0x400",
"alloc": { "<your address>": { "balance": "0x300000" } },
"gasLimit": "0xffffffffffff",
"config": {
        "chainId": 4002,
    }
}
```

Replace the address in the genesis file with the account address that you have just created.

Step 5: Initialize your node

Now that we have the **genesis.json** file, let's forge the genesis block!

```
> geth --datadir data init genesis.json
```

Note: How does your node know about the genesis parameters when joining the Ethereum Mainnet or the Ropsten testnet, or the Rinkeby testnet? They are already defined in the source code in params/config.go.

Step 6: Make it live

Big time! Finally (but usually here the troubles arrive too). Everything in one huge command!

Now run the following command to start the private network.

```
> geth --identity "miner" --networkid 4002 --datadir data --rpc --rpcport "8545" --unlock 0 --password password.txt --ipcpath "~/.ethereum/geth.ipc" --rpccorsdomain "*" --rpcapi "db,eth,net,web3,personal"
```

Run the following command to attach a JavaScript console to the running network:

```
> geth attach
```

Run the following command to start and stop mining in the network respectively:

```
miner.start()

miner.stop()
```

Tips

1. If you don't want to store your password in the file and want to enter each time you run the chain, **remove** the --password parameter from command, and run you will be prompted for password.

2. In case you forget the password of your Coinbase, **delete** the UTC file in the **keystore**, and create a new account.