

# ETH:

First, with the help of the command inside the image, we create the directories of the nodes.

```
mmdubuntu@DESKTOP-0862V20:~/crypto$ mkdir node1 node2 node3
```

Then we create an account for each node with the help of the command in the pictures below.

```
mmdubuntu@DESKTOP-0862V20:~/crypto$ geth --datadir "./node1" account new
INFO [05-31|15:17:03.237] Maximum peer count          ETH=50 LES=0 total=50
INFO [05-31|15:17:03.238] Smartcard socket not found, disabling  err="stat /run/pcscd/pcscd.comm: no such file or directory"
Your new account is locked with a password. Please give a password. Do not forget this password.
Password:
Repeat password:

Your new key was generated

Public address of the key:   0x041339ed31497969B48065BAB3b507571E75cCfc
Path of the secret key file: node1/keystore/UTC--2024-05-31T11-47-06.255106922Z--041339ed31497969b48065bab3b507571e75ccfc

- You can share your public address with anyone. Others need it to interact with you.
- You must NEVER share the secret key with anyone! The key controls access to your funds!
- You must BACKUP your key file! Without the key, it's impossible to access account funds!
- You must REMEMBER your password! Without the password, it's impossible to decrypt the key!
```

```
mmdubuntu@DESKTOP-0862V20:~/crypto$ geth --datadir "./node2" account new
INFO [05-31|15:17:26.016] Maximum peer count          ETH=50 LES=0 total=50
INFO [05-31|15:17:26.016] Smartcard socket not found, disabling  err="stat /run/pcscd/pcscd.comm: no such file or directory"
Your new account is locked with a password. Please give a password. Do not forget this password.
Password:
Repeat password:

Your new key was generated

Public address of the key:   0xE9796e682EC7b6405C37157E784ff921897f237D
Path of the secret key file: node2/keystore/UTC--2024-05-31T11-47-28.451108799Z--e9796e682ec7b6405c37157e784ff921897f237d

- You can share your public address with anyone. Others need it to interact with you.
- You must NEVER share the secret key with anyone! The key controls access to your funds!
- You must BACKUP your key file! Without the key, it's impossible to access account funds!
- You must REMEMBER your password! Without the password, it's impossible to decrypt the key!
```

```
mmdubuntu@DESKTOP-0862V20:~/crypto$ geth --datadir "./node3" account new
INFO [05-31|15:17:39.902] Maximum peer count          ETH=50 LES=0 total=50
INFO [05-31|15:17:39.902] Smartcard socket not found, disabling  err="stat /run/pcscd/pcscd.comm: no such file or directory"
Your new account is locked with a password. Please give a password. Do not forget this password.
Password:
Repeat password:

Your new key was generated

Public address of the key:   0x934c04FD1C6091C29bae78D277a7229633AcC4dE
Path of the secret key file: node3/keystore/UTC--2024-05-31T11-47-42.485020779Z--934c04fd1c6091c29bae78d277a7229633acc4de

- You can share your public address with anyone. Others need it to interact with you.
- You must NEVER share the secret key with anyone! The key controls access to your funds!
- You must BACKUP your key file! Without the key, it's impossible to access account funds!
- You must REMEMBER your password! Without the password, it's impossible to decrypt the key!
```

Then we add the address of the nodes in the genesis block.

```
{ } genesis.json X
{ } genesis.json > ...
1  {
2      "config": {
3          "chainId": 15,
4          "homesteadBlock": 0,
5          "eip155Block": 0,
6          "eip158Block": 0,
7          "eip150Block": 0
8      },
9      "difficulty": "400000",
10     "gasLimit": "2100000",
11     "alloc": {
12         "0x041339ed31497969B48065B4B3b507571E75cCfc": { "balance": "10000",
13         "0xE9796e682EC7b6405C37157E784ff921897f237D": { "balance": "20000",
14         "0x934c04FD1C6091C29bae78D277a7229633AcC4dE": { "balance": "15000"
15     }
16 }
```

In the next step, we will initialize the nodes with the help of the command shown in the images below.

```
mmdubuntu@DESKTOP-0862V20:~/crypto$ geth --datadir "./node1" init ./genesis.json
INFO [05-31|15:19:37.373] Maximum peer count          ETH=50 LES=0 total=50
INFO [05-31|15:19:37.376] Smartcard socket not found, disabling err="stat /run/pcscd/pcscd.comm: no such file or dire
ctory"
INFO [05-31|15:19:37.379] Set global gas cap          cap=50,000,000
INFO [05-31|15:19:37.381] Using leveledb as the backing database
INFO [05-31|15:19:37.382] Allocated cache and file handles database=/home/mmdubuntu/crypto/node1/geth/chaindata
cache=16.00MiB handles=16
INFO [05-31|15:19:37.409] Using LevelDB as the backing database
INFO [05-31|15:19:37.468] Opened ancient database      database=/home/mmdubuntu/crypto/node1/geth/chaindata/
ancient/chain readonly=false
INFO [05-31|15:19:37.469] Writing custom genesis block
INFO [05-31|15:19:37.469] Persisted trie from memory database nodes=4 size=585.00B time="94.7µs" gcnodes=0 gcsiz
e=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [05-31|15:19:37.474] Successfully wrote genesis state database=chaindata hash=8dffffe..9d5b40
INFO [05-31|15:19:37.474] Using leveledb as the backing database
INFO [05-31|15:19:37.474] Allocated cache and file handles database=/home/mmdubuntu/crypto/node1/geth/lightchain
data cache=16.00MiB handles=16
INFO [05-31|15:19:37.503] Using LevelDB as the backing database
INFO [05-31|15:19:37.568] Opened ancient database      database=/home/mmdubuntu/crypto/node1/geth/lightchain
data/ancient/chain readonly=false
INFO [05-31|15:19:37.568] Writing custom genesis block
INFO [05-31|15:19:37.569] Persisted trie from memory database nodes=4 size=585.00B time="492.1µs" gcnodes=0 gcsiz
e=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [05-31|15:19:37.574] Successfully wrote genesis state database=lightchaindata hash=8dffffe..9d5b40

mmdubuntu@DESKTOP-0862V20:~/crypto$ geth --datadir "./node2" init ./genesis.json
INFO [05-31|15:19:52.582] Maximum peer count          ETH=50 LES=0 total=50
INFO [05-31|15:19:52.583] Smartcard socket not found, disabling err="stat /run/pcscd/pcscd.comm: no such file or dire
ctory"
INFO [05-31|15:19:52.586] Set global gas cap          cap=50,000,000
INFO [05-31|15:19:52.588] Using leveledb as the backing database
INFO [05-31|15:19:52.588] Allocated cache and file handles database=/home/mmdubuntu/crypto/node2/geth/chaindata
cache=16.00MiB handles=16
INFO [05-31|15:19:52.615] Using LevelDB as the backing database
INFO [05-31|15:19:52.674] Opened ancient database      database=/home/mmdubuntu/crypto/node2/geth/chaindata/
ancient/chain readonly=false
INFO [05-31|15:19:52.674] Writing custom genesis block
INFO [05-31|15:19:52.675] Persisted trie from memory database nodes=4 size=585.00B time="126.4µs" gcnodes=0 gcsiz
e=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [05-31|15:19:52.678] Successfully wrote genesis state database=chaindata hash=8dffffe..9d5b40
INFO [05-31|15:19:52.678] Using leveledb as the backing database
INFO [05-31|15:19:52.678] Allocated cache and file handles database=/home/mmdubuntu/crypto/node2/geth/lightchain
data cache=16.00MiB handles=16
INFO [05-31|15:19:52.702] Using LevelDB as the backing database
INFO [05-31|15:19:52.762] Opened ancient database      database=/home/mmdubuntu/crypto/node2/geth/lightchain
data/ancient/chain readonly=false
INFO [05-31|15:19:52.762] Writing custom genesis block
INFO [05-31|15:19:52.763] Persisted trie from memory database nodes=4 size=585.00B time="635.2µs" gcnodes=0 gcsiz
e=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [05-31|15:19:52.767] Successfully wrote genesis state database=lightchaindata hash=8dffffe..9d5b40
```



```

mmdubuntu@DESKTOP-0862V20:~/crypto$ geth --datadir "/.node3" init ./genesis.json
INFO [05-31|15:20:08.493] Maximum peer count          ETH=50 LES=0 total=50
INFO [05-31|15:20:08.494] Smartcard socket not found, disabling err="stat /run/pcscd/pcscd.comm: no such file or directory"
INFO [05-31|15:20:08.497] Set global gas cap          cap=50,000,000
INFO [05-31|15:20:08.499] Using LevelDB as the backing database
INFO [05-31|15:20:08.499] Allocated cache and file handles database=/home/mmdubuntu/crypto/node3/geth/chaindata
cache=16.00MiB handles=16
INFO [05-31|15:20:08.524] Using LevelDB as the backing database
INFO [05-31|15:20:08.595] Opened ancient database     database=/home/mmdubuntu/crypto/node3/geth/chaindata/ancient/chain readonly=false
INFO [05-31|15:20:08.595] Writing custom genesis block
INFO [05-31|15:20:08.596] Persisted trie from memory database nodes=4 size=585.00B time="552.7µs" gcnodes=0 gcsiz=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [05-31|15:20:08.601] Successfully wrote genesis state database=chaindata hash=8dffffe..9d5b40
INFO [05-31|15:20:08.601] Using LevelDB as the backing database
INFO [05-31|15:20:08.601] Allocated cache and file handles database=/home/mmdubuntu/crypto/node3/geth/lightchain
data cache=16.00MiB handles=16
INFO [05-31|15:20:08.628] Using LevelDB as the backing database
INFO [05-31|15:20:08.690] Opened ancient database     database=/home/mmdubuntu/crypto/node3/geth/lightchain
data/ancient/chain readonly=false
INFO [05-31|15:20:08.690] Writing custom genesis block
INFO [05-31|15:20:08.691] Persisted trie from memory database nodes=4 size=585.00B time="431.2µs" gcnodes=0 gcsiz=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [05-31|15:20:08.695] Successfully wrote genesis state database=lightchaindata hash=8dffffe..9d5b40

```

Then we run the nodes using the command in the image.

```

mmdubuntu@DESKTOP-0862V20:~/crypto$ geth --identity node1 --http --http.port "8001" --http.corsdomain "*" --datadir "/.node1" --port "30301" --authrpc.port "8551" --nodiscover --http.api "db,eth,net,web3,personal,miner,admin" --networkid 1900 --nat "any" --allow-insecure-unlock --ipcdisable
INFO [05-31|15:20:31.957] Maximum peer count          ETH=50 LES=0 total=50
INFO [05-31|15:20:31.958] Smartcard socket not found, disabling err="stat /run/pcscd/pcscd.comm: no such file or directory"
INFO [05-31|15:20:31.961] Set global gas cap          cap=50,000,000
INFO [05-31|15:20:31.974] Allocated trie memory caches clean=154.00MiB dirty=256.00MiB
INFO [05-31|15:20:31.975] Using LevelDB as the backing database database=/home/mmdubuntu/crypto/node1/geth/chaindata cache=512.00MiB handles=524,288
INFO [05-31|15:20:31.975] Allocated cache and file handles
INFO [05-31|15:20:32.010] Using LevelDB as the backing database database=/home/mmdubuntu/crypto/node1/geth/chaindata/ancient/chain readonly=false
INFO [05-31|15:20:32.045] Opened ancient database     dir=/home/mmdubuntu/crypto/node1/geth/ethash count=3
INFO [05-31|15:20:32.045] Disk storage enabled for ethash caches dir=/home/mmdubuntu/.ethash count=2
INFO [05-31|15:20:32.045] Disk storage enabled for ethash DAGs
INFO [05-31|15:20:32.045] Initialising Ethereum protocol network=1900 deversion=enil>
INFO [05-31|15:20:32.046] -----
INFO [05-31|15:20:32.046] Chain ID: 15 (unknown)
INFO [05-31|15:20:32.046] Consensus: unknown
INFO [05-31|15:20:32.046] -----
INFO [05-31|15:20:32.046] Pre-Merge hard forks (block based):
INFO [05-31|15:20:32.046] - Homestead: #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/homestead.md)
INFO [05-31|15:20:32.047] - Tangerine Whistle (EIP 150): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/tangerine-whistle.md)
INFO [05-31|15:20:32.047] - Spurious Dragon/1 (EIP 155): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurious-dragon.md)
INFO [05-31|15:20:32.047] - Spurious Dragon/2 (EIP 158): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurious-dragon.md)
INFO [05-31|15:20:32.047] - Byzantium: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/byzantium.md)
INFO [05-31|15:20:32.047] - Constantinople: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/constantinople.md)
INFO [05-31|15:20:32.047] - Petersburg: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/petersburg.md)
INFO [05-31|15:20:32.047] - Istanbul: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/istanbul.md)
INFO [05-31|15:20:32.047] - Berlin: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/berlin.md)
INFO [05-31|15:20:32.047] - London: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/london.md)
INFO [05-31|15:20:32.047] -----
INFO [05-31|15:20:32.047] The Merge is not yet available for this network!
INFO [05-31|15:20:32.047] - Hard-fork specification: https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/paris.md
INFO [05-31|15:20:32.047] -----
INFO [05-31|15:20:32.047] Post-Merge hard forks (timestamp based):
INFO [05-31|15:20:32.047] -----
INFO [05-31|15:20:32.047] loaded most recent local block number=0 hash=8dffffe..9d5b40 tx=400,000 age=55y2m0z0
INFO [05-31|15:20:32.048] Failed to load snapshot err="missing or corrupted snapshot"
INFO [05-31|15:20:32.048] Rebuilding state snapshot
INFO [05-31|15:20:32.048] Resuming state snapshot generation root=ad3fac..09c360 accounts=0 slots=0 storage=0.00B dangling=0 elapsed="273µs"
INFO [05-31|15:20:32.048] Generated state snapshot account=2 slots=0 storage=130.00B dangling=0 elapsed="677µs"
INFO [05-31|15:20:32.048] Regenerated local transaction journal transactions=0 accounts=0
INFO [05-31|15:20:32.051] Gasprice oracle is ignoring threshold set threshold=2
mmdubuntu@DESKTOP-0862V20:~/crypto$ geth --identity node2 --http --http.port "8002" --http.corsdomain "*" --datadir "/.node2" --port "30302" --authrpc.port "8552" --nodiscover --http.api "db,eth,net,web3,personal,miner,admin" --networkid 1900 --nat "any" --allow-insecure-unlock --ipcdisable
INFO [05-31|15:21:50.655] Maximum peer count          ETH=50 LES=0 total=50
INFO [05-31|15:21:50.656] Smartcard socket not found, disabling err="stat /run/pcscd/pcscd.comm: no such file or directory"
INFO [05-31|15:21:50.660] Set global gas cap          cap=50,000,000
INFO [05-31|15:21:50.661] Allocated trie memory caches clean=154.00MiB dirty=256.00MiB
INFO [05-31|15:21:50.661] Using LevelDB as the backing database database=/home/mmdubuntu/crypto/node2/geth/chaindata cache=512.00MiB handles=524,288
INFO [05-31|15:21:50.697] Using LevelDB as the backing database database=/home/mmdubuntu/crypto/node2/geth/chaindata/ancient/chain readonly=false
INFO [05-31|15:21:50.720] Opened ancient database     dir=/home/mmdubuntu/crypto/node2/geth/ethash count=3
INFO [05-31|15:21:50.730] Disk storage enabled for ethash caches dir=/home/mmdubuntu/.ethash count=2
INFO [05-31|15:21:50.730] Disk storage enabled for ethash DAGs
INFO [05-31|15:21:50.731] Initialising Ethereum protocol network=1900 deversion=enil>
INFO [05-31|15:21:50.731] -----
INFO [05-31|15:21:50.731] Chain ID: 15 (unknown)
INFO [05-31|15:21:50.731] Consensus: unknown
INFO [05-31|15:21:50.731] -----
INFO [05-31|15:21:50.731] Pre-Merge hard forks (block based):
INFO [05-31|15:21:50.731] - Homestead: #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/homestead.md)
INFO [05-31|15:21:50.731] - Tangerine Whistle (EIP 150): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/tangerine-whistle.md)
INFO [05-31|15:21:50.731] - Spurious Dragon/1 (EIP 155): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurious-dragon.md)
INFO [05-31|15:21:50.731] - Spurious Dragon/2 (EIP 158): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurious-dragon.md)
INFO [05-31|15:21:50.731] - Byzantium: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/byzantium.md)
INFO [05-31|15:21:50.731] - Constantinople: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/constantinople.md)
INFO [05-31|15:21:50.731] - Petersburg: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/petersburg.md)
INFO [05-31|15:21:50.731] - Istanbul: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/istanbul.md)
INFO [05-31|15:21:50.731] - Berlin: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/berlin.md)
INFO [05-31|15:21:50.731] - London: #enil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/london.md)
INFO [05-31|15:21:50.731] -----
INFO [05-31|15:21:50.731] The Merge is not yet available for this network!
INFO [05-31|15:21:50.731] - Hard-fork specification: https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/paris.md
INFO [05-31|15:21:50.731] -----
INFO [05-31|15:21:50.731] Post-Merge hard forks (timestamp based):
INFO [05-31|15:21:50.731] -----
INFO [05-31|15:21:50.731] loaded most recent local block number=0 hash=8dffffe..9d5b40 tx=400,000 age=55y2m0z0
INFO [05-31|15:21:50.732] Failed to load snapshot err="missing or corrupted snapshot"
INFO [05-31|15:21:50.732] Rebuilding state snapshot
INFO [05-31|15:21:50.733] Resuming state snapshot generation root=ad3fac..d9c360 accounts=0 slots=0 storage=0.00B dangling=0 elapsed="513.5µs"
INFO [05-31|15:21:50.733] Regenerated local transaction journal transactions=0 accounts=0
INFO [05-31|15:21:50.733] Generated state snapshot accounts=3 slots=0 storage=138.00B dangling=0 elapsed="931.9µs"
INFO [05-31|15:21:50.733] Gasprice oracle is ignoring threshold set threshold=2
INFO [05-31|15:21:50.733] Error reading unclean shutdown markers error="levelDB: not found"
INFO [05-31|15:21:50.733] Engine API enabled protocol=eth
INFO [05-31|15:21:50.733] Engine API started but chain not configured for merge yet
INFO [05-31|15:21:50.734] Starting peer-to-peer node

```

```
INFO [05-31-15:22:41] crypto geth -identity "n3" -http -http.port 8003 -http.corsdomain "*" --datadir ~/.node3 -port 30303 --authrpc.port 8553 --moddiscover -http.api "db,eth,network,peerinfo,miner,admin" --networkid 1900 --nat "" --allow-insecure-unlock --ipcidable
INFO [05-31-15:22:41.877] Maximum peer count ETH=50 [EWS total]=50
INFO [05-31-15:22:41.878] Smartcard socket not found, disabling err='stat /run/pccsd/pccsd.com: no such file or directory'
INFO [05-31-15:22:41.881] Set global gas cap cap=50,000,000
INFO [05-31-15:22:41.882] Allocated trie memory caches cleanup=154.00MB1 dirty=256.00MB1
INFO [05-31-15:22:41.882] Using leveldb as the backing database database=/home/mdbubuntu/crypto/node3/geth/chainedata cache=512.00MB1 handles=524,288
INFO [05-31-15:22:41.882] Allocated cache and file handles database=/home/mdbubuntu/crypto/node3/geth/chainedata/ancient/chain readonly=false
INFO [05-31-15:22:41.927] Using leveldb as the backing database dir=/home/mdbubuntu/crypto/node3/geth/ethash count=3
INFO [05-31-15:22:41.935] Opened ancient database dir=/home/mdbubuntu/.ethash count=2
INFO [05-31-15:22:41.956] Disk storage enabled for ethash caches network=1900 doversion=enll
INFO [05-31-15:22:41.956] Disk storage enabled for DAGS
INFO [05-31-15:22:41.956] Initialising Ethereum protocol
INFO [05-31-15:22:41.956]
INFO [05-31-15:22:41.956] Chain ID: 15 (unknown)
INFO [05-31-15:22:41.956] Consensus: unknown
INFO [05-31-15:22:41.956]
INFO [05-31-15:22:41.956] Pre-Merge hard forks (block based):
INFO [05-31-15:22:41.956] - Homestead: #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/homestead.md)
INFO [05-31-15:22:41.956] - Frontier Whistle (EIP 150): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/tangerine-whistle.md)
INFO [05-31-15:22:41.957] - Spurious Dragon/1 (EIP 155): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurious-dragon.md)
INFO [05-31-15:22:41.957] - Constant Dragong/2 (EIP 158): #0 (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurious-dragon.md)
INFO [05-31-15:22:41.957] - Byzantium: #nil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/byzantium.md)
INFO [05-31-15:22:41.957] - Constantinople: #nil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/constantinople.md)
INFO [05-31-15:22:41.957] - Petersburg: #nil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/petersburg.md)
INFO [05-31-15:22:41.957] - Istanbul: #nil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/istanbul.md)
INFO [05-31-15:22:41.957] - Berlin: #nil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/berlin.md)
INFO [05-31-15:22:41.957] - London: #nil (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/london.md)
INFO [05-31-15:22:41.957]
INFO [05-31-15:22:41.957] The Merge is not yet available for this network!
INFO [05-31-15:22:41.957] - Hard-fork specification: https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/paris.md
INFO [05-31-15:22:41.957]
INFO [05-31-15:22:41.957] Post-Merge hard forks (timestamp based):
INFO [05-31-15:22:41.957]
INFO [05-31-15:22:41.957]
INFO [05-31-15:22:41.957]
INFO [05-31-15:22:41.957] Loaded most recent local block number=0 hash=8dffff..9d5b40 [ld=400,000 age=55y2m2wz
WARN [05-31-15:22:41.957] Failed to load snapshot err='missing or corrupted snapshot'
INFO [05-31-15:22:41.957] Rebuilding state snapshot
INFO [05-31-15:22:41.957] Resuming state snapshot generation root+adFae..d0e360 accounts=0 slots=0 storage=0.000 dangling=0 elapsed=194.6us"
INFO [05-31-15:22:41.957] Regenerated local transaction journal transactions=0 accounts=0
INFO [05-31-15:22:41.958] Generated state snapshot accounts=3 slots=0 storage=138.000 dangling=0 elapsed=524µs"
INFO [05-31-15:22:41.958] Gas price oracle is ignoring threshold set threshold=0
WARN [05-31-15:22:41.958] Error reading unclean shutdown markers error='leveldb: not found'
INFO [05-31-15:22:41.958] Engine API enabled protocol=eth
INFO [05-31-15:22:41.958] Engine API started but chain not configured for merge yet
INFO [05-31-15:22:41.958] Engine API started but chain not configured for merge yet
```

Then we obtain the information of the first node as follows .

```

ubuntu@08c5670f-88c2v0n0:~$ geth attach http://127.0.0.1:8001
WARN [05-31|15:23:11.958] Enabling deprecated personal namespace
Welcome to the Geth JavaScript console!

instance: Geth/node/v1.11.6-stable-ea9e62ca/linux-amd64/go1.20.3
at block: 0 (Thu Jan 01 1970 03:30:00 GMT+0330) (+0330)
data dir: /home/meduuntu/.crypto/node1
modules: admin:1.0 eth:1.0 miner:1.0 net:1.0 personal:1.0 rpc:1.0 web3:1.0

To exit, press ctrl-d or type exit
> admin.nodeInfo
{
  enode: "enode://90185e50954b32799cad78ee4b815805f26d177d145170e677cd94585578bdc6179ad693bc53d42c455e1ab289a8c50ba728645382b6adaf28c7a668c3@127.0.0.1:30301/discport-0",
  name: "3aQ0Pw-1uKc40N93u8ow11e2Zp0t1f adAoc JDF Czo5.DZcfst pVay-4hlpasQfrc4lPdL etJadHf8U7Qz0b8b6AY_GH1cdgZ9aWafGhPbJ2DqgnIkYgnVQgnJahHdAAKjZ2ycdJThesoxQXGf31n15c35nK147kuBmXybh89FFw5eFE6MfV7Ztzmf
12W93Cd10",
  id: "386ec211047ac84d0d52c878b872c83f4b5c5e5011ab49495aac8f4bdc23",
  ip: "127.0.0.1",
  listenAddr: "[*]:30301",
  name: "geth/node/v1.11.6-stable-ea9e62ca/linux-amd64/go1.20.3",
  ports: {
    discovery: 0,
    listener: 30301
  },
  protocols: {
    eth: {
      config: {
        chainId: 0,
        eip1500lock: 0,
        eip1550lock: 0,
        eip1580lock: 0,
        homesteadBlock: 0
      },
      difficulty: 400000,
      genesis: "0xaddffffb8580e2e89ce27c1c4122daF8b13bd4d3087dcdf2b2c27d9f535b40",
      head: "0xadffffee9580e2e89ce27c1c4122daF8b13bd4d3087dcdf2b2c27d9f535b40",
      network: 1980
    },
    snap: {}
  }
}

```

Then we connect the nodes with the help of the following commands.

```
mmdubuntu@DESKTOP-0862V20:~$ geth attach http://127.0.0.1:8002
WARN [05-31|15:24:57.946] Enabling deprecated personal namespace
Welcome to the Geth JavaScript console!

instance: Geth/node3/v1.11.6-stable-ea9e62ca/linux-amd64/go1.20.3
at block: 0 (Thu Jan 01 1970 03:30:00 GMT+0330 (+0330))
datadir: /home/mmdubuntu/crypto/node3
modules: admin:1.0 eth:1.0 miner:1.0 net:1.0 personal:1.0 rpc:1.0 web3:1.0

To exit, press ctrl-d or type exit
> admin.addPeer("enode://90185de59e54b32799cad78ee4b815865f26d177d145170e677c4e9458557b8dcc9179a4693bc533d024c455e1ab285ba85c0b8a728d5382b6a8af20c7a660c3@127.0.0.1:30301?discport=0")
true

mmdubuntu@DESKTOP-0862V20:~$ geth attach http://127.0.0.1:8002
WARN [05-31|15:24:30.524] Enabling deprecated personal namespace
Welcome to the Geth JavaScript console!

instance: Geth/node2/v1.11.6-stable-ea9e62ca/linux-amd64/go1.20.3
at block: 0 (Thu Jan 01 1970 03:30:00 GMT+0330 (+0330))
datadir: /home/mmdubuntu/crypto/node2
modules: admin:1.0 eth:1.0 miner:1.0 net:1.0 personal:1.0 rpc:1.0 web3:1.0

To exit, press ctrl-d or type exit
> admin.addPeer("enode://90185de59e54b32799cad78ee4b815865f26d177d145170e677c4e9458557b8dcc9179a4693bc533d024c455e1ab285ba85c0b8a728d5382b6a8af20c7a660c3@127.0.0.1:30301?discport=0")
true
> net.peerCount
1
```

Now, we get the number of connections with the help of the given command, from where nodes 2 and 3 are connected to one node, we get the number one, and because



node 1 is connected to two nodes, we get the number two.

```
mmdubuntu@DESKTOP-0862V20: ~  
  discovery: 0,  
  listener: 30301  
},  
protocols: {  
  eth: {  
    config: {  
      chainId: 15,  
      eip150Block: 0,  
      eip155Block: 0,  
      eip158Block: 0,  
      homesteadBlock: 0  
    },  
    difficulty: 4000000,  
    genesis: "0x8dffffeb8580e2e89c627c1c4122daf6be13bd4d30b7dcdafeb2b2cd79f29d5b40",  
    head: "0x8dffffeb8580e2e89c627c1c4122daf6be13bd4d30b7dcdafeb2b2cd79f29d5b40",  
    network: 1900  
  },  
  snap: {}  
}  
>  
> net.peerCount  
2  
>
```

node1

```
mmdubuntu@DESKTOP-0862V20: ~  
mmdubuntu@DESKTOP-0862V20:~$ geth attach http://127.0.0.1:8002  
WARN [05-31|15:24:30.524] Enabling deprecated personal namespace  
Welcome to the Geth JavaScript console!  
  
instance: Geth/node2/v1.11.6-stable-ea9e62ca/linux-amd64/go1.20.3  
at block: 0 (Thu Jan 01 1970 03:30:00 GMT+0330 (+0330))  
datadir: /home/mmdubuntu/crypto/node2  
modules: admin:1.0 eth:1.0 miner:1.0 net:1.0 personal:1.0 rpc:1.0 web3:1.0  
  
To exit, press ctrl-d or type exit  
> admin.addPeer("enode://90185de59e54b32799cad78ee4b815865f26d177d145170e677c4e9458557b8dcc9179a4693bc533d024c455e1ab285  
ba85c0b8a728d5382b6a8af20c7a660c3@127.0.0.1:30301?discport=0")  
true  
> net.peerCount  
1  
>
```

node2

```
mmdubuntu@DESKTOP-0862V20: ~  
mmdubuntu@DESKTOP-0862V20:~$ geth attach http://127.0.0.1:8003  
WARN [05-31|15:24:57.946] Enabling deprecated personal namespace  
Welcome to the Geth JavaScript console!  
  
instance: Geth/node3/v1.11.6-stable-ea9e62ca/linux-amd64/go1.20.3  
at block: 0 (Thu Jan 01 1970 03:30:00 GMT+0330 (+0330))  
datadir: /home/mmdubuntu/crypto/node3  
modules: admin:1.0 eth:1.0 miner:1.0 net:1.0 personal:1.0 rpc:1.0 web3:1.0  
  
To exit, press ctrl-d or type exit  
> admin.addPeer("enode://90185de59e54b32799cad78ee4b815865f26d177d145170e677c4e9458557b8dcc9179a4693bc533d024c455e1ab285  
ba85c0b8a728d5382b6a8af20c7a660c3@127.0.0.1:30301?discport=0")  
true  
> net.peerCount  
1  
>
```

node3

Now we receive the accounts of each node .

```
> eth.accounts  
["0x041339ed31497969b48065bab3b507571e75ccfc"]  
> eth.getBalance(eth.accounts[0])  
1000000000810100206  
>
```

node1

```
> eth.accounts
["0xe9796e682ec7b6405c37157e784ff921897f237d"]
> eth.getBalance(eth.accounts[0])
2000000000810100206
> _
```

node2

```
> eth.accounts
["0x934c04fd1c6091c29bae78d277a7229633acc4de"]
> eth.getBalance(eth.accounts[0])
1500000000810100206
> _
```

node3

Now we transfer 1000 units from node 1 to node 3, for this purpose we first unlock node 1 and perform the transaction and then mine the transaction with the help of node 1.

```
> personal.unlockAccount(eth.accounts[0])
Unlock account 0x041339ed31497969b48065bab3b507571e75ccfc
Passphrase:
true
> eth.sendTransaction({from:eth.accounts[0], to:"0x934c04fd1c6091c29bae78d277a7229633acc4de", value:1000})
"0x11570b99556d7228f9ae163f65a6012398c2e2783420a12d3f733fb88a746efe"
> miner.start()
null
> miner.stop()
null
> eth.getBalance(eth.accounts[0])
17600000000810097206
> _
```

node1 : as you can see the 1000 credit decreased and the mine bonuse earned

## geth --help:

- First, the installed version has arrived.
- Then different commands and a brief explanation about each one.

```
COMMANDS:
  account          Manage accounts
  attach           Start an interactive JavaScript environment (connect to node)
  console          Start an interactive JavaScript environment
  db               Low level database operations
  dump             Dump a specific block from storage
  dumpconfig       Export configuration values in a TOML format
  dumpgenesis      Dumps genesis block JSON configuration to stdout
  export           Export blockchain into file
  export-preimages Export the preimage database into an RLP stream
  import           Import a blockchain file
  import-preimages Import the preimage database from an RLP stream
  init             Bootstrap and initialize a new genesis block
  js               (DEPRECATED) Execute the specified JavaScript files
  license          Display license information
  makecache        Generate ethash verification cache (for testing)
  makedag          Generate ethash mining DAG (for testing)
  removedb         Remove blockchain and state databases
  show-deprecated-flags Show flags that have been deprecated
  snapshot         A set of commands based on the snapshot
  verkle           A set of experimental verkle tree management commands
  version          Print version numbers
  version-check    Checks (online) for known Geth security vulnerabilities
  wallet           Manage Ethereum presale wallets
  help, h         Shows a list of commands or help for one command
```

- And then in the last part, which is a relatively long part, adjustable options for each subset of the command have been explained.

## Q1:

There are two types of nodes in the Ethereum network. Full nodes and light nodes.

- Full nodes have all the blocks in the blockchain and smart contracts completely, and based on them, they perform validation activities and communicate with other nodes and can validate all smart contract transactions and broadcast them on the network. .
- On the other hand, light nodes only contain blockchain headers, and if validation is needed, they get help from full nodes, and this reduces the space consumption and hardware required in these nodes.

## Q2:

Successfully sealed new block and block reached canonical chain and Imported new chain segment . These logs mean that a new block has been mined and accepted into the main chain. Details about the block are provided. Next is the Synchronisation Logs. These logs indicate the progress of synchronising with the blockchain: Block synchronisation started and Imported new state entries and Imported new block headers and Imported new block receipts. These logs mean that Geth is synchronising with the blockchain importing state entries, block headers, and block receipts. These logs show the count and performance metrics of these operations. Now we go through the Mining Activity Logs. Commit new mining work and Successfully sealed new block. They mean that new mining work is being prepared with details on the block being mined. Once mining is successful a confirmation log is generated. For the Error and Warning Logs we have Synchronisation failed and Failed to mine block.

## Q3:

Theoretically, this is possible if you have enough resources. But from a practical point of view, it is very unlikely that we will review the reasons: The ethereum network is a network with a very high hash rate, and in order to achieve our goal, we need to exceed the mining speed of the network, so that we can compensate for the distance from the genesis block to the mined blocks with this difference in mining speed. The problem is that we need more processing resources than the entire Ethereum network, which practically requires a very large investment and is almost impossible. Also, with the passage of time, the difficulty of the network increases, and this means that we must continuously increase our processing power until we reach the required number of blocks. Also, Ethereum will use proof-of-stick from some point on, which in case of trying to carry out this attack in this way, it is first necessary to enter a lot of shares of Ethereum into the mining network, which is economically unlikely. Also, due to such an issue, the network In order for a miner not to mine back to back, Ethereum considers penalty scenarios after a few back to back blocks to increase the chances of other miners to mine and reduce the risk of an attack. Also, if this amount of Ethereum is entered to mine, others will notice this attack. And they can put security measures and updates for this network.

