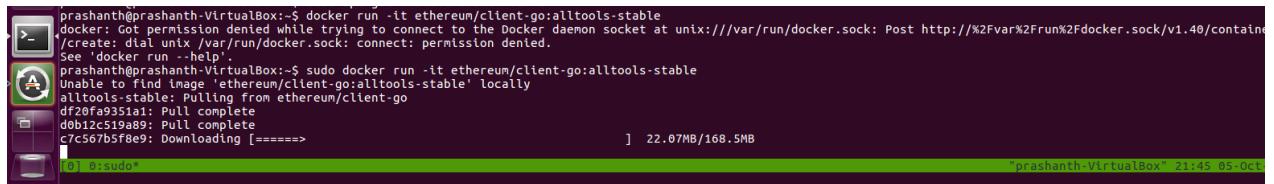


Private Ethereum By Example

creation of docker container

docker run -it ethereum/client-go:alltools-stable

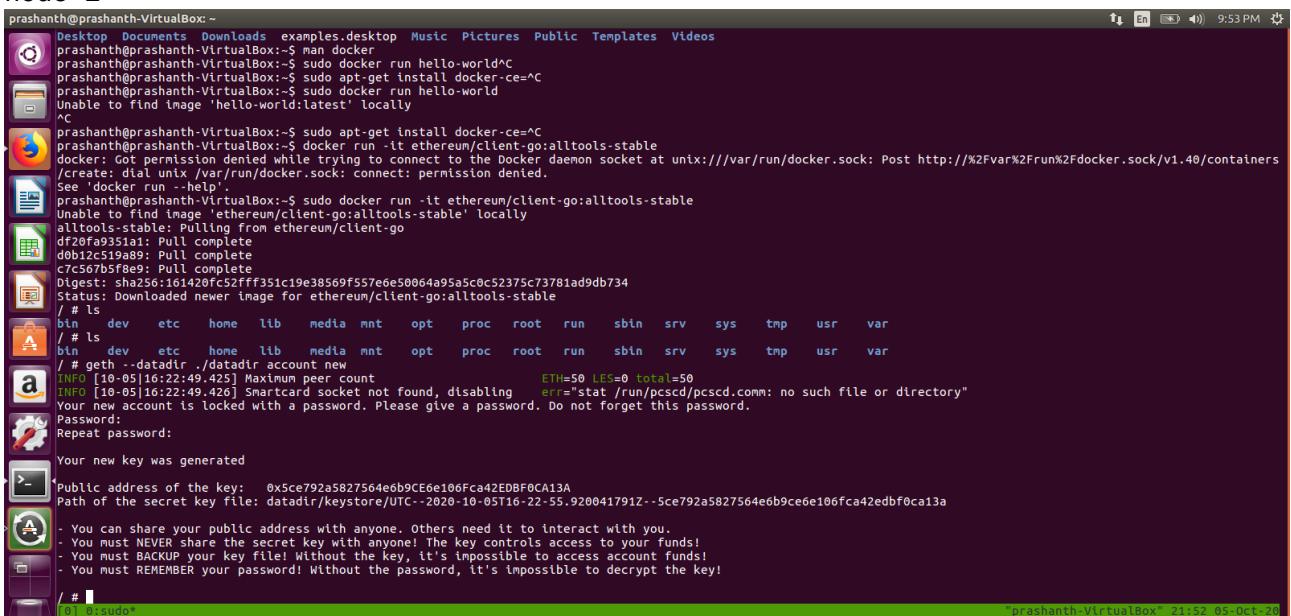


```
prashanth@prashanth-VirtualBox:~$ docker run -it ethereum/client-go:alltools-stable
docker: Got permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Post http://<ip>/v1.40/containers/create: dial unix /var/run/docker.sock: connect: permission denied.
See 'docker run --help'.
prashanth@prashanth-VirtualBox:~$ sudo docker run -it ethereum/client-go:alltools-stable
Unable to find image 'ethereum/client-go:alltools-stable' locally
alltools-stable: Pulling from ethereum/client-go
df20fa9351ai: Pull complete
d0b12c519a89: Pull complete
c7c567b5f8e9: Downloading [=====] 22.07MB/168.5MB
[ 0] 0:sudo*
```

create a new account in all the three nodes

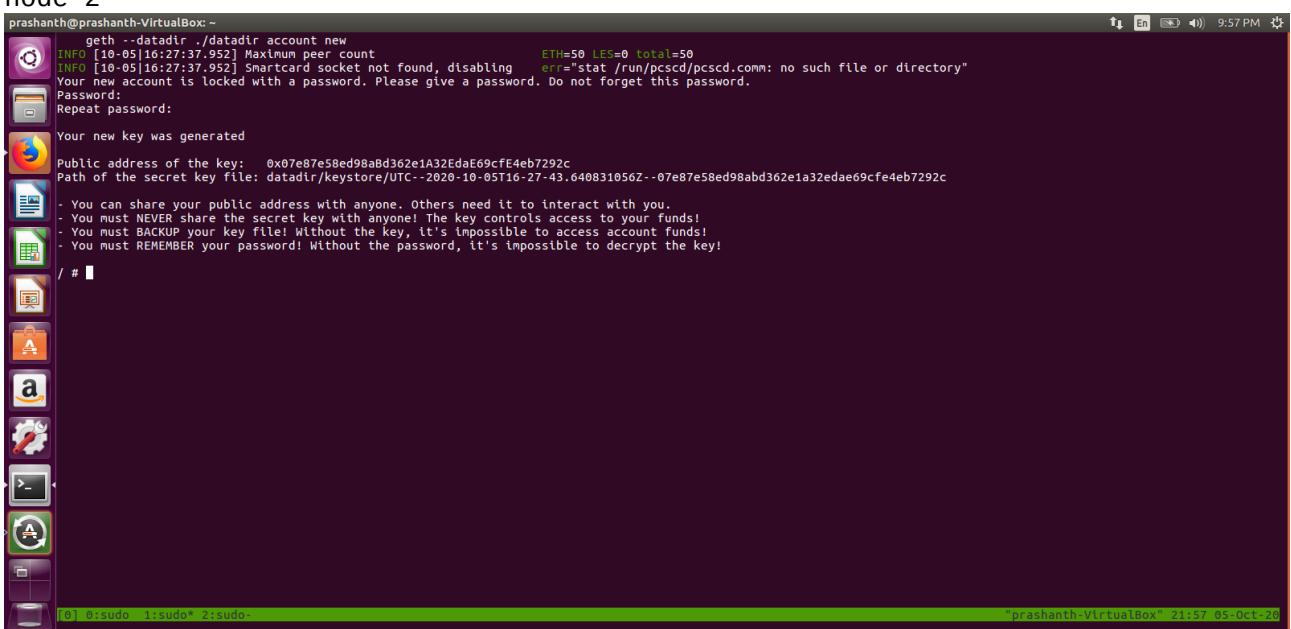
geth --datadir ./datadir account new

node 1



```
prashanth@prashanth-VirtualBox:~$ man docker
prashanth@prashanth-VirtualBox:~$ sudo docker run hello-world
prashanth@prashanth-VirtualBox:~$ sudo apt-get install docker-ce=^C
prashanth@prashanth-VirtualBox:~$ sudo docker run hello-world
^C
prashanth@prashanth-VirtualBox:~$ sudo apt-get install docker-ce=^C
prashanth@prashanth-VirtualBox:~$ docker run -it ethereum/client-go:alltools-stable
docker: Got permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Post http://<ip>/v1.40/containers/create: dial unix /var/run/docker.sock: connect: permission denied.
See 'docker run --help'.
prashanth@prashanth-VirtualBox:~$ sudo docker run -it ethereum/client-go:alltools-stable
Unable to find image 'ethereum/client-go:alltools-stable' locally
alltools-stable: Pulling from ethereum/client-go
df20fa9351ai: Pull complete
d0b12c519a89: Pull complete
c7c567b5f8e9: Pull complete
Digest: sha256:161420fc52fff351c19e38569f557e6e50064a95a5c0c52375c73781ad9db734
Status: Downloaded newer image for ethereum/client-go:alltools-stable
/ # ls
bin dev etc home lib media mnt opt proc root run sbin srv sys tmp usr var
/ # ls
bin dev etc home lib media mnt opt proc root run sbin srv sys tmp usr var
/ # geth --datadir ./datadir account new
INFO [10-05|16:22:49.425] Maximum peer count          ETH=50 LES=0 total=50
INFO [10-05|16:22:49.426] 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: 0x5ce792a5827564e6b9CE6e106Fca42EDBF0CA13A
Path of the secret key file: datadir/keystore/UTC--2020-10-05T16-22-55.920041791Z--5ce792a5827564e6b9ce6e106fca42edbf0ca13a
/ # 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!
```

node 2



```
prashanth@prashanth-VirtualBox:~$ geth --datadir ./datadir account new
INFO [10-05|16:27:37.952] Maximum peer count          ETH=50 LES=0 total=50
INFO [10-05|16:27:37.952] 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: 0x07e87e58ed98ab3d362e1a32EdaE69cfE4eb7292c
Path of the secret key file: datadir/keystore/UTC--2020-10-05T16-27-43.640831056Z--07e87e58ed98abd362e1a32edae69cf4eb7292c
/ # 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!
```

node 3

```
prashanth@prashanth-VirtualBox: ~
prashanth@prashanth-VirtualBox:~$ sudo docker run -it ethereum/client-go:alltools-stable
[sudo] password for prashanth:
/ # geth --datadir ./datadir account new
INFO [10-05|16:27:55.904] Maximum peer count           ETH=50 LFS=0 total=50
INFO [10-05|16:27:55.905] 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: 0x4B42e856618281cAAAC8d726a31417f36e92E6a4
Path of the secret key file: datadir/keystore/UTC--2020-10-05T16-28-00.608307700Z--4b42e856618281caaac8d726a31417f36e92E6a4
- 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!
/ #
```

Puppeteth

```
prashanth@prashanth-VirtualBox: ~
prashanth@prashanth-VirtualBox:~$ puppeteth
Password:
Repeat password:
Your new key was generated
Public address of the key: 0x5ce792a5827564e6b9CE6e106Fca42EDBF0CA13A
Path of the secret key file: datadir/keystore/UTC--2020-10-05T16-22-55.920041791Z--5ce792a5827564e6b9ce6e106fca42edbf0ca13a
- 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!
/ # puppeteth
+-----+
| Welcome to puppeteth, your Ethereum private network manager |
| This tool lets you create a new Ethereum network down to      |
| the genesis block, bootnodes, miners and ethstats servers     |
| without the hassle that it would normally entail.           |
|                                                               |
| Puppeteth uses SSH to dial in to remote servers, and builds |
| its network components out of Docker containers using the    |
| docker-compose toolset.                                         |
+-----+
a Please specify a network name to administer (no spaces, hyphens or capital letters please)
> PES1201800410
ERROR [10-05|16:24:20.328] I also like to live dangerously, still no spaces, hyphens or capital letters
> pes1201800410
Sweet, you can set this via --network=pes1201800410 next time!
> INFO [10-05|16:24:34.757] Administering Ethereum network
WARN [10-05|16:24:34.757] No previous configurations found          name=pes1201800410
path=/root/.puppeteth/pes1201800410
> 
> What would you like to do? (default = stats)
  1. Show network stats
  2. Configure new genesis
  3. Track new remote server
  4. Deploy network components
> 1
[0] 0:sudo*
```

```
prashanth@prashanth-VirtualBox: ~
> pes1201800410
Sweet, you can set this via --network=pes1201800410 next time!
INFO [10-05|16:24:34.757] Administering Ethereum network      name=pes1201800410
WARN [10-05|16:24:34.757] No previous configurations found    path=/root/.puppet/pes1201800410

What would you like to do? (default = stats)
1. Show network stats
2. Configure new genesis
3. Track new remote server
4. Deploy network components
> 2

What would you like to do? (default = create)
1. Create new genesis from scratch
2. Import already existing genesis
> 1

Which consensus engine to use? (default = clique)
1. Ethash - proof-of-work
2. Clique - proof-of-authority
> 2

How many seconds should blocks take? (default = 15)
>

Which accounts are allowed to seal? (mandatory at least one)
> 0x5ce792a5827564e6b9cE6e106FcA42EDBF0CA13A
> 0x

Which accounts should be pre-funded? (advisable at least one)
> 0x5ce792a5827564e6b9cE6e106FcA42EDBF0CA13A
> 0x07e87e58ed98ab3d62e1A32EddE69cfE4eb7292c
> 0x4b42e856618281cAAC8d726a31417F36e92E6a4
> 0x

Should the precompile-addresses (0x1 .. 0xff) be pre-funded with 1 wei? (advisable yes)
>

Specify your chain/network ID if you want an explicit one (default = random)
> 1
1:0:0:sudo* 1:sudo 2:sudo-                                     "prashanth-VirtualBox" 22:10 05-Oct-20
```

```
prashanth@prashanth-VirtualBox: ~
> 0x
Which accounts should be pre-funded? (advisable at least one)
> 0x5ce792a5827564e6b9cE6e106FcA42EDBF0CA13A
> 0x07e87e58ed98ab3d62e1A32EddE69cfE4eb7292c
> 0x4b42e856618281cAAC8d726a31417F36e92E6a4
> 0x

Should the precompile-addresses (0x1 .. 0xff) be pre-funded with 1 wei? (advisable yes)
>

Specify your chain/network ID if you want an explicit one (default = random)
>
INFO [10-05|16:41:01.123] Configured new genesis block

What would you like to do? (default = stats)
1. Show network stats
2. Manage existing genesis
3. Track new remote server
4. Deploy network components
> 2

1. Modify existing configurations
2. Export genesis configurations
3. Remove genesis configuration
> 2

Which folder to save the genesis specs into? (default = current)
Will create pes1201800410.json, pes1201800410-aleth.json, pes1201800410-parity.json
>
INFO [10-05|16:42:10.205] Saved native genesis chain spec      path=pes1201800410.json
ERROR[10-05|16:42:10.205] Failed to create Aleth chain spec   errr="unsupported consensus engine"
ERROR[10-05|16:42:10.205] Failed to create Parity chain spec   errr="unsupported consensus engine"
INFO [10-05|16:42:10.206] Saved genesis chain spec             client=harmony path=pes1201800410-harmony.json

What would you like to do? (default = stats)
1. Show network stats
2. Manage existing genesis
3. Track new remote server
4. Deploy network components
> ^C
1:0:0:sudo* 1:sudo 2:sudo-                                     "prashanth-VirtualBox" 22:12 05-Oct-20
```

renaming to genesis.json and removing harmony.json

```
prashanth@prashanth-VirtualBox: ~
[1] 0:sudo* 1:sudo 2:sudo-
prashanth@prashanth-VirtualBox: ~
/ # ls
bin          home        opt           root        sys
datadir      lib         pes1201800410-harmony.json run
dev          media       pes1201800410.json    sbin      tmp
etc          mnt         proc          srv       usr
/ # rm pes1201800410-harmony.json
/ # ls
bin          etc        media       pes1201800410.json run
datadir      lib         opt         proc          sbin      sys
dev          lib         mnt         root          srv      tmp
/ # mv pes1201800410.json genesis.json
/ #
```

copy genesis.json to all the three nodes
geth --datadir ./datadir init genesis.json

on node 1

```
prashanth@prashanth-VirtualBox: ~
[1] 0:sudo* 1:sudo 2:sudo-
prashanth@prashanth-VirtualBox: ~
/ # geth --datadir ./datadir init genesis.json
INFO [10-05|16:51:01.859] Maximum peer count
INFO [10-05|16:51:01.859] Smartcard socket not found, disabling
ERROR [10-05|16:51:01.859] Failed to enumerate USB devices
"
ERROR [10-05|16:51:01.860] Failed to enumerate USB devices
INFO [10-05|16:51:01.861] Set global gas cap
INFO [10-05|16:51:01.862] Allocated cache and file handles
INFO [10-05|16:51:01.895] Writing custom genesis block
INFO [10-05|16:51:01.922] Persisted trie from memory database
INFO [10-05|16:51:01.923] Successfully wrote genesis state
INFO [10-05|16:51:01.923] Allocated cache and file handles
INFO [10-05|16:51:01.940] Writing custom genesis block
INFO [10-05|16:51:01.947] Persisted trie from memory database
INFO [10-05|16:51:01.947] Successfully wrote genesis state
"
cap=25000000
database=/datadir/geth/chaindata cache=16.00MiB handles=16
nodes=360 size=51.05KiB time=3.266791ms gcnodes=0 gctime=0s livenodes=1 livesize=0.00B
database=chaindata hash="417aa3..5923fb"
database=/datadir/geth/lightchaindata cache=16.00MiB handles=16
nodes=360 size=51.05KiB time=1.652589ms gcnodes=0 gctime=0s livenodes=1 livesize=0.00B
database=lightchaindata hash="417aa3..5923fb"
/ #
```

on node 2

```
prashanth@prashanth-VirtualBox: ~
  geth --datadir ./datadir init genesis.json
INFO [10-05|16:51:46.273] Maximum peer count
INFO [10-05|16:51:46.273] Smartcard socket not found, disabling
ERROR[10-05|16:51:46.273] Failed to enumerate USB devices
" "
ERROR[10-05|16:51:46.274] Failed to enumerate USB devices
" "
ERROR[10-05|16:51:46.274] Failed to enumerate USB devices
INFO [10-05|16:51:46.274] Set global gas cap
INFO [10-05|16:51:46.288] Allocated cache and file handles
INFO [10-05|16:51:46.288] Writing custom genesis block
INFO [10-05|16:51:46.293] Persisted trie from memory database
INFO [10-05|16:51:46.293] Successfully wrote genesis state
INFO [10-05|16:51:46.293] Allocated cache and file handles
INFO [10-05|16:51:46.307] Writing custom genesis block
INFO [10-05|16:51:46.311] Persisted trie from memory database
INFO [10-05|16:51:46.311] Successfully wrote genesis state
/ #"

ETH=50 LES=0 total=50
err="stat /run/pcscd/pcscd.comm: no such file or directory"
hub=ledger vendor=11415 fallcount=1 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=trezor vendor=21324 fallcount=1 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=trezor vendor=4617 fallcount=1 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=ledger vendor=11415 fallcount=2 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=trezor vendor=21324 fallcount=2 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=trezor vendor=4617 fallcount=2 err="failed to initialize libusb: libusb: unknown error [code -99]"
cap=25000000
database=/datadir/geth/chaindata cache=16.00MiB handles=16
nodes=360 size=51.05KiB time="902.097µs" gcnodes=0 gctime=0s livenodes=1 livesize=0.00B
database=chaindata hash="417aa3..5923fb"
database=/datadir/geth/lightchaindata cache=10.00MiB handles=16
nodes=360 size=51.05KiB time="957.658µs" gcnodes=0 gctime=0s livenodes=1 livesize=0.00B
database=lightchaindata hash="417aa3..5923fb"

[0] 0:sudo 1:sudo* 2:sudo*                                     "prashanth-VirtualBox" 22:21 05-Oct-20
```

on node 3

```
prashanth@prashanth-VirtualBox: ~
  geth --datadir ./datadir init genesis.json
INFO [10-05|16:52:05.022] Maximum peer count
INFO [10-05|16:52:05.023] Smartcard socket not found, disabling
ERROR[10-05|16:52:05.030] Failed to enumerate USB devices
" "
ERROR[10-05|16:52:05.030] Failed to enumerate USB devices
ERROR[10-05|16:52:05.030] Failed to enumerate USB devices
" "
ERROR[10-05|16:52:05.031] Failed to enumerate USB devices
ERROR[10-05|16:52:05.031] Failed to enumerate USB devices
" "
INFO [10-05|16:52:05.033] Set global gas cap
INFO [10-05|16:52:05.033] Allocated cache and file handles
INFO [10-05|16:52:05.070] Writing custom genesis block
INFO [10-05|16:52:05.083] Persisted trie from memory database
INFO [10-05|16:52:05.085] Successfully wrote genesis state
INFO [10-05|16:52:05.085] Allocated cache and file handles
INFO [10-05|16:52:05.101] Writing custom genesis block
INFO [10-05|16:52:05.108] Persisted trie from memory database
INFO [10-05|16:52:05.108] Successfully wrote genesis state
/ #"

ETH=50 LES=0 total=50
err="stat /run/pcscd/pcscd.comm: no such file or directory"
hub=ledger vendor=11415 fallcount=1 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=trezor vendor=21324 fallcount=1 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=trezor vendor=4617 fallcount=1 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=ledger vendor=11415 fallcount=2 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=trezor vendor=21324 fallcount=2 err="failed to initialize libusb: libusb: unknown error [code -99]"
hub=trezor vendor=4617 fallcount=2 err="failed to initialize libusb: libusb: unknown error [code -99]"
cap=25000000
database=/datadir/geth/chaindata cache=16.00MiB handles=16
nodes=360 size=51.05KiB time=2.996582ms gcnodes=0 gctime=0s livenodes=1 livesize=0.00B
database=chaindata hash="417aa3..5923fb"
database=/datadir/geth/lightchaindata cache=16.00MiB handles=16
nodes=360 size=51.05KiB time=1.635563ms gcnodes=0 gctime=0s livenodes=1 livesize=0.00B
database=lightchaindata hash="417aa3..5923fb"

[0] 0:sudo 1:sudo* 2:sudo*                                     "prashanth-VirtualBox" 22:22 05-Oct-20
```

connecting to the blockchain network
geth --datadir ./datadir --nat extip:`hostname -i` console

```

prashanth@prashanth-VirtualBox: ~
[ 10-05|16:54:56.058] Failed to enumerate USB devices
INFO [10-05|16:54:56.059] Set global gas cap
INFO [10-05|16:54:56.060] Allocated trie memory caches
INFO [10-05|16:54:56.390] Opened ancient database
INFO [10-05|16:54:56.393] Initialised chain configuration
ium: 0 Constantinople: 0 Petersburg: 0 Istanbul: 0, Muir Glacier: <nil>, YOLO v1: <nil>, Engne: clique"
INFO [10-05|16:54:56.396] Initialising Ethereum protocol
WARN [10-05|16:54:56.396] Upgrade blockchain database version
INFO [10-05|16:54:400] Loaded most recent local header
INFO [10-05|16:54:56.400] Loaded most recent local full block
INFO [10-05|16:54:56.400] Loaded most recent local fast block
INFO [10-05|16:54:56.403] Regenerated local transaction journal
INFO [10-05|16:54:56.433] Allocated fast sync bloom
INFO [10-05|16:54:56.435] Starting peer-to-peer node
INFO [10-05|16:54:56.435] Stored checkpoint snapshot to disk
INFO [10-05|16:54:56.451] Mapped network port
INFO [10-05|16:54:56.451] Mapped network port
INFO [10-05|16:54:56.460] New local node record
2edad0e8d6a1ad5ef1767de50f2371216061894@172.17.0.2:30303
INFO [10-05|16:54:56.477] IP endpoint opened
INFO [10-05|16:54:56.592] Etherbase automatically configured
Welcome to the Geth JavaScript console!

instance: Geth/v1.9.22-stable-c71a7e26/linux-amd64/go1.15.2
coinbase: 0x5ce792a5827564e6b9ce6e106fc42edbfb0ca13a
at block: 0 (Mon Oct 05 2020 16:36:01 GMT+0000 (UTC))
datadir: /datadir
modules: admin:1.0 clique: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
>_ > [ERROR[10-05|16:54:57.085] Failed to enumerate USB devices
[ERROR[10-05|16:54:57.085] Failed to enumerate USB devices
[ERROR[10-05|16:54:57.085] Failed to enumerate USB devices
INFO [10-05|16:54:58.271] Initialzed fast sync bloom
INFO [10-05|16:55:06.516] Looking for peers
hub=trezor vendor=4617 fallcount=2 err="failed to initialize libusb: libusb: unknown error [code -99]"
cap=25000000
clean=328.00MB dirty=328.00MB
database=/datadir/geth/chaindata cache=657.00MB handles=524288
conflict=[ChainID: 55751 Homestead: 0 DAO: <nil> DAOSupport: false EIP150: 0 EIP155: 0 EIP158: 0 Byzantium: 0 Constantinople: 0 Petersburg: 0 Istanbul: 0, Muir Glacier: <nil>, YOLO v1: <nil>, Engne: clique"]
version='[65 64 63]' network=1 dbversion=<nil>
from=<nil> to=8
number=0 hash="417aa3..5923fb" td=1 age=18m55s
number=0 hash="417aa3..5923fb" td=1 age=18m55s
number=0 hash="417aa3..5923fb" td=1 age=18m55s
transaction=0 account=0
size=656.00MB
instance=Geth/v1.9.22-stable-c71a7e26/linux-amd64/go1.15.2
number=0 hash="417aa3..5923fb"
proto=tcp export=30303 lntport=30303 interface=ExtIP(172.17.0.2)
proto=udp export=30303 lntport=30303 interface=ExtIP(172.17.0.2)
seq=1 id=f0654fff/e43abec ip=172.17.0.2 udp=30303 tcp=30303
self=enode://dd15c2708f55443cc7c4951a8511b3960527d6a6d15c5b1ef875b635e31ec1374a98bfe1a9446bb31d8f4685
url=/datadir/geth.lpc
address=0x5ce792a5827564e6b9CE6e106Fca42EDBF0CA13A
"prashanth-VirtualBox" 22:25 05-Oct-20
```

let try with by loggin in password.txt

```

prashanth@prashanth-VirtualBox: ~
/ # cat > password.txt
12345
^C
/ # !
```

node 1

```

prashanth@prashanth-VirtualBox: ~
[10-05|16:57:13.202] Allocated trie memory caches
[10-05|16:57:13.202] Allocated cache and file handles
[10-05|16:57:13.226] Opened ancient database
[10-05|16:57:13.227] Initialised chain configuration
tun: 0 Constantinople: 0 Petersburg: 0 Istanbul: 0, Muir Glacier: <nil>, YOLO v1: <nil>, Engine: clique"
INFO [10-05|16:57:13.227] Initialising Ethereum protocol
INFO [10-05|16:57:13.228] Loaded most recent local header
INFO [10-05|16:57:13.228] Loaded most recent local full block
INFO [10-05|16:57:13.228] Loaded most recent local fast block
INFO [10-05|16:57:13.228] Loaded local transaction journal
INFO [10-05|16:57:13.228] Regenerated local transaction journal
INFO [10-05|16:57:13.238] Allocated fast sync bloom
INFO [10-05|16:57:13.238] Starting peer-to-peer node
INFO [10-05|16:57:13.263] Mapped network port
INFO [10-05|16:57:13.263] Mapped network port
INFO [10-05|16:57:13.272] New local node record
INFO [10-05|16:57:13.276] Started P2P networking
2e0daea8d61ad5ef1767de50f2371216061894@172.17.0.2:30303
[10-05|16:57:13.278] IP endpoint opened
url=/datadir/geth.ipc
[10-05|16:57:13.279] -----
WARN [10-05|16:57:13.279] Referring to accounts by order in the keystore folder is dangerous!
WARN [10-05|16:57:13.279] This functionality is deprecated and will be removed in the future!
WARN [10-05|16:57:13.279] Please use explicit addresses! (can search via `geth account list`)
[10-05|16:57:13.279] -----
INFO [10-05|16:57:13.434] Initialised fast sync bloom
ERROR [10-05|16:57:14.203] Failed to enumerate USB devices
[10-05|16:57:14.203] Failed to enumerate USB devices
[10-05|16:57:14.203] Failed to enumerate USB devices
INFO [10-05|16:57:16.143] Unlocked account
INFO [10-05|16:57:16.219] Etherbase automatically configured
Welcome to the Geth JavaScript console!

instance: Geth/v1.9.22-stable-c71a7e26/linux-amd64/go1.15.2
coinbase: 0x5ce792a5827564eb9c66e106fcfa42edbf0ca13a
at block: 0 (Mon Oct 05 2020 16:36:01 GMT+0000 (UTC))
datadir: /datadir/
modules: admin:1.0 clique: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
> [1] 0:sudo* 1:sudo* 2:sudo*                                     "prashanth-VirtualBox" 22:27 05-Oct-20

```

node 2 similar to node 3

```

prashanth@prashanth-VirtualBox: ~
[10-05|16:59:10.895] Allocated cache and file handles
[10-05|16:59:10.939] Opened ancient database
[10-05|16:59:10.943] Initialised chain configuration
tun: 0 Constantinople: 0 Petersburg: 0 Istanbul: 0, Muir Glacier: <nil>, YOLO v1: <nil>, Engine: clique"
INFO [10-05|16:59:10.943] Initialising Ethereum protocol
INFO [10-05|16:59:10.948] Upgrade blockchain database version
INFO [10-05|16:59:10.948] Loaded most recent local header
INFO [10-05|16:59:10.948] Loaded most recent local full block
INFO [10-05|16:59:10.948] Loaded most recent local fast block
INFO [10-05|16:59:10.950] Regenerated local transaction journal
INFO [10-05|16:59:10.968] Allocated fast sync bloom
INFO [10-05|16:59:10.969] Starting peer-to-peer node
INFO [10-05|16:59:10.971] Stored checkpoint snapshot to disk
INFO [10-05|16:59:11.023] Mapped network port
INFO [10-05|16:59:11.023] Mapped network port
INFO [10-05|16:59:11.024] New local node record
INFO [10-05|16:59:11.025] Started P2P networking
e1a2498ba7ef9c03ff5ed8318b393613d3aa2190172.17.0.4:30303
[10-05|16:59:11.027] IP endpoint opened
url=/datadir/geth.ipc
[10-05|16:59:11.027] -----
WARN [10-05|16:59:11.028] Referring to accounts by order in the keystore folder is dangerous!
WARN [10-05|16:59:11.028] This functionality is deprecated and will be removed in the future!
WARN [10-05|16:59:11.028] Please use explicit addresses! (can search via `geth account list`)
[10-05|16:59:11.028] -----
ERROR [10-05|16:59:11.897] Failed to enumerate USB devices
[10-05|16:59:11.897] Failed to enumerate USB devices
[10-05|16:59:11.897] Failed to enumerate USB devices
INFO [10-05|16:59:12.310] Initialised fast sync bloom
INFO [10-05|16:59:13.215] Unlocked account
INFO [10-05|16:59:13.548] Etherbase automatically configured
Welcome to the Geth JavaScript console!

instance: Geth/v1.9.22-stable-c71a7e26/linux-amd64/go1.15.2
coinbase: 0x4b42e856618281caaaa8d726a31417f36e92e6a4
at block: 0 (Mon Oct 05 2020 16:36:01 GMT+0000 (UTC))
datadir: /datadir/
modules: admin:1.0 clique: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
> [1] 0:sudo* 1:sudo* 2:sudo*                                     "prashanth-VirtualBox" 22:29 05-Oct-20

```

find node address using admin.nodeInfo.enode to add peers
node 1 info

```
prashanth@prashanth-VirtualBox: ~
> admin.nodeInfo.enode
"enode://355029f509fd9a7db81f187ce2baa3f96b800fc94dc294afe0f98c4893fad5b16e167fe55b4a43a18d93e1426e1a2498ba7ef9c03ff5ed0318b393613d3aa219@172.17.0.4:30303"
> [ ]
```

Ubuntu desktop icons

```
[0] 0:sudo -1:sudo- 2:sudo* "prashanth-VirtualBox" 22:29 05-Oct-20
```

node 2 info

```
prashanth@prashanth-VirtualBox: ~
> admin.nodeInfo.enode
"enode://d01sc2708f55443cc7c4951a8511b3960527d6ad15c5b51ef875b635e31ec1374a98bfe1a9446bb31d8f46852e6dae68d6a1ad5ef1767de50f2371216061894@172.17.0.2:30303"
> [ ]
```

Ubuntu desktop icons

```
[0] 0:sudo* 1:sudo- 2:sudo* "prashanth-VirtualBox" 22:29 05-Oct-20
```

node 3 info

```

prashanth@prashanth-VirtualBox: ~
> INFO [10-05|17:00:10.692] Looking for peers          peercount=2 tried=54 static=0
> admin.nodeInfo.enode
'enode://40354614637a1b3952218bd61d2f8db0f3adab5d68d18a5b292a76a28072c8c1230c04d771a757335822ab52c94b1ad7e6291dced86c2f0c9454d396ae202de4@172.17.0.3:30303'
> █

```

File Manager

Firefox

FileZilla

Filebeat

Apache

Amazon

Redis

MySQL

Git

Terminal

```

[0] 0:sudo* 1:sudo* 2:sudo*                               "prashanth-VirtualBox" 22:30 05-Oct-20

```

add peers using `admin.addPeer("client address")`

list all peers using `admin.peers`
for node 1

```

prashanth@prashanth-VirtualBox: ~
> admin.peers
[{
  caps: ["eth/63", "eth/64", "eth/65"],
  enode: "enode://355029f509fd9a7db81f187ce2baa3f96b800fc94dc294afe0f98c4893fad5b16e167fe55b4a43a18d93e1426e1a2498ba7ef9c03ff5ed0318b393613d3aa219@172.17.0.4:30303",
  id: "94210e2c4fd1e4002de73ed7e45981c9fefdbfb8475327cdb423893334469",
  name: "Geth/v1.9.22-stable-c71a7e26/llinux-and64/go1.15.2",
  network: {
    inbound: false,
    localAddress: "172.17.0.2:39200",
    remoteAddress: "172.17.0.4:30303",
    static: true,
    trusted: false
  },
  protocols: {
    eth: {
      difficulty: 1,
      head: "0x417aa3c63b22e0742a7d4e9810064ea63257b8d9d2a89920fe04e780415923fb",
      version: 65
    }
  }
}, {
  caps: ["eth/63", "eth/64", "eth/65"],
  enode: "enode://40354614637a1b3952218bd61d2f8db0f3adab5d68d18a5b292a76a28072c8c1230c04d771a757335822ab52c94b1ad7e6291dced86c2f0c9454d396ae202de4@172.17.0.3:40662",
  id: "ff2f6867783c3fbff71496ed7e19f7d1f7fff0cd507b0f4adbc1b67a3bfec4d",
  name: "Geth/v1.9.22-stable-c71a7e26/llinux-and64/go1.15.2",
  network: {
    inbound: true,
    localAddress: "172.17.0.2:30303",
    remoteAddress: "172.17.0.3:40662",
    static: false,
    trusted: false
  },
  protocols: {
    eth: {
      difficulty: 1,
      head: "0x417aa3c63b22e0742a7d4e9810064ea63257b8d9d2a89920fe04e780415923fb",
      version: 65
    }
  }
}]
> █

```

File Manager

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Git

Terminal

```

[0] 0:sudo* 1:sudo* 2:sudo*                               "prashanth-VirtualBox" 23:05 05-Oct-20

```

node 2 peers

```
prashanth@prashanth-VirtualBox: ~
> admin.peers
[[{"caps": ["eth/63", "eth/64", "eth/65"], "enode": "enode://355029f509fd9a7db81f187ce2baa3f96b800fc94dc294afe0f98c4893fad5b16e167fe55b4a43a18d93e1426e1a2498ba7ef9c03ff5ed0318b393613d3aa219@172.17.0.4:57564", "id": "94210e2c4fd1e4082debf3ed7e45981c9fefdbfb8475327cdb423893334469", "name": "Geth/v1.9.22-stable-c71a7e26/linux-and64/go1.15.2", "network": {"inbound: true, "localAddress: "172.17.0.3:30303", "remoteAddress: "172.17.0.4:57564", "static: false, "trusted: false"}, "protocols: { "eth: { "difficulty: 1, "head: "0x417aa3c63b22e0742a7d4e9810064ea63257b8d9d2a89920fe04e780415923fb", "version: 05 } } }, {"caps": ["eth/63", "eth/64", "eth/65"], "enode": "enode://d615c2708f55443cc/c4951a8511b3960527d6a6d15c5b51ef875b635e31ec1374a98bfe1a9446bb31d8f46852e6dae68d6a1ad5ef1767de50f2371216061894@172.17.0.2:30303", "id": "f0054ffff43a8ec9dbdb02fc83cfeeee1980d703e1e533b442b4de160f45f0c", "name": "Geth/v1.9.22-stable-c71a7e26/linux-and64/go1.15.2", "network": {"inbound: false, "localAddress: "172.17.0.3:40662", "remoteAddress: "172.17.0.2:30303", "static: true, "trusted: false"}, "protocols: { "eth: { "difficulty: 1, "head: "0x417aa3c63b22e0742a7d4e9810064ea63257b8d9d2a89920fe04e780415923fb", "version: 05 } } } ]]
> [ 0: sudo- 1:sudo* 2:sudo* ] "prashanth-VirtualBox" 23:00 05-Oct-20
```

node 3 peers

```
prashanth@prashanth-VirtualBox: ~
> admin.peers
[[{"caps": ["eth/63", "eth/64", "eth/65"], "enode": "enode://d615c2708f55443cc/c4951a8511b3960527d6a6d15c5b51ef875b635e31ec1374a98bfe1a9446bb31d8f46852e6dae68d6a1ad5ef1767de50f2371216061894@172.17.0.2:39200", "id": "f0054ffff43a8ec9dbdb02fc83cfeeee1980d703e1e533b442b4de160f45f0c", "name": "Geth/v1.9.22-stable-c71a7e26/linux-and64/go1.15.2", "network": {"inbound: true, "localAddress: "172.17.0.4:39200", "remoteAddress: "172.17.0.2:39200", "static: false, "trusted: false"}, "protocols: { "eth: { "difficulty: 1, "head: "0x417aa3c63b22e0742a7d4e9810064ea63257b8d9d2a89920fe04e780415923fb", "version: 05 } } }, {"caps": ["eth/63", "eth/64", "eth/65"], "enode": "enode://40354614617a1b3952218bd61d2f8db0f3adab5d68d18a5b292a76a28072c8c1230c04d771a757335822ab52c94b1ad7e6291dced86c2f0c9454d396ae202de4@172.17.0.3:30303", "id": "ff2f6867783c3fbff71496ed7e19f7df1f7ff0cd587ebf4adb1c67a3bfec4d", "name": "Geth/v1.9.22-stable-c71a7e26/linux-and64/go1.15.2", "network": {"inbound: false, "localAddress: "172.17.0.4:57564", "remoteAddress: "172.17.0.3:30303", "static: true, "trusted: false"}, "protocols: { "eth: { "difficulty: 1, "head: "0x417aa3c63b22e0742a7d4e9810064ea63257b8d9d2a89920fe04e780415923fb", "version: 05 } } } ]]
> [ 0: sudo- 1:sudo* 2:sudo* ] "prashanth-VirtualBox" 23:00 05-Oct-20
```

start mining
miner.start(1)

```
prashanth@prashanth-VirtualBox: ~
> miner.start(1) INFO [10-05|17:37:52.548] Looking for peers
INFO [10-05|17:37:52.677] Transaction pool price threshold updated price=1000000000
null
INFO [10-05|17:37:52.678] Commit new mining work
> WARN [10-05|17:37:52.687] Block sealing failed
  number=1 sealhash="0e7b9f_00d0bd" uncles=0 txs=0 gas=0 fees=0 elapsed="525.645µs"
    err="unauthorized signer"
[0] 0:sudo - 1:sudo- 2:sudo*                                     "prashanth-VirtualBox" 23:07 05-Oct-20
```

we can observe we don't have authority to start mining
so we go to authorized node and start mining

```
prashanth@prashanth-VirtualBox: ~
> miner.start(1) INFO [10-05|17:38:20.504] Transaction pool price threshold updated price=1000000000
INFO [10-05|17:38:20.506] Commit new mining work
> INFO [10-05|17:38:20.510] Successfully sealed new block
INFO [10-05|17:38:20.510] ↵mined potential block
INFO [10-05|17:38:20.512] Commit new mining work
  number=1 sealhash="e4b685_8ffed2" uncles=0 txs=0 gas=0 fees=0 elapsed=1.552ms
  number=1 sealhash="e4b685_8ffed2" hash="de33e4..920503" elapsed=4.208ms
  number=1 hash="de33e4..920503"
  number=2 sealhash="73e760..32bb9c" uncles=0 txs=0 gas=0 fees=0 elapsed=1.491ms
[0] 0:sudo* 1:sudo 2:sudo-                                     "prashanth-VirtualBox" 23:08 05-Oct-20
```

mining logs on all nodes
node 2 logs

```

prashanth@prashanth-VirtualBox: ~
[10-05|17:36:12.496] Looking for peers          peercount=2 tried=4 static=2
INFO [10-05|17:36:22.498] Looking for peers      peercount=2 tried=0 static=2
INFO [10-05|17:36:32.885] Looking for peers      peercount=2 tried=4 static=2
INFO [10-05|17:36:46.513] Looking for peers      peercount=2 tried=3 static=2
INFO [10-05|17:36:57.500] Looking for peers      peercount=2 tried=3 static=2
INFO [10-05|17:37:09.027] Looking for peers      peercount=2 tried=2 static=2
INFO [10-05|17:37:21.513] Looking for peers      peercount=2 tried=0 static=2
WARN [10-05|17:38:20.515] Fast syncing, discarded propagated block number=1 hash="de33e4...920503"
[10 0: sudo- 1:sudo- 2:sudo* "prashanth-VirtualBox" 23:08 05-Oct-20

```

node 3 logs

```

prashanth@prashanth-VirtualBox: ~
[10-05|17:38:20.512] Fast syncing, discarded propagated block number=1 hash="de33e4...920503"
peercount=2 tried=3 static=2
INFO [10-05|17:38:23.599] Looking for peers      peercount=2 tried=3 static=2
INFO [10-05|17:38:33.601] Looking for peers      peercount=2 tried=4 static=2
INFO [10-05|17:38:35.029] Block synchronisation started
INFO [10-05|17:38:35.039] Mining aborted due to sync
INFO [10-05|17:38:35.039] Imported new block headers
INFO [10-05|17:38:35.039] Downloader queue stats
INFO [10-05|17:38:35.041] Imported new chain segment
INFO [10-05|17:38:35.041] Fast sync complete, auto disabling
INFO [10-05|17:38:35.042] Commit new mining work
WARN [10-05|17:38:35.042] Block sealing failed
INFO [10-05|17:38:35.043] Commit new mining work
INFO [10-05|17:38:43.603] Looking for peers
INFO [10-05|17:38:50.015] Imported new chain segment
INFO [10-05|17:38:50.016] Commit new mining work
WARN [10-05|17:38:50.016] Block sealing failed
INFO [10-05|17:38:53.005] Looking for peers
peerCount=2 tried=3 static=2
count=2 elapsed=2.942ms number=2 hash="548099...4c1063"
receiptTask=0 blockTasks=0 itemSize=121.798 throttle=8192
blocks=2 txs=0 mgas=0.000 elapsed=1.409ms mgasps=0.000 number=2 hash="548099...4c1063" dirty=0.008
number=3 sealhash="7a0a26...8f33dc" uncles=0 txs=0 gas=0 fees=0 elapsed="781.215µs"
err="unauthorized signer"
number=3 sealhash="7a0a26...8f33dc" uncles=0 txs=0 gas=0 fees=0 elapsed="250.189µs"
peerCount=2 tried=4 static=2
block=1 txs=0 mgas=0.000 elapsed=6.317ms mgasps=0.000 number=3 hash="d46900...fdee2f" dirty=0.008
number=4 sealhash="610467...d5945e" uncles=0 txs=0 gas=0 fees=0 elapsed="615.724µs"
err="unauthorized signer"
peerCount=2 tried=3 static=2
[10 0: sudo- 1:sudo- 2:sudo* "prashanth-VirtualBox" 23:08 05-Oct-20

```

we can observe a block is created every 15 secs