Aula 019 - Prática sobre *Ethereum*: *Visão Geral*

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A proposta desta aula é termos uma Visão Geral sobre rede **Ethereum**, componentes do Ecossistema *Ethereum*. Instalando *Wallets* e *softwares* clientes, com a execução de ferramentas e APIs.

Sumário

1 Leitura do Capítulo 12: *Futher Ethereum*

1. Faça a leitura do Capítulo 12: *Futher Ethereum*

2. Instalar as ferramentas e testar os comandos apresentados no capítulo.

O cliente padrão `Geth` pode ser instalado em sistema derivados do Ubuntu:

```
1 $ sudo apt-get install -y software-properties-common
2 $ sudo add-apt-repository -y ppa:ethereum/ethereum
3 $ sudo apt-get update
4 $ sudo apt-get install -y ethereum
```

Em outros Sistemas como o `Manjaro`:

```
1 [rag@nitro-ryzen ~]$ sudo pacaur -Ss ethereum
2 community/go-ethereum 1.10.25-1 [instalado]
3     Official Go implementation of the Ethereum protocol
4 [rag@nitro-ryzen ~]$ sudo pacaur -S go-ethereum
5 [rag@nitro-ryzen ~]$ pacaur -S go-ethereum
6 resolvendo dependencias...
7 procurando pacotes conflitantes...
8
9 Pacotes (1) go-ethereum-1.10.25-1
10
11 Tamanho total instalado: 197,38 MiB
12 Alteração no tamanho: 0,00 MiB
13
14 :: Continuar a instalação? [S/n]
```

Instruções para outros Sistemas Operacionais podem ser encontradas no site oficial da documentação do `Ethereum` https://geth.ethereum.org/docs/install-and-build/installing-geth.

Executando o `Geth` diretamente ele irá sincronizar com a rede principal do `Ethereum`, a `mainnet`.

```
 1  [rag@nitro-ryzen ~]$ geth
 2  INFO [10-20|21:07:12.911] Starting Geth on Ethereum mainnet...
 3  INFO [10-20|21:07:12.912] Bumping default cache on mainnet provided=1024 updated=4096
 4  INFO [10-20|21:07:12.914] Maximum peer count ETH=50 LES=0 total=50
 5  INFO [10-20|21:07:12.915] Smartcard socket not found, disabling err="stat
        /run/pcscd/pcscd.comm: no such file or directory"
 6  INFO [10-20|21:07:12.920] Set global gas cap cap=50,000,000
 7  INFO [10-20|21:07:12.922] Allocated trie memory caches clean=614.00MiB dirty=1024.00MiB
 8  INFO [10-20|21:07:12.923] Allocated cache and file handles
        database=/home/rag/.ethereum/geth/chaindata cache=2.00GiB handles=262,144
 9  INFO [10-20|21:07:12.946] Opened ancient database
        database=/home/rag/.ethereum/geth/chaindata/ancient/chain readonly=false
10  INFO [10-20|21:07:12.950]
11  INFO [10-20|21:07:12.950]
        --------------------------------------------------------------------------------
12  INFO [10-20|21:07:12.950] Chain ID: 1 (mainnet)
13  INFO [10-20|21:07:12.950] Consensus: Beacon (proof-of-stake), merged from Ethash
        (proof-of-work)
14  INFO [10-20|21:07:12.950]
15  INFO [10-20|21:07:12.950] Pre-Merge hard forks:
16  INFO [10-20|21:07:12.950]  - Homestead: 1150000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/homest
17  INFO [10-20|21:07:12.950]  - DAO Fork: 1920000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/dao-fo
18  INFO [10-20|21:07:12.950]  - Tangerine Whistle (EIP 150): 2463000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/tanger
19  INFO [10-20|21:07:12.950]  - Spurious Dragon/1 (EIP 155): 2675000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurio
20  INFO [10-20|21:07:12.950]  - Spurious Dragon/2 (EIP 158): 2675000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spurio
21  INFO [10-20|21:07:12.950]  - Byzantium: 4370000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/byzant
22  INFO [10-20|21:07:12.950]  - Constantinople: 7280000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/consta
23  INFO [10-20|21:07:12.950]  - Petersburg: 7280000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/peters
24  INFO [10-20|21:07:12.950]  - Istanbul: 9069000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/istanb
25  INFO [10-20|21:07:12.950]  - Muir Glacier: 9200000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/muir-g
26  INFO [10-20|21:07:12.950]  - Berlin: 12244000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/berlin
27  INFO [10-20|21:07:12.950]  - London: 12965000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/londor
28  INFO [10-20|21:07:12.950]  - Arrow Glacier: 13773000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/arrow-
29  INFO [10-20|21:07:12.950]  - Gray Glacier: 15050000
        (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/gray-g
30  INFO [10-20|21:07:12.950]
31  INFO [10-20|21:07:12.950] Merge configured:
32  INFO [10-20|21:07:12.950]  - Hard-fork specification:
        https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/paris.m
33  INFO [10-20|21:07:12.950]  - Network known to be merged: true
34  INFO [10-20|21:07:12.950]  - Total terminal difficulty: 58750000000000000000000
35  INFO [10-20|21:07:12.950]  - Merge netsplit block: <nil>
36  INFO [10-20|21:07:12.950]
```

```
   -----------------------------------------------------------------------
37 INFO [10-20|21:07:12.950]
38 INFO [10-20|21:07:12.952] Disk storage enabled for ethash caches
      dir=/home/rag/.ethereum/geth/ethash count=3
39 INFO [10-20|21:07:12.952] Disk storage enabled for ethash DAGs dir=/home/rag/.ethash
      count=2
40 INFO [10-20|21:07:12.952] Initialising Ethereum protocol network=1 dbversion=8
41 INFO [10-20|21:07:12.963] Loaded most recent local header number=0 hash=d4e567..cb8fa3
      td=17,179,869,184 age=53y6mo3w
42 INFO [10-20|21:07:12.963] Loaded most recent local full block number=0
      hash=d4e567..cb8fa3 td=17,179,869,184 age=53y6mo3w
43 INFO [10-20|21:07:12.963] Loaded most recent local fast block number=0
      hash=d4e567..cb8fa3 td=17,179,869,184 age=53y6mo3w
44 INFO [10-20|21:07:12.964] Loaded local transaction journal transactions=0 dropped=0
45 INFO [10-20|21:07:12.964] Regenerated local transaction journal transactions=0
      accounts=0
46 INFO [10-20|21:07:12.965] Chain post-merge, sync via beacon client
47 INFO [10-20|21:07:12.965] Gasprice oracle is ignoring threshold set threshold=2
48 WARN [10-20|21:07:12.965] Engine API enabled protocol=eth
49 INFO [10-20|21:07:12.966] Starting peer-to-peer node
      instance=Geth/v1.10.25-stable-69568c55/linux-amd64/go1.19.1
50 INFO [10-20|21:07:12.991] New local node record seq=1,665,519,113,919
      id=da440578e33a2ce7 ip=127.0.0.1 udp=30303 tcp=30303
51 INFO [10-20|21:07:12.992] Started P2P networking
      self=enode://9ae8fcdad4a7243d1bd2308a159c5800ec170e588862be110152627c9ed3fa67376ef8c7526d7a56e9bb
52 INFO [10-20|21:07:12.993] IPC endpoint opened url=/home/rag/.ethereum/geth.ipc
53 INFO [10-20|21:07:12.993] Loaded JWT secret file
      path=/home/rag/.ethereum/geth/jwtsecret crc32=0xdeccafe4
54 INFO [10-20|21:07:12.994] WebSocket enabled url=ws://127.0.0.1:8551
55 INFO [10-20|21:07:12.994] HTTP server started endpoint=127.0.0.1:8551 auth=true
      prefix= cors=localhost vhosts=localhost
56 INFO [10-20|21:07:16.251] New local node record seq=1,665,519,113,920
      id=da440578e33a2ce7 ip=187.95.110.26 udp=2770 tcp=30303
57 INFO [10-20|21:07:22.992] Looking for peers peercount=0 tried=2 static=0
58 INFO [10-20|21:07:32.994] Looking for peers peercount=0 tried=3 static=0
59 INFO [10-20|21:07:43.205] Looking for peers peercount=0 tried=9 static=0
60 WARN [10-20|21:07:47.967] Post-merge network, but no beacon client seen. Please launch
      one to follow the chain!
61 INFO [10-20|21:07:53.281] Looking for peers peercount=0 tried=13 static=0
62 INFO [10-20|21:08:03.346] Looking for peers peercount=0 tried=9 static=0
```

Criando uma nova conta:

```
1 [rag@nitro-ryzen ~]$ geth account new
2 INFO [10-20|21:13:44.948] Maximum peer count ETH=50 LES=0 total=50
3 INFO [10-20|21:13:44.949] Smartcard socket not found, disabling err="stat
     /run/pcscd/pcscd.comm: no such file or directory"
4 Your new account is locked with a password. Please give a password. Do not forget this
     password.
5 Password:
6 Repeat password:
7
8 Your new key was generated
9
10 Public address of the key: 0x668a07cAf4f4b2A5939051d25DA2334a4c425599
11 Path of the secret key file:
```

```
       /home/rag/.ethereum/keystore/UTC--2022-10-21T00-14-13.552574058Z--668a07caf4f4b2a5939051d25da2334
12
13 - You can share your public address with anyone. Others need it to interact with you.
14 - You must NEVER share the secret key with anyone! The key controls access to your
       funds!
15 - You must BACKUP your key file! Without the key, it's impossible to access account
       funds!
16 - You must REMEMBER your password! Without the password, it's impossible to decrypt
       the key!
17
18 [rag@nitro-ryzen ~]$
```

As contas existentes ou que foram criadas podem ser listadas com o comando:

```
1 [rag@nitro-ryzen ~]$ geth account list
2 INFO [10-20|21:15:41.981] Maximum peer count ETH=50 LES=0 total=50
3 INFO [10-20|21:15:41.982] Smartcard socket not found, disabling err="stat
     /run/pcscd/pcscd.comm: no such file or directory"
4 INFO [10-20|21:15:41.982] Set global gas cap cap=50,000,000
5 Account #0: {668a07caf4f4b2a5939051d25da2334a4c425599}
     keystore:///home/rag/.ethereum/keystore/UTC--2022-10-21T00-14-13.552574058Z--668a07caf4f4b2a59390
6 [rag@nitro-ryzen ~]$
```

A documentação, bem como comandos e parâmetros podem ser acessados em https://geth.ethereum.org/docs

Executando com opção de responder a comandos via RPC. A documentação desta parte está disponível em https://geth.ethereum.org/docs/rpc/server.

```
1 [rag@nitro-ryzen ~]$ geth --mainnet --syncmode snap --http --http.addr 127.0.0.1
     --http.port 8559 --http.api "eth,net,web3,personal"
2 INFO [10-20|21:57:05.774] Starting Geth on Ethereum mainnet...
3 INFO [10-20|21:57:05.775] Bumping default cache on mainnet provided=1024 updated=4096
4 INFO [10-20|21:57:05.777] Maximum peer count ETH=50 LES=0 total=50
5 INFO [10-20|21:57:05.779] Smartcard socket not found, disabling err="stat
     /run/pcscd/pcscd.comm: no such file or directory"
6 INFO [10-20|21:57:05.784] Set global gas cap cap=50,000,000
7 INFO [10-20|21:57:05.815] Allocated trie memory caches clean=614.00MiB dirty=1024.00MiB
8 INFO [10-20|21:57:05.815] Allocated cache and file handles
     database=/home/rag/.ethereum/geth/chaindata cache=2.00GiB handles=262,144
9 INFO [10-20|21:57:05.840] Opened ancient database
     database=/home/rag/.ethereum/geth/chaindata/ancient/chain readonly=false
10 INFO [10-20|21:57:06.054]
11 INFO [10-20|21:57:06.055]
     ---------------------------------------------------------------------------------
12 INFO [10-20|21:57:06.055] Chain ID: 1 (mainnet)
13 INFO [10-20|21:57:06.055] Consensus: Beacon (proof-of-stake), merged from Ethash
     (proof-of-work)
14 INFO [10-20|21:57:06.055]
15 INFO [10-20|21:57:06.055] Pre-Merge hard forks:
16 INFO [10-20|21:57:06.055] - Homestead: 1150000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/homest
17 INFO [10-20|21:57:06.055] - DAO Fork: 1920000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/dao-fo
18 INFO [10-20|21:57:06.055] - Tangerine Whistle (EIP 150): 2463000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/tanger
```

```
19 INFO [10-20|21:57:06.055] - Spurious Dragon/1 (EIP 155): 2675000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spuric
20 INFO [10-20|21:57:06.055] - Spurious Dragon/2 (EIP 158): 2675000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/spuric
21 INFO [10-20|21:57:06.055] - Byzantium: 4370000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/byzant
22 INFO [10-20|21:57:06.055] - Constantinople: 7280000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/consta
23 INFO [10-20|21:57:06.055] - Petersburg: 7280000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/peters
24 INFO [10-20|21:57:06.055] - Istanbul: 9069000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/istanb
25 INFO [10-20|21:57:06.055] - Muir Glacier: 9200000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/muir-g
26 INFO [10-20|21:57:06.055] - Berlin: 12244000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/berlin
27 INFO [10-20|21:57:06.055] - London: 12965000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/londor
28 INFO [10-20|21:57:06.055] - Arrow Glacier: 13773000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/arrow-
29 INFO [10-20|21:57:06.055] - Gray Glacier: 15050000
     (https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/gray-g
30 INFO [10-20|21:57:06.055]
31 INFO [10-20|21:57:06.055] Merge configured:
32 INFO [10-20|21:57:06.055] - Hard-fork specification:
     https://github.com/ethereum/execution-specs/blob/master/network-upgrades/mainnet-upgrades/paris.m
33 INFO [10-20|21:57:06.055] - Network known to be merged: true
34 INFO [10-20|21:57:06.055] - Total terminal difficulty: 58750000000000000000000
35 INFO [10-20|21:57:06.055] - Merge netsplit block: <nil>
36 INFO [10-20|21:57:06.055]
     --------------------------------------------------------------------------------
37 INFO [10-20|21:57:06.055]
38 INFO [10-20|21:57:06.055] Disk storage enabled for ethash caches
     dir=/home/rag/.ethereum/geth/ethash count=3
39 INFO [10-20|21:57:06.055] Disk storage enabled for ethash DAGs dir=/home/rag/.ethash
     count=2
40 INFO [10-20|21:57:06.056] Initialising Ethereum protocol network=1 dbversion=8
41 INFO [10-20|21:57:06.068] Loaded most recent local header number=0 hash=d4e567..cb8fa3
     td=17,179,869,184 age=53y6mo3w
42 INFO [10-20|21:57:06.068] Loaded most recent local full block number=0
     hash=d4e567..cb8fa3 td=17,179,869,184 age=53y6mo3w
43 INFO [10-20|21:57:06.068] Loaded most recent local fast block number=0
     hash=d4e567..cb8fa3 td=17,179,869,184 age=53y6mo3w
44 INFO [10-20|21:57:06.069] Loaded local transaction journal transactions=0 dropped=0
45 INFO [10-20|21:57:06.069] Regenerated local transaction journal transactions=0
     accounts=0
46 INFO [10-20|21:57:06.069] Chain post-merge, sync via beacon client
47 INFO [10-20|21:57:06.069] Gasprice oracle is ignoring threshold set threshold=2
48 WARN [10-20|21:57:06.070] Engine API enabled protocol=eth
49 INFO [10-20|21:57:06.073] Starting peer-to-peer node
     instance=Geth/v1.10.25-stable-69568c55/linux-amd64/go1.19.1
50 INFO [10-20|21:57:06.095] New local node record seq=1,665,519,113,934
     id=da440578e33a2ce7 ip=127.0.0.1 udp=30303 tcp=30303
51 INFO [10-20|21:57:06.096] Started P2P networking
     self=enode://9ae8fcdad4a7243d1bd2308a159c5800ec170e588862be110152627c9ed3fa67376ef8c7526d7a56e9bb
52 INFO [10-20|21:57:06.097] IPC endpoint opened url=/home/rag/.ethereum/geth.ipc
```

```
53 INFO [10-20|21:57:06.098] Loaded JWT secret file
      path=/home/rag/.ethereum/geth/jwtsecret crc32=0xdeccafe4
54 INFO [10-20|21:57:06.098] HTTP server started endpoint=127.0.0.1:8559 auth=false
      prefix= cors= vhosts=localhost
55 INFO [10-20|21:57:06.099] WebSocket enabled url=ws://127.0.0.1:8551
56 INFO [10-20|21:57:06.099] HTTP server started endpoint=127.0.0.1:8551 auth=true
      prefix= cors=localhost vhosts=localhost
57 INFO [10-20|21:57:15.361] New local node record seq=1,665,519,113,935
      id=da440578e33a2ce7 ip=187.95.110.26 udp=32871 tcp=30303
58 INFO [10-20|21:57:16.097] Looking for peers peercount=0 tried=2 static=0
59 INFO [10-20|21:57:26.262] Looking for peers peercount=0 tried=9 static=0
60 INFO [10-20|21:57:36.278] Looking for peers peercount=1 tried=6 static=0
61 WARN [10-20|21:57:41.071] Post-merge network, but no beacon client seen. Please launch
      one to follow the chain!
62 INFO [10-20|21:57:46.410] Looking for peers peercount=1 tried=13 static=0
63 INFO [10-20|21:57:56.453] Looking for peers peercount=1 tried=11 static=0
64 WARN [10-20|21:57:57.257] Snapshot extension registration failed peer=88f932f1
      err="peer connected on snap without compatible eth support"
65 INFO [10-20|21:58:06.562] Looking for peers peercount=1 tried=12 static=0
66 INFO [10-20|21:58:16.663] Looking for peers peercount=1 tried=18 static=0
67 INFO [10-20|21:58:26.782] Looking for peers peercount=1 tried=13 static=0
68 INFO [10-20|21:58:36.839] Looking for peers peercount=1 tried=8 static=0
69 INFO [10-20|21:58:46.845] Looking for peers peercount=1 tried=7 static=0
70 INFO [10-20|21:58:56.920] Looking for peers peercount=1 tried=17 static=0
71 INFO [10-20|21:59:06.974] Looking for peers peercount=1 tried=9 static=0
72 INFO [10-20|21:59:16.997] Looking for peers peercount=1 tried=8 static=0
73 INFO [10-20|21:59:27.042] Looking for peers peercount=1 tried=11 static=0
74 INFO [10-20|21:59:37.100] Looking for peers peercount=1 tried=10 static=0
75 INFO [10-20|21:59:47.102] Looking for peers peercount=1 tried=4 static=0
76 INFO [10-20|21:59:57.232] Looking for peers peercount=1 tried=15 static=0
77 INFO [10-20|22:00:07.251] Looking for peers peercount=1 tried=5 static=0
78 INFO [10-20|22:00:17.284] Looking for peers peercount=1 tried=8 static=0
79 INFO [10-20|22:00:27.336] Looking for peers peercount=1 tried=11 static=0
```

Executando o console JavaScript:

O console `Javascript` pode também ser conectado ao nó `Geth` usando `IPC`. Quando o `Geth` é iniciado, um arquivo `geth.ipc` é criado automaticamente e salvo no diretório de dados. Este arquivo ou um caminho customizado para um arquivo IPC pode ser passado para o `Geth` usando o parâmetro `attach`:

```
 1 [rag@nitro-ryzen ~]$ geth attach /home/rag/.ethereum/geth.ipc
 2 Welcome to the Geth JavaScript console!
 3
 4 instance: Geth/v1.10.25-stable-69568c55/linux-amd64/go1.19.1
 5 coinbase: 0x668a07caf4f4b2a5939051d25da2334a4c425599
 6 at block: 0 (Wed Dec 31 1969 21:00:00 GMT-0300 (-03))
 7  datadir: /home/rag/.ethereum
 8  modules: admin:1.0 debug:1.0 engine:1.0 eth:1.0 ethash:1.0 miner:1.0 net:1.0
      personal:1.0 rpc:1.0 txpool:1.0 web3:1.0
 9
10 To exit, press ctrl-d or type exit
11 >
```

O comando verifica se a rede está funcionando:

```
1 [rag@nitro-ryzen ~]$ geth attach /home/rag/.ethereum/geth.ipc
2 Welcome to the Geth JavaScript console!
3
4 instance: Geth/v1.10.25-stable-69568c55/linux-amd64/go1.19.1
5 coinbase: 0x668a07caf4f4b2a5939051d25da2334a4c425599
6 at block: 0 (Wed Dec 31 1969 21:00:00 GMT-0300 (-03))
7  datadir: /home/rag/.ethereum
8  modules: admin:1.0 debug:1.0 engine:1.0 eth:1.0 ethash:1.0 miner:1.0 net:1.0
       personal:1.0 rpc:1.0 txpool:1.0 web3:1.0
9
10 To exit, press ctrl-d or type exit
11 > net.listening
12 true
```

A mesma verificação pode ser feita via RPC JSON:

```
1 [rag@nitro-ryzen ~]$ curl -X POST --insecure -H "Content-Type: application/json"
       --data '{"jsonrpc":"2.0", "method":"net_listening","params":[], "id":64}'
       http://localhost:8559
2 {"jsonrpc":"2.0","id":64,"result":true}
```

Listar as Contas

A lista de contas (*personal_listAccounts: eturns all the Ethereum account addresses of all keys in the key store*), pode ser obtida através dos comandos no console `personal.listAccounts`e por RPC `{"method": "personal_listAccounts", "params": []}`.

```
1 [rag@nitro-ryzen ~]$ geth attach /home/rag/.ethereum/geth.ipc
2 Welcome to the Geth JavaScript console!
3
4 instance: Geth/v1.10.25-stable-69568c55/linux-amd64/go1.19.1
5 coinbase: 0x668a07caf4f4b2a5939051d25da2334a4c425599
6 at block: 0 (Wed Dec 31 1969 21:00:00 GMT-0300 (-03))
7  datadir: /home/rag/.ethereum
8  modules: admin:1.0 debug:1.0 engine:1.0 eth:1.0 ethash:1.0 miner:1.0 net:1.0
       personal:1.0 rpc:1.0 txpool:1.0 web3:1.0
9
10 To exit, press ctrl-d or type exit
11 > personal.listAccounts
12 ["0x668a07caf4f4b2a5939051d25da2334a4c425599"]
13 >
```

O comando para listar as contas em RPC:

```
1 [rag@nitro-ryzen ~]$ curl -X POST --insecure -H "Content-Type: application/json"
       --data '{"jsonrpc":"2.0","method":"eth_accounts","params":[], "id":64}'
       http://localhost:8559
2 {"jsonrpc":"2.0","id":64,"result":["0x668a07caf4f4b2a5939051d25da2334a4c425599"]}
```

Outros comandos podem ser executados da mesma maneira via console ou invocação RPC.

Referências

Imran, Bashir. 2018. *Mastering Blockchain : Distributed Ledger Technology, Decentralization, and Smart Contracts Explained, 2nd Edition.* Packt Publishing. https://search.ebscohost.com/login.aspx?direct=true&db=e000xww&AN=1789486&lang=pt-br&site=eds-live&scope=site.