Practica 13: Blockchain Introducción a Ethereum

Parte 1: Creación de BDs

Inicialización de base de datos:

```
C:\Program Files\Geth>geth --networkid 12342 --datadir ./chaindata init ./genesis.json
INFO [12-21|13:02:53.402] Maximum peer count                       ETH=50 LES=0 total=50
INFO [12-21|13:02:53.481] Allocated cache and file handles         database="C:\\Program Files\\Geth\\chaindata\\geth\\chaindata" cache=16.00MiB handles=16
INFO [12-21|13:02:53.510] Writing custom genesis block
INFO [12-21|13:02:53.515] Persisted trie from memory database      nodes=0 size=0.00B time=0s gcnodes=0 gcsize=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [12-21|13:02:53.526] Successfully wrote genesis state         database=chaindata hash=6dd601…9339c2
INFO [12-21|13:02:53.536] Allocated cache and file handles         database="C:\\Program Files\\Geth\\chaindata\\geth\\lightchaindata" cache=16.00MiB handles=16
INFO [12-21|13:02:53.557] Writing custom genesis block
INFO [12-21|13:02:53.564] Persisted trie from memory database      nodes=0 size=0.00B time=0s gcnodes=0 gcsize=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [12-21|13:02:53.576] Successfully wrote genesis state         database=lightchaindata hash=6dd601…9339c2

C:\Program Files\Geth>
```

Existen dos bases de datos, una de los bloques encadenados y otra de configuración.

Parte 2: Asignación de Ether en el bloque génesis

Creación de cuenta ethereum

```
C:\Program Files\Geth>geth account new --datadir ./chaindata
INFO [12-21|13:12:12.726] Maximum peer count                       ETH=50 LES=0 total=50
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:    0xC642b5d7eDa2382EA7e4B7406AD224BF706ACF94
```

Eliminación de DB:

```
C:\Program Files\Geth>geth removedb --datadir ./chaindata
INFO [12-21|13:19:45.005] Maximum peer count                       ETH=50 LES=0 total=50
Remove full node state database (C:\Program Files\Geth\chaindata\geth\chaindata)? [y/n] y
INFO [12-21|13:19:51.327] Database successfully deleted             path="C:\\Program Files\\Geth\\chaindata\\geth\\chaindata" elapsed=1.858ms
INFO [12-21|13:19:51.337] Full node ancient database missing        path="C:\\Program Files\\Geth\\chaindata\\geth\\chaindata\\ancient"
Remove light node database (C:\Program Files\Geth\chaindata\geth\lightchaindata)? [y/n] Y
INFO [12-21|13:20:44.981] Database successfully deleted             path="C:\\Program Files\\Geth\\chaindata\\geth\\lightchaindata" elapsed=1.879ms
```

Recreación de BDS:

```
C:\Program Files\Geth>geth --networkid 12342 --datadir ./chaindata init ./genesis_2.json
INFO [12-21|13:21:23.327] Maximum peer count                       ETH=50 LES=0 total=50
INFO [12-21|13:21:23.398] Allocated cache and file handles         database="C:\\Program Files\\Geth\\chaindata\\geth\\chaindata" cache=16.00MiB handles=16
INFO [12-21|13:21:23.421] Writing custom genesis block
INFO [12-21|13:21:23.427] Persisted trie from memory database      nodes=1 size=149.00B time=998.3µs gcnodes=0 gcsize=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [12-21|13:21:23.443] Successfully wrote genesis state         database=chaindata hash=0b92a9…6b130f
INFO [12-21|13:21:23.453] Allocated cache and file handles         database="C:\\Program Files\\Geth\\chaindata\\geth\\lightchaindata" cache=16.00MiB handles=16
INFO [12-21|13:21:23.484] Writing custom genesis block
INFO [12-21|13:21:23.496] Persisted trie from memory database      nodes=1 size=149.00B time=232.1µs gcnodes=0 gcsize=0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [12-21|13:21:23.509] Successfully wrote genesis state         database=lightchaindata hash=0b92a9…6b130f

C:\Program Files\Geth>
```

Parte 3: Ejecución del nodo de Ethereum

Ejecución de nodo eth

```
C:\Program Files\Geth>geth --identity "Practica13" --networkid 12342 --datadir ./chaindata --nodiscover -rpc --allow-insecure-unlock
INFO [12-21|13:24:03.991] Maximum peer count                       ETH=50 LES=0 total=50
INFO [12-21|13:24:04.064] Starting peer-to-peer node               instance=Geth/Practica13/v1.9.9-stable-01744997/windows-amd64/go1.13.4
INFO [12-21|13:24:04.076] Allocated trie memory caches             clean=256.00MiB dirty=256.00MiB
INFO [12-21|13:24:04.082] Allocated cache and file handles         database="C:\\Program Files\\Geth\\chaindata\\geth\\chaindata" cache=512.00MiB handles=8192
INFO [12-21|13:24:04.188] Opened ancient database                  database="C:\\Program Files\\Geth\\chaindata\\geth\\chaindata\\ancient"
INFO [12-21|13:24:04.213] Initialised chain configuration          config="{ChainID: 12342 Homestead: 0 DAO: <nil> DAOSupport: false EIP150: 0 EIP155: 0 EIP158: 0 Byzantium: <nil> Constantinople: <nil> Petersburg: <nil> Istanbul: <nil>, Muir Glacier: <nil>, Engine: unknown}"
INFO [12-21|13:24:04.230] Disk storage enabled for ethash caches   dir="C:\\Program Files\\Geth\\chaindata\\geth\\ethash" count=3
INFO [12-21|13:24:04.240] Disk storage enabled for ethash DAGs     dir=C:\\Users\\asan1\\AppData\\Local\\Ethash count=2
INFO [12-21|13:24:04.246] Initialising Ethereum protocol           versions="[64 63]" network=12342 dbversion=<nil>
WARN [12-21|13:24:04.254] Upgrade blockchain database version      from=<nil> to=7
INFO [12-21|13:24:04.261] Loaded most recent local header          number=0 hash=0b92a9…6b130f td=1024 age=50y8mo1w
INFO [12-21|13:24:04.270] Loaded most recent local full block      number=0 hash=0b92a9…6b130f td=1024 age=50y8mo1w
INFO [12-21|13:24:04.277] Loaded most recent local fast block      number=0 hash=0b92a9…6b130f td=1024 age=50y8mo1w
INFO [12-21|13:24:04.291] Regenerated local transaction journal    transactions=0 accounts=0
INFO [12-21|13:24:04.311] Allocated fast sync bloom                size=512.00MiB
INFO [12-21|13:24:04.320] Initialized fast sync bloom              items=1 errorrate=0.000 elapsed=1.025ms
INFO [12-21|13:24:04.343] New local node record                    seq=1 id=71789ab186da013d ip=127.0.0.1 udp=0 tcp=30303
INFO [12-21|13:24:04.345] IPC endpoint opened                      url=\\\\.\\pipe\\geth.ipc
INFO [12-21|13:24:04.355] Started P2P networking                   self="enode://ba0c2716308d255d392fe4c949b80a2b69f0b7fca9b3608a55325ceadd423ea8b4eebbb75e0f2edd36f85910046800720f32e0099540e0ea03a2168193c3816f@127.0.0.1:30303?discport=0"

INFO [12-21|13:24:04.361] HTTP endpoint opened                     url=http://127.0.0.1:8545 cors= vhosts=localhost
INFO [12-21|13:24:06.633] Mapped network port                      proto=tcp extport=30303 intport=30303 interface="UPNP IGDv2-IP1"
```

Eth accounts hace consult de las accounts creadas en el chaindata, y de ahí nos dice que tenemos 100 eth corresponde a lo que hemos agregado en el genesis alloc balance

Un wallet determinista se basa en derivar claves desde un simple punto de partida conocido como seed. Seed words es un nivel más de seguridad para evitar que una cuenta sea robada
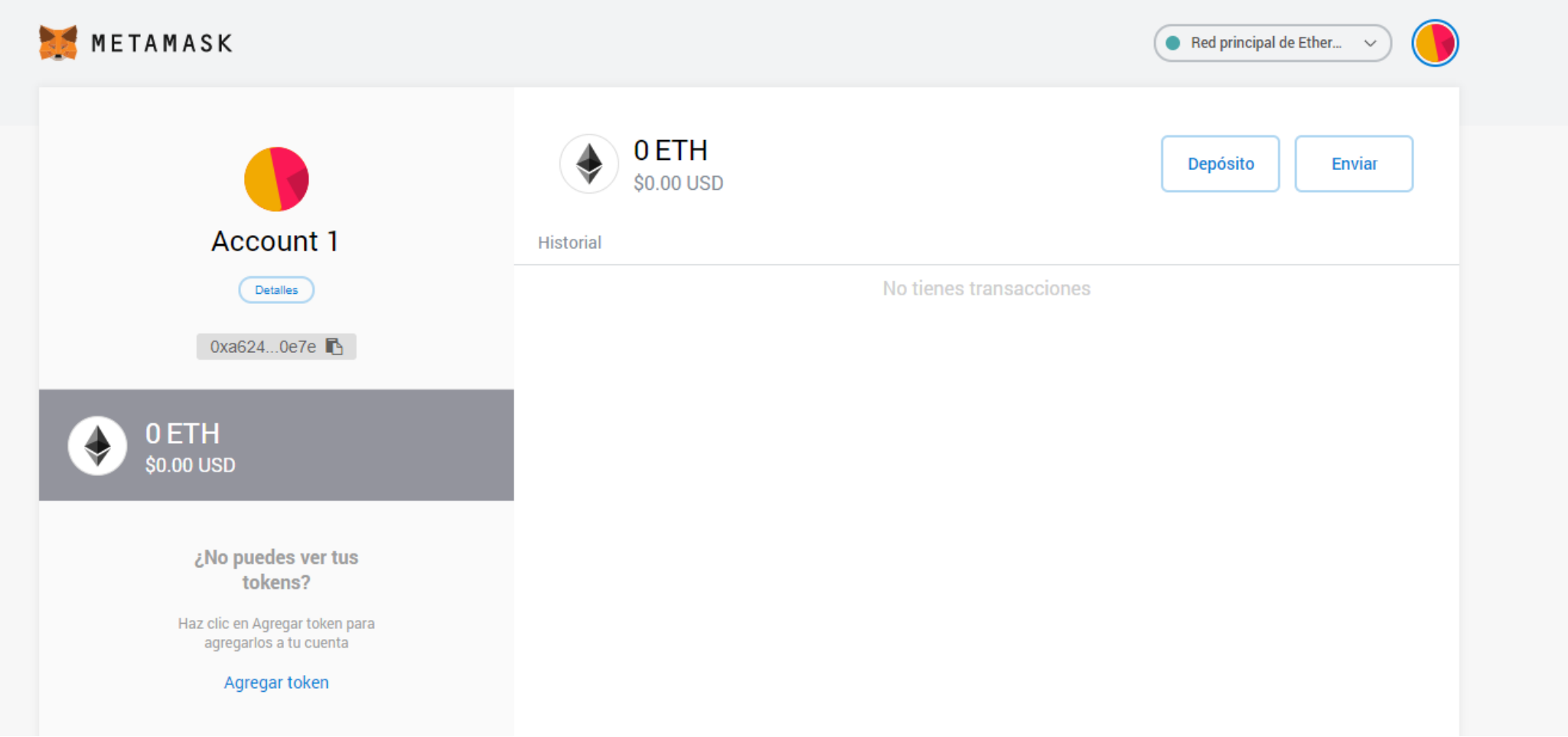
Metamask conectado a localhost 8545
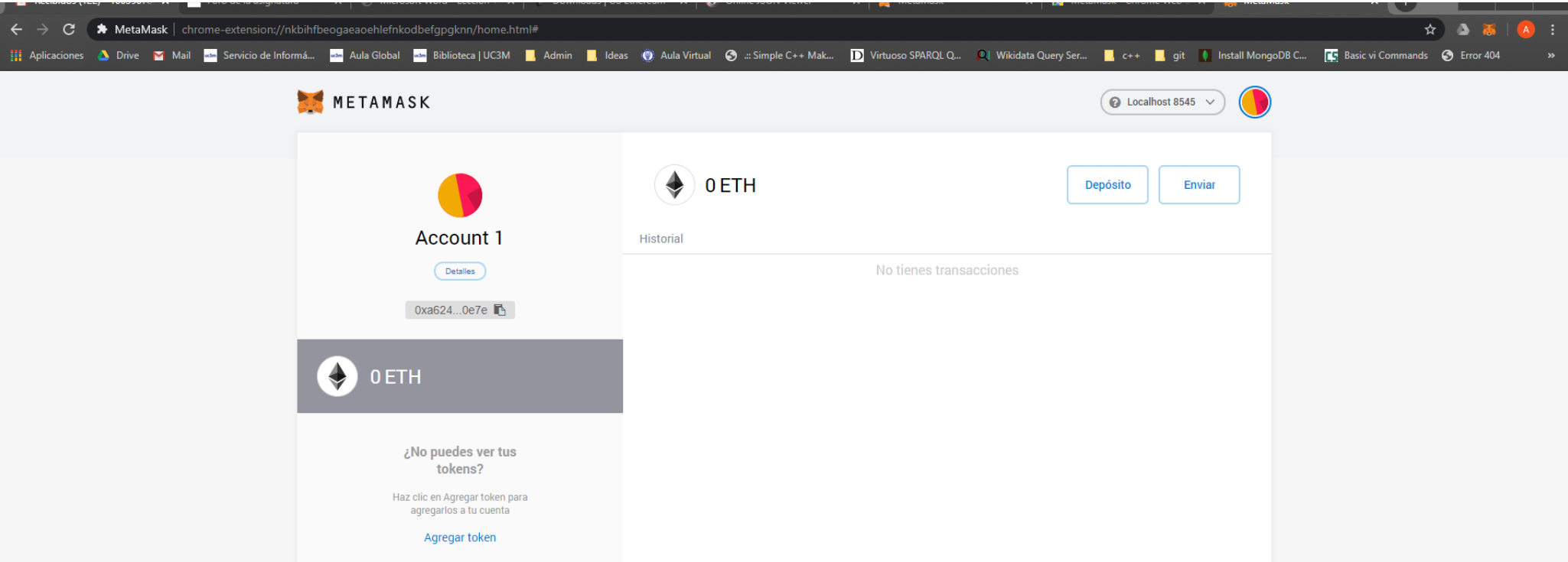
Se envía balance a la wallet de metamask

```
>
> eth.accounts
["0xc642b5d7eda2382ea7e4b7406ad224bf706acf94"]
> web3.fromWei(eth.getBalance(eth.accounts[0]), "ether")
100
> eth.sendTransaction({from:sender, to:receiver, value: amount})
Error: authentication needed: password or unlock
    at web3.js:3143:20
    at web3.js:6347:15
    at web3.js:5081:36
    at <anonymous>:1:1

> personal.unlockAccount(sender)
Unlock account 0xc642b5d7eda2382ea7e4b7406ad224bf706acf94
Password:
true
> eth.sendTransaction({from:sender, to:receiver, value: amount})
"0x4fa26b2e01bb328f71bbd1308be5cb51f7dc1773af91ea06f87af8215cbc626a"
>
```

Nodos por minar

```
> txpool.status
{
  pending: 1,
  queued: 0
}
> txpool.content
{
  pending: {
    0xC642b5d7eDa2382EA7e4B7406AD224BF706ACF94: {
      0: {
        blockHash: null,
        blockNumber: null,
        from: "0xc642b5d7eda2382ea7e4b7406ad224bf706acf94",
        gas: "0x5208",
        gasPrice: "0x3b9aca00",
        hash: "0x4fa26b2e01bb328f71bbd1308be5cb51f7dc1773af91ea06f87af8215cbc626a",
        input: "0x",
        nonce: "0x0",
        r: "0xecf38305f919f560d6db4a2b0cd55a06a25f488079e3a7f299d0bf8acc88759",
        s: "0x1272a5e1348086d7d7764dd5b52e579190c359c45d5dc7580a89c9dc9adcfd6",
        to: "0xa6246b33b002f0c4c5e3e87cc4a590441c1d0e7e",
        transactionIndex: null,
        v: "0x6090",
        value: "0xde0b6b3a7640000"
      }
    }
  },
```

Parte 4: Habilitar el minado en nodo
Se empieza a hacer el minado para procesar los nodos faltantes

```
INFO [12-21|14:20:33.533] Loaded local transaction journal       transactions=0 dropped=0
INFO [12-21|14:20:33.549] Regenerated local transaction journal  transactions=0 accounts=0
INFO [12-21|14:20:33.576] Allocated fast sync bloom              size=512.00MiB
INFO [12-21|14:20:33.586] Initialized fast sync bloom            items=1 errorrate=0.000 elapsed=0s
INFO [12-21|14:20:33.635] New local node record                  seq=2 id=71789ab186da013d ip=127.0.0.1 udp=0 tcp=30303
INFO [12-21|14:20:33.637] IPC endpoint opened                    url=\\\\.\\pipe\\geth.ipc
INFO [12-21|14:20:33.647] Started P2P networking                 self="enode://ba0c2716308d255d392fe4c949b80a2b69f0b7fca9b3608a55325ceadd423ea8b4eebbb75e0f2edd36f85910046800720f

INFO [12-21|14:20:33.652] HTTP endpoint opened                   url=http://127.0.0.1:8545 cors= vhosts=localhost
INFO [12-21|14:20:35.938] Mapped network port                    proto=tcp extport=30303 intport=30303 interface="UPNP IGDv1-IP1"
WARN [12-21|14:23:27.521] Served eth_sendTransaction             reqid=20 t=1.5084ms err="authentication needed: password or unlock"
INFO [12-21|14:25:14.981] Setting new local account              address=0xC642b5d7eDa2382EA7e4B7406AD224BF706ACF94
INFO [12-21|14:25:14.990] Submitted transaction                  fullhash=0x4fa26b2e01bb328f71bbd1308be5cb51f7dc1773af91ea06f87af8215cbc626a recipient=0xa6246b33b002F0C4C5E3e87C
INFO [12-21|14:27:53.622] Updated mining threads                 threads=8
INFO [12-21|14:27:53.627] Transaction pool price threshold updated price=1000000000
INFO [12-21|14:27:53.637] Etherbase automatically configured     address=0xC642b5d7eDa2382EA7e4B7406AD224BF706ACF94
INFO [12-21|14:27:53.646] Commit new mining work                 number=1 sealhash=cd94e3...cba12d uncles=0 txs=0 gas=0 fees=0 elapsed=0s
INFO [12-21|14:27:53.658] Commit new mining work                 number=1 sealhash=768ef7...51f69e uncles=0 txs=1 gas=21000 fees=2.1e-05 elapsed=11.969ms
INFO [12-21|14:27:56.013] Generating DAG in progress             epoch=0 percentage=0 elapsed=1.131s
INFO [12-21|14:27:57.090] Generating DAG in progress             epoch=0 percentage=1 elapsed=2.208s
INFO [12-21|14:27:58.207] Generating DAG in progress             epoch=0 percentage=2 elapsed=3.324s
INFO [12-21|14:27:59.364] Generating DAG in progress             epoch=0 percentage=3 elapsed=4.482s
INFO [12-21|14:28:00.539] Generating DAG in progress             epoch=0 percentage=4 elapsed=5.657s
INFO [12-21|14:28:01.729] Generating DAG in progress             epoch=0 percentage=5 elapsed=6.847s
INFO [12-21|14:28:02.933] Generating DAG in progress             epoch=0 percentage=6 elapsed=8.051s
INFO [12-21|14:28:04.005] Generating DAG in progress             epoch=0 percentage=7 elapsed=9.123s
INFO [12-21|14:28:05.196] Generating DAG in progress             epoch=0 percentage=8 elapsed=10.314s
INFO [12-21|14:28:06.348] Generating DAG in progress             epoch=0 percentage=9 elapsed=11.466s
```

Nodo minado:

```
INFO [12-21|14:29:33.531] Generating DAG in progress               epoch=0 percentage=85 elapsed=1m38.649s
INFO [12-21|14:29:34.747] Generating DAG in progress               epoch=0 percentage=86 elapsed=1m39.865s
INFO [12-21|14:29:35.818] Generating DAG in progress               epoch=0 percentage=87 elapsed=1m40.935s
INFO [12-21|14:29:36.870] Generating DAG in progress               epoch=0 percentage=88 elapsed=1m41.988s
INFO [12-21|14:29:37.929] Generating DAG in progress               epoch=0 percentage=89 elapsed=1m43.046s
INFO [12-21|14:29:38.981] Generating DAG in progress               epoch=0 percentage=90 elapsed=1m44.099s
INFO [12-21|14:29:40.035] Generating DAG in progress               epoch=0 percentage=91 elapsed=1m45.153s
INFO [12-21|14:29:41.091] Generating DAG in progress               epoch=0 percentage=92 elapsed=1m46.209s
INFO [12-21|14:29:42.141] Generating DAG in progress               epoch=0 percentage=93 elapsed=1m47.258s
INFO [12-21|14:29:43.196] Generating DAG in progress               epoch=0 percentage=94 elapsed=1m48.314s
INFO [12-21|14:29:44.245] Generating DAG in progress               epoch=0 percentage=95 elapsed=1m49.363s
INFO [12-21|14:29:45.308] Generating DAG in progress               epoch=0 percentage=96 elapsed=1m50.426s
INFO [12-21|14:29:46.385] Generating DAG in progress               epoch=0 percentage=97 elapsed=1m51.503s
INFO [12-21|14:29:47.519] Generating DAG in progress               epoch=0 percentage=98 elapsed=1m52.636s
INFO [12-21|14:29:48.872] Generating DAG in progress               epoch=0 percentage=99 elapsed=1m53.989s
INFO [12-21|14:29:48.884] Generated ethash verification cache      epoch=0 elapsed=1m54.001s
INFO [12-21|14:29:54.100] Successfully sealed new block            number=1 sealhash=768ef7…51f69e hash=453e1e…64da28 elapsed=2m0.441s
INFO [12-21|14:29:54.115] 🔨 🔨 mined potential block                  number=1 hash=453e1e…64da28
INFO [12-21|14:29:54.101] Commit new mining work                   number=2 sealhash=bba279…6e02dc uncles=0 txs=0 gas=0     fees=0       elapsed=961.1µs
INFO [12-21|14:29:54.432] Successfully sealed new block            number=2 sealhash=bba279…6e02dc hash=a00fcc…45a3ab elapsed=330.998ms
INFO [12-21|14:29:54.447] 🔨 🔨 mined potential block                  number=2 hash=a00fcc…45a3ab
INFO [12-21|14:29:54.432] Commit new mining work                   number=3 sealhash=1de409…b92745 uncles=0 txs=0 gas=0     fees=0       elapsed=0s
INFO [12-21|14:29:55.438] Successfully sealed new block            number=3 sealhash=1de409…b92745 hash=d58de9…3b9008 elapsed=1.006s
INFO [12-21|14:29:55.751] 🔨 🔨 mined potential block                  number=3 hash=d58de9…3b9008
INFO [12-21|14:29:55.438] Commit new mining work                   number=4 sealhash=a5bd1e…7bee42 uncles=0 txs=0 gas=0     fees=0       elapsed=0s
INFO [12-21|14:29:56.052] Successfully sealed new block            number=4 sealhash=a5bd1e…7bee42 hash=238c05…4ed642 elapsed=613.881ms
INFO [12-21|14:29:56.084] 🔨 🔨 mined potential block                  number=4 hash=238c05…4ed642
INFO [12-21|14:29:56.062] Commit new mining work                   number=5 sealhash=d4fae2…db3ffc uncles=0 txs=0 gas=0     fees=0       elapsed=519.9µs
INFO [12-21|14:29:57.975] Generating DAG in progress               epoch=1 percentage=0 elapsed=2.315s
INFO [12-21|14:30:00.152] Successfully sealed new block            number=5 sealhash=d4fae2…db3ffc hash=6e3a6a…3f512b elapsed=4.089s
INFO [12-21|14:30:00.263] 🔨 🔨 mined potential block                  number=5 hash=6e3a6a…3f512b
INFO [12-21|14:30:00.177] Commit new mining work                   number=6 sealhash=fb78e7…3ec4f6 uncles=0 txs=0 gas=0     fees=0       elapsed=996.8µs
INFO [12-21|14:30:00.195] Generating DAG in progress               epoch=1 percentage=1 elapsed=4.535s
INFO [12-21|14:30:02.870] Generating DAG in progress               epoch=1 percentage=2 elapsed=7.210s
```

Se verifica en metamask:

METAMASK

Account 1

Detalles

0xa624...0e7e

1 ETH

1 ETH

Historial

¿No puedes ver tus tokens?