Join Pchain main network

1. reference:

   https://github.com/pchain-org/pchain/wiki/How-to-run-pchain

2. Download Files:

   https://s3.us-east-2.amazonaws.com/download.pchain.org/pchain_init_dirs.zip

3. Use the files in zip to replace 3 files as below in the local folder named pchain

   1) .pchain/static-nodes.json

   2) .pchain/pchain/genesis.json

   3) .pchain/pchain/eth_genesis.json

4. init pchain with eth_genesis.json

cd $HOME/pchain

./pchain --datadir .pchain

init .pchain/pchain/eth_genesis.json

5. Run pchain

Run mining mode:

```bash
#!/bin/bash

./pchain --datadir .pchain --networkid=10000 --port=30201 --syncmode "full" --mine --rpc --rpcport 6969 --rpcaddr=0.0.0.0 --rpccorsdomain=* --rpcapi "eth,web3,personal,net,admin,miner,tdm" --verbosity=4 > pchain.log 2>&1 &
```

and then run this file

```
./run.sh
```

Check whether the main network is connected successfully.

Get the current block number:

```
curl -X POST -H "Content-Type:application/json" --data
```

'{"jsonrpc":"2.0","method":"eth_blockNumber","params":[],"id":1}' localhost:6969/pchain
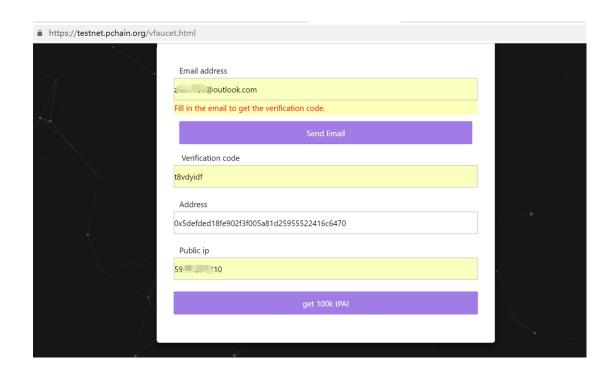
pchain@pchain-01:~/pchain$ curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_blockNumber","params":[],"id":1}' localhost:6969/pchain
{"jsonrpc":"2.0","id":1,"result":"0xdcfc9"}

Result

blockNumber:{"jsonrpc":"2.0","id":1,"result":"0xdcfc9"}

Get block number 0xdcfc9 details:

curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_getBlockByNumber","params":["0xdcfc9",true],"id":1}' localhost:6969/pchain

pchain@pchain-01:~/pchain$ curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_getBlockByNumber","params":["0xdcfc9",true],"id":1}' localhost:6969/pchain
{"jsonrpc":"2.0","id":1,"result":{"difficulty":"0x1","extraData":"0x010670636861696e00000000000dcfc91579ab2a9a77e1c000000000000000000000b011499fe1a0043512737adc98fa57010a5ed29e2e125011459f79153da4cc9dccbb13c95207be6c3c95bf495010114f5675e13db974ec4159cc8b828f36054442a0e790000000000000010114b6cf67bd56147dc53df149485786e78bd7d3d65100000000000dcfc900014025a8d2ce406868d90526ed375424fe4ed5ea493688aa6969cfa3531f4a129f7952c035ad861990d2656a1ee4acf6dcdafc8c19fa10d11f43f6d36719ac0974d201000000000000040101000000000000000d00","gasLimit":"0x169d08cc40","gasUsed":"0x0","hash":"0x723020e29263f7cda758b2c54a6a6b285eb43aaea7a899dc48984a78f1860ff8","logsBloom":"0x00","miner":"0x0000000000000000000000000000000000000000","mixHash":"0x63746963616c72062797a616e74696696e65206661756f7420746f6c6572616e6365","nonce":"0x0000000000000000","number":"0xdcfc9","parentHash":"0x8a76326db3961b393844deacd155a79a094d36513baf189ae81ca09b1e267f0d","receiptsRoot":"0x56e81f171bcc55a6ff8345e692c0f86e5b48e01b996cadc001622fb5e363b421","sha3Uncles":"0x1dcc4de8dec75d7aab85b567b6ccd41ad312451b948a7413f0a142fd40d49347","size":"0x2e5","stateRoot":"0xfad7017e583b505f353b1c79ba31569e75a6d8ed47a47e7c13642e26bff7fc7a","timestamp":"0x5c3c4e91","totalDifficulty":"0xdd3c9","transactions":[],"transactionsRoot":"0x56e81f171bcc55a6ff8345e692c0f86e5b48e01b996cadc001622fb5e363b421","uncles":[]}}
pchain@pchain-01:~/pchain$

Check main network block number 0xdcfc9 details:

(Pchain Testnet Ip:34.221.29.3)

curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_getBlockByNumber","params":["0xdcfc9",true],"id":1}' 34.221.29.3:6969/pchain

Successful connection to primary network with the same hash value,

"hash":"0x723020e29263f7cda758b2c54a6a6b285eb43aaea7a899dc48984a78f1860ff8"

6. Checking account balance

1. Check account

curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_accounts","params":[],"id":

1}' localhost:6969/pchain

pchain@pchain-01:~/pchain$ curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_accounts","params":[],"id":1}' localhost:6969/
pchain
{"jsonrpc":"2.0","id":1,"result":["0x5defded18fe902f3f005a81d25955522416c6470"]}
pchain@pchain-01:~/pchain$

curl -X POST -H "Content-Type:application/json" --data
'{"jsonrpc":"2.0","method":"eth_getBalance","params":["0x5d
efded18fe902f3f005a81d25955522416c6470", "latest"],"id":1}'
localhost:6969/pchain

pchain@pchain-01:~/pchain$ curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_getBalance","params":["0x5defded18fe902f3f005a8
1d25955522416c6470", "latest"],"id":1}' localhost:6969/pchain
{"jsonrpc":"2.0","id":1,"result":"0x0"}
pchain@pchain-01:~/pchain$
pchain@pchain-01:~/pchain$

2. Receive account balance

Link: https://testnet.pchain.org/vfaucet.html

Check：

curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_getBalance","params":["0x5d efded18fe902f3f005a81d25955522416c6470", "latest"],"id":1}' localhost:6969/pchain

{"jsonrpc":"2.0","id":1,"result":"0x3f870857a3e0e3800000 "}

Vote:

1. Before bidding, users should prepare the following parameters: {address, public key, the amount of tPAI, Hash}

2. Check the current epoch number.

curl -X POST -H "Content-Type:application/json" --data

'{"jsonrpc":"2.0","method":"tdm_getCurrentEpochNumber","par
ams":[],"id":1}' localhost:6969/pchain

3. Check if you are the Validator in current epoch, and get to
know when to vote for the next Epoch(the number of Epoch
Blocks).

curl -X POST -H "Content-Type:application/json" --data
'{"jsonrpc":"2.0","method":"tdm_getEpoch","params":[11],"id
":1}' localhost:6969/pchain

{"jsonrpc":"2.0","id":1,
"result":{"number":11,"reward_per_block":1286827650572402986,
"start_block":893569,"end_block":974339,
"start_time":"2019-01-14T05:28:51.819Z","end_time":"0001-01-01T00:00:00Z",
"vote_start_block":954147,"vote_end_block":962223,"reveal_start_block":962224,"reveal_end_block":970300,"status":3,
"validators":
[{"address":"0x4cacbcbf218679dcc9574a90a2061bca4a8d8b6c","public_key":"085586D41F70435700850E19B7DE54B3E793C5EC4C6EC
502D19030EF4F2122823E5A765E56CBA7B4C57E50561F77B022313C39895CA303F3C95D7B7282412F334778B95ACE046A79AE4DB14833452725
0C8895AC5DB80459BF5D367236B59AF2DB5C0254E30A6D8CD1FA10AB8A5D872F5EBD312D3160D3E4DD496973BDC75E0","voting_power":100}
,{"address":"0x79cd31b59e3faab6deea68fbbaafa4da748bbdf6","public_key":"7315DF293B07C52EF6C1FC05018A1CA4FB630F6DBD4F1
216804FEDDC2F04CD2932A5AB72B6910145ED97A5FFA0CDCB818F928A8921FDAE8033BF4259AC3400552065951D2440C25A6994367E1DC60EE34
B34C85CD95304B24F9A07473163F1F24C79AC5CBEC240B5EAA80907F6B3EDD44FD8341BF6EB8179334105FEDE6E790","voting_power":100}
,{"address":"0xc6179a651918888251380a4e3fee6af81cf091d1","public_key":"72747AFEE21059D6BE594C815A280EF64620EE0BA502D
F5A064AB45AC2D633CA106E6439414C8CB688FC3699566472F3A056471581713EA09B5E9C6216744CC68CCCA0A390A0088248DBC2679C9B9CD69
9631472C4000F64D77919A8472A75716D690F669F53DE3ED2919A1457D75FABDFB4ACD7BD8BAB35B7D6CD8B59CFC4A5","voting_power":100}
,{"address":"0xd2fd09246e2ced295411f1f863e6e7b5929bcc59","public_key":"0C75143EB5952A46803215DAA3E8F53E2245501C2BCBA
0285E624DE74C6DF703157710EBA5023EF1B082FC8ECA27670E131745ED01954A48892AD1F8CF2602303B2D37035353410982E31AC15BEF80902
B38591593A312C9D917F2ED5C941164425FE4B19C1C65C3E2C31B544A3BABF85EE0BEEDE5D9E1F8C004C28A9C93E47F","voting_power":100}
]}}

Check current blockNumber:

```
curl -X POST -H "Content-Type:application/json" --data '{"jsonrpc":"2.0","method":"eth_blockNumber","params":[],"id":1}' localhost:6969/pchain
```


4. Sealed-bid

Send Hash of vote to the PCHAIN chain through the RPC provided by PCHAIN for the Validator competition.

Get priv_validator.json the detail(address/privateKey/publicKey).

```
vi $HOME/pchain/.pchain/pchain/priv_validator.json
```


Unlock account:

```
unlock account:

curl -X POST -H "Content-Type:application/json" --data
'{"jsonrpc":"2.0","method":"personal_unlockAccount","params":["0x5DEFDED18FE902F3F005A81D25955522416C6470", "PASSWORD", 0],"id":1}'
http://localhost:6969/pchain
```

web3.getVoteHash(from,pubkey,amount,salt):

https://github.com/pchain-org/pweb3/wiki/JavaScript-API#web3getVoteHash

```
Example:
var Web3 = require('pweb3');
var web3 = new Web3(new Web3.providers.HttpProvider("http://localhost:8545"));

var from = "0x5DEFDED18FE902F3F005A81D25955522416C6470";
var pubkey =
"        C227A63CA1601E6DBED9C4F2EC6513B9CBA278EAF6F44093ED448      DA01C76859356ED223AC3E1DFA0C1DB8D175DFDEF104D96EBE3C103E7706D023D71A0F96833002CD
C3F9A94F5C5210E4A9275A5FBC9A53EFC77803C3DD736E98F4550E8D9DB4E41C40C4B387A83A360B23E322051928211A6        "
var amount = "0x2a5a058fc295ec000000";
var salt = "PCHAIN";

var hash  = web3.getVoteHash(from,pubkey,amount,salt);
console.log(hash)

Returns:

0x      98de00bf032bb608726e73254b5147e84032b05267b24bb5403
```

Get return hash and voted:

https://github.com/pchain-org/pchain/wiki/JSON-RPC#tdm_votenextepoch

```
voted:

curl -X POST -H "Content-Type:application/json" --data
'{"jsonrpc":"2.0","method":"tdm_voteNextEpoch","params":["0x5DEFDED18FE902F3F005A81D25955522416C6470",
"0x      98de00bf032bb608726e73254b5147e84032b05267b24bb5403      "],"id":1}' http://localhost:6969/pchain
```

5. Get the details of the vote includes epoch number, start block, end block and the number of votes.

https://github.com/pchain-org/pchain/wiki/JSON-

tdm_getNextEpochVote

Returns the votes details of the next epoch

Parameters

Returns

`result` , string - votes detail of the next epoch, such as epoch number, start block, end block, votes

6. Reveal the vote

When an Epoch reaches 85%~95% of the total time period, the next round of Validator bidding begins. Upload the address, public key, and number of bets prepared for the previous round of bidding to the chain through the RPC provided by PCHAIN.

Sign Address

https://github.com/pchain-org/pchain/wiki/JSON-RPC#chain_signAddress

Sign the Address with BLS Private Key, return the BLS Signature to proof you are the owner of the BLS Public Key

Parameters

1. from: address, 20 Bytes - Address which will be signed

2. privateKey: hex string, 32 Bytes - BLS Private Key

Example

```
sign:

curl -X POST -H "Content-Type:application/json" --data
'{"jsonrpc":"2.0","method":"chain_signAddress","params":["0x5DEFDED18FE902F3F005A81D25955522416C6470",
"0x           EC492FE0993CDE99D32CA860FDEFD4E6E925243FBA89CBAA            "],"id":1}' http://localhost:6969/pchain
```

Returns

DATA, 64 Bytes - the BLS Signature for the Address

```
result:

{"jsonrpc":"2.0","id":1,"result":"0x              d76a210bf9bacd5b0211f4987ee3680d6e12b              22a458df01b3615b52825f32      b851048b4e67aeacadee
da9             "}
```

Revealvote:

https://github.com/pchain-org/pchain/wiki/JSON-RPC#tdm_revealvote

Reveal the vote, the content of vote should matched with the hash which provided in tdm_voteNextEpoch (The valid window for this vote is between 85% - 95% of current epoch time, to know the detail block height, use tdm_getEpoch)

Parameters

1. from: address, 20 Bytes - the address who triggers the action

2. voteHash: hex string, 32 Bytes - hash of the vote. (How to get the vote hash, use Keccak-256 (not the standardized SHA3-256) example: keccak256(from + pubkey + amount + salt))

3. gasPrice: hex string - (optional, default: 1 gwei) gas price from the request

Example

```
revealvote:

curl -X POST -H "Content-Type:application/json" --data
'{"jsonrpc":"2.0","method":"tdm_revealVote","params":["0x5DEFDED18FE902F3F005A81D25955522416C6470",
"3          3CA1601E6DBED9C4F2EC6513B9CBA278EAF6F44093ED44802128644DA01C76859356ED223AC3E1DFA0C1DB8D175DFDEF104D96EBE3C103E7706D023D71A0F96833002CD
C3F9A94F5C5210E4A9275A5FBC9A53EFC77803C3DD736E98F4550E8D9DB4E41C40C4B387A83A360B23E322051928211.          ", "0x2a5a058fc295ec000000", "PCHAIN",
"0x          d76a210bf9bacd5b0211f4987ee3680d6e12b6ab08bc607c476122a458df01b3615b52825f3214430b851048b4e67aeacadeeda9a15        "],"id":1}'
http://localhost:6969/pchain
```

Returns

hash, string - the transaction hash

7. Check if you have competed successfully to be Validator based on the vote for the next Epoch.

https://github.com/pchain-org/pchain/wiki/JSON-RPC#tdm_getnextepochvalidators

tdm_getNextEpochValidators

Returns the validators of the next epoch based on the votes

Parameters

Returns

`result` , DATA - validators of the next epoch, such as address, public key, voting power