```
[sadeghmacbook@Sadeghs-MacBook ~ % geth --help
NAME:
   geth - the go-ethereum command line interface

USAGE:
   geth [global options] command [command options] [arguments...]

VERSION:
   1.14.3-stable

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-history        Export blockchain history to Era archives
   import                Import a blockchain file
   import-history        Import an Era archive
   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
   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
```

- **ACCOUNT COMMANDS**:

- `account new`: Creates a new Ethereum account.
- `account list`: Lists all existing Ethereum accounts.
- `account update`: Updates an existing account, for example, changing the password.
- `account import`: Imports an account from a file.

- **BLOCKCHAIN COMMANDS**:

- `import <file>`: Imports blockchain data from a file.
- `export <file>`: Exports blockchain data to a file.
- `copydb <source> <destination>`: Creates a copy of the database from one location to another.
- `removedb`: Deletes the blockchain database.

- **CONSOLE COMMANDS**:

`console`: Opens an interactive JavaScript console (connects to the geth instance).   •
`attach <endpoint>`: Opens an interactive JavaScript console, attaching to the specified   •
endpoint.

- **MINER COMMANDS**:

`miner start <threads>`: Starts the mining process with the specified number of   •
threads.
`miner stop`: Stops the mining process.   •
`setEtherbase <address>`: Sets the etherbase (mining rewards address) for the node.   •

- **NETWORKING COMMANDS**:

`addnode <node> <add|remove|connect>`: Manages peer connections.   •
`peers`: Lists all connected peers.   •
`admin.nodeInfo`: Displays information about the node.   •

- **DEV MODE COMMANDS**:

`init <genesis.json>`: Initializes a new genesis block and definition for a private chain.   •
`test`: Runs node in test mode.   •

- **CONFIGURATION COMMANDS**:

`--datadir <directory>`: Specifies the data directory for the databases and keystore.   •
`--networkid <id>`: Network identifier (integer) for the private network.   •
`--nodiscover`: Disables the peer discovery mechanism.   •
`--maxpeers <number>`: Limits the number of network peers.   •
`--syncmode <mode>`: Specifies the blockchain sync mode (full, fast, or light).   •
`--ipcpath <path>`: Sets the file path for IPC RPC server endpoint.   •
`--rpc`, `--rpcaddr <address>`, `--rpcport <port>`: Enable and configure the HTTP-   •
RPC server.

- **CHAIN COMMANDS**:

`--genesis <file>`: Specifies a custom genesis block.   •
`--networkid <id>`: Specifies the network ID.   •
`--syncmode <mode>`: Specifies the sync mode (full, fast, light).   •
`--verbosity <level>`: Sets the logging verbosity level.   •

- **ACCOUNT MANAGEMENT**:

`account new`: Create a new account.   •

- `account update`: Update an existing account.
- `account import`: Import an account.
- `account export`: Export an account.

- **UTILITY COMMANDS**:

- `dump`: Dumps the state of the blockchain.
- `monitor`: Monitor blockchain statistics.

- **MISCELLANEOUS**:

- `version`: Displays the geth version.
- `help`: Displays help information for commands.

گام دوم: کانفیگ کردن مشخصات بلوک اولیه

```json
{
    "config":{
        "chainId": 15,
        "homesteadBlock": 0,
        "eip155Block": 0,
        "eip158Block": 0
    },
    "difficulty": "400000",
    "gasLimit": "2100000",
    "alloc": {
    "[Account #1 Address]": { "balance": "10000000000810100274"},
    "[Account #2 Address]": { "balance": "20000000000810100274"},
    "[Account #3 Address]": { "balance": "15000000000810100274"}
    }
}
```

```
Last login: Thu May 23 16:40:40 on ttys011
[sadeghmacbook@Sadeghs-MacBook ~ % mkdir node01 node02 node03
[sadeghmacbook@Sadeghs-MacBook ~ % geth --datadir "/node01" account new
INFO [05-23|16:43:27.292] Maximum peer count                       ETH=50 total=50
Fatal: Failed to get the keystore directory: mkdir /node01: read-only file system
sadeghmacbook@Sadeghs-MacBook ~ % geth --datadir "~/node01" account new
INFO [05-23|16:44:38.076] Maximum peer count                       ETH=50 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:    0xBC065584Df25522B86B5086B0013B7b2c15b4C40
Path of the secret key file: /Users/sadeghmacbook/node01/keystore/UTC--2024-05-23T13-14-51.457441000Z--bc065584df25522b86b5086b0013b7b2c15b4c40

- 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!

sadeghmacbook@Sadeghs-MacBook ~ % geth --datadir "~/node02" account new
INFO [05-23|16:45:22.641] Maximum peer count                       ETH=50 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:    0x69580ADcE3AA998D470F638242Fa7aC19B607A33
Path of the secret key file: /Users/sadeghmacbook/node02/keystore/UTC--2024-05-23T13-15-29.369443000Z--69580adce3aa998d470f638242fa7ac19b607a33

- 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!

sadeghmacbook@Sadeghs-MacBook ~ % geth --datadir "~/node03" account new
INFO [05-23|16:45:41.136] Maximum peer count                       ETH=50 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:    0x4CBaFC21e496248249D1ce8A703a32A88d83C53A
Path of the secret key file: /Users/sadeghmacbook/node03/keystore/UTC--2024-05-23T13-15-46.039916000Z--4cbafc21e496248249d1ce8a703a32a88d83c53a

- 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!
```

گام چهارم: ایجاد اکانت و شروع به کار گره ها

ابتدا ساخت اکانت جدید در برای هر نود

و سپس ذخیره آدرس های ایجاد شده در در فایل genesis.json

حال اقدام به استارت زدن هرکدام از نودها در ترمینالی متفاوت با استفاده از دستور فوق مینماییم :

Node1:

Node2:

```
Last login: Thu May 23 17:08:40 on ttys004
[sadeghmacbook@Sadeghs-MacBook ~ % geth --identity "Node02" --http --http.port "8001]
" --http.corsdomain "*" --datadir "~/node02" --port "30304" --nodiscover --http.api
 "db,eth,net,web3,personal,miner,admin" --networkid 1900 --nat "any"

INFO [05-23|17:16:23.414] Maximum peer count                       ETH=50 total=50
INFO [05-23|17:16:23.418] Set global gas cap                       cap=50,000,000
INFO [05-23|17:16:23.418] Initializing the KZG library             backend=gokzg
INFO [05-23|17:16:23.448] Allocated trie memory caches             clean=154.00MiB
dirty=256.00MiB
INFO [05-23|17:16:23.448] Using pebble as the backing database
INFO [05-23|17:16:23.448] Allocated cache and file handles         database=/Users/
sadeghmacbook/node02/geth/chaindata cache=512.00MiB handles=5120
INFO [05-23|17:16:23.492] Opened ancient database                  database=/Users/
sadeghmacbook/node02/geth/chaindata/ancient/chain readonly=false
INFO [05-23|17:16:23.492] State scheme set to already existing      scheme=path
Fatal: Failed to register the Ethereum service: only PoS networks are supported, pl
ease transition old ones with Geth v1.13.x
sadeghmacbook@Sadeghs-MacBook ~ %
```
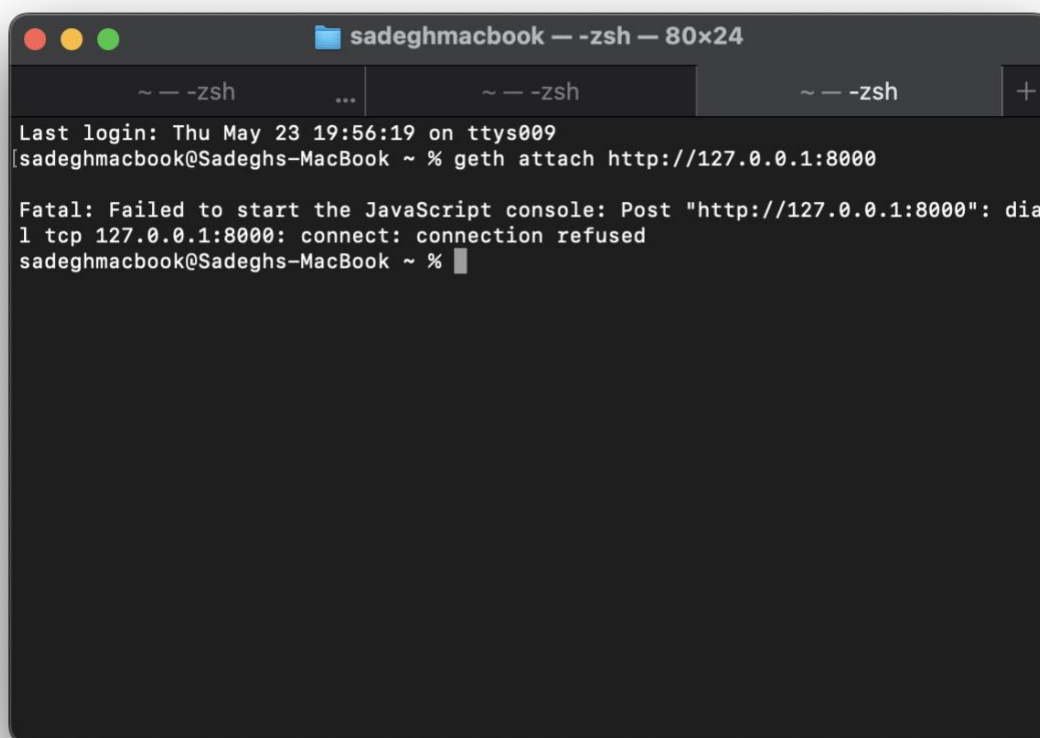
Node3:

```
Last login: Thu May 23 17:16:13 on ttys003
[sadeghmacbook@Sadeghs-MacBook ~ % geth --identity "Node03" --http --http.port "8002]
" --http.corsdomain "*" --datadir "~/node03" --port "30305" --nodiscover --http.api
 "db,eth,net,web3,personal,miner,admin" --networkid 1900 --nat "any"

INFO [05-23|17:16:32.984] Maximum peer count                       ETH=50 total=50
INFO [05-23|17:16:32.988] Set global gas cap                       cap=50,000,000
INFO [05-23|17:16:32.988] Initializing the KZG library             backend=gokzg
INFO [05-23|17:16:33.019] Allocated trie memory caches             clean=154.00MiB
dirty=256.00MiB
INFO [05-23|17:16:33.019] Using pebble as the backing database
INFO [05-23|17:16:33.019] Allocated cache and file handles         database=/Users/
sadeghmacbook/node03/geth/chaindata cache=512.00MiB handles=5120
INFO [05-23|17:16:33.053] Opened ancient database                  database=/Users/
sadeghmacbook/node03/geth/chaindata/ancient/chain readonly=false
INFO [05-23|17:16:33.053] State scheme set to already existing      scheme=path
Fatal: Failed to register the Ethereum service: only PoS networks are supported, pl
ease transition old ones with Geth v1.13.x
sadeghmacbook@Sadeghs-MacBook ~ %
```

گام پنجم: وصل شدن به نودها از طریق یک کلاینت

هم اکنون با استفاده از دستور فوق در یک ترمینال مجزا از ترمینال های قبلی، به عنوان یک کلاینت به یکی از نودها به
صورت لوکال متصل شوید.

در این بخش هنگام اتصال به نود ها این ارور رو دریافت کردم و نتوانستم آن را برطرف کنم!!

```
Last login: Thu May 23 19:56:19 on ttys009
[sadeghmacbook@Sadeghs-MacBook ~ % geth attach http://127.0.0.1:8000]

Fatal: Failed to start the JavaScript console: Post "http://127.0.0.1:8000": dia
l tcp 127.0.0.1:8000: connect: connection refused
sadeghmacbook@Sadeghs-MacBook ~ %
```