

하이퍼레저 벡스 네트워크 구축



<https://github.com/hyperledger/besu>

hyperledger / besu Public Watch 48

<> Code Issues 207 Pull requests 24 Actions Security 2 Insights

main 6 branches 112 tags Go to file Add file Code

garyschulte Bugfix/terminal block check (#3501) ...

- .circleci use med executor for quorum
- .github Add GitHub action to verify
- acceptance-tests to remove deprecated proto
- benchmark spike: add benchmark (#271)
- besu Update ef bootnodes (#3502)
- buildSrc/src/main/groovy Adding a spdx license check gradle task (#30) 3 years ago
- config Update ef bootnodes (#3502) yesterday
- consensus Bugfix/terminal block check (#3501) 14 hours ago

Clone ?

HTTPS SSH GitHub CLI

<https://github.com/hyperledger/besu.git>

Use Git or checkout with SVN using the web URL.

Open with GitHub Desktop

Download ZIP

프라이빗 네트워크 구축

besu_privateNetwork > besu-main				
이름	수정한 날짜	유형	크기	
✳ .circleci	2022-03-02 오전 4:27	파일 폴더		
✳ .github	2022-03-02 오전 4:27	파일 폴더		
✳ acceptance-tests	2022-03-02 오전 4:27	파일 폴더		
✳ benchmark	2022-03-02 오전 4:27	파일 폴더		
✳ besu	2022-03-02 오전 4:27	파일 폴더		
✳ buildSrc	2022-03-02 오전 4:27	파일 폴더		
✳ config	2022-03-02 오전 4:27	파일 폴더		
consensus	2022-03-02 오전 4:27	파일 폴더		
container-tests	2022-03-02 오전 4:27	파일 폴더		
crypto	2022-03-02 오전 4:27	파일 폴더		
datatypes	2022-03-02 오전 4:27	파일 폴더		
docker	2022-03-02 오전 4:27	파일 폴더		
docs	2022-03-02 오전 4:27	파일 폴더		
enclave	2022-03-02 오전 4:27	파일 폴더		
errorprone-checks	2022-03-02 오전 4:27	파일 폴더		
ethereum	2022-03-02 오전 4:27	파일 폴더		
evm	2022-03-02 오전 4:27	파일 폴더		
gradle	2022-03-02 오전 4:27	파일 폴더		
metrics	2022-03-02 오전 4:27	파일 폴더		
nat	2022-03-02 오전 4:27	파일 폴더		
pki	2022-03-02 오전 4:27	파일 폴더		
plugin-api	2022-03-02 오전 4:27	파일 폴더		
plugins	2022-03-02 오전 4:27	파일 폴더		
privacy-contracts	2022-03-02 오전 4:27	파일 폴더		
scripts	2022-03-02 오전 4:27	파일 폴더		
services	2022-03-02 오전 4:27	파일 폴더		
testutil	2022-03-02 오전 4:27	파일 폴더		
util	2022-03-02 오전 4:27	파일 폴더		
.dockerignore	2022-03-02 오전 4:27	DOCKERIGNORE ...	1KB	
.gitattributes	2022-03-02 오전 4:27	텍스트 문서	1KB	
.gitignore	2022-03-02 오전 4:27	텍스트 문서	1KB	
.gitmodules	2022-03-02 오전 4:27	텍스트 문서	1KB	
build.gradle	2022-03-02 오전 4:27	GRADLE 파일	31KB	
CHANGELOG.md	2022-03-02 오전 4:27	MD 파일	250KB	
CODE_OF_CONDUCT.md	2022-03-02 오전 4:27	MD 파일	8KB	
CODEOWNERS.md	2022-03-02 오전 4:27	MD 파일	0KB	
CONTRIBUTING.md	2022-03-02 오전 4:27	MD 파일	3KB	
DCO.md	2022-03-02 오전 4:27	MD 파일	1KB	
gradle.properties	2022-03-02 오전 4:27	PROPERTIES 파일	1KB	

```
system888@DESKTOP-GM35NPN MINGW64 /e/besu_privateNetwork/besu-main
$ ls
acceptance-tests/  crypto/          gradlew.bat      PULL_REQUEST_TEMPLATE.md
benchmark/         datatypes/       ISSUE_TEMPLATE.md  README.md
besu/              DCO.md          KNOWN_ISSUES.md   scripts/
build.gradle       docker/         LICENSE          SECURITY.md
buildSrc/          docs/          MAINTAINERS.md   services/
CHANGELOG.md       enclave/        metrics/         settings.gradle
CODE_OF_CONDUCT.md errorprone-checks/ nat/             SUPPORT.md
CODEOWNERS.md      ethereum/       NOTICE.md       testutil/
config/            evm/           pki/            util/
consensus/         gradle/        plugin-api/
container-tests/   gradle.properties  plugins/
CONTRIBUTING.md   gradlew*        privacy-contracts/
```

OS 상관없이 주의해야 할 것은
경로에서의
/ \

PPT 및 실습 환경

<https://gitforwindows.org/>

Git Bash terminal로 진행



./gradlew installDist

```
system88@DESKTOP-GM35NPN MINGW64 /e/besu_privateNetwork/besu-main
$ ./gradlew installDist
Downloading https://services.gradle.org/distributions/gradle-7.3.3-bin.zip
.....10%.....20%.....30%.....40%.....50%.....60%.....70%
.....80%.....90%.....100%
|
```

프라이빗 네트워크 구축

```
> Task :ethereum:core:compileTestSupportJava
Note: E:\besu_privateNetwork\besu-main\ethereum\core\src\test-support\java\org\hyperledger\besu\et
hereum\core\InMemoryPrivacyStorageProvider.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

> Task :ethereum:evmtool:compileJava
Note: Some input files use or override a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

Deprecated Gradle features were used in this build, making it incompatible with Gradle 8.0.

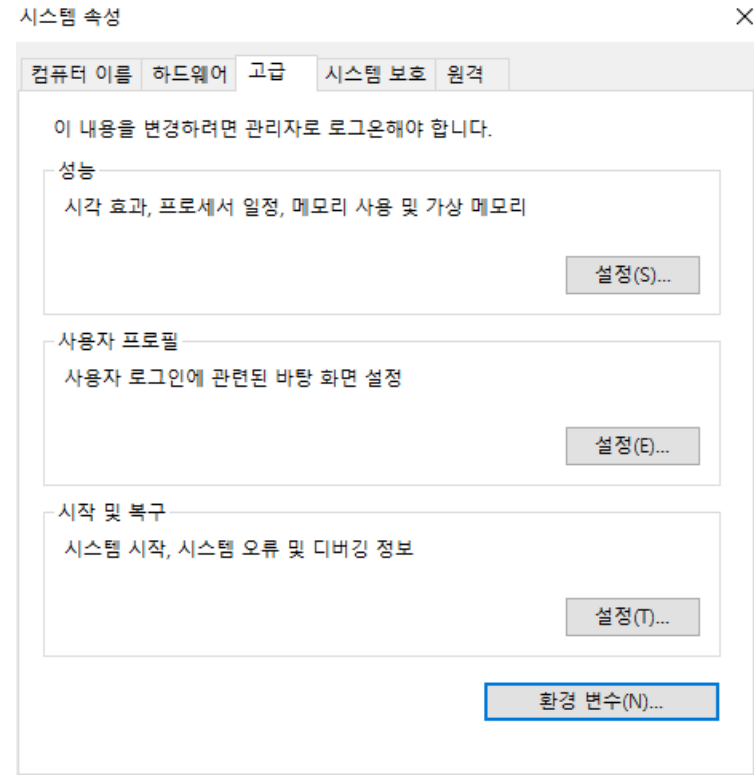
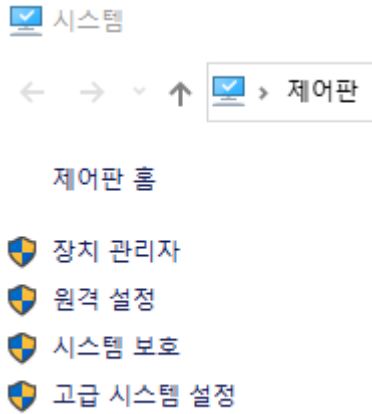
You can use '--warning-mode all' to show the individual deprecation warnings and determine if they
come from your own scripts or plugins.

See https://docs.gradle.org/7.3.3/userguide/command\_line\_interface.html#sec:command\_line\_warnings

BUILD SUCCESSFUL in 1m 35s
89 actionable tasks: 50 executed, 39 up-to-date
```

프라이빗 네트워크 구축

내PC -> 속성 -> 고급 시스템 설정 -> 환경변수



프라이빗 네트워크 구축

환경 변수

selab에 대한 사용자 변수(U)

변수	값
besu	C:\Wbesu-1.5.1\Wbesu-1.5.1\build\install\Wbesu
ChocolateyLastPath...	132361009493958207
IntelliJ IDEA	C:\Program Files\JetBrains\IntelliJ IDEA 202...
OneDrive	C:\Users\selab\OneDrive
Path	C:\Users\selab\AppData\Local\Microsoft...

새로 만들기(N)...

시스템 변수(S)

변수	값
ChocolateyInstall	C:\ProgramData\chocolatey
ComSpec	C:\Windows\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
NUMBER_OF_PRO...	12
OS	Windows NT

새로 만들기(W)... 편집(I)... 삭제(L)

확인 취소

사용자 변수 편집

변수 이름(N): besu

변수 값(V): C:\Wbesu-1.5.1\Wbesu-1.5.1\build\install\Wbesu

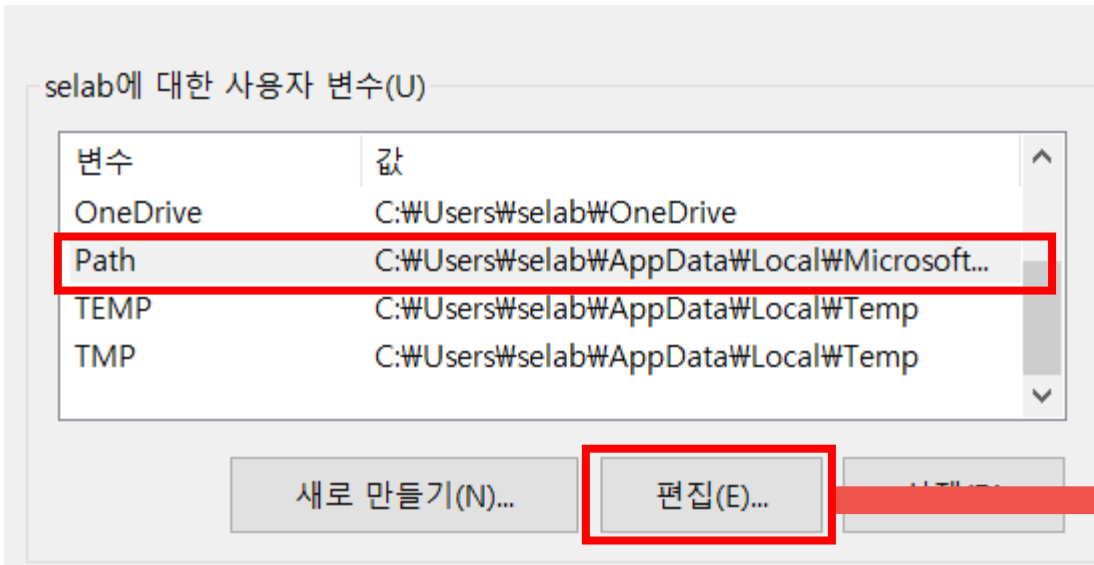
디렉터리 찾아보기(D)... 파일 찾아보기(F)...

확인 취소

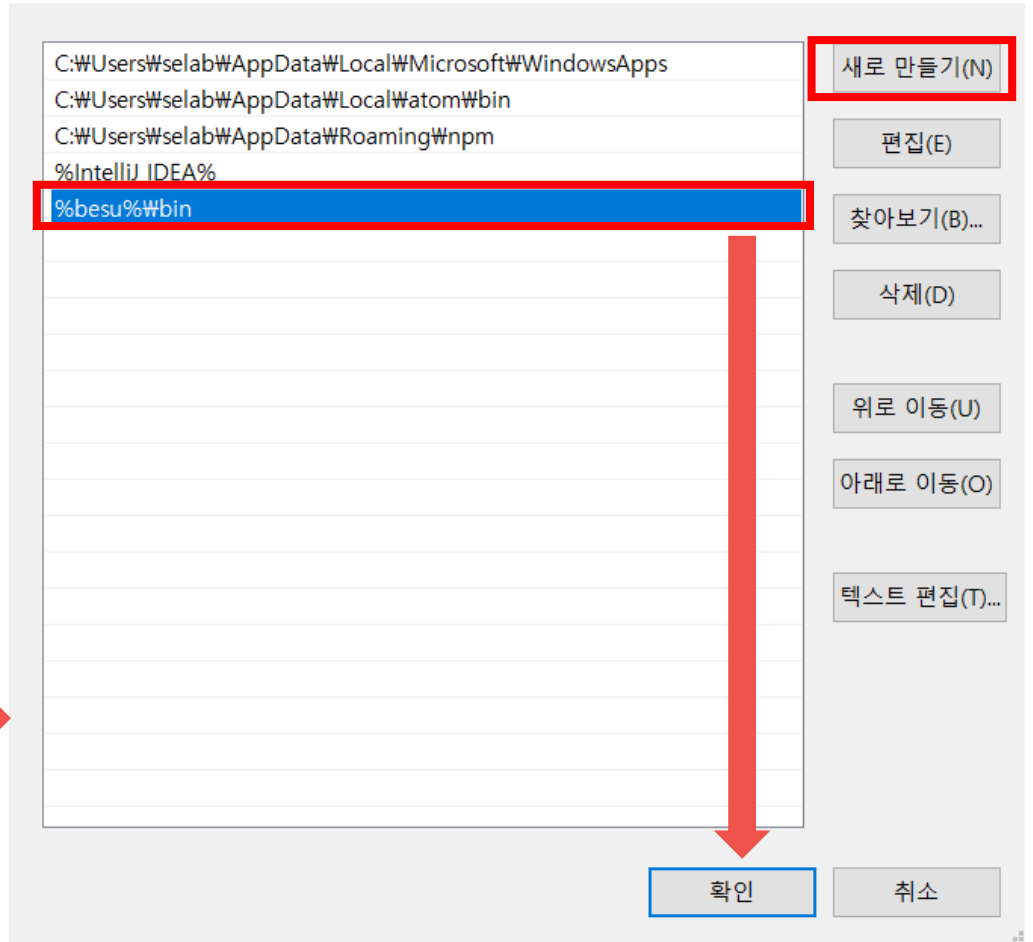
본인이 압축 해제한 위치

프라이빗 네트워크 구축

환경 변수



환경 변수 편집



해당 방법으로 besu를 못 읽을 경우 사용자 변수 path에 직접 등록

환경 변수

selab에 대한 사용자 변수(U)

변수	값
besu	C:\besu-1.5.1\besu-1.5.1\build\install\besu
ChocolateyLastPath...	132361009493958207
IntelliJ IDEA	C:\Program Files\JetBrains\IntelliJ IDEA 202...
OneDrive	C:\Users\selab\OneDrive
Path	C:\Users\selab\AppData\Local\Microsoft...

새로 만들기(N)... 편집(E)... 삭제(D)

시스템 변수(S)

변수	값
ChocolateyInstall	C:\ProgramData\chocolatey
ComSpec	C:\Windows\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
NUMBER_OF_PROC...	12
OS	Windows NT

새로 만들기(W)... 편집(I)... 삭제(L)

확인 취소

해당 방법으로 besu를 못 읽을 경우 사용자 변수 path에 직접 등록

```
PS C:\#Users\system888> besu --version  
besu/v22.1.2-dev-xxxxxxx/windows-x86_64/oracle-java-11
```

프라이빗 네트워크 데이터 저장을 위한 폴더 생성

```
E: .  
├─ node1  
│   └─ data  
├─ node2  
│   └─ data  
├─ node3  
│   └─ data  
└─ node4  
    └─ data
```

ivateNetwork > besu_network

이름

- node1
- node2
- node3
- node4

Ethereum Account 생성

<https://vanity-eth.tk/>

The screenshot shows the vanity-eth.tk website interface. It features a teal header and a light blue background. The main content area is divided into two columns. The left column contains a 'Prefix' input field with a placeholder 'Prefix' and an example 'E.g. 0xaD165589E4D3a765fd16cEA79bAd37eA2B0bF8B7'. Below this are checkboxes for 'Case-sensitive' (checked) and 'Prefix' (unchecked) and 'Suffix' (unchecked). There are also minus and plus buttons next to '12 threads (recommended)'. At the bottom of this column are 'Generate' and 'Stop' buttons. The right column displays statistics: 'Difficulty: 1', 'Generated: 0 addresses', '50% probability: 0 addresses', 'Speed: 0 addr/s', and 'Status: Waiting'. A progress bar at the bottom right shows '0% Probability'. At the bottom of the page, there are fields for 'Address:' and 'Private key:', and a 'Save' button.

Prefix

E.g. 0xaD165589E4D3a765fd16cEA79bAd37eA2B0bF8B7

☒ Case-sensitive

Prefix ☐ Suffix

- + 12 threads (recommended)

Generate Stop

Difficulty: 1

Generated: 0 addresses

50% probability: 0 addresses

Speed: 0 addr/s

Status: Waiting

0% Probability

Address:

Private key:

Save

Address, Private key 따로 저장

프라이빗 네트워크 구축

Genesis.json 파일 생성

```
1 {
2   "genesis": {
3     "config": {
4       "chainId": 1337,
5       "muirglacierblock": 0,
6       "ibft2": {
7         "blockperiodseconds": 2,
8         "epochlength": 30000,
9         "requesttimeoutseconds": 4
10      }
11    },
12    "nonce": "0x0",
13    "timestamp": "0x58ee40ba",
14    "gasLimit": "0x47b760",
15    "difficulty": "0x1",
16    "mixHash": "0x63746963616c2062797a616e74696e65206661756c742074666c6572616e6365",
17    "coinbase": "0x0000000000000000000000000000000000000000",
18    "alloc": {
19      "9D9a133eFE458949E30F6D4B184eD0CE11D02325": {
20        "privateKey": "b628eda31d34b136633ff9d2b5177824569966560084768e0722df1e497ff773",
21        "balance": "0xad78ebc5ac6200000"
22      },
23      "40c91d1d7669873486ea79Ec338C8F96eEEDca32": {
24        "privateKey": "4bea1b5d3309bda0785608d4c2deaea6216b26d07fafd1030a0d243f0006aa1c",
25        "balance": "0xad78ebc5ac6200000"
26      },
27      "bDa6cE3177682C39fF36Ab76692e094e30848024": {
28        "privateKey": "4db07403ed6a33c4cf395781ab07a564ea0954d1a274e01163eb7e4a8b0512ae",
29        "balance": "90000000000000000000000000000000"
30      },
31      "3493100b7d85A40450D38819Fa242728BdEd4887": {
32        "privateKey": "689030691365c657e31bf348f4c08cf647a9c5f9fc62089ad71c77832ce224ed",
33        "balance": "90000000000000000000000000000000"
34      }
35    }
36  },
37  "blockchain": {
38    "nodes": {
39      "generate": true,
40      "count": 4
41    }
42  }
43 }
```

besu_privateNetwork > besu_network

이름

node1
node2
node3
node4
genesis.json

생성한 Address 랑 Private key 작성

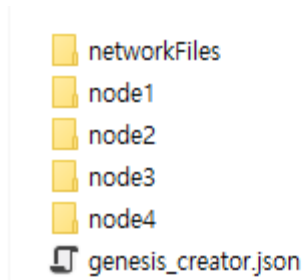
Genesis.json 파일 기반 Key 파일 생성

생성한 genesis.json 파일의 위치에서 Console창 접속

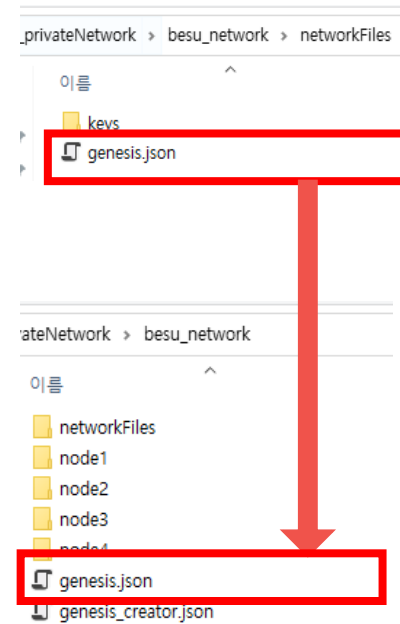
```
$ besu operator generate-blockchain-config --config-file=genesis.json --to=networkFiles --private-key-file-name=key
2022-03-03 11:20:40.009+09:00 | main | INFO | GenerateBlockchainConfig | Generating 4 nodes keys.
2022-03-03 11:20:40.013+09:00 | main | INFO | GenerateBlockchainConfig | Generating keypair for node 0.
2022-03-03 11:20:40.860+09:00 | main | INFO | GenerateBlockchainConfig | Generating keypair for node 1.
2022-03-03 11:20:40.864+09:00 | main | INFO | GenerateBlockchainConfig | Generating keypair for node 2.
2022-03-03 11:20:40.867+09:00 | main | INFO | GenerateBlockchainConfig | Generating keypair for node 3.
2022-03-03 11:20:40.871+09:00 | main | INFO | GenerateBlockchainConfig | Generating IBFT extra data.
2022-03-03 11:20:40.873+09:00 | main | INFO | GenerateBlockchainConfig | Writing genesis file.
```

```
$ besu operator generate-blockchain-config --config-file=genesis.json --to=networkFiles --private-key-file-name=key
```

파일 위치 조정

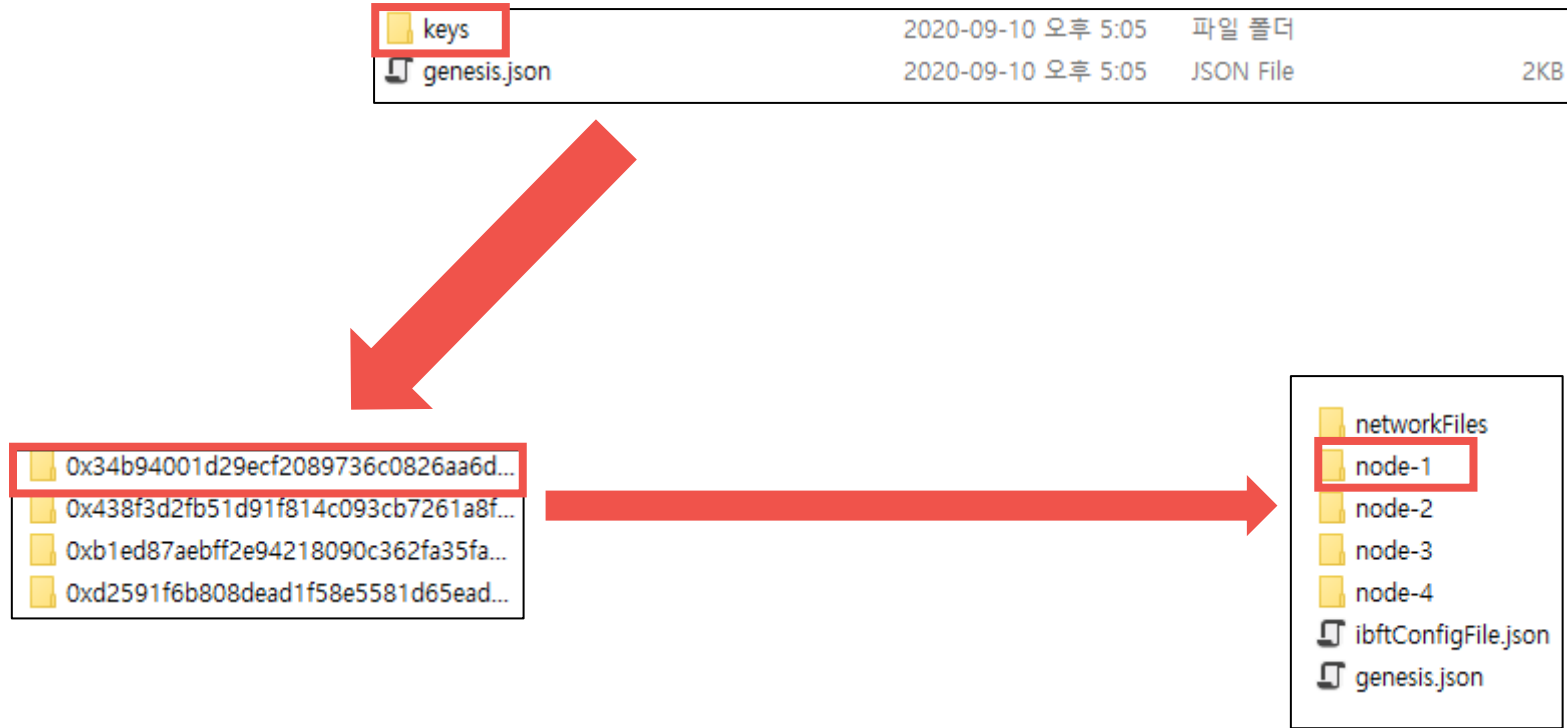


기존 genesis.json 파일 이름을 genesis_creator.json으로 변경



프라이빗 네트워크 구축

파일 위치 조정



각각 폴더 안에 있는
Key, key.pub 파일을 각 노드의 폴더의 data 폴더 안에 이동

파일 위치 조정

```
IBFT-Network/  
├── genesis.json  
├── Node-1  
│   ├── data  
│   │   ├── key  
│   │   └── key.pub  
├── Node-2  
│   ├── data  
│   │   ├── key  
│   │   └── key.pub  
├── Node-3  
│   ├── data  
│   │   ├── key  
│   │   └── key.pub  
└── Node-4  
    ├── data  
    │   ├── key  
    │   └── key.pub
```

그림과 같은 형태로 파일 위치 조정

Console 창 활용해서 node1 폴더로 이동

MINGW64:/e/bsu_privateNetwork/bsu_network/node1

```
system888@DESKTOP-GM35NPN MINGW64 /e/bsu_privateNetwork/bsu_network/node1
$ |
```

```
system888@DESKTOP-GM35NPN MINGW64 /e/bsu_privateNetwork/bsu_network/node1
$ besu --data-path=data --genesis-file=./genesis.json --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="" --rpc-http-cors-origins="all"
2022-03-03 11:33:44.058+09:00 | main | INFO | AltBN128PairingPrecompiledContract | Native alt bn128 requested but not available
2022-03-03 11:33:44.539+09:00 | main | INFO | SECP256K1 | Native secp256k1 requested but not available
2022-03-03 11:33:44.543+09:00 | main | INFO | Besu | Starting Besu version: besu/v1.5.0-RC4-dev-xxxxxxx/windows-x86_64/oracle-java-11
2022-03-03 11:33:44.845+09:00 | main | INFO | StaticNodesParser | StaticNodes file E:\bsu_privateNetwork\bsu_network\node1\data\static-nodes.json does not exist, no static connections will be created.
2022-03-03 11:33:44.846+09:00 | main | INFO | Besu | Connecting to 0 static nodes.
2022-03-03 11:33:44.848+09:00 | main | INFO | Besu | Security Module: localfile
2022-03-03 11:33:44.882+09:00 | main | INFO | KeyPairUtil | Loaded public key 0xe8f3977e2d2922cbe18117a4439daee5cb816d755ec2033fcfaedcddc33924033b138af9a94bfe3df8d4cd2fa39398cfbbb6275670f5b2b7e7fc873a5790cfd from E:\bsu_privateNetwork\bsu_network\node1\data\key
2022-03-03 11:33:44.921+09:00 | main | INFO | RocksDBKeyValueStorageFactory | No existing database detected at E:\bsu_privateNetwork\bsu_network\node1\data. Using version 1
2022-03-03 11:33:46.186+09:00 | main | INFO | ProtocolScheduleBuilder | Protocol schedule created with milestones: [MuirGlacier: 0]
2022-03-03 11:33:46.276+09:00 | main | INFO | RunnerBuilder | Detecting NAT service.
2022-03-03 11:33:46.366+09:00 | main | INFO | Runner | Starting Ethereum main loop ...
2022-03-03 11:33:46.366+09:00 | main | INFO | NatService | No NAT environment detected so no service could be started
2022-03-03 11:33:46.366+09:00 | main | INFO | NetworkRunner | Starting Network.
2022-03-03 11:33:46.913+09:00 | nioEventLoopGroup-2-1 | INFO | RlpAgent | P2P RLPx agent started and listening on /0:0:0:0:0:0:0:0:30303.
2022-03-03 11:33:46.914+09:00 | main | INFO | PeerDiscoveryAgent | Starting peer discovery agent on host=0.0.0.0, port=30303
2022-03-03 11:33:47.423+09:00 | vert.x-eventloop-thread-1 | INFO | VertxPeerDiscoveryAgent | Started peer discovery agent successfully, on effective host=0:0:0:0:0:0:0:0 and port=30303
2022-03-03 11:33:47.426+09:00 | vert.x-eventloop-thread-1 | INFO | PeerDiscoveryAgent | P2P peer discovery agent started and listening on /0:0:0:0:0:0:0:0:30303
2022-03-03 11:33:47.451+09:00 | main | INFO | DefaultP2PNetwork | Enode URL enode://e8f3977e2d2922cbe18117a4439daee5cb816d755ec2033fcfaedcddc33924033b138af9a94bfe3df8d4cd2fa39398cfbbb6275670f5b2b7e7fc873a5790cfd@127.0.0.1:30303
2022-03-03 11:33:47.452+09:00 | main | INFO | DefaultP2PNetwork | Node address 0x7a7dcddfe6b203df14360fa09e63ddea61110fea
2022-03-03 11:33:47.454+09:00 | main | INFO | DefaultSynchronizer | Starting synchronizer.
2022-03-03 11:33:47.455+09:00 | main | INFO | FullSyncDownloader | Starting full sync.
2022-03-03 11:33:47.456+09:00 | main | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:33:47.487+09:00 | main | INFO | JsonRpcHttpService | Starting JsonRPC service on 127.0.0.1:8545
2022-03-03 11:33:47.528+09:00 | vert.x-eventloop-thread-5 | INFO | JsonRpcHttpService | JsonRPC service started and listening on 127.0.0.1:8545
2022-03-03 11:33:47.531+09:00 | main | INFO | Runner | Ethereum main loop is up.
2022-03-03 11:33:47.542+09:00 | main | INFO | AutoTransactionLogBloomCachingService | Starting auto transaction log bloom caching service.
2022-03-03 11:33:52.470+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:33:57.471+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
```

```
besu --data-path=data --genesis-file=./genesis.json --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="" --rpc-http-cors-origins="all"
```

Encode 정보 복사

```
system888@DESKTOP-GM35NPN MINGW64 /e/besu_privateNetwork/besu_network/node1
$ besu --data-path=data --genesis-file=./genesis.json --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="" --rpc-http-cors-origins="all"
2022-03-03 11:33:44.058+09:00 | main | INFO | AltBN128PairingPrecompiledContract | Native alt bn128 requested but not available
2022-03-03 11:33:44.539+09:00 | main | INFO | SECP256K1 | Native secp256k1 requested but not available
2022-03-03 11:33:44.543+09:00 | main | INFO | Besu | Starting Besu version: besu/v1.5.0-RC4-dev-xxxxxxx/windows-x86_64/oracle-java-11
2022-03-03 11:33:44.845+09:00 | main | INFO | StaticNodesParser | StaticNodes file E:\besu_privateNetwork\besu_network\node1\data\static-nodes.json does not exist, no static connections will be created.
2022-03-03 11:33:44.846+09:00 | main | INFO | Besu | Connecting to 0 static nodes.
2022-03-03 11:33:44.848+09:00 | main | INFO | Besu | Security Module: localfile
2022-03-03 11:33:44.882+09:00 | main | INFO | KeyPairUtil | Loaded public key 0xe8f3977e2d2922cbe18117a4439daee5cb816d75ec2033fcaedcddc33924033b138af9a94bfe3df8d4cd2fa39398cfbbb6275670f5b2b7e7fc873a5790cfd from E:\besu_privateNetwork\besu_network\node1\data\key
2022-03-03 11:33:44.921+09:00 | main | INFO | RocksDBKeyValueStorageFactory | No existing database detected at E:\besu_privateNetwork\besu_network\node1\data. Using version 1
2022-03-03 11:33:46.186+09:00 | main | INFO | ProtocolScheduleBuilder | Protocol schedule created with milestones: [MuirGlacier: 0]
2022-03-03 11:33:46.276+09:00 | main | INFO | RunnerBuilder | Detecting NAT service.
2022-03-03 11:33:46.366+09:00 | main | INFO | Runner | Starting Ethereum main loop ...
2022-03-03 11:33:46.366+09:00 | main | INFO | NatService | No NAT environment detected so no service could be started
2022-03-03 11:33:46.366+09:00 | main | INFO | NetworkRunner | Starting Network.
2022-03-03 11:33:46.913+09:00 | nioEventLoopGroup-2-1 | INFO | RlpAgent | P2P RLPx agent started and listening on /0:0:0:0:0:0:0:0:30303.
2022-03-03 11:33:46.914+09:00 | main | INFO | PeerDiscoveryAgent | Starting peer discovery agent on host=0.0.0.0, port=30303
2022-03-03 11:33:47.423+09:00 | vert.x-eventloop-thread-1 | INFO | VertxPeerDiscoveryAgent | Started peer discovery agent successfully, on effective host=0:0:0:0:0:0:0:0 and port=30303
2022-03-03 11:33:47.426+09:00 | vert.x-eventloop-thread-1 | INFO | PeerDiscoveryAgent | P2P peer discovery agent started and listening on /0:0:0:0:0:0:0:0:30303
2022-03-03 11:33:47.451+09:00 | main | INFO | DefaultP2PNetwork | Enode URL enode://e8f3977e2d2922cbe18117a4439daee5cb816d75ec2033fcaedcddc33924033b138af9a94bfe3df8d4cd2fa39398cfbbb6275670f5b2b7e7fc873a5790cfd@127.0.0.1:30303
2022-03-03 11:33:47.452+09:00 | main | INFO | DefaultP2PNetwork | Node address 0x7a7cd9dfe6b203df14360fa09e63ddea61110fea
2022-03-03 11:33:47.454+09:00 | main | INFO | DefaultSynchronizer | Starting synchronizer.
2022-03-03 11:33:47.455+09:00 | main | INFO | FullSyncDownloader | Starting full sync.
2022-03-03 11:33:47.456+09:00 | main | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:33:47.487+09:00 | main | INFO | JsonRpcHttpService | Starting JsonRPC service on 127.0.0.1:8545
2022-03-03 11:33:47.528+09:00 | vert.x-eventloop-thread-5 | INFO | JsonRpcHttpService | JsonRPC service started and listening on 127.0.0.1:8545
2022-03-03 11:33:47.531+09:00 | main | INFO | Runner | Ethereum main loop is up.
2022-03-03 11:33:47.542+09:00 | main | INFO | AutoTransactionLogBloomCachingService | Starting auto transaction log bloom caching service.
2022-03-03 11:33:52.470+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:33:57.471+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
```

```
2022-03-03 11:36:22.514+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:36:27.515+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:36:32.517+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:36:37.519+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:36:42.521+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:36:47.525+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:36:52.528+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:36:57.530+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:02.531+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:07.533+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:12.534+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:17.536+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:22.537+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:27.539+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:32.540+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:37.541+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:42.543+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:47.545+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:52.547+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:37:57.549+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
2022-03-03 11:38:02.550+09:00 | EthScheduler-Timer-0 | INFO | FullSyncTargetManager | No sync target, waiting for peers: 0
```

노드 실행 명령어 만들기

Node-1

```
besu --data-path=data --genesis-file=../genesis.json --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all"
```

Node-2

```
besu --data-path=data --genesis-file=../genesis.json --bootnodes=<Node-1  
Enode URL> --p2p-port=30304 --rpc-http-enabled --rpc-http-  
api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all" --rpc-  
http-port=8546
```

Node-3

```
besu --data-path=data --genesis-file=../genesis.json --  
bootnodes=<Node-1 Enode URL> --p2p-port=30305 --rpc-http-  
enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="*" --rpc-  
http-cors-origins="all" --rpc-http-port=8547
```

Node-4

```
besu --data-path=data --genesis-file=../genesis.json --bootnodes=<Node-1 Enode URL> --p2p-port=30306 --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-  
allowlist="*" --rpc-http-cors-origins="all" --rpc-http-port=8548
```

노드 실행 명령어 만들기2

Node-1

```
besu --data-path=data --genesis-file=./genesis.json --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all"
```

Node-2

```
besu --data-path=data --genesis-file=./genesis.json --bootnodes=<Node-1 Enode URL> --p2p-port=30304 --rpc-ws-enabled --rpc-ws-api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all" --rpc-ws-port=8546
```

Node-3

```
besu --data-path=data --genesis-file=./genesis.json --bootnodes=<Node-1 Enode URL> --p2p-port=30305 --rpc-ws-enabled --rpc-ws-api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all" --rpc-ws-port=8547
```

Node-4

```
besu --data-path=data --genesis-file=./genesis.json --bootnodes=<Node-1 Enode URL> --p2p-port=30306 --rpc-ws-enabled --rpc-ws-api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all" --rpc-ws-port=8548
```

노드 실행 명령어 만들기

Enode URL

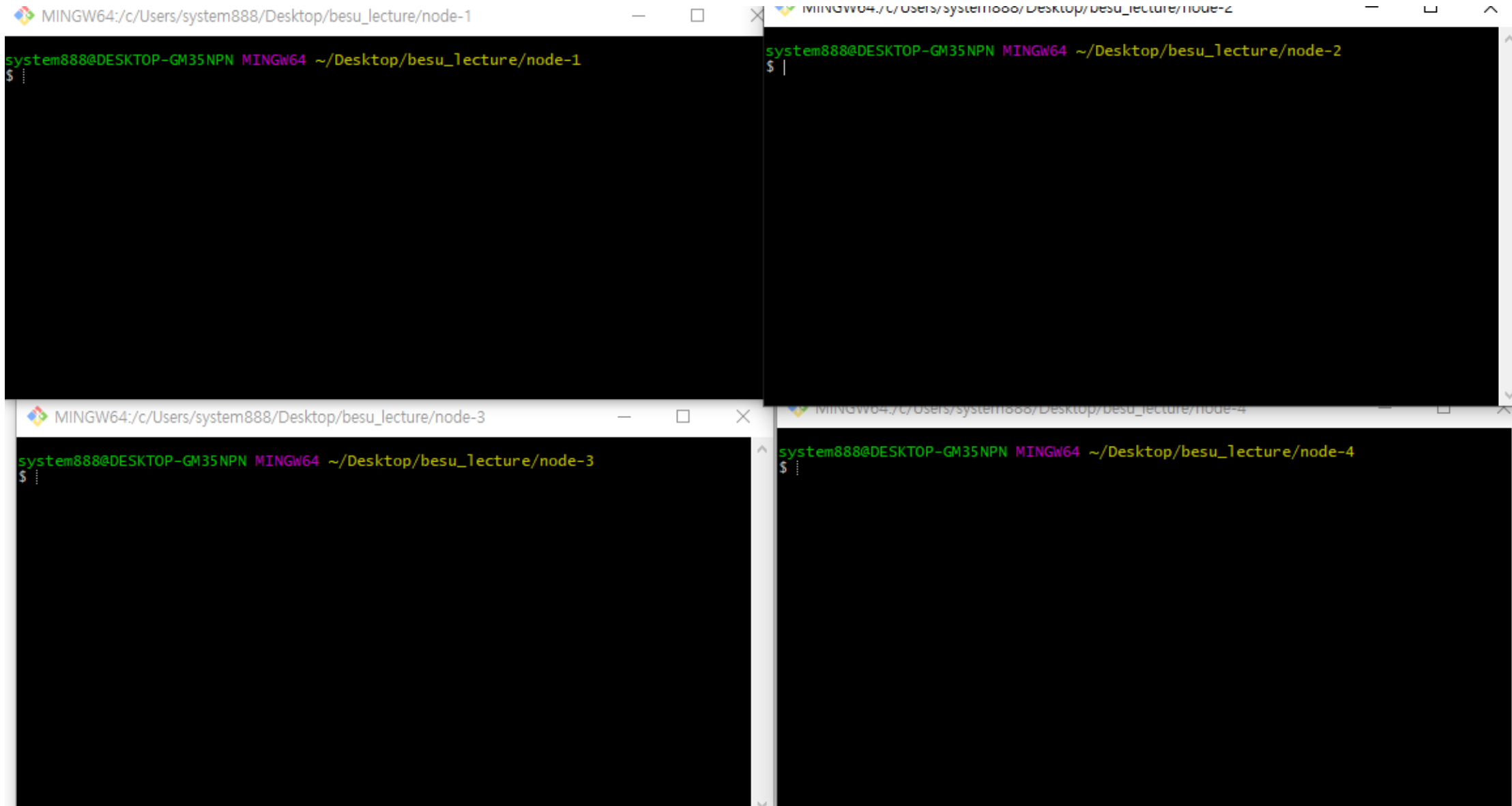
```
enode://ae5d71cefa32190dd20d298f9d9d58ee435429244892868426126c7d160b734d04d930a9f4fb139889e99e0c7d91e263167992615d91c1e0ea59d74d277b2437@127.0.0.1:30303
```

```
besu --data-path=data --genesis-file=../genesis.json --  
bootnodes=enode://ae5d71cefa32190dd20d298f9d9d58ee435429244892868426126c7d160b734d04d930a9f4fb139889e99e0c7d91e263167992615d91c1e0ea59d74d277b2437@127.0.0.1:30303 --p2p-port=30304 --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all" --rpc-http-port=8546
```

```
besu --data-path=data --genesis-file=../genesis.json --  
bootnodes=enode://ae5d71cefa32190dd20d298f9d9d58ee435429244892868426126c7d160b734d04d930a9f4fb139889e99e0c7d91e263167992615d91c1e0ea59d74d277b2437@127.0.0.1:30303 --p2p-port=30305 --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all" --rpc-http-port=8547
```

```
besu --data-path=data --genesis-file=../genesis.json --  
bootnodes=enode://ae5d71cefa32190dd20d298f9d9d58ee435429244892868426126c7d160b734d04d930a9f4fb139889e99e0c7d91e263167992615d91c1e0ea59d74d277b2437@127.0.0.1:30303 --p2p-port=30306 --rpc-http-enabled --rpc-http-api=ETH,NET,IBFT --host-allowlist="*" --rpc-http-cors-origins="all" --rpc-http-port=8548
```

프라이빗 네트워크 구축



프라이빗 네트워크 구축

```
MINGW64:/e/besu_privateNetwork/besu_network/node1
ntrollerBuilder | Imported #39 / 0 tx / 0 pending / 0 (0.0%) gas / (0x3862756113
519c3dd244078c228cbb3d8fef1024d94952753367762d9e0ad78a)
2022-03-03 13:36:54.089+09:00 | EthScheduler-Workers-0 | INFO | PersistBlockTas
k | Imported #40 / 0 tx / 0 om / 0 (0.0%) gas / (0xd521c738b38e5fa53166b6c357438
133954603c6234abbe3fb2086462f6bfb14) in 0.006s. Peers: 3
2022-03-03 13:36:54.089+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Produced #40 / 0 tx / 0 pending / 0 (0.0%) gas / (0xd521c738b3
8e5fa53166b6c357438133954603c6234abbe3fb2086462f6bfb14)
2022-03-03 13:36:56.097+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #41 / 0 tx / 0 pending / 0 (0.0%) gas / (0xcb6d99f009
8c683480edd984f44f633ef712743b7ba0ba7513e72ee1ddcc9cba)
2022-03-03 13:36:58.095+09:00 | EthScheduler-Workers-2 | INFO | PersistBlockTas
k | Imported #42 / 0 tx / 0 om / 0 (0.0%) gas / (0x0efeedc20d6b592db52832899b293
eb8afe1b52a0c7d6ea68d78e28505d83478) in 0.008s. Peers: 3
2022-03-03 13:36:58.098+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #42 / 0 tx / 0 pending / 0 (0.0%) gas / (0x0efeedc20d
6b592db52832899b293eb8afe1b52a0c7d6ea68d78e28505d83478)
2022-03-03 13:37:00.104+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #43 / 0 tx / 0 pending / 0 (0.0%) gas / (0xfd274e8afe
ec13fa50f264f96ba6ff1212029de3610589c642c9d6430edae490)
2022-03-03 13:37:02.113+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Produced #44 / 0 tx / 0 pending / 0 (0.0%) gas / (0x84820f4c6a
6db9500531720577c2d65138afe20dd49603f4933c69d48040b97d)

MINGW64:/e/besu_privateNetwork/besu_network/node2
k | Imported #40 / 0 tx / 0 om / 0 (0.0%) gas / (0xd521c738b38e5fa53166b6c357438
133954603c6234abbe3fb2086462f6bfb14) in 0.000s. Peers: 4
2022-03-03 13:36:56.099+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #41 / 0 tx / 0 pending / 0 (0.0%) gas / (0xcb6d99f009
8c683480edd984f44f633ef712743b7ba0ba7513e72ee1ddcc9cba)
2022-03-03 13:36:56.101+09:00 | EthScheduler-Workers-1 | INFO | PersistBlockTas
k | Imported #41 / 0 tx / 0 om / 0 (0.0%) gas / (0xcb6d99f0098c683480edd984f44f6
33ef712743b7ba0ba7513e72ee1ddcc9cba) in 0.000s. Peers: 4
2022-03-03 13:36:58.098+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #42 / 0 tx / 0 pending / 0 (0.0%) gas / (0x0efeedc20d
6b592db52832899b293eb8afe1b52a0c7d6ea68d78e28505d83478)
2022-03-03 13:36:58.098+09:00 | EthScheduler-Workers-3 | INFO | PersistBlockTas
k | Imported #42 / 0 tx / 0 om / 0 (0.0%) gas / (0x0efeedc20d6b592db52832899b293
eb8afe1b52a0c7d6ea68d78e28505d83478) in 0.004s. Peers: 4
2022-03-03 13:37:00.108+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Produced #43 / 0 tx / 0 pending / 0 (0.0%) gas / (0xfd274e8afe
ec13fa50f264f96ba6ff1212029de3610589c642c9d6430edae490)
2022-03-03 13:37:02.124+09:00 | EthScheduler-Workers-0 | INFO | PersistBlockTas
k | Imported #44 / 0 tx / 0 om / 0 (0.0%) gas / (0x84820f4c6a6db9500531720577c2d
65138afe20dd49603f4933c69d48040b97d) in 0.003s. Peers: 4
2022-03-03 13:37:02.124+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #44 / 0 tx / 0 pending / 0 (0.0%) gas / (0x84820f4c6a
6db9500531720577c2d65138afe20dd49603f4933c69d48040b97d)

MINGW64:/e/besu_privateNetwork/besu_network/node3
k | Imported #40 / 0 tx / 0 om / 0 (0.0%) gas / (0xd521c738b38e5fa53166b6c357438
133954603c6234abbe3fb2086462f6bfb14) in 0.000s. Peers: 4
2022-03-03 13:36:54.085+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #40 / 0 tx / 0 pending / 0 (0.0%) gas / (0xd521c738b3
8e5fa53166b6c357438133954603c6234abbe3fb2086462f6bfb14)
2022-03-03 13:36:56.097+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Produced #41 / 0 tx / 0 pending / 0 (0.0%) gas / (0xcb6d99f009
8c683480edd984f44f633ef712743b7ba0ba7513e72ee1ddcc9cba)
2022-03-03 13:36:58.096+09:00 | EthScheduler-Workers-2 | INFO | PersistBlockTas
k | Imported #42 / 0 tx / 0 om / 0 (0.0%) gas / (0x0efeedc20d6b592db52832899b293
eb8afe1b52a0c7d6ea68d78e28505d83478) in 0.006s. Peers: 4
2022-03-03 13:37:00.109+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #43 / 0 tx / 0 pending / 0 (0.0%) gas / (0xfd274e8afe
ec13fa50f264f96ba6ff1212029de3610589c642c9d6430edae490)
2022-03-03 13:37:00.113+09:00 | EthScheduler-Workers-0 | INFO | PersistBlockTas
k | Imported #43 / 0 tx / 0 om / 0 (0.0%) gas / (0xfd274e8afeec13fa50f264f96ba6f
f1212029de3610589c642c9d6430edae490) in 0.000s. Peers: 4
2022-03-03 13:37:02.121+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #44 / 0 tx / 0 pending / 0 (0.0%) gas / (0x84820f4c6a
6db9500531720577c2d65138afe20dd49603f4933c69d48040b97d)
2022-03-03 13:37:02.121+09:00 | EthScheduler-Workers-3 | INFO | PersistBlockTas
k | Imported #44 / 0 tx / 0 om / 0 (0.0%) gas / (0x84820f4c6a6db9500531720577c2d
65138afe20dd49603f4933c69d48040b97d) in 0.000s. Peers: 4

MINGW64:/e/besu_privateNetwork/besu_network/node4
ntrollerBuilder | Produced #38 / 0 tx / 0 pending / 0 (0.0%) gas / (0xf27fbc2436
6456e9c36cd1453bde1e93c1c64e5166650eb3201915021365fbc3)
2022-03-03 13:36:52.115+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #39 / 0 tx / 0 pending / 0 (0.0%) gas / (0x3862756113
519c3dd244078c228cbb3d8fef1024d94952753367762d9e0ad78a)
2022-03-03 13:36:54.074+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #40 / 0 tx / 0 pending / 0 (0.0%) gas / (0xd521c738b3
8e5fa53166b6c357438133954603c6234abbe3fb2086462f6bfb14)
2022-03-03 13:36:56.093+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #41 / 0 tx / 0 pending / 0 (0.0%) gas / (0xcb6d99f009
8c683480edd984f44f633ef712743b7ba0ba7513e72ee1ddcc9cba)
2022-03-03 13:36:58.080+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Produced #42 / 0 tx / 0 pending / 0 (0.0%) gas / (0x0efeedc20d
6b592db52832899b293eb8afe1b52a0c7d6ea68d78e28505d83478)
2022-03-03 13:37:00.112+09:00 | EthScheduler-Workers-3 | INFO | PersistBlockTas
k | Imported #43 / 0 tx / 0 om / 0 (0.0%) gas / (0xfd274e8afeec13fa50f264f96ba6f
f1212029de3610589c642c9d6430edae490) in 0.000s. Peers: 4
2022-03-03 13:37:00.113+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #43 / 0 tx / 0 pending / 0 (0.0%) gas / (0xfd274e8afe
ec13fa50f264f96ba6ff1212029de3610589c642c9d6430edae490)
2022-03-03 13:37:02.116+09:00 | BftProcessorExecutor-IBFT-0 | INFO | IbftBesuCo
ntrollerBuilder | Imported #44 / 0 tx / 0 pending / 0 (0.0%) gas / (0x84820f4c6a
6db9500531720577c2d65138afe20dd49603f4933c69d48040b97d)
```

<https://besu.hyperledger.org/en/stable/HowTo/Interact/APIs/Using-JSON-RPC-API/>

Updated on August 13, 2020

JSON-RPC over HTTP and WebSockets

To enable JSON-RPC over HTTP or WebSockets, use the `--rpc-http-enabled` and `--rpc-ws-enabled` options.

Click the button to import our collection of API examples to [Postman](#).

or download the raw JSON collection file.

프라이빗 네트워크 구축

Postman

File Edit View Help

+ New

Import

Runner

⌵

Filter

History

Collections

APIs

+ New Collection

Trash

> API
3 requests

> Hyperledger Besu JSON-RPC API ☆
89 requests

> onetwocm
2 requests

> temp
20 requests

Hyperledger Besu JSON-RPC API ☆
89 requests

> web
> net
> eth
> permissioning
> clique
> ibft
> debug
> miner
> admin
> rpc
> txpool
> eea
> priv

프라이빗 네트워크 구축

▼	eth	...
POST	eth_accounts	
POST	eth_syncing	
POST	eth_protocolVersion	
POST	eth_newPendingTransactionFilter	
POST	eth_uninstallFilter	
POST	eth_getFilterLogs	
POST	eth_getLogs	
POST	eth_newBlockFilter	
POST	eth_getFilterChanges	
POST	eth_newFilter	
POST	eth_chainId	
POST	eth_coinbase	
POST	eth_mining	
POST	eth_hashrate	
POST	eth_gasPrice	
POST	eth_blockNumber	

프라이빗 네트워크 구축

The screenshot displays a REST client interface. At the top, a POST request is configured for the URL `http://localhost:8545`. The `Body` tab is selected, showing a JSON payload: `{ "jsonrpc": "2.0", "method": "eth_blockNumber", "params": [], "id": 1 }`. A red box highlights the `Send` button in the top right corner. A large red arrow points from the request body to the response section below.

The response section shows the `Body` tab with the JSON response: `{ "jsonrpc": "2.0", "id": 1, "result": "0xd5" }`. The `"result": "0xd5"` field is highlighted with a red box. The response is formatted in 'Pretty' view, and the content type is set to 'JSON'.

0xd5 number

✕ | 📄 | 🗣️ | 🔍

🔍 전체 | 📍 지도 | 📺 동영상 | 📰 뉴스 | 🛍️ 쇼핑 | ⋮ 더보기

설정 | 도구

검색결과 약 195,000개 (0.47초)

도움말: 한국어 검색결과만 검색합니다. 환경설정에서 검색 언어를 지정할 수 있습니다.

numbermonk.com > hexadecimal ▾ 이 페이지 번역하기

Number info and conversion: 0xd5 (hexadecimal)

Number info: 0xd5 (hexadecimal). Conversion. Decimal. 213. Binary. 11010101. Hexadecimal. 0xd5. Roman, CCXIII. Math. Square root of, 45369. Factors, 71 3 ...

decimal.info > hex-to-decimal > ho... ▾ 이 페이지 번역하기

0XD5 to decimal

0XD5 is a hexadecimal (hex) number. We can tell it is a hex number because it starts with 0X. Hexadecimal numbers like 0XD5 are not often used in daily life, ...

www.hexadecimaldictionary.com > ... ▾ 이 페이지 번역하기

0xD5 = 213 - Hexadecimal Dictionary

0xD5 is represented as: 208 + 5. More details. Prime Number, 213 is not prime. Factors, 3, 71. How is 0xD5 calculated ...

www.utf8-chartable.de > unicode-u... - 이 페이지 번역하기

Unicode/UTF-8-character table - starting from code position ...

U+0540, 𐎀, 0xd5 0x80. U+0541, 𐎁, 0xd5 0x81. U+0542, 𐎂, 0xd5 0x82. U+0543, 𐎃, 0xd5 0x83. U+0544, 𐎄, 0xd5 0x84. U+0545, 𐎅, 0xd5 0x85. U+0546, 𐎆, ...

www.utf8-chartable.de > unicode-u... - 이 페이지 번역하기

hex. (0x) - UTF-8 encoding table and Unicode characters

U+0544, 𐎄, 0xd5 0x84, ARMENIAN CAPITAL LETTER MEN. U+0545, 𐎅, 0xd5 0x85, ARMENIAN CAPITAL LETTER YI. U+0546, 𐎆, 0xd5 0x86, ARMENIAN ...

stackoverflow.com > questions > u... ▾ 이 페이지 번역하기

UnicodeDecodeError: 'utf-8' codec can't decode byte 0xd5 in ...


2018. 7. 19. - UnicodeDecodeError: 'utf-8' codec can't decode byte 0xd5 in position ... str(tags_rb) # if number of products is found print it and search for the ...

Number info: 0xd5 (hexadecimal)


Conversion

Decimal	213
Binary	11010101
Hexadecimal	0xd5
Roman	CCXIII

프라이빗 네트워크 구축

 METAMASK

noncelab



설정

일반

고급

연락처

보안 및 개인정보 보호


경고

네트워크

실험적

정보

네트워크 > 네트워크 추가

 약성 네트워크 공급업체는 블록체인 상태를 거짓으로 보고하고 네트워크 활동을 기록할 수 있습니다. 신뢰하는 맞춤형 네트워크만 추가하세요.

네트워크 이름

새 RPC URL

체인 ID ⓘ

통화 기호 (선택적)

블록 탐색기 URL (선택적)

취소

저장

네트워크

이더리움 메인넷

Ropsten 테스트 네트워크

Kovan 테스트 네트워크

Rinkeby 테스트 네트워크

Goerli 테스트 네트워크

네트워크 추가

프라이빗 네트워크 구축

네트워크 이름

Test_network

새 RPC URL

http://localhost:8545

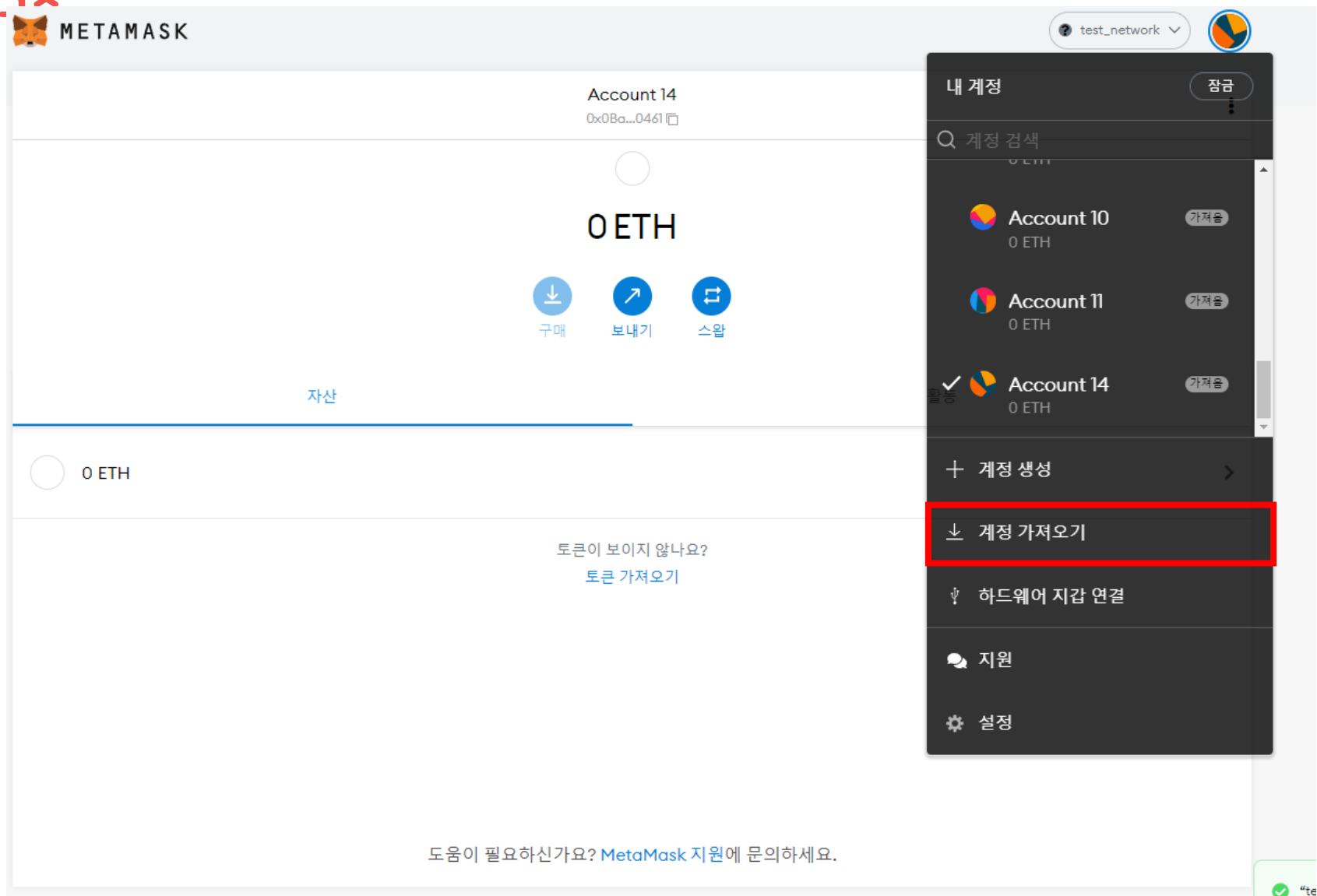
체인 ID ⓘ

1337 (genesis block 에 기록되어있음)

통화 기호 (선택적)

블록 탐색기 URL (선택적)

프라이빗 네트워크 구축



프라이빗 네트워크 구축

계정 가져오기

가져온 계정은 생성한 MetaMask 계정 비밀 복구 구문
원본에 연결되지 않습니다. 가져온 계정에 대해 자세히
알아보기 [여기](#)

유형 선택

비공개 키

여기에 비공개 키 문자열을 붙여넣으세요.

.....

취소

가져오기

Account 15

0x9D9...2325

200 ETH



구매



보내기



스왑

Account 16

0x40c...ca32

200 ETH



구매



보내기



스왑

Account 17

0xbDa...8024

90000 ETH



구매



보내기



스왑

Account 18

0x349...4887

90000 ETH



구매

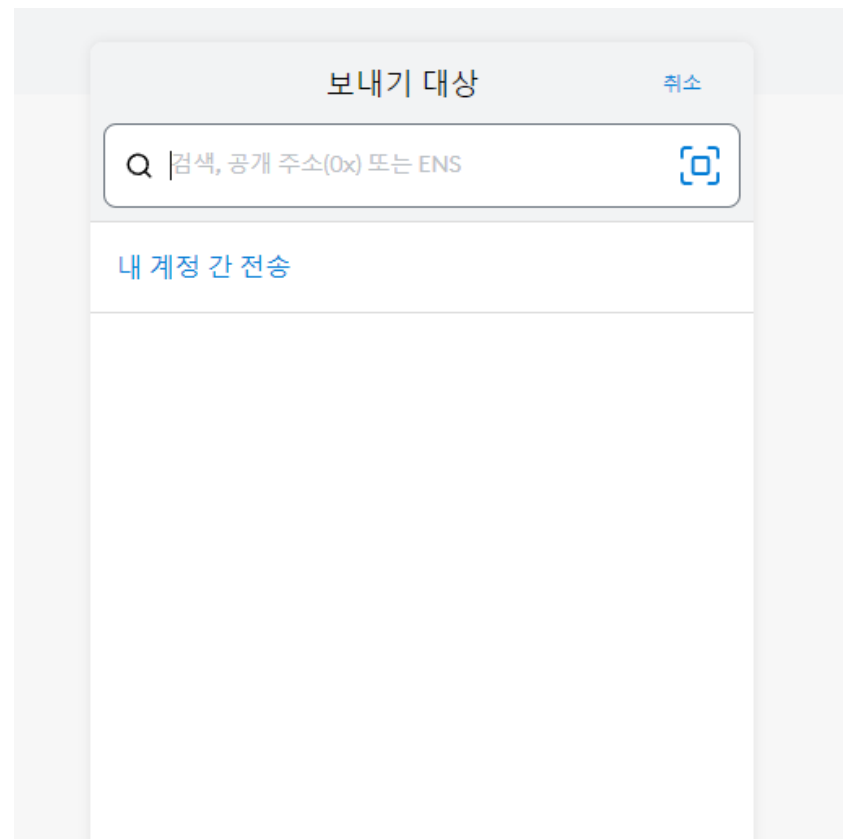
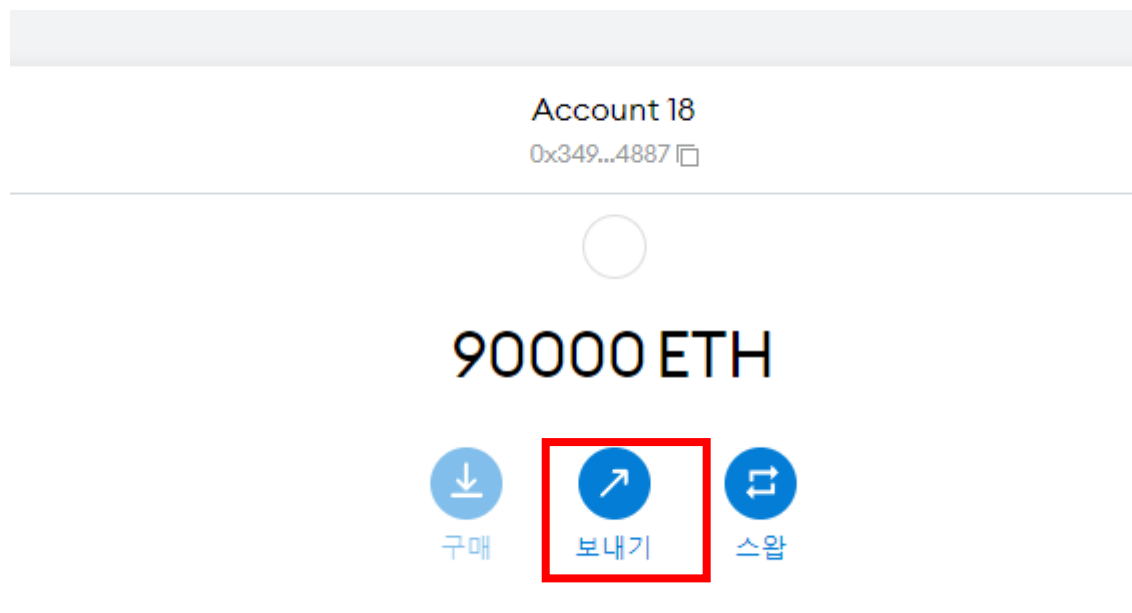


보내기



스왑

프라이빗 네트워크 구축



프라이빗 네트워크 구축

보내기

Account 15

0x9D9a133eFE458949E30F6D4B184eD0CE11D02325

자산:

잔액: 90000 ETH

금액:

최대 10000 ETH

사용 가능한 전환율이 없음

Gas 가격(GWEI) 0.000001

Gas 한도 21000

< 편집

Account 18

Account 15

New gas experience

We've updated how gas fee estimation and customization works.

Turn on Enhanced Gas Fee UI in Settings

보내기

10000

예상 가스 요금 0 0 ETH

최대 요금 0 ETH


합계 10000 10000 ETH


금액 + 가스 요금 최대 금액: 10000 ETH

거부




확인

프라이빗 네트워크 구축


Account 18
0x349...4887 




80000 ETH






구매 보내기 스왑

Account 15
0x9D9...2325 



10200 ETH



구매 보내기 스왑

Q & A

