

블록체인 실습 자료 #1

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주요 실습 과제

- 노드 구성
- 탈중앙화 지갑 생성(myetherwallet, metamask)
- NFT 용 컨트랙트 생성하고 등록해보기(rinkeby)
- OpenSea 에 NFT 등록해보기
- 이더리움 테스트넷(rinkeby) 기반의 지갑 코드로 생성
 - 무료로 Rinkeby ETH 얻기
- nft.storage, truffle, ganache

- Ganache
 - ganache는 개발을 목적으로 로컬 블록체인 네트워크를 제공하는 도구이다. 어떤 블록체인 네트워크에 접근해서 정보를 얻으려면 그 네트워크에서 돌아가는 노드가 필요하다. 그러나 노드를 운영하는 것은 쉬운 일이 아니므로 ganache 같은 도구가 존재한다.
 - ganache를 이용하면 해당 블록체인 네트워크의 블록이나 트랜잭션 등을 확인할 수 있다.
- Truffle
 - 스마트 컨트랙트 개발을 위한 도구이다. 스마트 컨트랙트의 테스트, 컴파일, 배포 등의 기능을 제공한다.
- Hardhat
 - Ganache + Truffle 이다. 로컬 블록체인 네트워크를 제공하고, 스마트 컨트랙트 개발을 위한 도구(테스트, 컴파일, 배포 등)의 역할도 한다.
 - Truffle과 Hardhat은 스마트 컨트랙트 개발을 위한 도구 이므로 블록체인 네트워크에 연결해서 사용한다. 테스트를 위한 용도로 Ganache나 Infura의 엔드포인트를 연결해서 사용할 수 있다.
- Openzeppelin
 - 스마트 컨트랙트 코드 구현을 위한 라이브러리이다.
 - ERC20이나 ERC721 스탠다드 코드나 Counters 같은 유ти리티 코드를 제공
 - 예를들어 나만의 NFT 컨트랙트를 개발한다고 하면 openzeppelin에서 제공하는 ERC721 코드를 상속받아 개발하는 식이다.

node 설치

<https://nodejs.org/ko/>

The screenshot shows the official Node.js website homepage in Korean. At the top, there is a dark header bar with the Node.js logo and a navigation menu in Korean: 홈 | ABOUT | 다운로드 | 문서 | 참여하기 | 보안 | 뉴스 | CERTIFICATION. Below the header, a large green banner states "Node.js®는 Chrome V8 JavaScript 엔진으로 빌드된 JavaScript 런타임입니다." (Node.js is built on the Chrome V8 JavaScript engine). A green call-to-action button labeled "Node.js assessment of OpenSSL 21 Jun 2022 security releases" is visible. The main content area features two prominent download buttons: a green one for "16.15.1 LTS" (labeled "안정적, 신뢰도 높음") and a larger green one for "18.4.0 현재 버전" (labeled "최신 기능"). Below each button is a link to "다른 운영 체제 | 변경사항 | API 문서". A note at the bottom right says "LTS 일정은 여기서 확인하세요".

Node.js®는 Chrome V8 JavaScript 엔진으로 빌드된 JavaScript 런타임입니다.

Node.js assessment of OpenSSL 21 Jun 2022 security releases

다운로드 - Windows (x64)

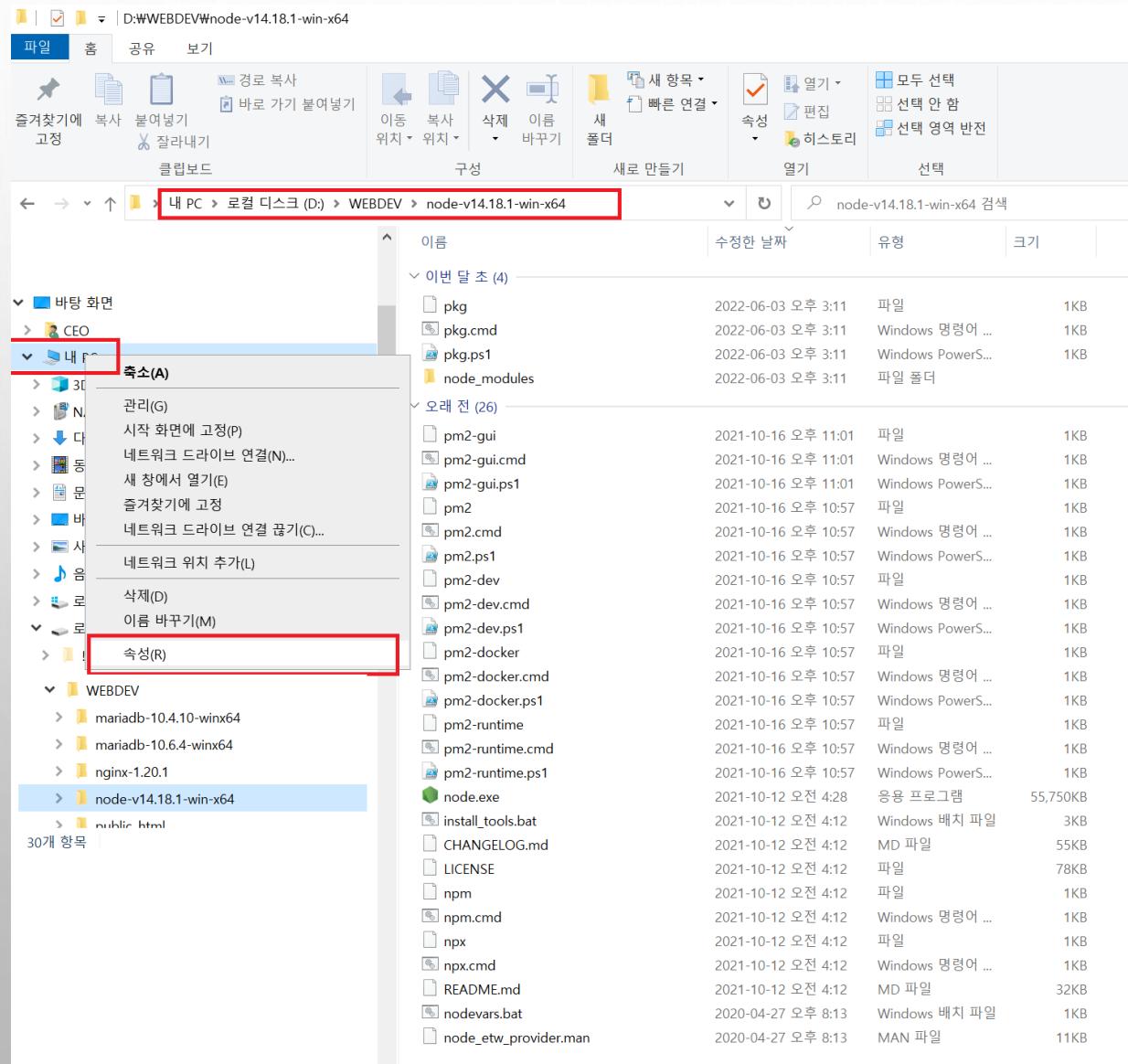
16.15.1 LTS
안정적, 신뢰도 높음

18.4.0 현재 버전
최신 기능

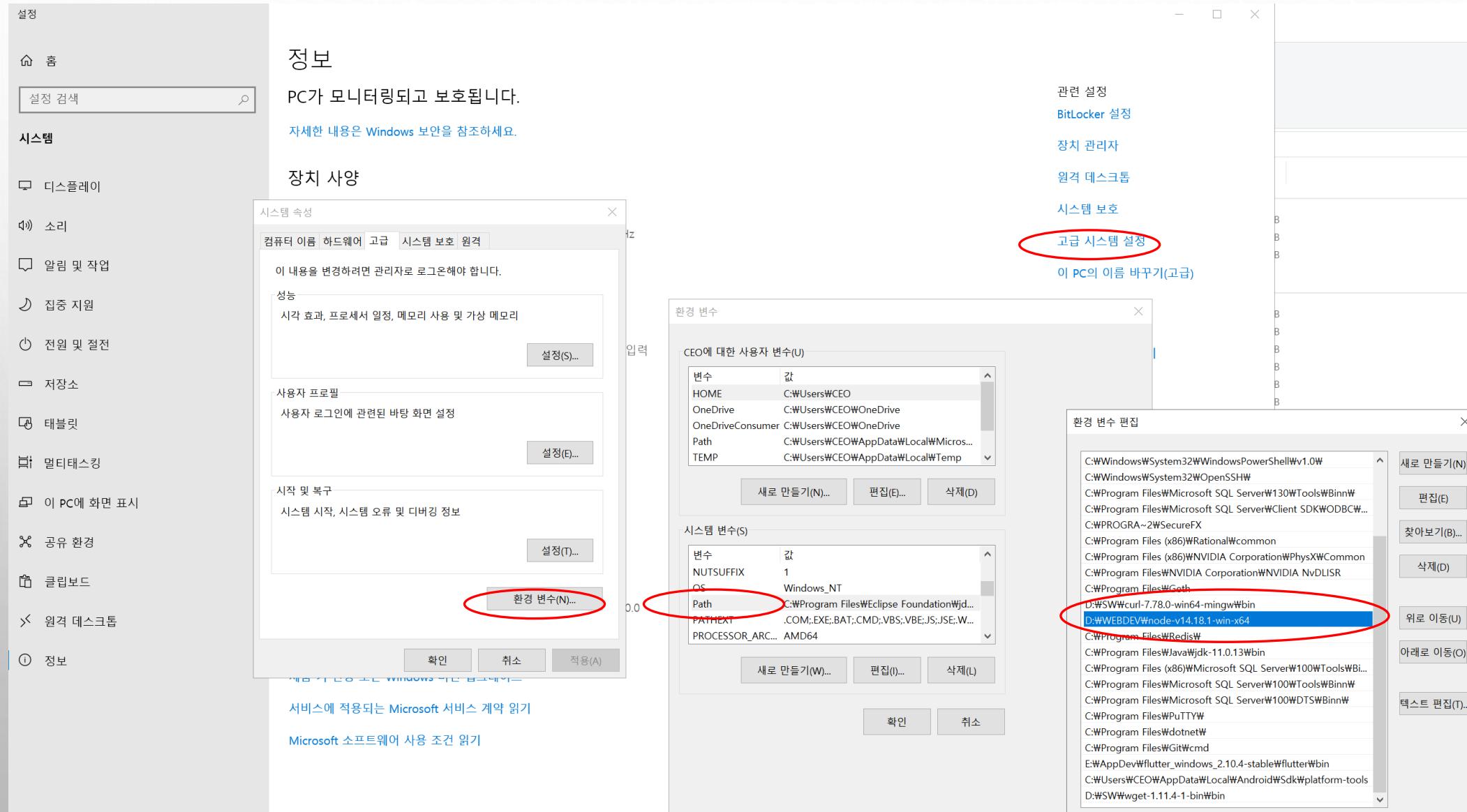
다른 운영 체제 | 변경사항 | API 문서 다른 운영 체제 | 변경사항 | API 문서

LTS 일정은 [여기서 확인하세요](#)

환경 변수 등록 화면 열기



환경 변수 등록



환경 변수 설정 여부 확인

내 PC > 로컬 디스크 (D:) > WEBDEV > wallet_test

이름	수준

```
C:\ 관리자: 명령 프롬프트

D:\WEBDEV\wallet_test>dir
D 드라이브의 볼륨에는 이름이 없습니다.
볼륨 일련 번호: BE9E-7EB3
D:\WEBDEV\wallet_test 디렉터리

2022-06-25 오후 01:22    <DIR> .
2022-06-25 오후 01:22    <DIR> ..
              0개 파일          0 바이트
              2개 디렉터리  1,834,143,825,920 바이트 남음

D:\WEBDEV\wallet_test>node -v
v14.18.1

D:\WEBDEV\wallet_test>npm -v
6.14.15
```

Nodejs

- 특징

- SINGLE-THREAD의 NON-BLOCKING I/O 이벤트 기반 비동식 방식으로 작동한다.
- JAVASCRIPT 엔진(V8 ENGINE)으로 빌드된 JAVASCRIPT 런타임이다.

그렇기 때문에 사용자의 요청은 한 곳에서 받지만 작업은 실질적으로 MULTI-THREAD로 운영하여 구현한다.

- SINGLE-THREAD는 메모리 사용량과 시스템 리소스 사용량에는 변화가 거의 없다.

그렇기 때문에 대규모 네트워크 프로그램 개발에 적합한 형태이다.

하지만 쓰레드 하나가 무너진다면 프로그램 전체에 문제가 발생하게 된다.

- NODE.JS는 APPLICATION 자체에서 SINGLE-THREAD로 실행되지만 BACKGROUND에서 THREAD POOL을 구성해 작업을 수행한다. 이 THREAD POOL을 관리는 개발자가 아니라 플랫폼이 한다.

개발자는 THREAD 하나를 관리하듯 프로그래밍하면 플랫폼이 여러 쓰레드를 효율적으로 운용한다.

- 장점

- 자바스크립트를 사용해 서버단 로직을 처리할 수 있고, 이벤트기반 비동기 방식이라 서버에 무리가 적다.
- NPM(NODE PACKAGE MANAGER)을 통한 다양한 모듈(패키지)을 제공한다.
- V8 JAVASCRIPT ENGINE을 사용했기 때문에 확장성이 좋고 지속적으로 엔진성능이 업그레이드 된다.

Nodejs

- 단점

- 이벤트 기반 비동기방식이라 서버단 로직이 복잡한 경우 콜백 함수의 늪(CALLBACK HELL)에 빠질 수 있다.
- SINGLE-THREAD이기 때문에 하나의 작업 자체가 시간이 오래 걸리는 웹서비스에 어울리지 않고 가벼운 I/O가 많은 웹 서비스에 어울린다.
- 코드가 수행되어야 코드에 에러가 있는지 알 수 있으며, 에러가 날 경우 프로세스가 내려가기 때문에 테스트가 매우 중요하다. 반드시 모든 케이스에 대해 소스코드를 검증해야 한다.

- **NODE.JS가 어울리는 웹서비스**

- 간단한 로직, 동시에 여러 REQUEST를 처리하는 서비스, 빠른 응답시간과 개발을 요구하는 서비스, 비동기 방식에 어울리는 서비스(네트워크 스트리밍 서비스, 채팅 서비스 등)

- **NODE.JS가 어울리지 않는 웹서비스**

- 단일 처리가 오래 걸리는 서비스(SINGLE-THREAD이기 때문),
서버 체크 로직이 많은 경우(비동기방식이기 때문에 콜백 함수의 늪에 빠지기 쉬움),
업무 복잡도와 난이도가 높은 경우(에러가 나면 서버가 죽어서 코드 품질이 중요하기 때문)

Eth 지갑 생성

- npm install ethereumjs-wallet --save

```
D:\Roy\Desktop\해커스홀딩스\Lecture\Eth_wallet>npm install ethereumjs-wallet --save
> secp256k1@4.0.3 install D:\Roy\Desktop\해커스홀딩스\Lecture\Eth_wallet\node_modules\secp256k1
> node-gyp-build || exit 0

> keccak@3.0.2 install D:\Roy\Desktop\해커스홀딩스\Lecture\Eth_wallet\node_modules\keccak
> node-gyp-build || exit 0

npm WARN saveError ENOENT: no such file or directory, open 'D:\Roy\Desktop\해커스홀딩스\Lecture\Eth_wallet\package.json'
npm notice created a lockfile as package-lock.json. You should commit this file.
npm WARN enoent ENOENT: no such file or directory, open 'D:\Roy\Desktop\해커스홀딩스\Lecture\Eth_wallet\package.json'
npm WARN eth_wallet No description
npm WARN eth_wallet No repository field.
npm WARN eth_wallet No README data
npm WARN eth_wallet No license field.

+ ethereumjs-wallet@1.0.2
added 47 packages from 127 contributors and audited 47 packages in 6.089s

1 package is looking for funding
  run `npm fund` for details

found 0 vulnerabilities

D:\Roy\Desktop\해커스홀딩스\Lecture\Eth_wallet>
```

wallet.js 코드 작성

```
var Wallet = require('ethereumjs-wallet');
const EthWallet = Wallet.default.generate();
console.log("address: " + EthWallet.getAddressString());
console.log("privateKey: " + EthWallet.getPrivateKeyString());
```

```
D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet>node wallet.js
address: 0x93f4d0b0e3ccbf41a5c16fc8ecf81bfd53949d
privateKey: 0xe93e21bc9fd92f69ad6ce0d505b1ee201be19dc0547a8d05dd08ed560c4fec4
```

```
address: 0x93f4d0b0e3ccbf41a5c16fc8ecf81bfd53949d
privateKey: 0xe93e21bc9fd92f69ad6ce0d505b1ee201be19dc0547a8d05dd08ed560c4fec4
address: 0x79de5c4d8442d4f5a76fd6aa07ff450ce6d3ab3d
privateKey: 0xf5773ba4b01f1537bec8e416d675454e48067c96d621b816ce98426b0e66b60c
```

send_tx.js

- npm install @alch/alchemy-web3

The screenshot shows a browser window displaying a transaction on the Alchemy platform. The transaction details are as follows:

- Transaction Hash: 0xca5f9d922b019c7070290cd495236a693bf01d6d051fc8ce9296a6ca3fc1b125
- Status: Indexing (This transaction has been included and will be reflected in a short while.)
- Block: 10925566
- From: 0x79de5c4d8442d4f5a76fd6aa07ff450ce6d3ab3d
- To: 0x83f8f68c31e7f7834fb78c27502ba8e15d612cd1
- Value: 100 wei (\$0.00)
- Gas Price: 0.000000025 Ether (2.5 Gwei)

Below the transaction details, a terminal window shows the command-line interface for sending a transaction. The terminal output includes:

- 관리자: 명령 프롬프트
- at D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet\node_modules\web3-eth-accounts\lib\index.js:245:16
- at processTicksAndRejections (internal/process/task_queues.js:95:5)
- at async main (D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet\send_tx.js:23:22)
- (Use `node --trace-warnings ...` to show where the warning was created)
- (node:13848) UnhandledPromiseRejectionWarning: Unhandled promise rejection. This error originated either by throwing inside of an async function without a catch block, or by rejecting a promise which was not handled with .catch(). To terminate the node process on unhandled promise rejection, use the CLI flag `--unhandled-rejections=strict` (see https://nodejs.org/api/cli.html#cli_unhandled_rejections_mode). (rejection id: 2)
- (node:13848) [DEP0018] DeprecationWarning: Unhandled promise rejections are deprecated. In the future, promise rejections that are not handled will terminate the Node.js process with a non-zero exit code.

```
D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet>node send_tx.js
messageHash: '0x121f285190f575d19191eb11af1f962545c7ea5e3635869633c75f08cc6eb0b4',
v: '0x1',
r: '0x41b587967147fd4c31b486ece113cf87537840126d6e873a60e4c8df323e48c2',
s: '0x36286d1d69938bd8581d7f8d74215d12200c056a5f8b6e2278c3d9962620dd5',
rawTransaction: '0x02f86a0480849502f900849502f9008275309483f8f68c31e7f7834fb78c27502ba8e15d612cd16480c001a041b587967147fd4c31b486ece113cf87537840126e873a60e4c8df323e48c2a036286d1d69938bd8581d7f8d74215d12200c056a5f8b6e2278c3d9962620dd5',
transactionHash: '0xca5f9d922b019c7070290cd495236a693bf01d6d051fc8ce9296a6ca3fc1b125'

D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet>node send_tx.js
messageHash: '0x121f285190f575d19191eb11af1f962545c7ea5e3635869633c75f08cc6eb0b4',
v: '0x1',
r: '0x41b587967147fd4c31b486ece113cf87537840126d6e873a60e4c8df323e48c2',
s: '0x36286d1d69938bd8581d7f8d74215d12200c056a5f8b6e2278c3d9962620dd5',
rawTransaction: '0x02f86a0480849502f900849502f9008275309483f8f68c31e7f7834fb78c27502ba8e15d612cd16480c001a041b587967147fd4c31b486ece113cf87537840126e873a60e4c8df323e48c2a036286d1d69938bd8581d7f8d74215d12200c056a5f8b6e2278c3d9962620dd5',
transactionHash: '0xca5f9d922b019c7070290cd495236a693bf01d6d051fc8ce9296a6ca3fc1b125'

❶ The hash of your transaction is: 0xca5f9d922b019c7070290cd495236a693bf01d6d051fc8ce9296a6ca3fc1b125
Check Alchemy's Mempool to view the status of your transaction!
```

send_tx.js

```
async function main() {  
  
    const API_URL = 'https://eth-rinkeby.alchemyapi.io/v2/tryvv4cEj8QwySvUqyf_UBIB5yaA2IOv';  
  
    const PRIVATE_KEY =  
'0xf5773ba4b01f1537bec8e416d675454e48067c96d621b816ce98426b0e66b60c';  
  
    const { createAlchemyWeb3 } = require("@alch/alchemy-web3");  
  
    const web3 = createAlchemyWeb3(API_URL);  
  
    const frm = '0x79de5c4d8442d4f5a76fd6aa07ff450ce6d3ab3d'  
  
    //TODO: replace this address with your own public address  
  
    const nonce = await web3.eth.getTransactionCount(frm, 'latest'); // nonce starts counting from 0  
  
    const transaction = {  
        'to': '0x83F8F68c31E7F7834Fb78c27502BA8e15D612cd1', // faucet address to return eth  
        'value': 100,  
        'gas': 30000,  
        'maxFeePerGas': 2500000000,  
        'nonce': nonce,  
        // optional data field to send message or execute smart contract  
    };  
  
    //web3.eth.getMaxPriorityFeePerGas().then(console.log);  
  
    const signedTx = await web3.eth.accounts.signTransaction(transaction, PRIVATE_KEY);  
  
    console.log(signedTx);  
  
    web3.eth.sendSignedTransaction(signedTx.rawTransaction, function(error, hash) {  
        if (!error) {  
            console.log("🎉 The hash of your transaction is: ", hash, "\n Check Alchemy's Mempool to view the status of your transaction!");  
        } else {  
            console.log("❗ Something went wrong while submitting your transaction: ", error)  
        }  
    });  
}  
  
main();
```

<https://www.myetherwallet.com/wallet/create>

 MEW

What is MEW Wallet actions ▾ Buy ETH

MEW Hub

Create a new wallet

Please select a method to create a new wallet
Already have a wallet? [Access Wallet](#)

Get MEW Wallet App ✓
Download Our Official App And Connect To MEW Web Using Your Mobile Phone. Available On IOS And Android.



Buy A Hardware Wallet ✓
For The Highest Standard Of Security, Buy A Hardware Wallet And Use It With MEW.



Software ▲

NOT RECOMMENDED

Software Methods Like Keystore File And Mnemonic Phrase Should Only Be Used In Offline Settings By Experienced Users.

키스토어 파일

Create wallet using software

Keystore File

Using A Keystore File Online Makes Your Wallet More Vulnerable To Loss Of Funds. We Don't Recommend This Method Of Wallet Creation.



Mnemonic Phrase

Using A Mnemonic Phrase Online Makes Your Wallet More Vulnerable To Loss Of Funds. We Don't Recommend This Method Of Wallet Creation.



⚠ NOT RECOMMENDED

This information is sensitive, and these options should only be used in offline settings by experienced crypto users.

[Learn more](#)

Need help? [Contact support](#)

키스토어 파일 저장

Create Wallet with Keystore File

- 1 STEP 1. Create password
- 2 STEP 2. Download keystore file
- 3 STEP 3. Well done

STEP 1.

Create password

Password

Confirm Password

Create Wallet

NOT RECOMMENDED

This information is sensitive, and these options should only be used in offline settings by experienced crypto users. You will need your keystore file + password to access your wallet. Please save them in a secure location. We CAN NOT retrieve or reset your keystore/password if you lose them.

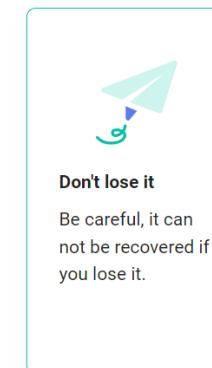
Create Wallet with Keystore File

- 1 STEP 1. Create password
- 2 STEP 2. Download keystore file
- 3 STEP 3. Well done

STEP 2.

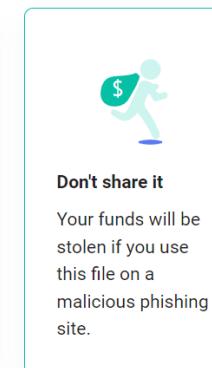
Download keystore file

Important things to know before downloading your keystore file.



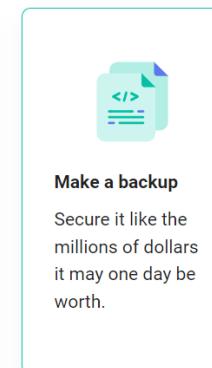
Don't lose it

Be careful, it can not be recovered if you lose it.



Don't share it

Your funds will be stolen if you use this file on a malicious phishing site.



Make a backup

Secure it like the millions of dollars it may one day be worth.

Back

Acknowledge & Download

NOT RECOMMENDED

This information is sensitive, and these options should only be used in offline settings by experienced crypto users. You will need your keystore file + password to access your wallet. Please save them in a secure location. We CAN NOT retrieve or reset your keystore/password if you lose them.

keystore text

Create Wallet with Keystore File

STEP 1. Create password
STEP 2. Download keystore file
STEP 3. Well done

STEP 3.

You are done!

You are now ready to take advantage of all that Ethereum has to offer! Access with keystore file should only be used in an offline setting.

Access Wallet

Create Another Wallet

The screenshot shows a Windows File Explorer window with the following details:

- Path: 내 PC > 로컬 디스크 (D:) > CEO > 다운로드
- File Name: UTC--2022-06-25T04-26-34.173Z--d863d688c9ead4eea756363921e8de73bd93ef3e - Windows 메모장
- File Type: Windows 메모장
- File Size: 1KB
- File Last Modified: 2022-06-25 오후 1:27
- File Creation Time: 173Z--D863D688...

The file content is a JSON object representing a keystore file:

```
{"version":3,"id":"f95bfb62-cd99-4d59-bef4-6114e44c673c","address":"d863d688c9ead4eea756363921e8de73bd93ef3e","crypto":{"ciphertext":"e11942ee6cd7b404d3fc39d3783a7373fcbb13c5c6b86cc142df9182eb0641ef0","cipherparams":{"iv":"b34999eef1170e9e9d1a8f72d4faaf8"},"cipher":"aes-128-ctr","kdf":"scrypt","kdparams":{},"dklen":32,"salt":"7420b9e4f8e62e5d69a78e48216a7bcc3b4505cc7de63ccb032b4acb3f3abf99","n":131072,"r":8,"p":1}, "mac":"26ff9e0b3000af3673a01fdeae6856f89b6aa0bd1f431b6de1d5c9436ff5a90f"}}
```

browser extension

 **MEW**

What is MEW Wallet actions ▾ Buy ETH

MEW Hub

Access My Wallet

Please select a method to access your wallet.
Don't have a wallet? [Create Wallet](#)

MEW Wallet ✓
Connect MEW Wallet App To MEW Web



Browser Extension ✓
Use Your Web3 Wallet With MEW.



Hardware Wallets ✓
Ledger, Trezor, KeepKey, FINNEY, BitBox



Mobile Apps ✓
WalletConnect, WalletLink



[What is MEW](#)[Wallet actions](#) ▾[Buy ETH](#)

Access My Wallet

Please select a method to access your wallet.

Don't have a wallet? [Create Wallet](#)

MEW Wallet

Connect MEW Wallet App To MEW Web



Browser Extension

Use Your Web3 Wallet With MEW.



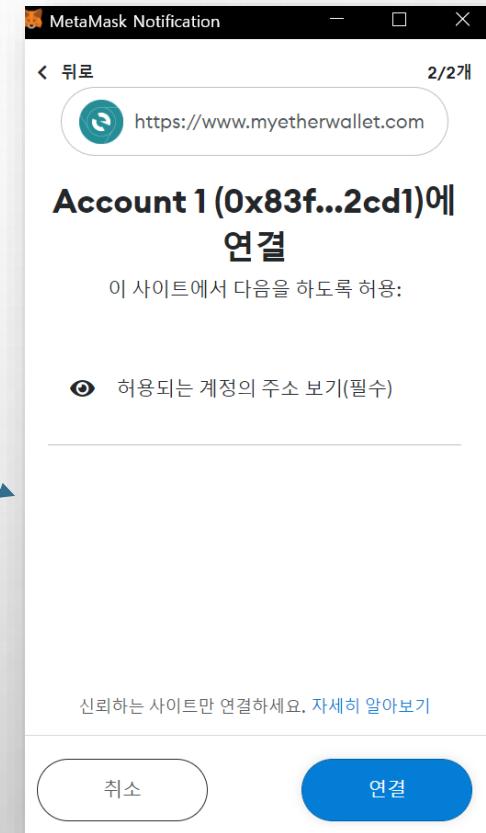
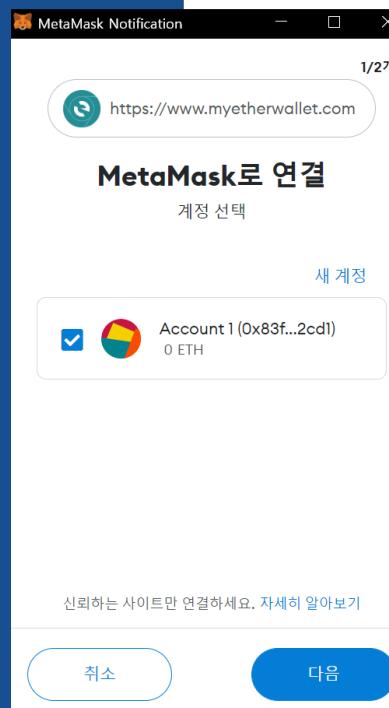
Hardware Wallets

Ledger, Trezor, KeepKey, FINNEY, BitBox



Mobile Apps

WalletConnect, WalletLink



MEW

MY PERSONAL ACCOUNT
0x83f8...2cd1

\$0.00
0 ETH

Buy/Sell Send Swap

Dashboard NFT Manager DApps Contract Message Settings Logout Data Tracking is Off v6.6.0

You can now Buy crypto with low fees
Enjoy 0.7% fee when you select 'Bank account' as payment method.

Buy Crypto Now

My ETH balance is empty

Buy ETH With A Credit Card

We accept credit card VISA

Tip: You can also send your ETH from another wallet!

Join the Stakewise pool with any amount of ETH

Start earning rewards on your ETH within 24 hours.
Simplified staking with no minimum requirements.

CURRENT APR 3.05%
ETH IN POOL 62,979.31 ETH

START STAKING

Network

ETH - Ethereum
Last Block: 15,021,904

Swap More...

1 ETH / 0.056282 BTC

1 ETH / 1,170.14 USDT

1 ETH / 794.8447 KNC

1 ETH / 1,168.8998 DAI

1 ETH / 159.5973 LINK

1 ETH / 1,169.6369 USDC

Hardware wallets Buy a hardware wallet!

테스트 네트워크 보기

METAMASK

설정

고급

상태 로그
상태 로그에 공개 계정 주소와 전송된 거래가 있습니다.
[상태 로그 다운로드](#)

네트워크
[모바일과 동기화](#)

계정 재설정
계정을 재설정하면 거래 내역이 지워집니다. 계정의 잔액은 변경되지 않으며 비밀 복구 구문을 다시 입력하지 않아도 됩니다.
[계정 재설정](#)

고급 가스 제어 기능
이 항목을 선택하면 보내기 및 확인 화면에서 바로 가스 가격과 한도 조절을 확인할 수 있습니다.
 고기

16진수 데이터 표시
이 항목을 선택하면 보내기 화면에 16진수 데이터 필드가 표시됩니다.
 고기

테스트넷에 전환 표시
이 항목을 선택하면 테스트넷에 명목 전환이 표시됩니다.
 고기

테스트 네트워크 보기
네트워크 목록에서 표시하려는 테스트 네트워크를 선택하세요.

커기

거래 임시값 맞춤화
이 기능을 켜면 확인 화면에서 임시값(거래 번호)을 변경할 수 있습니다. 이는 고급 기능으로, 주

고기

내 계정

Account 1
0 ETH

+ 계정 생성

↓ 계정 가져오기

↓ 하드웨어 지갑 연결

지원

설정

테스트넷에 전환 표시
이 항목을 선택하면 테스트넷에 명목 전환이 표시됩니다.

고기

테스트 네트워크 보기
네트워크 목록에서 표시하려는 테스트 네트워크를 선택하세요.

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고기

 이더리움 메인넷 

네트워크

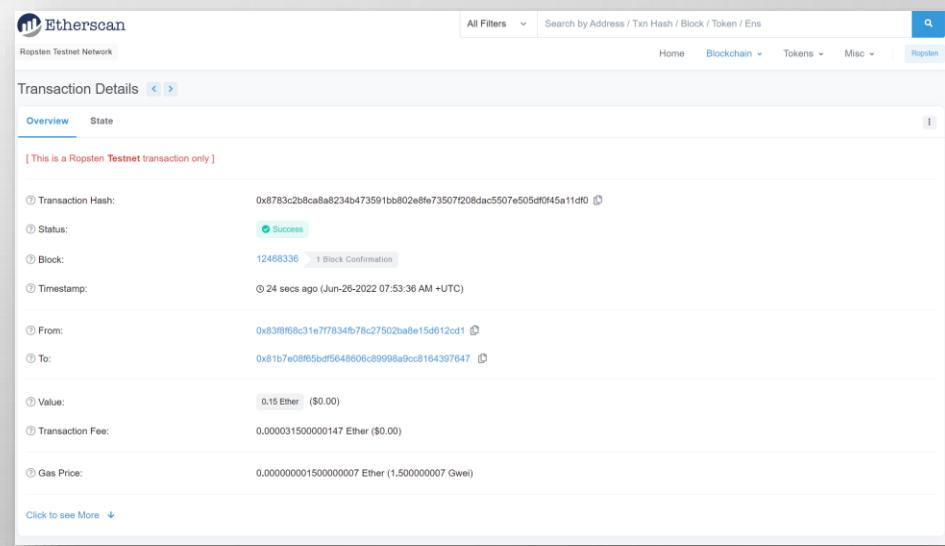
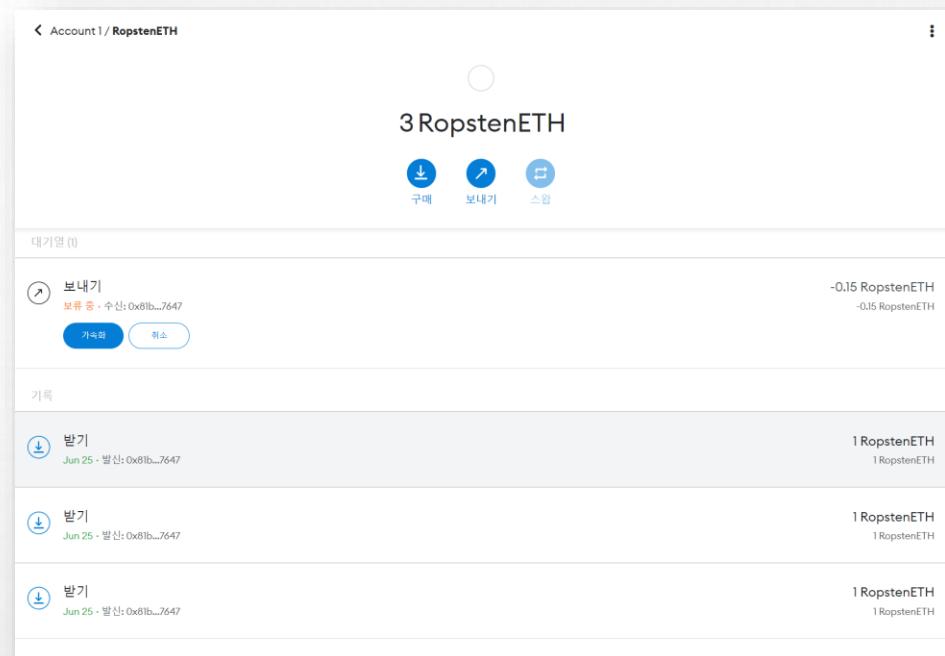
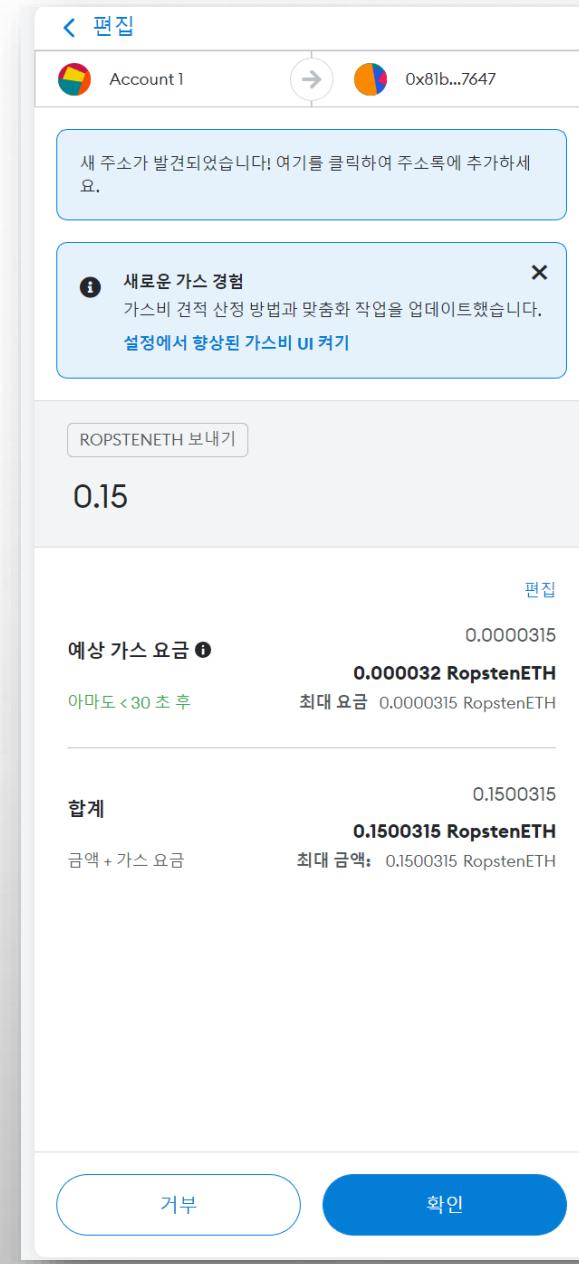
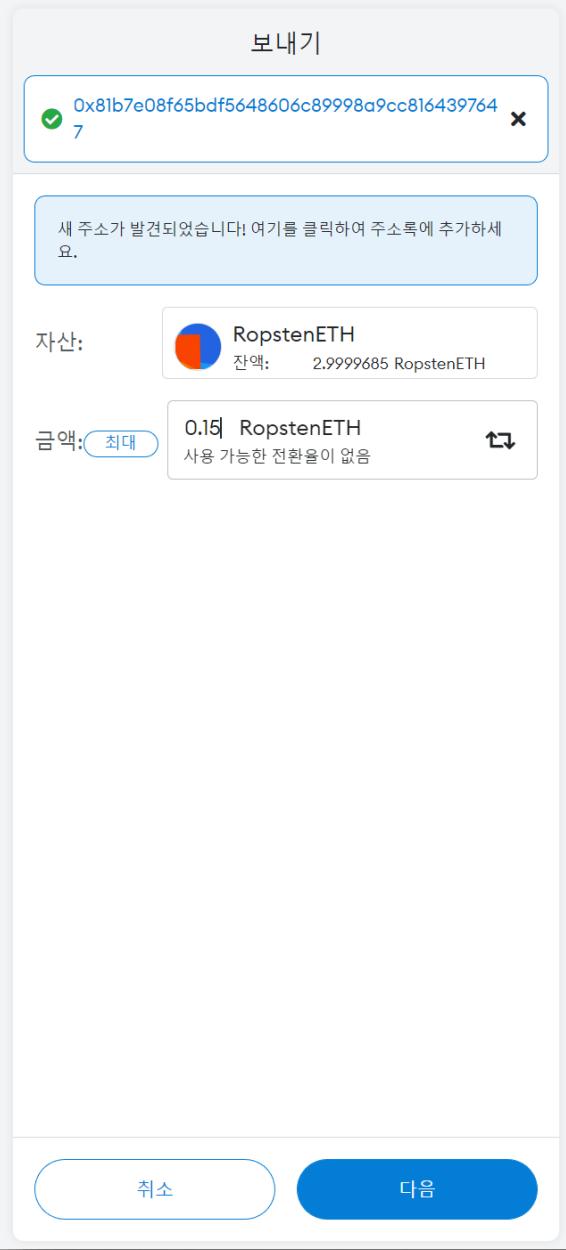
[보기/숨기기 테스트 네트워크](#) 해지

이더리움 메인넷

- Ropsten 테스트 네트워크
- Kovan 테스트 네트워크
- Rinkeby 테스트 네트워크
- Goerli 테스트 네트워크
- Localhost 8545

[네트워크 추가](#)

토ken이 보이지 않나요?
[새로 고침 목록 또는 토큰 가져오기](#)



NFT 만들기(alchemy.io 가입)

alchemy

Login

 Sign in with Google

or

EMAIL

PASSWORD

[Forgot your password?](#)

Log in

Don't have an account? [Signup](#)

This site is protected by reCAPTCHA and the Google [Privacy Policy](#) and [Terms of Service](#) apply.

alchemy

Select Ecosystem

Pick the blockchain environment you want to use. Don't know what to work with? Ethereum is a great default choice.

MOST POPULAR

 Ethereum

Including L2s

 Crypto.org

 Flow

Get Started

SET UP YOUR ACCOUNT

Create your first app

Choose your plan

Welcome to Alchemy 

Create your first app

An app is your gateway to Ethereum. No more running nodes - your app is all you need to get started.

TEAM NAME

Roy's Personal

APP NAME

ROYTEST

NETWORK 

Rinkeby

DEPRECATION NOTICE

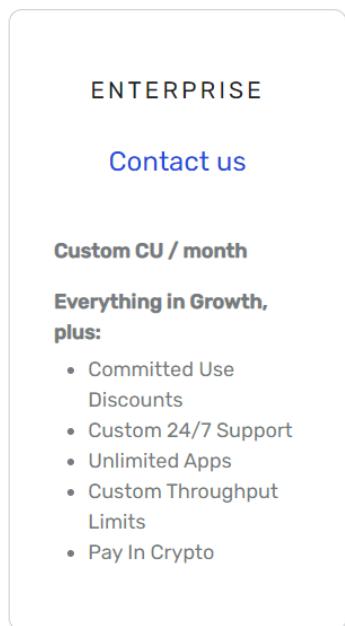
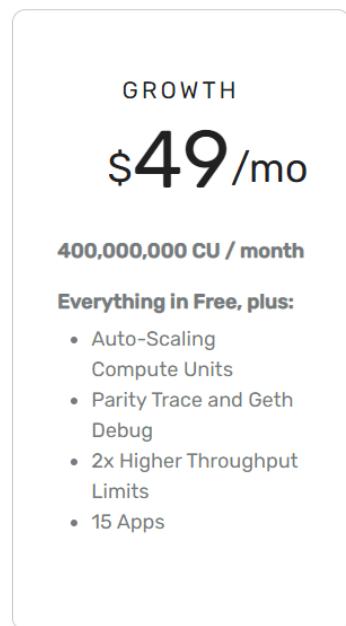
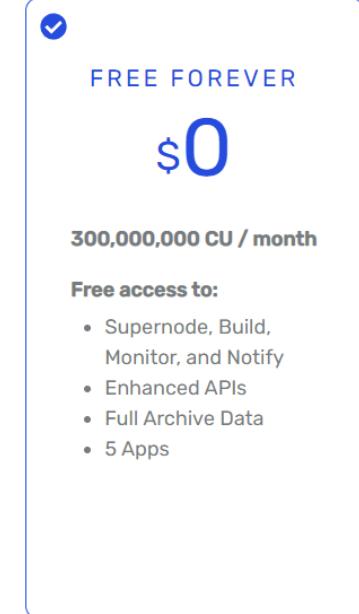
Create App

SET UP YOUR ACCOUNT

 Create your first app Choose your plan Welcome to Alchemy 

Choose your plan

Flexible options for building your blockchain application

[Compare Plans](#)[Back](#)[Continue](#)

ROYTEST

Rinkeby

+ Create App

Demo App

Demo

VIEW KEY

GET TEST ETH

ADD TO WALLET

EDIT APP

COMPUTE UNITS / SEC (LA
MIN)

0

CONC. REQUESTS (LAST 1 MIN)

0

API KEY

tryvv4cEj8QwySvUqyf_UBIB5yaA2IOv

Copy

HTTPS

https://eth-rinkeby.alchemyapi.io/v2/tryvv4cEj8QwySvUqyf_UBIB5yaA2IOv

Copy

WEBSOCKETS

wss://eth-rinkeby.alchemyapi.io/v2/tryvv4cEj8QwySvUqyf_UBIB5yaA2IOv

Copy

THROUGHPUT LIMITED % (LAST
24 H) i

0% (0)

INVALID REQUESTS (LAST 24 H) i

0

Recent Requests

View all ↗

Recent Invalid Requests

Recent Throughput Limited Requests

METHOD

ERROR CODE

HTTP

RESPONSE TIME

SENT



node/npm/hardhat 구성

- npm install -D hardhat
- npx hardhat

```
npm WARN nodejs No README data
npm WARN nodejs No license field.

+ hardhat@2.9.9
added 301 packages from 289 contributors and audited 302 pa
53 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities

D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs>npx hardhat
888 888     888 888     888
888 888     888 888     888
888 888     888 888     888
8888888888 8888b. 888d888 .d88888 888888b. 8888b. 8888888
888 888     "88b 888P" d88" 888 888 "88b     "88b 888
888 888 .d888888 888 888 888 888 .d888888 888
888 888 888 888 Y88b 888 888 888 888 888 Y88b.
888 888 "Y888888 888     "Y888888 888 888 "Y888888 "Y888

Welcome to Hardhat v2.9.9

? What do you want to do?
❯ Create a basic sample project
  Create an advanced sample project
  Create an advanced sample project that uses TypeScript
  Create an empty hardhat.config.js
  Quit
```

이름	수정한 날짜	유형	크기
▽ 오늘 (7)			
.gitignore	2022-06-26 오후 5:00	텍스트 문서	1KB
package.json	2022-06-26 오후 5:00	JSON File	1KB
package-lock.json	2022-06-26 오후 4:58	JSON File	105KB
contracts	2022-06-26 오후 5:00	파일 폴더	
scripts	2022-06-26 오후 5:00	파일 폴더	
▽ 오래 전 (2)			
hardhat.config.js	1985-10-26 오후 5:15	JS 파일	1KB
README.md	1985-10-26 오후 5:15	MD 파일	1KB

- npm i @openzeppelin/contracts@4.0.0

Contracts 폴더에 **.sol 저장

// SPDX-License-Identifier: MIT

pragma solidity ^0.8.2;

```
import "@openzeppelin/contracts/token/ERC721/ERC721.sol";
import "@openzeppelin/contracts/token/ERC721/extensions/ERC721URIStorage.sol";
import "@openzeppelin/contracts/access/Ownable.sol";
```

```
contract ThePublicMarket is ERC721, ERC721URIStorage, Ownable {
```

```
    constructor() ERC721("NFT Name", "Symbol") {}
```

```
    function _baseURI() internal pure override returns (string memory) {
```

```
        return "https://eth-rinkeby.alchemyapi.io/v2/tryvv4cEj8QwySvUqyf_UBIB5yaA2IOv ";
    }
```

```
    function safeMint(address to, uint256 tokenId, string memory uri)
```

```
        public
```

```
        onlyOwner
```

```
{
```

```
    _safeMint(to, tokenId);
```

```
    _setTokenURI(tokenId, uri);
```

```
}
```

ERC721 선택 후 Name과 Symbol 지정

Base URI는 Alchemy Dashboard에서 만든 APP 이름 클릭 > 우측
상단에 View Key > HTTP주소 복사

FEATURES는 Mintable, URI Storage 체크

ACCESS CONTROL은 Ownable

나머지는 사용하지 않음

// The following functions are overrides required by Solidity.

```
    function _burn(uint256 tokenId) internal override(ERC721, ERC721URIStorage) {
```

```
        super._burn(tokenId);
```

```
}
```

```
    function tokenURI(uint256 tokenId)
```

```
        public
```

```
        view
```

```
        override(ERC721, ERC721URIStorage)
```

```
        returns (string memory)
```

```
{
```

```
    return super.tokenURI(tokenId);
```

```
}
```

```
}
```

- metamask 와 프로젝트 연결

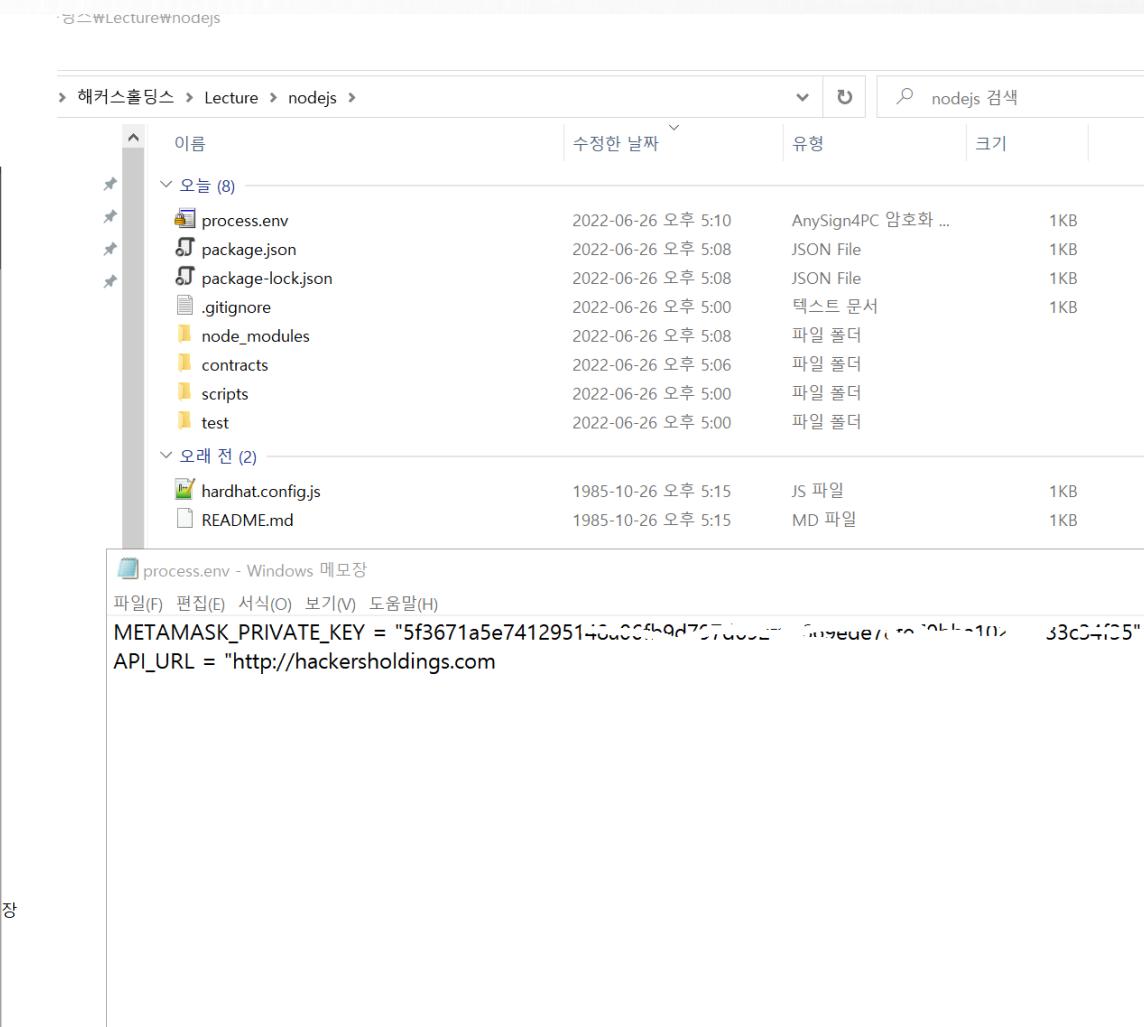
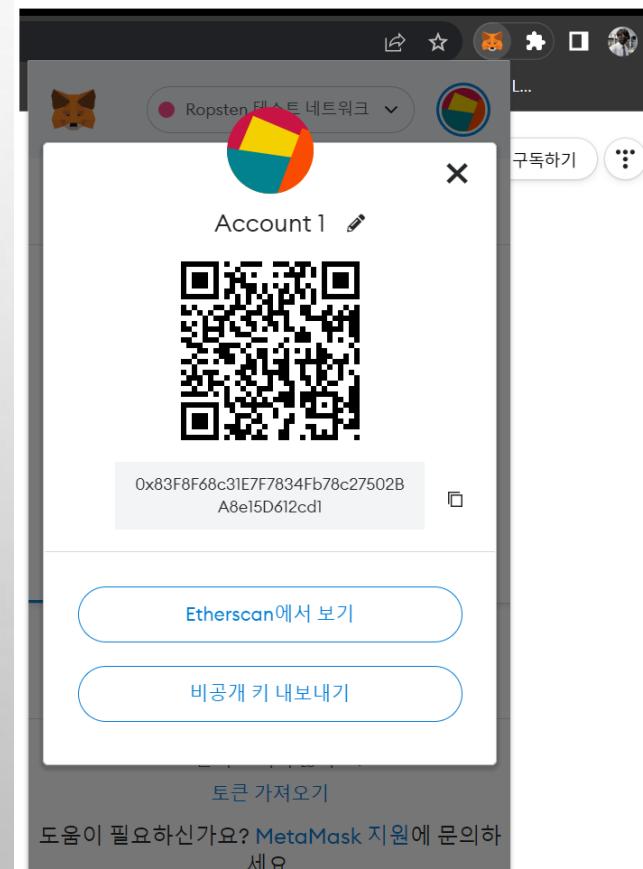
- Chrome Extension에서 Meta Mask 실행
- 본인의 Account Detail에서 Private Key 확인

- dotenv 패키지 설치 (Key secure)

- npm i dotenv

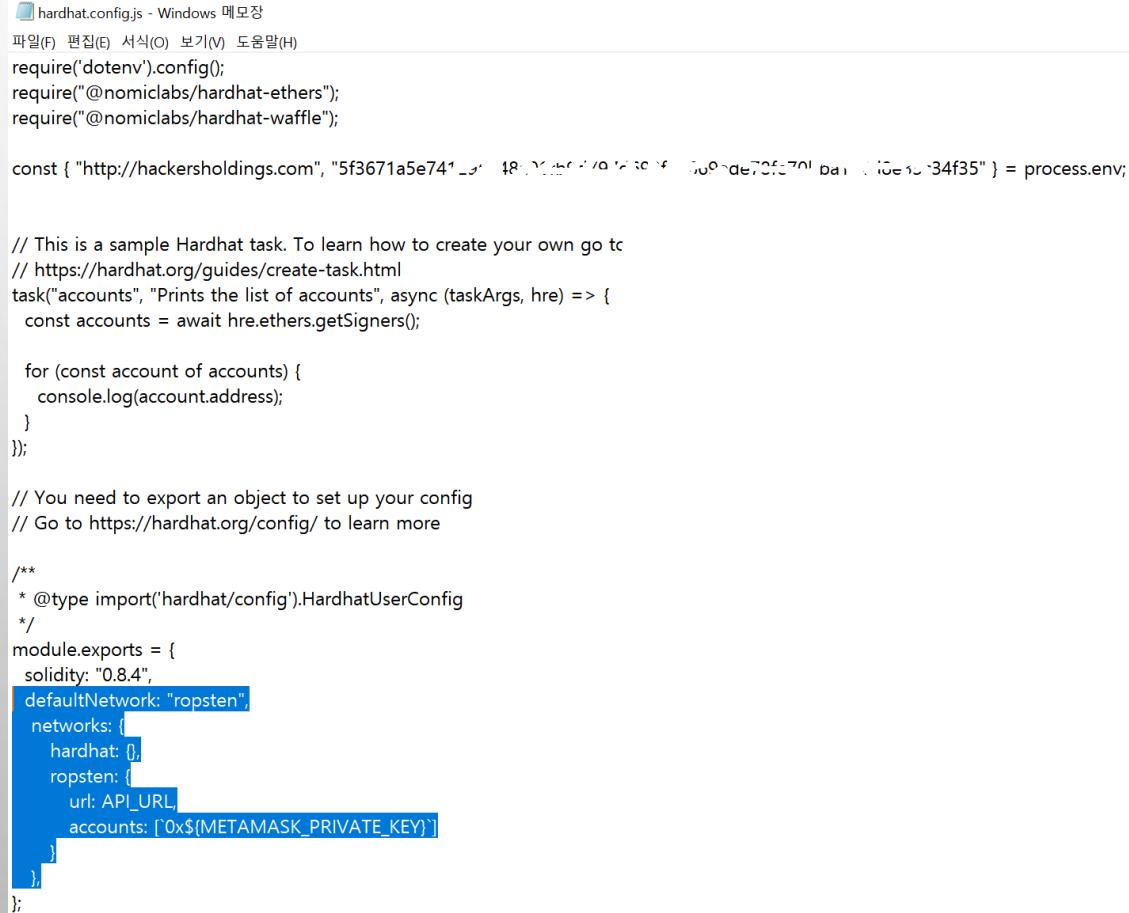
- 프로젝트 root 폴더에서 process.env라는 파일을 생성 후 아래 정보 기입

- METAMASK_PRIVATE_KEY = "Metamask Private Key"
- API_URL = "https://eth-rinkeby.alchemyapi.io/v2/tryvv4cEj8QwySvUqyf_UBIB5yaA2IOv"



- Ether.js 설치

- `npm i -D @nomiclabs/hardhat-ethers ethers@^5.0.0`



hardhat.config.js - Windows 메모장

파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)

```
require('dotenv').config();
require("@nomiclabs/hardhat-ethers");
require("@nomiclabs/hardhat-waffle");

const { "http://hackersholdings.com", "5f3671a5e741...": "0x...34f35" } = process.env;

// This is a sample Hardhat task. To learn how to create your own go to
// https://hardhat.org/guides/create-task.html
task("accounts", "Prints the list of accounts", async (taskArgs, hre) => {
  const accounts = await hre.ethers.getSigners();

  for (const account of accounts) {
    console.log(account.address);
  }
});

// You need to export an object to set up your config
// Go to https://hardhat.org/config/ to learn more

/**
 * @type import('hardhat/config').HardhatUserConfig
 */
module.exports = {
  solidity: "0.8.4",
  defaultNetwork: "ropsten",
  networks: {
    hardhat: {},
    ropsten: {
      url: API_URL,
      accounts: [0x${METAMASK_PRIVATE_KEY}]
    }
  }
};
```

hardhat.config.js 에 추가할 내용

```
/**  
 * @type import('hardhat/config').HardhatUserConfig  
 */  
require('dotenv').config();  
require("@nomiclabs/hardhat-ethers");  
const { API_URL, METAMASK_PRIVATE_KEY } = process.env;  
  
module.exports = {  
  solidity: "0.8.2",  
  defaultNetwork: "ropsten",  
  networks: {  
    hardhat: {},  
    ropsten: {  
      url: API_URL,  
      accounts: [`0x${METAMASK_PRIVATE_KEY}`]  
    }  
  },  
};
```

컴파일

- **npx hardhat compile**

```
D:\Roy\Desktop\해커스홀딩스\Lecture\node.js>npx hardhat compile
Error HH12: Trying to use a non-local installation of Hardhat, which is not supported.
Please install Hardhat locally using npm or Yarn, and try again.

For more info go to https://hardhat.org/HH12 or run Hardhat with --show-stack-traces
Error: EPERM: operation not permitted, unlink 'C:\Users\Roy\AppData\Roaming\npm-cache\_npx\8960\node_modules\hardhat\node_modules\keccak\prebuilds\win32-x64\node.napi.node'
    at Object.unlinkSync (fs.js:1255:3)
    at fixWinEPERMSync (D:\Nginx\PhpMariaDB\node-v14.18.1-win-x64\node_modules\npm\node_modules\rimraf\rimraf.js:219:13)
    at rimrafSync (D:\Nginx\PhpMariaDB\node-v14.18.1-win-x64\node_modules\npm\node_modules\rimraf\rimraf.js:319:28)
    at D:\Nginx\PhpMariaDB\node-v14.18.1-win-x64\node_modules\npm\node_modules\rimraf\rimraf.js:350:5
    at Array.forEach (<anonymous>)
    at rmkidsSync (D:\Nginx\PhpMariaDB\node-v14.18.1-win-x64\node_modules\npm\node_modules\rimraf\rimraf.js:349:26)
    at rmdirSync (D:\Nginx\PhpMariaDB\node-v14.18.1-win-x64\node_modules\npm\node_modules\rimraf\rimraf.js:342:7)
    at fixWinEPERMSync (D:\Nginx\PhpMariaDB\node-v14.18.1-win-x64\node_modules\npm\node_modules\rimraf\rimraf.js:217:5)
    at rimrafSync (D:\Nginx\PhpMariaDB\node-v14.18.1-win-x64\node_modules\npm\node_modules\rimraf\rimraf.js:319:28)
    at D:\Nginx\PhpMariaDB\node-v14.18.1-win-x64\node_modules\npm\node_modules\rimraf\rimraf.js:350:5 {
  errno: -4048,
  syscall: 'unlink',
  code: 'EPERM',
  path: 'C:\Users\sw\Roy\AppData\Roaming\npm-cache\_npx\8960\node_modules\hardhat\node_modules\keccak\prebuilds\win32-x64\node.napi.node'
}
```

```
D:\Roy\Desktop\해커스홀딩스\Lecture\node.js>npx hardhat compile
An unexpected error occurred:

D:\Roy\Desktop\해커스홀딩스\Lecture\node.js\hardhat.config.js:5
const { "http://hackersholdings.com", "5f3671a5e7412844420f0d707609213cde78fe70bb3102102134f35" } = process.env;
^

SyntaxError: Unexpected token ','
    at wrapSafe (internal/modules/cjs/loader.js:1001:16)
    at Module._compile (internal/modules/cjs/loader.js:1049:27)
    at Object.Module._extensions..js (internal/modules/cjs/loader.js:1114:10)
    at Module.load (internal/modules/cjs/loader.js:950:32)
    at Function.Module._load (internal/modules/cjs/loader.js:790:12)
    at Module.require (internal/modules/cjs/loader.js:974:19)
    at require (internal/modules/cjs/helpers.js:93:18)
    at importCjsOrEsModule (D:\Roy\Desktop\해커스홀딩스\Lecture\node.js\node_modules\hardhat\src\internal\core\config\config-loading.ts:28:20)
    at loadConfigAndTasks (D:\Roy\Desktop\해커스홀딩스\Lecture\node.js\node_modules\hardhat\src\internal\core\config\config-loading.ts:80:18)
    at main (D:\Roy\Desktop\해커스홀딩스\Lecture\node.js\node_modules\hardhat\src\internal\cli.ts:142:62)

D:\Roy\Desktop\해커스홀딩스\Lecture\node.js>
```

장애 발생시

```
npm install --save-dev hardhat
npm install
```

기존

rinkeby.etherscan.io/address/0x83F8F68c31E7F7834Fb78c27502BA8e15D612cd1

Etherscan

Rinkeby Testnet Network

All Filters Search by Address / Txn Hash / Block / Token / Ens

Home Blockchain Tokens Misc Rinkeby

Address 0x83F8F68c31E7F7834Fb78c27502BA8e15D612cd1

Overview More

Balance: 0.1 Ether

More Info

My Name Tag: Not Available

Transactions

Latest 1 from a total of 1 transactions

Txn Hash	Method ⓘ	Block	Age	From ↴	To ↴	Value	Txn Fee
0x9cea0c8bd4856eb6c7...	Transfer	10919625	21 mins ago	0xedaf4083f29753753d0...	IN 0x83f8f68c31e7f7834fb7...	0.1 Ether	0.000168001679

[Download CSV Export]

A wallet address is a publicly available address that allows its owner to receive funds from another party. To access the funds in an address, you must have its private key. Learn more about addresses in our [Knowledge Base](#).

ROYTEST

 Rinkeby[VIEW KEY](#)[GET TEST ETH](#)[ADD TO WALLET](#)[EDIT APP](#)

COMPUTE UNITS / SEC (LAST 5 MIN)

0.2

MEDIAN RESPONSE (LAST 5 MIN)

20ms

SUCCESS % (LAST 1 H)

100%

THROUGHPUT LIMITED % (LAST 24 H)

0% (0)

CONC. REQUESTS (LAST 1 H)

0.4

SUCCESS % (LAST 24 H)

100%

TOTAL REQUESTS (LAST 24 H)

5

INVALID REQUESTS (LAST 24 H)

0

[Recent Requests](#)[View all](#)[Recent Invalid Requests](#)[Recent Throughput Limited Requests](#)

#	METHOD	ERROR CODE	HTTP	RESPONSE TIME	SENT	...	^
1	eth_getBalance	✓	200	42ms	1m ago	...	^
	PARAMS	COPY	RAW REQUEST	RESULT	RAW RESPONSE	COPY	
	0: 0x83f8f68c31e7f7834fb78c27502ba8e15d612cd1			Value: 1.0000000e+17			
	1: latest						
2	eth_chainId	✓	200	16ms	1m ago	...	^
3	eth_chainId	✓	200	16ms	1m ago	...	^
4	web3_clientVersion	✓	200	40ms	1m ago	...	^
5	web3_clientVersion	✓	200	31ms	1m ago	...	^

Daily Requests

Script 폴더에 deploy.js 생성

```
async function main() {  
  
    const [deployer] = await ethers.getSigners();  
  
    console.log("Deploying contracts with the account:", deployer.address);  
  
    console.log("Account balance:", (await deployer.getBalance()).toString());  
  
    const TPM = await ethers.getContractFactory("본인계약명");  
  
    // Start deployment, returning a promise that resolves to a contract object  
    const tpm = await TPM.deploy();  
  
    console.log("Contract deployed to address:", tpm.address);  
  
}  
  
main()  
.then(() => process.exit(0))  
.catch(error => {  
    console.error(error);  
    process.exit(1);  
});
```

npx hardhat run deploy.js --network rinkeby

```
D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs\scripts>npx hardhat run deploy.js --network rinkeby
Deploying contracts with the account: 0x83F8F68c31E7F7834Fb78c27502BA8e15D612cd1
Account balance: 10000000000000000000
HardhatError: HH700: Artifact for contract "ROYTESTCON" not found.
    at Artifacts._handleWrongArtifactForContractName (D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs\node_modules\hardhat\src\internal\artifacts.ts:478:11)
    at Artifacts._getArtifactPathFromFiles (D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs\node_modules\hardhat\src\internal\artifacts.ts:593:19)
    at Artifacts._getArtifactPath (D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs\node_modules\hardhat\src\internal\artifacts.ts:275:17)
    at Artifacts.readArtifact (D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs\node_modules\hardhat\src\internal\artifacts.ts:58:26)
    at getContractFactory (D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs\node_modules\@nomiclabs\hardhat-ethers\src\internal\helpers.ts:91:22)
    at main (D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs\scripts\deploy.js:6:17)
```

```
D:\Roy\Desktop\해커스홀딩스\Lecture\nodejs\scripts>npx hardhat run deploy.js --network rinkeby
Deploying contracts with the account: 0x83F8F68c31E7F7834Fb78c27502BA8e15D612cd1
Account balance: 10000000000000000000
Contract deployed to address: 0xBc392967D9399F00554800AE84EDbFfF6F9Aa1ab
```

```
1 // SPDX-License-Identifier: MIT
2 pragma solidity ^0.8.2;
3
4 import "@openzeppelin/contracts/token/ERC721/ERC721.sol";
5 import "@openzeppelin/contracts/token/ERC721/extensions/ERC721URIStorage.sol";
6 import "@openzeppelin/contracts/access/Ownable.sol";
7
8 contract ThePublicMarket is ERC721, ERC721URIStorage, Ownable {
9     constructor() ERC721("ROYTESTNFT", "RTN") {}
10
11     function _baseURI() internal pure override returns (string memory) {
12         return "https://eth-rinkeby.alchemyapi.io/v2/tryvv4cEj8QwySvUqyf_UB1B5yaA2IOv";
13     }
14
15     function safeMint(address to, uint256 tokenId, string memory uri)
16     public
17     onlyOwner
18     {
19         _safeMint(to, tokenId);
20         _setTokenURI(tokenId, uri);
21     }
22
23     // The following functions are overrides required by Solidity.
24
25     function _burn(uint256 tokenId) internal override(ERC721, ERC721URIStorage) {
26         super._burn(tokenId);
27     }
28
29     function tokenURI(uint256 tokenId)
30     public
31     view
32     override(ERC721, ERC721URIStorage)
33     returns (string memory)
34     {
35         return super.tokenURI(tokenId);
36     }
37 }
```

```
async function main() {
    const [deployer] = await ethers.getSigners();
    console.log("Deploying contracts with the account:", deployer.address);

    console.log("Account balance:", (await deployer.getBalance()).toString());
    const TPM = await ethers.getContractFactory("ThePublicMarket");

    // Start deployment, returning a promise that resolves to a contract object
    const tpm = await TPM.deploy();
    console.log("Contract deployed to address:", tpm.address);
}

main()
    .then(() => process.exit(0))
    .catch(error => {
        console.error(error);
        process.exit(1);
});
```

 Address 0x83f8f68c31e7f7834fb78c27502ba8e15d612cd1

Overview

Balance: 0.095767455977426432 Ether

More Info

My Name Tag: Not Available

More

Transactions

↓ Latest 2 from a total of 2 transactions

⋮

Txn Hash	Method ⓘ	Block	Age	From	To	Value	Txn Fee
0xfe61f131d4c03cedca9...	0x60806040	10919746	2 mins ago	0x83f8f68c31e7f7834fb7...	 Contract Creation	0 Ether	0.004232544022 \$
0x9cea0c8bd4856eb6c7...	Transfer	10919625	32 mins ago	0xedaf4083f29753753d0...		0.1 Ether	0.000168001679

[Download CSV Export ]

 Token ROYTESTNFT 

Overview [ERC-721]

Max Total Supply:  0 RTN 

Holders: 0

Transfers: 0

Profile Summary

Contract: [0xBc392967D9399F00554800AE84EDbFfF6F9Aa1ab](#)[Transfers](#) [Holders](#) [Contract](#)

A total of 0 transactions found

[First](#)

Page 1 of 1

[Last](#)[Txn Hash](#)[Method](#) [Age](#)[From](#)[To](#)[TokenID](#)

There are no matching entries

[Download CSV Export ]

OPENSEA

- NFT 분야 1등 기업(뉴욕)
- 2017년 설립
- 2022년 1월 3억 달러 펀딩
- 기업가치 133억 달러 평가

No.	투자 단계	유치 금액	투자일	누적투자금액	사후평가액
1	시드	12만달러	2018년 3월 19일	12만달러	171만달러
2	시리즈A	2300만달러	2021년 3월 18일	2312만달러	7300만달러
3	시리즈B	1억달러	2021년 7월 20일	1억2312만달러	15억달러
4	시리즈C	3억달러	2022년 1월 4일	4억2312만달러	133억달러

오픈씨의 NFT 거래 규모는 막대하다. 큰 투자가 될 수 있기 때문이라는 기대감 때문이다. 오픈씨의 거래 규모를 파악하는 가장 간단한 방법은 30일 거래량을 확인하고 합계에 2.5%의 수수료 비율을 적용하는 것이다. 암호화폐 데이터 출처 대프라더(Dappradar)에 따르면, 오픈씨는 최근 30일 동안 29억1000만달러의 거래량을 기록했다.

수수료 비율을 기준으로 오픈씨 예상 한 달 총수입은 7275만달러에 달할 것으로 예상된다. 오픈씨의 연간 거래량은 349억 2000만달러, 총 수익은 8억7300만 달러에 이를 것으로 예측된다.

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Solana is in beta on OpenSea



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[Popular](#)

Coinbase Wallet

WalletConnect

Phantom

[Solana](#)

Glow

[Solana](#)[Show more options](#)



OpenSea

Testnets

Search items, collections, and accounts

Explore

Stats

Resources

Discover, collect, and sell extraordinary NFTs

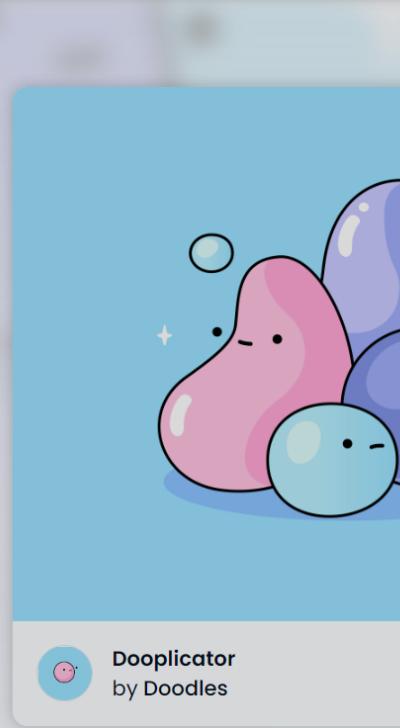
OpenSea is the world's first and largest NFT marketplace

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My wallet

Connect with on providers or cred

MetaMask

Coinbase

WalletCon

Phantom

Glow

https://testnets.opensea.io

MetaMask로 연결

계정 선택

새 계정

Account 1 (0x83f...2cd1)
0.09576746 RinkebyETH

신뢰하는 사이트만 연결하세요. 자세히 알아보기

취소

다음



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My wallet

0x83F8...2cd1

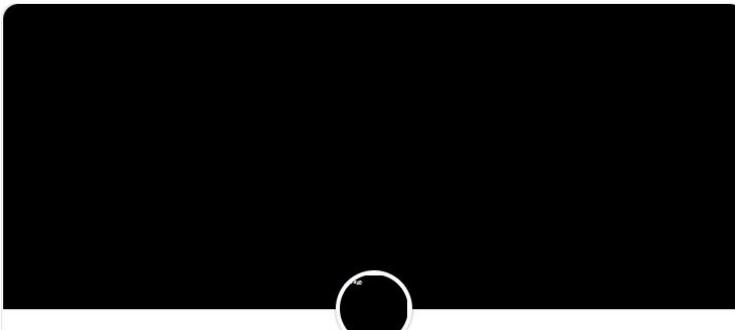
Total balance
\$38.85 USD

[Add Funds](#) ETH
Rinkeby 0.0958
\$38.85 USD



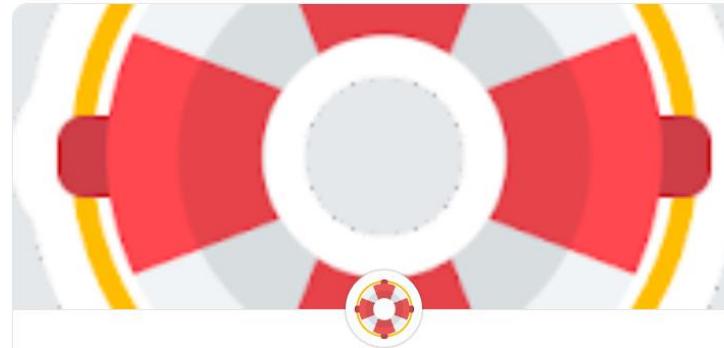
Explore Collections

Trending Top Art Collectibles Domain Names Music Photography Sports Trading Cards Utility Virtual Worlds



Faucet721 ✅

Explore the Faucet721 collection



Untitled Collection #74... ✅

by CurlyGirl ✅

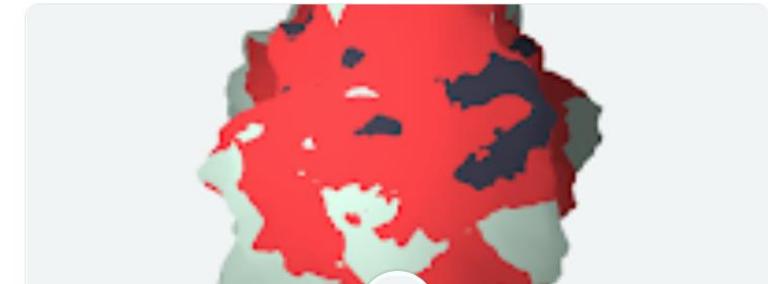
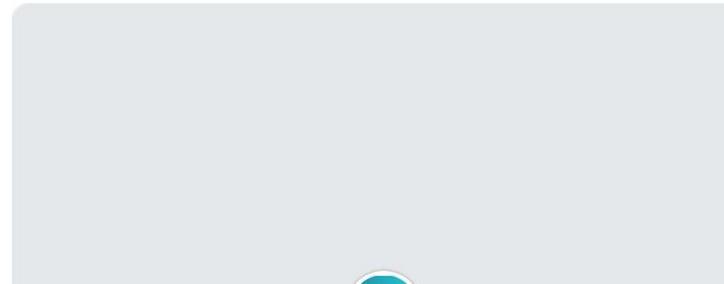
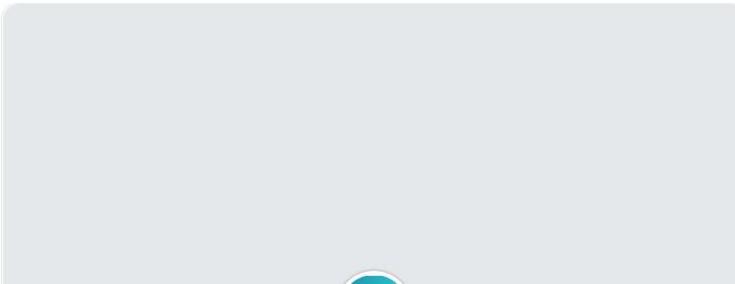
Explore the Untitled Collection #7496780 collection



Untitled Collection #21...

by austin_Opensea

Explore the Untitled Collection #2190385 collection





Profile

Favorites

Watchlist

My Collections

Settings

Log Out

Night Mode



Create a Collection

* Required fields

Logo image *

This image will also be used for navigation. 350 x 350 recommended.



Featured image

This image will be used for featuring your collection on the homepage, category pages, or other promotional areas of OpenSea. 600 x 400 recommended.



Banner image

This image will appear at the top of your collection page. Avoid including too much text in this banner image, as the dimensions change on different devices. 1400 x 350 recommended.





Create New Item

* Required fields

Image, Video, Audio, or 3D Model *

File types supported: JPG, PNG, GIF, SVG, MP4, WEBM, MP3, WAV, OGG, GLB, GLTF. Max size: 100 MB



Name *

sunset

External link

OpenSea will include a link to this URL on this item's detail page, so that users can click to learn more about it. You are welcome to link to your own webpage with more details.

<https://yoursite.io/item/123>

Description

The description will be included on the item's detail page underneath its image. [Markdown](#) syntax is supported.

roy's sunset



Status

 Buy Now On Auction New Has Offers

Price



Quantity



Collections



Chains



Category



Currency



#2 MAYC 2747
Malibu Private Beach



#3 LiveCreativity
Malibu Private Beach



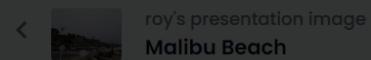
Malibu beach
The Photos



Malibu Beach
roy's presentation image

Sort by





Fees

Service Fee



Stay in the loop

Join our mailing list to stay in the loop with drops, and tips and tricks for navigating OpenSea.

Your email address

Complete your listing

roy's presentation image
Malibu Beach
Quantity: 1

Price: **0.03** \$12.17 USD

Initialize your wallet

Approve this item for sale

3 Confirm 0.03 ETH listing

Accept the [signature request](#) in your wallet and wait for your listing to process.

Waiting for signature...



OpenSea

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서명 요청



Wyvern Exchange Contract

<https://testnets.opensea.io>

0x83f8f6...5d612cd1

메시지

maker: 0x83f8f68c31e7f7834fb78c2

7502ba8e15d612cd1

exchange: 0xdd54d660178b28f603

3a953b0e55073cfa7e37

44

taker: 0x00000000000000000000000000000000

00000000000000000000000000000000

makerRelayerFee: 250

takerRelayerFee: 0

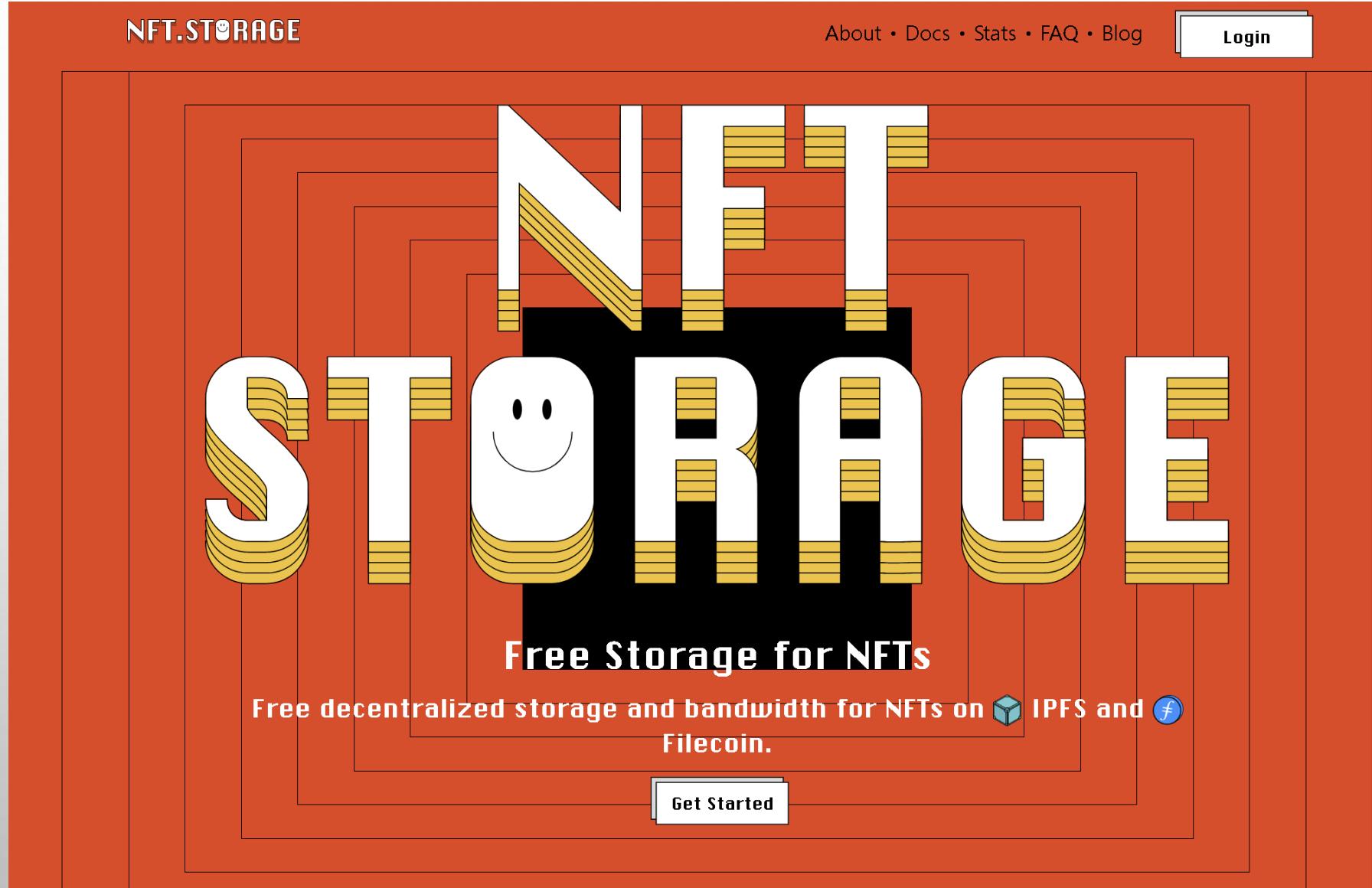
makerProtocolFee: 0

takerProtocolFee: 0

취소

서명

<https://nft.storage> 가입



Files

ⓘ Upload directories easily with NFTUp

+ Upload



No files

← First

← Previous

Next →

Tell us how we are doing

API Keys

[✉ Request API Pinning Access](#)[+ New Key](#)

Name	Key	
roy_nft	uZnQtc3RvcmFnZSlsmIhdCI6MTY1NjQxODgwOTYzNCwibmFtZSI6InJveV9uZnQifQ.4ZgtZIJroSRH3eKUNP7In6eP1Fu5zXT0JkZQe0CBj0o	Actions



NFT UP

nftup File Edit Tools Window Help

**CID**

bafybeieaicydtea637l7g2qgbkzpi3mjq76yzmhwaxfygzxchpcgt7rgly

IPFS URL

ipfs://bafybeieaicydtea637l7g2qgbkzpi3mjq76yzmhwaxfygzxchpcgt7rgly

Gateway URL

<https://nftstorage.link/ipfs/bafybeieaicydtea637l7g2qgbkzpi3mjq76yz...>

NFT.STORAGE

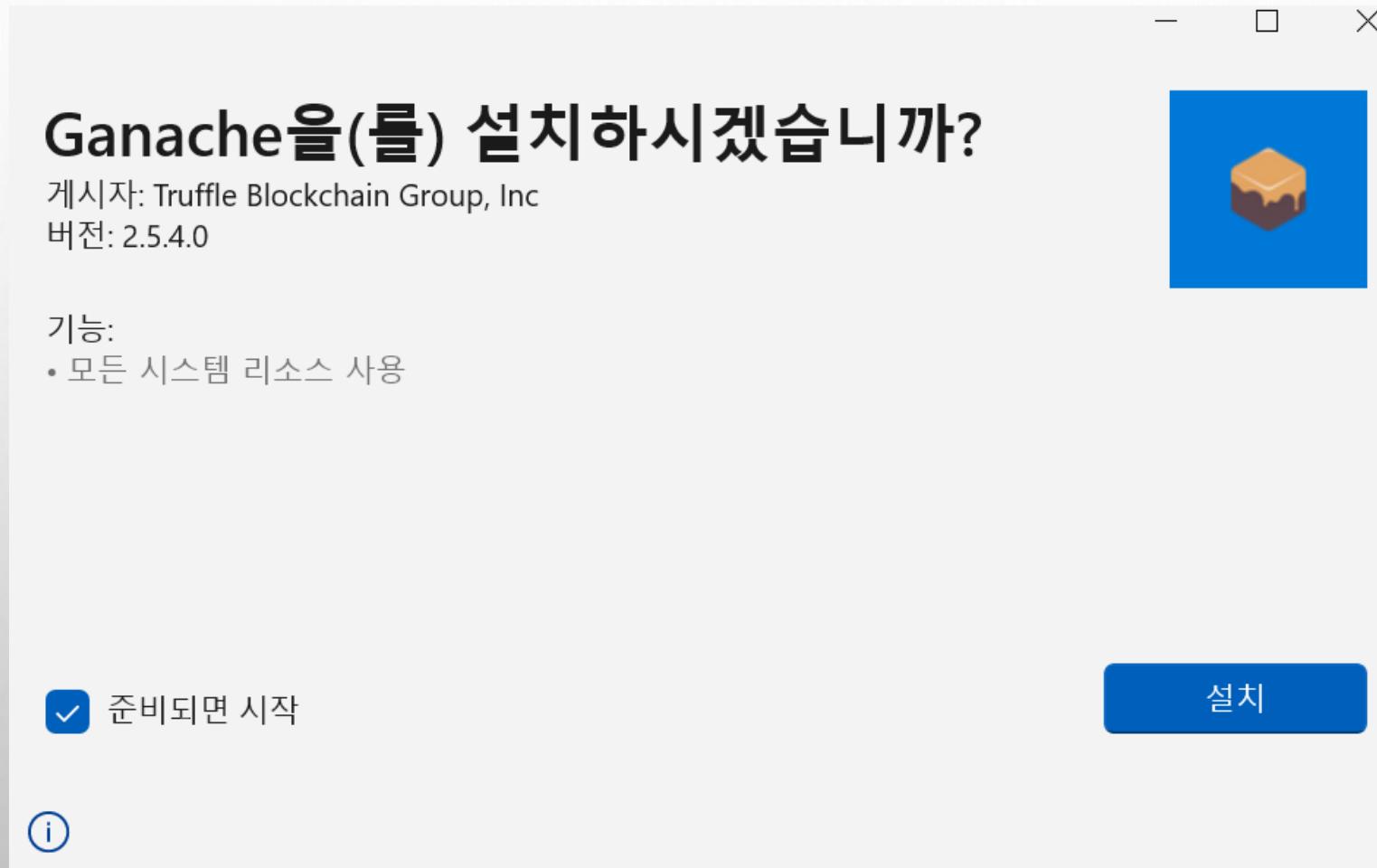
- CID
 - `bafybeieaicydtea637l7g2qgbkzpi3mjq76yzmhwaxfygzxchpcgt7rgly`
- IPFS
 - `ipfs://bafybeieaicydtea637l7g2qgbkzpi3mjq76yzmhwaxfygzxchpcgt7rgly`
- Gateway
 - `https://nftstorage.link/ipfs/bafybeieaicydtea637l7g2qgbkzpi3mjq76yzmhwaxfygzxchpcgt7rgly`

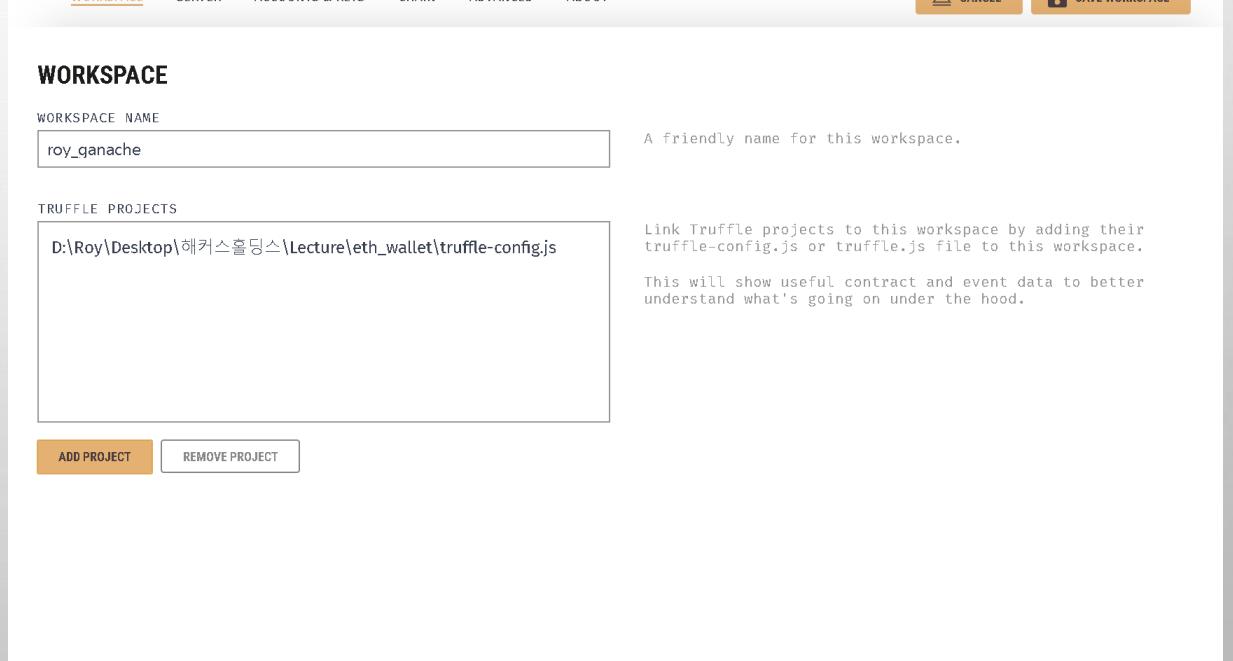
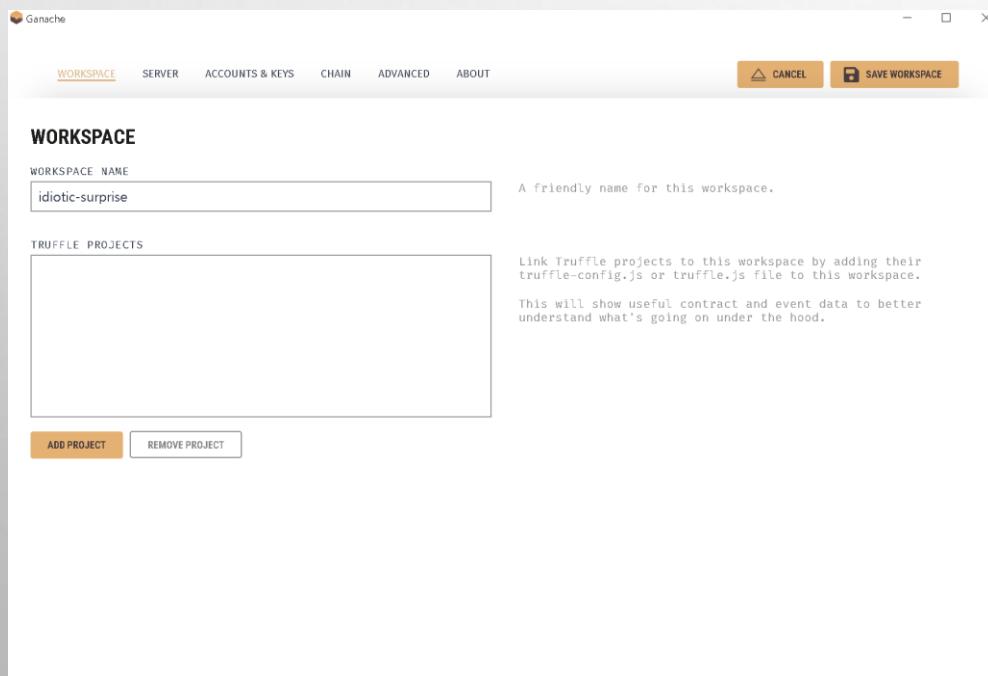
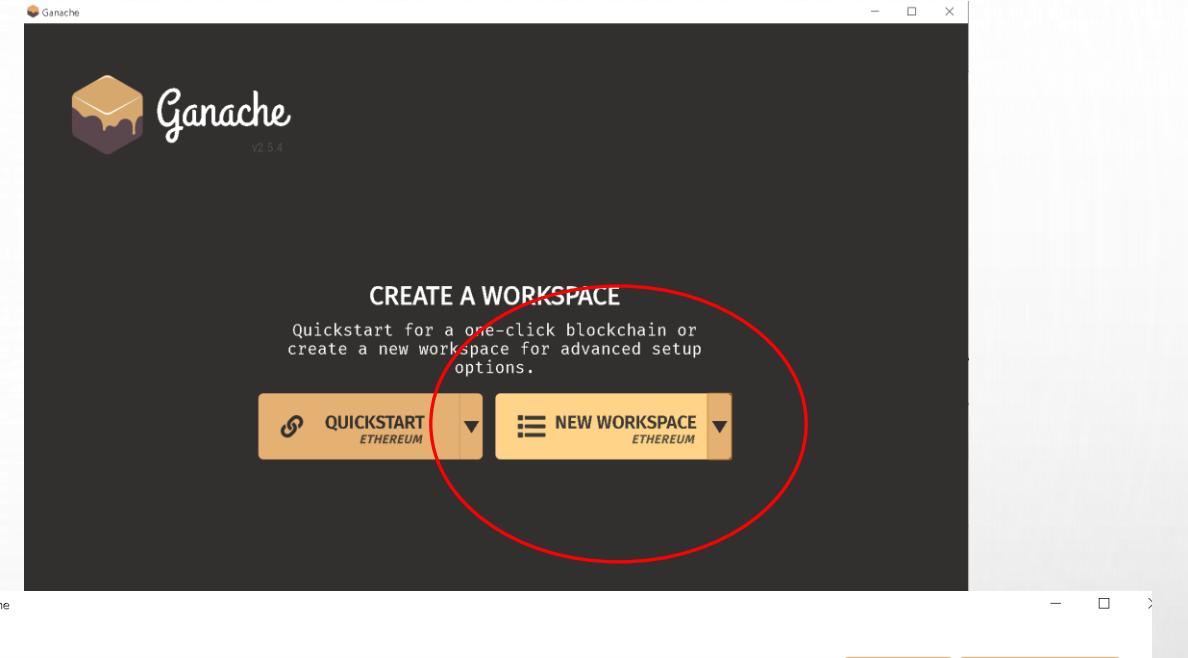
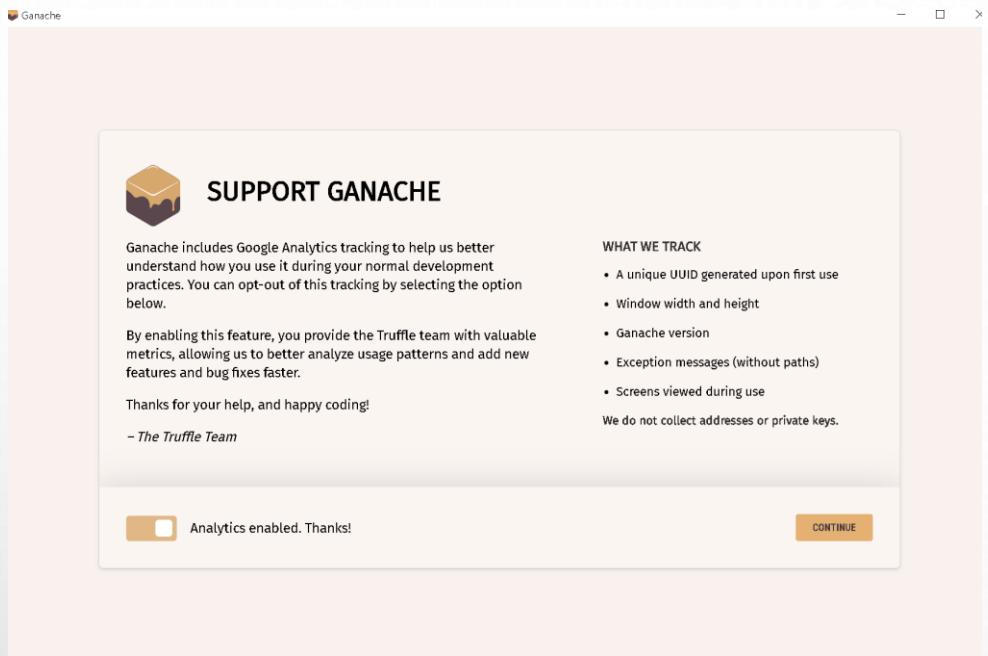
truffle로 생성하는 NFT

- npm init -y
- npm install -g truffle
- npm audit fix --force
- npm i --save @truffle/hdwallet-provider
- npx truffle init

Ganache 설치

- <https://trufflesuite.com/ganache/>





[WORKSPACE](#)[SERVER](#)[ACCOUNTS & KEYS](#)[CHAIN](#)[ADVANCED](#)[ABOUT](#)[CANCEL](#)[SAVE WORKSPACE](#)

WORKSPACE

WORKSPACE NAME

A friendly name for this workspace.

TRUFFLE PROJECTS

D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet\truffle-config.js

Link Truffle projects to this workspace by adding their truffle-config.js or truffle.js file to this workspace.

This will show useful contract and event data to better understand what's going on under the hood.

[ADD PROJECT](#)[REMOVE PROJECT](#)

WORKSPACE

SERVER

ACCOUNTS & KEYS

CHAIN

ADVANCED

ABOUT

 CANCEL SAVE WORK

SERVER

HOSTNAME

127.0.0.1 - Loopback Pseudo-Interface 1

The server will accept RPC connections on the following host and port.

PORT NUMBER

7545

NETWORK ID

5777

Internal blockchain identifier of Ganache server.

AUTOMINE

Process transactions instantaneously.

ERROR ON TRANSACTION FAILURE

When transactions fail, throw an error. If disabled, transaction failures will only be detectable via the "status" flag in the transaction receipt. Disabling this feature will make Ganache handle transaction failures like other Ethereum clients.

CHAIN FORKING



Fork an existing chain creating a new sandbox with the existing chain's accounts, contracts, transactions and state.

```
// options below to some value.  
//  
// development: {  
//   host: "127.0.0.1",           // Localhost (default: none)  
//   port: 8545,                 // Standard Ethereum port (default: no  
//   network_id: "*",            // Any network (default: none)  
// },  
development: {  
  host: '127.0.0.1', // Localhost (default: none)  
  port: 7545, // Standard Ethereum port (default: none)  
  network_id: '*', // Any network (default: none)  
},  
//
```

ACCOUNTS	BLOCKS	TRANSACTIONS	CONTRACTS	EVENTS	LOGS	SEARCH FOR BLOCK NUMBERS OR TX HASHES			
CURRENT BLOCK 0	GAS PRICE 200000000000	GAS LIMIT 6721975	HARDFORK MUIRGLACIER	NETWORK ID 5777	RPC SERVER HTTP://127.0.0.1:7545	MINING STATUS AUTOMINING	WORKSPACE ROY_GANACHE	SWITCH	⚙️

MNEMONIC ?
lunch aunt blade pumpkin lazy sad marble amazing tragic cliff tray stay

HD PATH
m/44'/60'/0'/0/account_index

ADDRESS	BALANCE	TX COUNT	INDEX	🔑
0x423f4A328F34775102cB21C33880C40a788969Ab	100.00 ETH	0	0	🔑
0xD141a4c2a4241f3c00b2A243c9aD269c8b146B48	100.00 ETH	0	1	🔑
0xb357CE295cc5f24c8a37673b4f20bD867a42629a	100.00 ETH	0	2	🔑
0xaC70a0774Df8d162B99fc642d36dEd0cf9C98bcA	100.00 ETH	0	3	🔑
0x665B0FEe2F7Da941529b307aF33Bc2BDF1B966B6	100.00 ETH	0	4	🔑
0x7FD823971A8d50f807083153AcdDebf068f8728B	100.00 ETH	0	5	🔑
0x6BD24279Eb735f7E5Cb8072d4e67A164F5088CDc	100.00 ETH	0	6	🔑

터미널에서 아래 명령 실행

- npm install --save @openzeppelin/contracts

contracts 폴더에 roy_nft.sol 파일 생성.

```
// SPDX-License-Identifier: MIT
```

```
pragma solidity >=0.4.22 <0.9.0;
```

```
import "@openzeppelin/contracts/token/ERC721/ERC721.sol";
```

```
import "@openzeppelin/contracts/utils/Counters.sol";
```

```
import "@openzeppelin/contracts/access/Ownable.sol";
```

roy_nft.sol

```
contract Banjubu is Ownable, ERC721 {  
    using Counters for Counters.Counter;  
    Counters.Counter private _tokenIds;  
    using Strings for uint256;  
    // Optional mapping for token URIs  
    mapping(uint256 => string) private _tokenURLs;  
  
    // Base URI  
    string private _baseURIextended;  
  
    constructor() public ERC721("banjubu", "BANJB") {}  
  
    // https://forum.openzeppelin.com/t/function-settokenuri-in-erc721-is-gone-with-pragma-0-8-0/5978/3  
    function setBaseURI(string memory baseURI_) external onlyOwner {  
        _baseURIextended = baseURI_;  
    }
```

roy_nft.sol

```
function _setTokenURI(uint256 tokenId, string memory _tokenURI)
    internal
    virtual
{
    require(
        _exists(tokenId),
        "ERC721Metadata: URI set of nonexistent token"
    );
    _tokenURLs[tokenId] = _tokenURI;
}

function _baseURI() internal view virtual override returns (string memory) {
    return _baseURlextended;
}
```

roy_nft.sol

```
function tokenURI(uint256 tokenId)
public
view
virtual
override
returns (string memory)
{
require(
_exists(tokenId),
"ERC721Metadata: URI query for nonexistent token"
);

string memory _tokenURI = _tokenURIs[tokenId];
string memory base = _baseURI();
```

roy_nft.sol

```
// If there is no base URI, return the token URI.  
if (bytes(base).length == 0) {  
    return _tokenURI;  
}  
  
// If both are set, concatenate the baseURI and tokenURI (via abi.encodePacked).  
if (bytes(_tokenURI).length > 0) {  
    return string(abi.encodePacked(base, _tokenURI));  
}  
  
// If there is a baseURL but no tokenURI, concatenate the tokenId to the baseURL.  
return string(abi.encodePacked(base, tokenId.toString()));  
}
```

roy_nft.sol

```
function claimItem(string memory tokenURI) public returns (uint256) {
    _tokenIds.increment();
    uint256 newItemId = _tokenIds.current();
    _safeMint(msg.sender, newItemId);
    _setTokenURI(newItemId, tokenURI);
    return newItemId;
}
```

```
function totalSupply() public view returns (uint256) {
    return _tokenIds.current();
}
```

migrations 폴더에 '2_deploy_roy_nft.js' 파일 생성.

```
const roy_nft = artifacts.require('roy_nft');
```

```
module.exports = function (deployer) {  
  deployer.deploy(roy_nft);  
};
```

다음 실행

- npm i --save solc
- npx solc --version

```
D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet>npm i --save solc
npm WARN @babel/helper-compilation-targets@7.18.6 requires a peer of @babel/core@^7.0.0 but
self.
npm WARN @babel/helper-define-polyfill-provider@0.3.1 requires a peer of @babel/core@^7.4.0-
s yourself.
npm WARN @babel/plugin-transform-runtime@7.18.6 requires a peer of @babel/core@^7.0.0-0 but
self.
npm WARN babel-plugin-polyfill-corejs2@0.3.1 requires a peer of @babel/core@^7.0.0-0 but nor
f.
npm WARN babel-plugin-polyfill-corejs3@0.5.2 requires a peer of @babel/core@^7.0.0-0 but nor
f.
npm WARN babel-plugin-polyfill-regenerator@0.3.1 requires a peer of @babel/core@^7.0.0-0 but
rsself.
npm WARN eth_wallet@1.0.0 No description
npm WARN eth_wallet@1.0.0 No repository field.

+ solc@0.8.15
added 9 packages from 12 contributors and audited 303 packages in 3.444s

15 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities

D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet>npx solc --version
npx: installed 9 in 1.428s
0.8.15+commit.e14f2714.Emscripten.clang
D:\Roy\Desktop\해커스홀딩스\Lecture\eth_wallet>
```

0.8.15+commit.e14f2714.Emscripten.clang

truffle-config.js > compilers 아래 solc의 version 주석 풀고 붙여넣기.

```
compilers: {
```

```
  solc: {
```

```
    version: '0.8.15', // Fetch exact version from solc-bin (default: truffle's version)
```

```
    // docker: true, // Use "0.5.1" you've installed locally with docker (default: false)
```

```
    // settings: { // See the solidity docs for advice about optimization and evmVersion
```

```
    // optimizer: {
```

```
      // enabled: false,
```

```
      // runs: 200
```

```
    // },
```

```
    // evmVersion: "byzantium"
```

```
  // }
```

```
,
```

```
,
```

```
npx truffle console
```

```
truffle(development)> $ migrate
```

완료 후 확인

```
truffle(development)> let roy_nft = await roy_nft.deployed()
```

```
truffle(development)> roy_nft.address
```

'0x97f1FB6689FDe9581C845d162d175d85B4Fb5c9F'

```
truffle(development)> accounts[0]
```

'0x423f4A328F34775102cB21C33880C40a788969Ab'

npm

```
> Saving migration to chain.  
> Saving artifacts  
-----  
> Total cost: 0.00497708 ETH
```

2_deploy_roy_nft.js

=====

```
Deploying 'roy_nft'
```

```
> transaction hash: 0xc8ca924106d002062420d2fed8a947f02907b9d1cb627fc7b8451169a9330495  
> Blocks: 0 Seconds: 0  
> contract address: 0x97f1FB6689FDe9581C845d162d175d85B4Fb5c9F  
> block number: 3  
> block timestamp: 1656418060  
> account: 0x423f4A328F34775102cB21C33880C40a788969Ab  
> balance: 99.93635692  
> gas used: 2890787 (0x2c1c23)  
> gas price: 20 gwei  
> value sent: 0 ETH  
> total cost: 0.05781574 ETH
```

```
> Saving migration to chain.  
> Saving artifacts
```

```
-----  
> Total cost: 0.05781574 ETH
```

Summary

=====

```
> Total deployments: 2  
> Final cost: 0.06279282 ETH
```

재확인

```
1 networks: {
2   // Useful for testing. The `development` name is special - truffle
3   // if it's defined here and no other network is specified at the c
4   // You should run a client (like ganache, geth, or parity) in a se
5   // tab if you use this network and you must also set the `host`, `
6   // options below to some value.
7   //
8   // development: {
9     // host: "127.0.0.1",           // Localhost (default: none)
10    // port: 8545,                 // Standard Ethereum port (default: non
11    // network_id: "*",           // Any network (default: none)
12    // },
13  development: {
14    host: '127.0.0.1', // Localhost (default: none)
15    port: 7545, // Standard Ethereum port (default: none)
16    network_id: '*', // Any network (default: none)
17  },
18  // An additional network, but with some advanced options...
19  // advanced: {
20    // port: 8777,                  // Custom port
21    // network_id: 1342,           // Custom network
22    // gas: 8500000,              // Gas sent with each transaction (de
23    // gasPrice: 20000000000,      // 20 gwei (in wei) (default: 100 gwe
24    // from: <address>           // Account to send transactions from
```

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가입 > 프로젝트 생성 > ENDPOINTS를 RINKEBY로 변경 > URL 복사 > truffle-config.js > clientURL에 설정



roy_nft

GENERAL SECURITY

☰ DETAILS

NAME*

roy_nft

SAVE CHANGES

🔑 KEYS

PROJECT ID

a4faaf175ba641c69202f738669b8c71 [🔗](#)

PROJECT SECRET ⓘ

c790b251f42c4901acf49557d03e066d [🔗](#)

ENDPOINTS

RINKEBY ⓘ

<https://rinkeby.infura.io/v3/a4faaf175ba641c69202f738669b8c71> [🔗](#)<wss://rinkeby.infura.io/ws/v3/a4faaf175ba641c69202f738669b8c71> [🔗](#)

📁 DELETE PROJECT

Any applications using this project's keys will no longer be able to access the Infura API. This can not be undone.

DELETE PROJECT

Getting Started

☐ YOUR FIRST REQUEST

Retrieve the current block number
Copy and paste the code below into Terminal and your response should be the current block number.

```
curl https://mainnet.infura.io/v3/a4faaf175ba641c69202f738669b8c71  
-X POST \  
-H "Content-Type: application/json" \  
-d '{"jsonrpc":"2.0","method":"eth_blockNumber"}'
```

COPY

Your response should look like:

```
{"jsonrpc":"2.0","id":1,"result":"0x8d8abf"}
```

☐ PROJECT SECURITY

☐ GETTING YOUR PROJECT STARTED

☐ VIEW YOUR PROJECT STATS

☐ GETTING HELP

OTHER RESOURCES

메타마스크 > Private Key 복사 > truffle-config.js > mnemonic에 설정

- const HDWalletProvider = require('@truffle/hdwallet-provider');
- const mnemonic = ``; // metamask private key
- const clientURL = `https://rinkeby.infura.io/v3/...`;

```
// private: {  
// provider: () => new HDWalletProvider(mnemonic, `https://network.io`),  
// network_id: 2111, // This network is yours, in the cloud.  
// production: true // Treats this network as if it was a public net. (default: false)  
// }
```

rinkeby: {

```
provider: () => new HDWalletProvider(mnemonic, clientURL),  
network_id: 4, // Rinkeby's id  
gas: 3000000,  
confirmations: 2, // # of confs to wait between deployments. (default: 0)  
timeoutBlocks: 200, // # of blocks before a deployment times out (minimum/default: 50)  
skipDryRun: true, // Skip dry run before migrations? (default: false for public nets )  
networkCheckTimeout: 10000000,  
},
```

명령 실행

- npx truffle console --network rinkeby
- truffle(rinkeby)> migrate
- truffle(rinkeby)> const roy_nft = await roy_nft.deployed()
- truffle(rinkeby)> await roy_nft.claimItem('https://ipfs.io/ipfs/[CID]')
- await
roy_nft.claimItem('https://nftstorage.link/ipfs/bafybeieaicydtea637l7g2qgbkzpi3mjq76yzmhwaxfygzxchpcgt7rgly')
- ipfs://bafybeieaicydtea637l7g2qgbkzpi3mjq76yzmhwaxfygzxchpcgt7rgly
- https://nftstorage.link/ipfs/bafybeieaicydtea637l7g2qgbkzpi3mjq76yzmhwaxfygzcchpcgt7rgly



Sell



≡ Description

By you

≡ About roy_nft V2

This collection has no description yet. Contact the owner of this collection about setting it up on OpenSea!



≡ Details

Contract Address

0xbaf1...e3cc

Token ID

1

Token Standard

ERC-721

Blockchain

Rinkeby

↗ Price History

All time



No item activity yet

🏷 Listings



No offers yet

≡ Offers