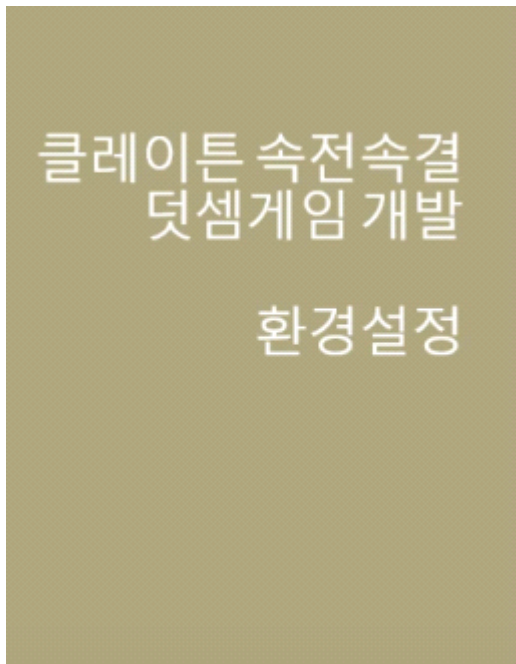


ERC721_Part2

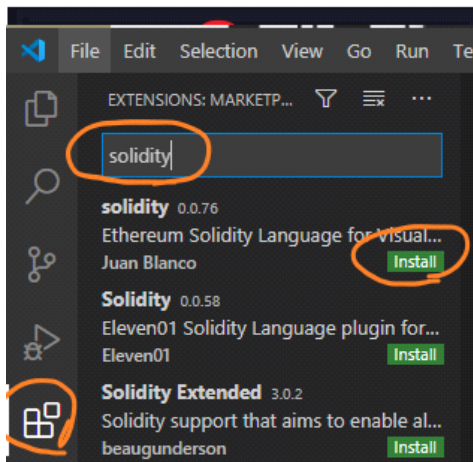
2020년 9월 8일 화요일 오후 1:05

- 환경설정



- Node.js
- NPM
- 트러플 프레임워크
- 비주얼 스튜디오 코드
- Node.js 버전 > 8
NPM 버전 > 5









1. <https://nodejs.org/en/>
 - nodejs 10.22.0 버전으로 설치
<https://seunghyun90.tistory.com/52>
2. visual studio code 설치
<https://code.visualstudio.com/docs/?dv=win>
3. solidity extension 설치





















※ <https://www.trufflesuite.com/boxes>


- 다양한 template

5. <https://github.com/OpenZeppelin/openzeppelin-contracts> 분석

 Nikhil95 Fix a grammatical error in a comment (#2352) ... ✓ ae4e984 14 hours ago 🕒 2,123		
	.circleci	Migrate from truffle to test-environment (#2007) 10 m
	.github	Update support request (#2148) 6 m
	audit	Add latest audit to repository (#1664) 2 :
	<u>contracts</u>	Fix a grammatical error in a comment (#2352) 14 l
	docs <div>contracts</div>	Fix AsciiDoc missing attribute references 7
	migrations	Clean up npm package (#904) 2 :
	scripts	Address ERC1155 changes (#2267) 3 m

 Nikhil95 Fix a grammatical error in a comment (#2352) ...		
..		
	GSN	Fix minor typos and grammar in docs (#2338)
	access	Add readme notices with link to docs site (#230
	cryptography	Add readme notices with link to docs site (#230
	introspection	Add readme notices with link to docs site (#230
	math	Fix minor typos and grammar in docs (#2338)
	mocks	Add Proxies from OpenZeppelin SDK (#2335)
	payment	Add readme notices with link to docs site (#230
	presets	Fix minor typos and grammar in docs (#2338)
	proxy	Adapt proxies to Contracts conventions (#2345)
	<u>token</u>	Fix minor typos and grammar in docs (#2338)
	utils	Fix a grammatical error in a comment (#2352)
	package.json	3.1.0

 abcoathup Fix minor typos and grammar in docs (#2338) ...		
..		
	ERC1155	Fix typos (#2343)
	ERC20	Fix minor typos and grammar in docs (#2338)
	ERC721	Fix minor typos and grammar in docs (#2338)
	ERC777	Fix minor typos and grammar in docs (#2338)

 abcoathup	Fix minor typos and grammar in docs (#2338)	...
ERC721.sol	Fix typos (#2343)	
ERC721Burnable.sol	Documentation/erc721 contracts (#2218)	
ERC721Holder.sol	Documentation/erc721 contracts (#2218)	
ERC721Pausable.sol	Add SPX license identifier (#2235)	
IERC721.sol	Fix typos (#2343)	
IERC721Enumerable.sol	Add SPX license identifier (#2235)	
IERC721Metadata.sol	Add SPX license identifier (#2235)	
IERC721Receiver.sol	Documentation/erc721 contracts (#2218)	
README.adoc	Fix minor typos and grammar in docs (#2338)	

이름	수정한 날짜	유형
구매자	2020-09-09 오후 5:07	파일 폴더
배포및대납	2020-09-09 오후 5:07	파일 폴더
판매자	2020-09-09 오후 5:07	파일 폴더
keystore-0x80e6d54c0791972b0d0379...	2020-09-07 오전 9:45	JSON 파일
keystore-0xda88c1bd96a03b391d1983...	2020-09-07 오전 9:44	JSON 파일
keystore-0xdea267b931be11edc7f4106...	2020-09-07 오전 9:42	JSON 파일

1. 먼저 template 다운 받는다.

git clone <https://github.com/kkagill/crypto-ytt-starter.git>

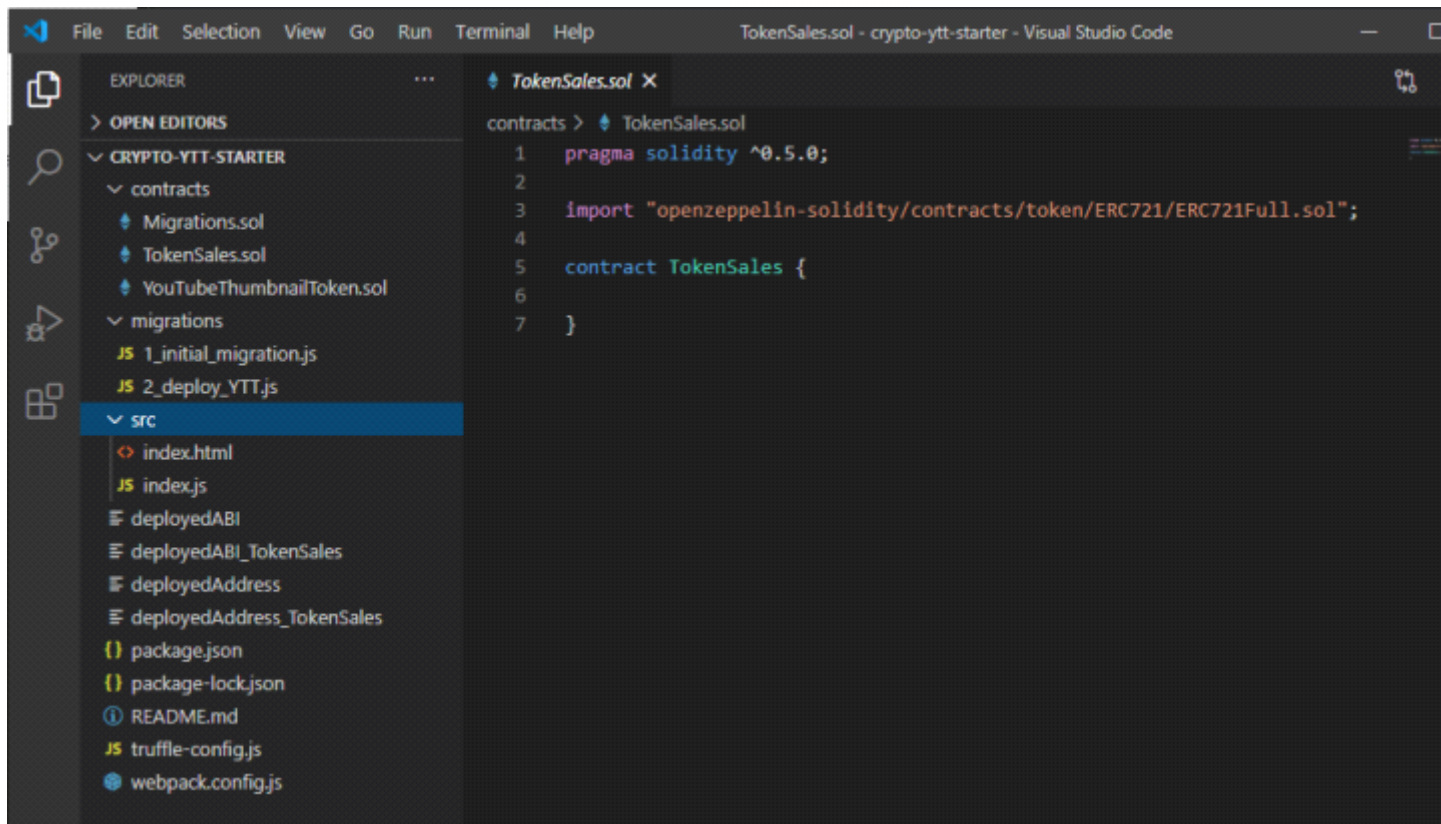
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

새로운 크로스 플랫폼 PowerShell 사용 https://aka.ms/pscore6

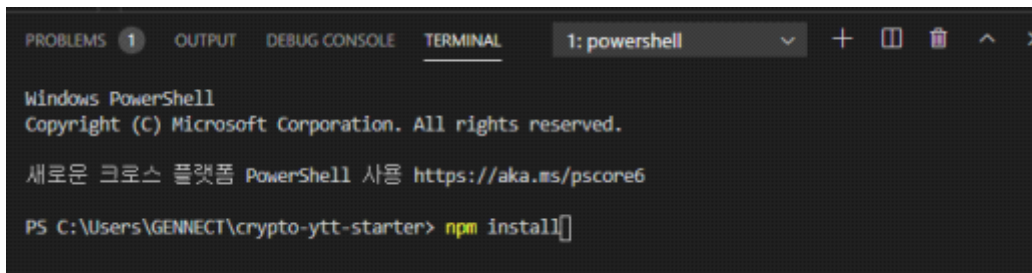
PS C:\Users\GENNECT> git clone https://github.com/kkagill/crypto-ytt-starter.git
Cloning into 'crypto-ytt-starter'...
remote: Enumerating objects: 26, done.
remote: Counting objects: 100% (26/26), done.
remote: Compressing objects: 100% (24/24), done.
remote: Total 26 (delta 5), reused 16 (delta 0), pack-reused 0
Unpacking objects: 100% (26/26), 117.41 KiB | 287.00 KiB/s, done.
PS C:\Users\GENNECT>
```

2. 폴더로 이동 후 실행

```
PS C:\Users\GENNECT> cd .\crypto-ytt-starter\
PS C:\Users\GENNECT\crypto-ytt-starter> code .
```



3. terminal을 열어서 package.json의 dependencies 설치



**** Error --> powershell 관리자 권한으로 한 후에

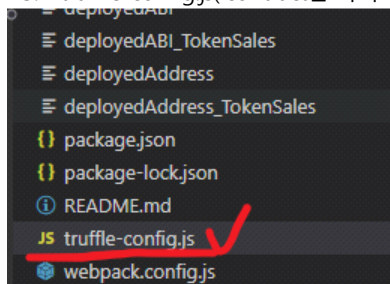
- Set-ExecutionPolicy Unrestricted
- yes(y) 입력
- node_modules 폴더와 package-lock.json 지우고 다시 실행
- npm install --global --production windows-build-tools
- npm install --global node-gyp

**시간 오래 걸림. 기다릴 것!!!

4. truffle를 5버전으로 업그레이드(4버전 지우고 다시 설치)

- npm uninstall -g truffle
- npm install -g truffle
- truffle version

5. truffle-config.js(contract를 어디에 배포할지 정하는 환경설정 파일)



```

JS truffle-config.js X
JS truffle-config.js > [0] <unknown>
1  const HDWalletProvider = require("truffle-hdwallet-provider-klaytn");
2  const NETWORK_ID = '1001'
3  const GASLIMIT = '20000000'
4  const URL = 'https://api.baobab.klaytn.net:8651'
5  const PRIVATE_KEY = ''
6
7  module.exports = {
8    networks: {
9      ganache: {
10        host: "localhost",
11        port: 8545,
12        network_id: "*" // Match any network id
13      },
14
15      // klaytn: {
16        // provider: new HDWalletProvider(PRIVATE_KEY, URL),
17        // network_id: NETWORK_ID,
18        // gas: GASLIMIT,
19        // gasPrice: null,
20        // }
21    }
22  }

```

- 가나슈나 클레이튼에 배포할 수 있게 세팅되어 있다.
- contract에 YouTubeThumbnailToken.sol 아래와 같이 추가해줘야 한다.

```

pragma solidity ^0.5.0;
import "openzeppelin-solidity/contracts/token/ERC721/ERC721Full.sol";
contract YouTubeThumbnailToken is ERC721Full {
  constructor (string memory name, string memory symbol) ERC721Full(name, symbol) public {}
  //매개 변수에 string 타입이 있으면 무조건 memory 키워드를 써야한다.
}

```

- 2_deploy_YTT.js에서 name & symbol을 추가해줘야한다.

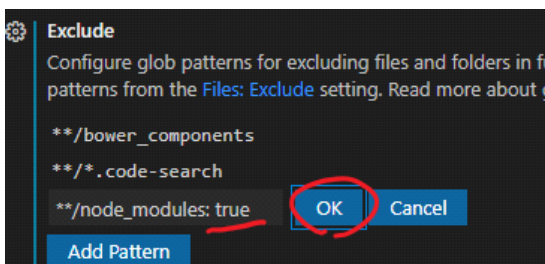
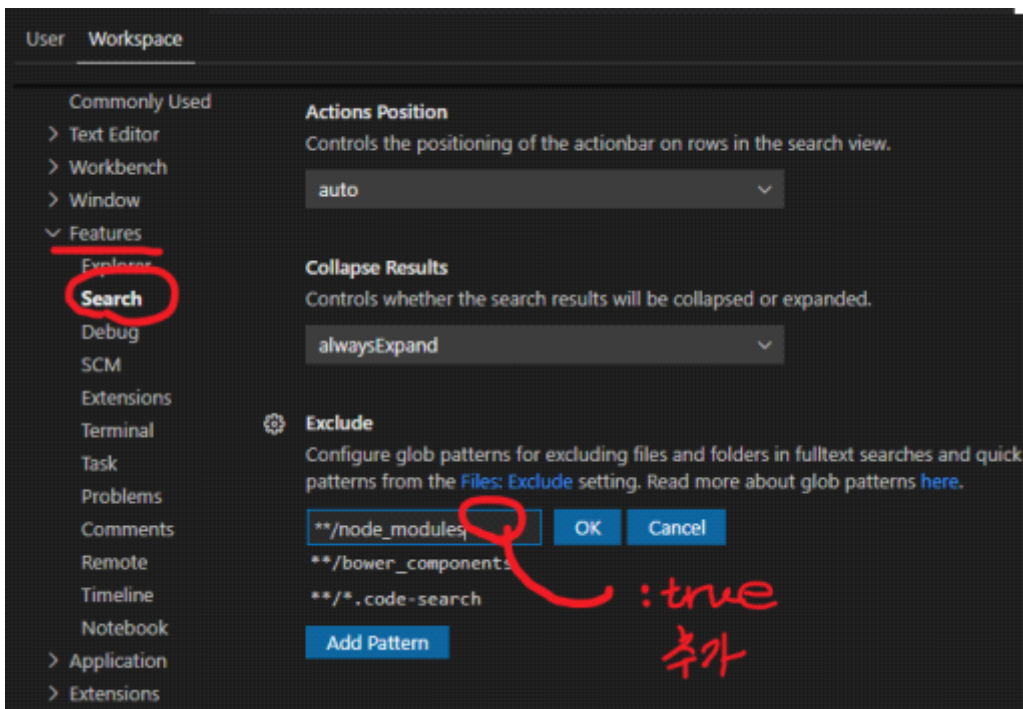
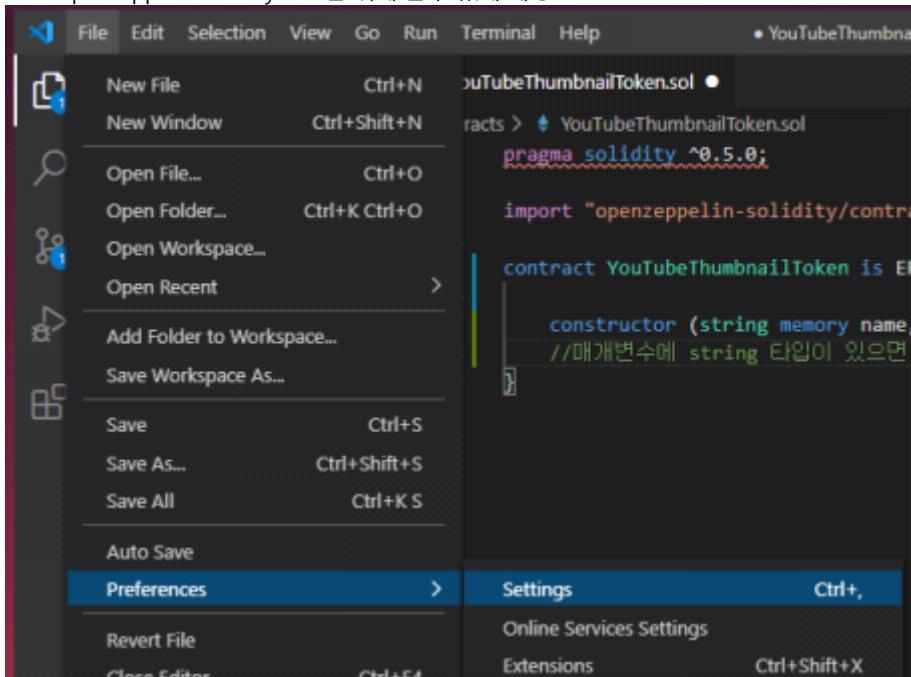
※ youtubeThumbnailToken.sol 생성자에서 name과 symbol을 받기 때문에 여기서(배포하는 단계) 이 값들을 넘겨주어야한다.

```

JS 2_deploy_YTT.js X
migrations > JS 2_deploy_YTT.js > [0] <unknown> > [1] exports > [2] then() callback
1  const YouTubeThumbnailToken = artifacts.require('./YouTubeThumbnailToken.sol')
2  const fs = require('fs')
3
4  module.exports = function (deployer) {
5    var name = "YouTube Thumbnail Token";
6    var symbol = "YTT";
7    //youtubeThumbnailToken.sol 생성자에서 name과 symbol을 받기 때문에 여기서(배포하는 단계) 이
8    deployer.deploy(YouTubeThumbnailToken, name, symbol)
9    .then(() => {
10      if (YouTubeThumbnailToken._json) {
11        fs.writeFile(
12          'deployedABI',
13          JSON.stringify(YouTubeThumbnailToken._json.abi),
14          (err) => {
15            if (err) throw err
16            console.log("파일에 ABI 입력 성공");
17          })
18      }
19
20      fs.writeFile(
21        'deployedAddress',
22        YouTubeThumbnailToken.address,
23        (err) => {
24          if (err) throw err
25          console.log("파일에 주소 입력 성공");
26        })
27    })
28  }

```

6. openzeppelin-solidity 코드를 쉬게 볼수 있게 세팅



-ctrl+p 눌러서 ERC721 검색 가능하다는데! 컴퓨터 켜다 켜기!

- 해당 contract 드래그 후 F12누르면 이동.

7. 가나슈 설치

- terminal
- npm install -g ganache-cli

8. powershell에서
 - ganache-cli

```
PS C:\Users\GENNECT> ganache-cli
Ganache CLI v6.10.2 (ganache-core: 2.11.3)

Available Accounts
-----
(0) 0xC45cea0066E6e8EF377d5A6538B97d88916e659 (100 ETH)
(1) 0x18930451C75e5A905841B40F50Ca1430F5AD3818 (100 ETH)
(2) 0x5af9e56f60931790d373AF2a55adFc1913956EA4 (100 ETH)
(3) 0xa67f6a65c6cdc92Cd771940A794aa6833b1a57df (100 ETH)
(4) 0x4c01f2506c81DeE6c7d22D6de0C721D66d3c1E91 (100 ETH)
(5) 0x698f028c06134696C1eA1dab5e7cc9084baA366f (100 ETH)
(6) 0x369Fc32bF1c5461F1f43455835580C00E00d9269 (100 ETH)
(7) 0xCd5A663F368832f1973f881Bde9E7dA724208FC4 (100 ETH)
(8) 0xE0529c52a0a20b81Bf5E540a441858AFB4584fd2 (100 ETH)
(9) 0x6F9A5b572ab00C3725F3f80832965253a721AFeb (100 ETH)

Private Keys
-----
(0) 0xeea7ff4a74bb30d0d23b42d0c58c4c9007aa4397dd4b85eaf2b71439c0e4ba34
(1) 0x2e5c4b268e036b0042f7f666b092fc1c96c08d4978dea83086149ec533b65257
(2) 0xc2b235ea51468ca04fabcf8f7806e0597fda9ac595a94531b223f2620b2a7de
(3) 0x4eb146d16d4b6fe32027f57b4e7ac4920085b5dac59e6a04f55c20faefb51499
(4) 0x845cbe7b78cc479b501a6930f156e22fcfa23114cf01000c551b39b26d54f024
(5) 0xed7cdc7cbf53feabe45535f24339c9d756a570242bb66d23886691949abb887c
(6) 0x0979dc91f79357e69077f2da01b4860823b092d7af5ab5e9af0d0dcbfde6e4a9
(7) 0x4f0abfffa2a23e799b20e677220965ef1c4816717a11f6597480d249df7c067a
(8) 0x87cf5777b28cbf853a66aa850da8daf0354dcd961b759e7cacfd652d371c5fc
(9) 0x59e06c999ad816b0a18f1dc1eefe70be034a50bb6be1a524cadd46f459aef353b

HD Wallet
-----
Mnemonic:      pulp weekend canvas bamboo start inch athlete praise elite dolphin vast mushroom
Base HD Path:  m/44'/60'/0'/0/{account_index}

Gas Price
-----
20000000000

Gas Limit
-----
6721975

Call Gas Limit
-----
9007199254740991

Listening on 127.0.0.1:8545
```

9. vscode terminal에서


```
truffle migrate --compile-all --reset --network ganache
```

//truffle migrate는 배포하는 커맨드, compile-all은 모든 contract를 재컴파일 시키며
reset은 새로운 주소로 배포하며, network는 ganache를 쓰겠다.

10. 가나슈 노드에 들어가는 것
 - truffle console --network ganache
 - truffle(ganache)> instance = await YouTubeThumbnailToken.deployed()

```
PS C:\Users\GENNECT\crypto-ytt-starter> truffle console --network ganache
truffle(ganache)> instance = await YouTubeThumbnailToken.deployed()
```

- 이름확인 --> instance.name()
- symbol확인 --> instance.symbol()

```
truffle(ganache)> instance = await YouTubeThumbnailToken.deployed()
undefined
truffle(ganache)> instance.name()
'YouTube Thumbnail Token'
truffle(ganache)> instance.symbol()
'YTT'
truffle(ganache)>
```

11. ERC721metadata 분석

```
interface ERC721Metadata /* is ERC721 */ {
  function name() external view returns (string _name);
  function symbol() external view returns (string _symbol);
  function tokenURI(uint256 _tokenId) external view returns (string);
  //토큰의 정보를 저장한 웹주소를 불러온다
  //ipfs에 저장된 토큰 정보의 주소를 불러온다
```

```
}
```

12. ERC721Enumerable 분석

--> 계정마다 소유한 토큰들을 불러오거나 발행된 모든 토큰을 불러온다

```
interface ERC721Enumerable /* is ERC721 */ {  
    function totalSupply() external view returns (uint256);  
    function tokenByIndex(uint256 _index) external view returns (uint256);  
    function tokenOfOwnerByIndex(address _owner, uint256 _index) external view returns (uint256);  
}
```

13.