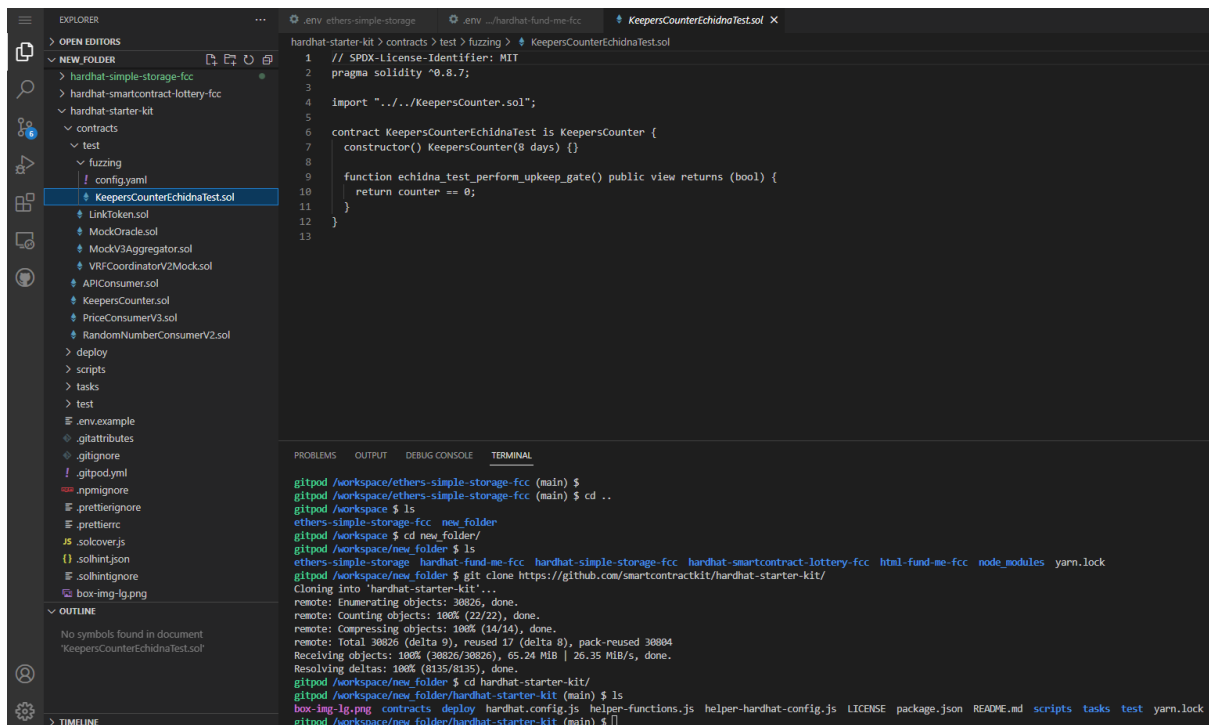


## Hardhat Starter Kit :

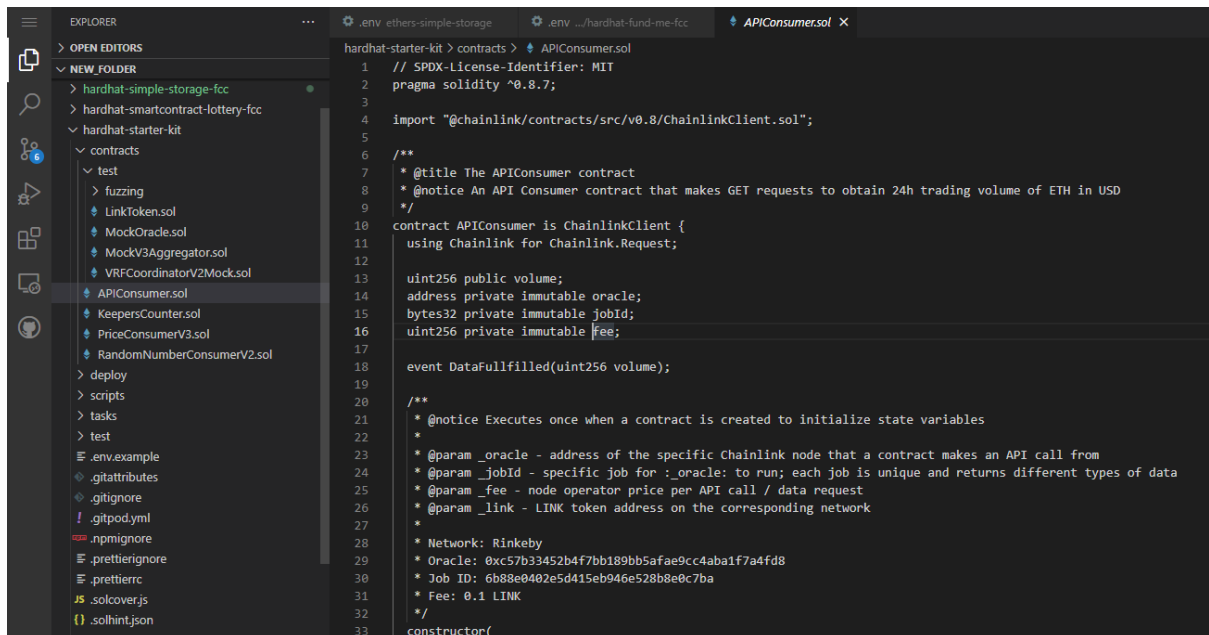
Terdapat template hardhat untuk mempermudah mengembangkan smart contract dengan menclone repo git clone <https://github.com/smartcontractkit/hardhat-starter-kit/>



The screenshot shows the VS Code interface with the Hardhat Starter Kit project. The Explorer panel on the left shows the project structure, including the 'contracts' folder and the 'KeepersCounterEchidnaTest.sol' file. The main editor displays the Solidity code for 'KeepersCounterEchidnaTest.sol'. The code includes a constructor that initializes a 'KeepersCounter' with 8 days and a function 'echidna\_test\_perform\_upkeep\_gate()' that returns a boolean value based on the counter state. The bottom panel shows the terminal output of the 'git clone' command and the 'yarn.lock' file.

```
1 // SPDX-License-Identifier: MIT
2 pragma solidity ^0.8.7;
3
4 import "../KeepersCounter.sol";
5
6 contract KeepersCounterEchidnaTest is KeepersCounter {
7   constructor() KeepersCounter(8 days) {}
8
9   function echidna_test_perform_upkeep_gate() public view returns (bool) {
10     return counter == 0;
11   }
12 }
13
```

Terdapat beberapa sampel smart contract pada folder contract yang bisa kita coba seperti APIConsumer, KeepersCounter, PriceConsumer, RandomNumberConsumer, dan beberapa fungsi untuk test



The screenshot shows the VS Code interface with the Hardhat Starter Kit project. The Explorer panel on the left shows the project structure, including the 'contracts' folder and the 'APIConsumer.sol' file. The main editor displays the Solidity code for 'APIConsumer.sol'. The code includes a constructor that initializes a 'ChainlinkClient' and a function 'DataFullfilled()' that returns a boolean value based on the client state. The bottom panel shows the terminal output of the 'git clone' command and the 'yarn.lock' file.

```
1 // SPDX-License-Identifier: MIT
2 pragma solidity ^0.8.7;
3
4 import "@chainlink/contracts/src/v0.8/ChainlinkClient.sol";
5
6 /**
7  * @title The APIConsumer contract
8  * @notice An API Consumer contract that makes GET requests to obtain 24h trading volume of ETH in USD
9  */
10 contract APIConsumer is ChainlinkClient {
11   using Chainlink for Chainlink.Request;
12
13   uint256 public volume;
14   address private immutable oracle;
15   bytes32 private immutable jobId;
16   uint256 private immutable fee;
17
18   event DataFullfilled(uint256 volume);
19
20   /**
21    * @notice Executes once when a contract is created to initialize state variables
22    *
23    * @param _oracle - address of the specific Chainlink node that a contract makes an API call from
24    * @param _jobId - specific job for :_oracle: to run; each job is unique and returns different types of data
25    * @param _fee - node operator price per API call / data request
26    * @param _link - LINK token address on the corresponding network
27    *
28    * Network: Rinkeby
29    * Oracle: 0xc57b33452b4f7bb189bb5afae9cc4aba1f7a4fd8
30    * Job ID: 6b88e0402e5d415eb946e528b8e0c7ba
31    * Fee: 0.1 LINK
32    */
33   constructor(

```

Untuk menginstal kebutuhannya diperlukan perintah yarn

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
gitpod /workspace/new_folder/hardhat-starter-kit (main) $ yarn
yarn install v1.22.19
[1/4] Resolving packages...
[2/4] Fetching packages...
warning Pattern ["ethereumjs-abi@https://github.com/ethereumjs/ethereumjs-abi.git"] is trying to unpack in the same destination "/home/gitpod/.cache/yarn/v6/npm-ethereumjs-abi-0.6.8-ee3994657fa7a27238e6a92a84d0b29bbcdce/node_modules/ethereumjs-abi" as pattern ["ethereumjs-abi@0.6.8","ethereumjs-abi@0.6.8","ethereumjs-abi@0.6.8"]. This could result in non-deterministic behavior, skipping.
warning Pattern ["@eth-optimism/solc@0.6.12-alpha.1"] is trying to unpack in the same destination "/home/gitpod/.cache/yarn/v6/npm-@eth-optimism-solc-v0-6-12-0-6-12-alpha-1-041876f83b34c6afe2f19df9626568dfed8598-integrity/node_modules/@eth-optimism/solc-v0.6.12" as pattern ["@eth-optimism/solc-v0.6.12@npm:@eth-optimism/solc@0.6.12-alpha.1"]. This could result in non-deterministic behavior, skipping.
[3/4] Linking dependencies...
warning @chainlink/test-helpers > @krebernisak/ovm-plugins@0.0.15 has incorrect peer dependency "@nomiclabs/hardhat-ethers@2.0.1".
warning @chainlink/test-helpers > @krebernisak/ovm-plugins > @nomiclabs/hardhat-truffle@2.0.3 has unmet peer dependency "@nomiclabs/hardhat-web3@2.0.0".
warning @chainlink/test-helpers > @krebernisak/ovm-plugins > @nomiclabs/hardhat-truffle@2.0.3 has unmet peer dependency "web3@1.0.0-beta.36".
warning @chainlink/test-helpers > typechain > ts-essentials@7.0.3 has unmet peer dependency "typescript@>=3.7.0".
warning @chainlink/test-helpers > @krebernisak/ovm-plugins > @nomiclabs/hardhat-truffle > @nomiclabs/truffle-contract@4.2.23 has unmet peer dependency "web3@1.2.1".
warning @chainlink/test-helpers > @krebernisak/ovm-plugins > @nomiclabs/hardhat-truffle > @nomiclabs/truffle-contract@4.2.23 has unmet peer dependency "web3-core-helpers@1.2.1".
warning @chainlink/test-helpers > @krebernisak/ovm-plugins > @nomiclabs/hardhat-truffle > @nomiclabs/truffle-contract@4.2.23 has unmet peer dependency "web3-core-promievent@1.2.1".
warning @chainlink/test-helpers > @krebernisak/ovm-plugins > @nomiclabs/hardhat-truffle > @nomiclabs/truffle-contract@4.2.23 has unmet peer dependency "web3-eth-abi@1.2.1".
warning @chainlink/test-helpers > @krebernisak/ovm-plugins > @nomiclabs/hardhat-truffle > @nomiclabs/truffle-contract@4.2.23 has unmet peer dependency "web3-utils@1.2.1".
warning > babel-eslint@10.1.0 has unmet peer dependency "eslint@^4.12.1".
warning > @nomiclabs/hardhat-waffle@2.0.2 has incorrect peer dependency "@nomiclabs/hardhat-ethers@2.0.0".
warning @ethereum-waffle > @ethereum-waffle/compiler > typechain > ts-essentials@6.0.7 has unmet peer dependency "typescript@>=3.7.0".
warning > hardhat-deploy@0.9.29 has unmet peer dependency "@ethersproject/hardware-wallets@5.0.14".
[4/4] Building fresh packages...
[22/27] * web3-bzz
[17/27] * node-hid
[14/27] * node-hid
[23/27] * web3-shh
warning From running install script for optional dependency: "/workspace/new_folder/hardhat-starter-kit/node_modules/node-hid: Command failed.
```

Setelah itu kita dapat mencoba fungsi yang tersedia pada repo hardhat kit ini seperti mencoba setiap test

```
Compiled 42 Solidity files successfully

APIConsumer Unit Tests
Funding contract 0xDc64a140Aa3E981100a9becA4E685F962f0cF6C9 on network hardhat
Contract 0xDc64a140Aa3E981100a9becA4E685F962f0cF6C9 funded with 1 LINK. Transaction Hash: 0xf6bccc6c425bac126dc66340e176d4e4ad7ae6c695bb9309d8e42c5c3f28075a
requestId: 0x1bfce59c2e0d7e0f015eb02ec4e04de4e67a1fe1508a4420cf49c650758abe6
  ✓ Should successfully make an API request (78ms)
Funding contract 0xDc64a140Aa3E981100a9becA4E685F962f0cF6C9 on network hardhat
Contract 0xDc64a140Aa3E981100a9becA4E685F962f0cF6C9 funded with 1 LINK. Transaction Hash: 0xf6bccc6c425bac126dc66340e176d4e4ad7ae6c695bb9309d8e42c5c3f28075a
  ✓ Should successfully make an API request and get a result (74ms)
Funding contract 0xDc64a140Aa3E981100a9becA4E685F962f0cF6C9 on network hardhat
Contract 0xDc64a140Aa3E981100a9becA4E685F962f0cF6C9 funded with 1 LINK. Transaction Hash: 0xf6bccc6c425bac126dc66340e176d4e4ad7ae6c695bb9309d8e42c5c3f28075a
DataFullfilled event fired!
  ✓ Our event should successfully fire event on callback (4013ms)

Keepers Counter Unit Tests
  ✓ should be able to call checkUpkeep
  ✓ should not be able to call perform upkeep without the time passed interval
  ✓ should be able to call performUpkeep after time passes

PriceConsumer Unit Tests
  constructor
    ✓ sets the aggregator addresses correctly
  getLatestPrice
    ✓ should return the same value as the mock

RandomNumberConsumer Unit Tests
  ✓ Should successfully request a random number
  ✓ Should successfully request a random number and get a result (72ms)
ReturnedRandomness event fired!
  ✓ Should successfully fire event on callback (4015ms)

11 passing (10s)

Done in 13.44s.
gitpod /workspace/new_folder/hardhat-starter-kit (main) $
```

Dapat membuat beberapa node untuk pengguna yang dapat diinteraksikan

```

Done in 13.44s.
gitpod /workspace/new_folder/hardhat-starter-kit (main) $ yarn hardhat node
yarn run v1.22.19
$ /workspace/new_folder/hardhat-starter-kit/node_modules/.bin/hardhat node
Nothing to compile
Local network detected! Deploying mocks...
deploying "LinkToken" (tx: 0x90ca7286c245a64ceaafde24331fe80e7daf4cf71e7ad32cf620ae66a943c8)...: deployed at 0x5Fb082315678afecb367f032d93f642f64180aa3 with 1279499 gas
deploying "MockV3Aggregator" (tx: 0x73367e44aa675ec6c93d61558f83d0f310bb095b07043a5cef3310614d95f406)...: deployed at 0xe7f1725e7734CFE288F8367e1Bb143E90bb3F0512 with 569671 gas
deploying "VRFCoordinatorV2Mock" (tx: 0x4a1df22fd7a09f1539013cccece1869430a238b0a6213bda3ceab8d866121a26)...: deployed at 0x9ff46736679d2D9a65F0902f2272dE9f3c7fa6e0 with 1797707 gas
deploying "MockOracle" (tx: 0x7c5bf13ac29f67542f81da4712d1a199f079ec7e4e32f35cecab7fc52885da82)...: deployed at 0xCfEd3AccA5a467E9e704C703E8087F634f80Fc9 with 1131081 gas
Mocks Deployed!

-----
You are deploying to a local network, you'll need a local network running to interact
Please run 'yarn hardhat console' to interact with the deployed smart contracts!
-----

deploying "PriceConsumerV3" (tx: 0xid0187d17e357248aa44108bc810533839e20a73625698ddbba1b3707c428a2a)...: deployed at 0xDc64a140Aa3E981100a9becA4E685f962f0cF6C9 with 245612 gas
Run Price Feed contract with command:
yarn hardhat read-price-feed --contract 0xDc64a140Aa3E981100a9becA4E685f962f0cF6C9 --network localhost

-----
deploying "APIConsumer" (tx: 0xd3acc18d9eb5d1b177e8338dc15e772e49ff29a965968183e07e19bc98285301)...: deployed at 0x5FC8d32690cc91D4c39d9d3abc8D16989F875707 with 1404981 gas
Run API Consumer contract with following command:
yarn hardhat request-data --contract 0x5FC8d32690cc91D4c39d9d3abc8D16989F875707 --network localhost

-----
deploying "RandomNumberConsumerV2" (tx: 0xf88f155ba416a4d95c9e296ed49147888b017dd96004d4a17ab78e0b1b82d9b)...: deployed at 0x227987A0a67D8372996a5FaB50D91eAA73d2eBe6 with 564345 gas
Then run RandomNumberConsumer contract with the following command
yarn hardhat request-random-number --contract 0x227987A0a67D8372996a5FaB50D91eAA73d2eBe6 --network localhost

-----
deploying "KeepersCounter" (tx: 0xb6836f42077c9d4e1700a35fbc27a757e8a6c1d724c4c96fa34146e061677f4)...: deployed at 0x8A791620dd6260079BF849Dc5567aDC3F2FdC318 with 448166 gas
Head to https://keepers.chain.link/ to register your contract for upkeep. Then run the following command to track the counter updates:
yarn hardhat read-keepers-counter --contract 0x8A791620dd6260079BF849Dc5567aDC3F2FdC318 --network localhost

-----
Started HTTP and WebSocket JSON-RPC server at http://127.0.0.1:8545/

Accounts
=====
WARNING: These accounts, and their private keys, are publicly known.
You funds sent to these accounts will be stolen via https://etherscan.io/address/0x95105207

```

## Atau mendeploy feed pada network rinkeby

```

gitpod /workspace/new_folder/hardhat-starter-kit (main) $ yarn hardhat deploy --tags feed --network rinkeby
yarn run v1.22.19
$ /workspace/new_folder/hardhat-starter-kit/node_modules/.bin/hardhat deploy --tags feed --network rinkeby
Nothing to compile
-----
deploying "PriceConsumerV3" (tx: 0x9f3229de2d602b84db9ea6aa17db5c6de116162777b1f3c59d947c5a697e0431)...: deployed at 0x00207db90bd49bf125B9F8b4bd8C8D491203a347 with 245612 gas
Run Price Feed contract with command:
yarn hardhat read-price-feed --contract 0x00207db90bd49bf125B9F8b4bd8C8D491203a347 --network rinkeby
-----
Done in 92.58s.
gitpod /workspace/new_folder/hardhat-starter-kit (main) $ █

```