



BLOCKCHAIN TECHNOLOGY LAB

(20CP406P)

LAB ASSIGNMENT - 8



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Lab Assignment 8

Aim: Create the Private Ethereum Setup through Ganache Cli and Truffle

Introduction:

- **Ganache Cli:** It's the command line version of Ganache. It's used to simulate full client behavior and make developing Ethereum applications faster, easier, and safer.
- **Truffle:** As one of the most popular Ethereum development frameworks, [Truffle](#) helps you create basic solidity templates to deploy.



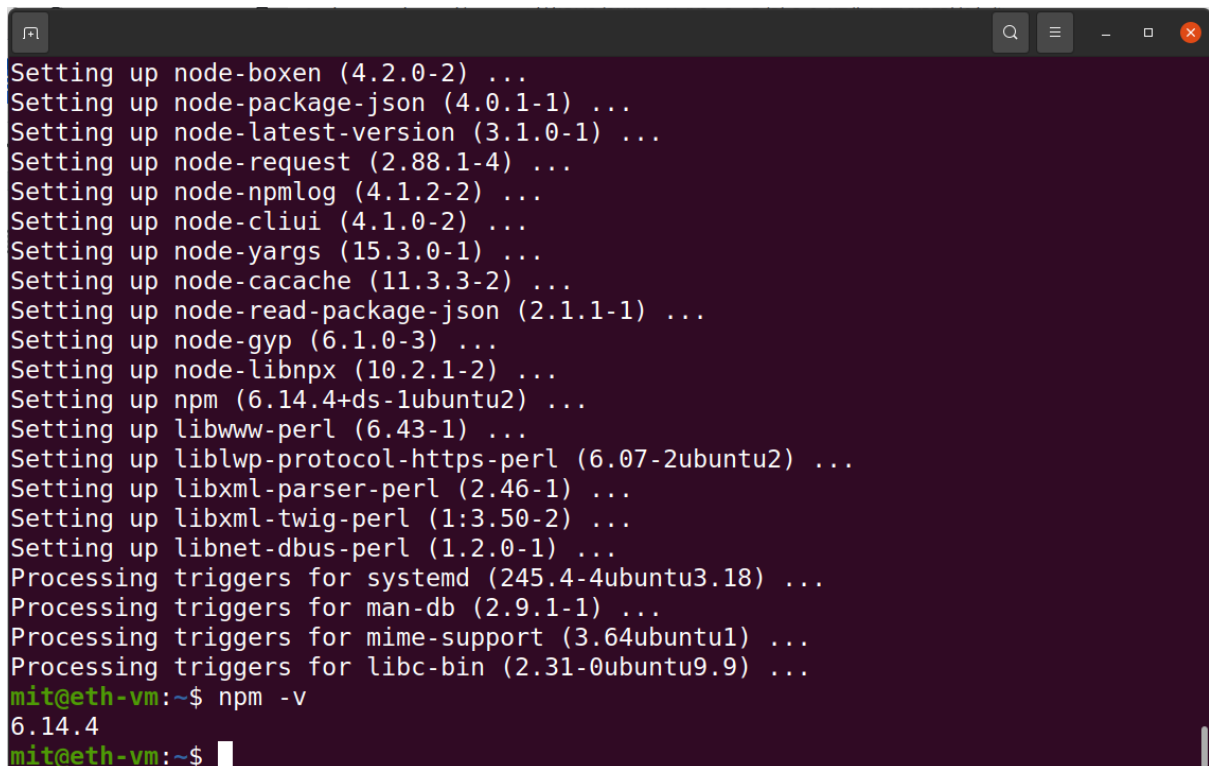
Experiment:

Run the following commands on ubuntu linux to setup ganach cli and Truffle.

Command:

```
sudo apt update  
sudo apt install -y nodejs npm  
npm -v
```

Procedure:

A terminal window with a dark purple background and white text. The window title bar shows standard Ubuntu window controls (minimize, maximize, close) and a search icon. The terminal output shows the process of setting up Node.js and npm. It lists various dependencies being installed, such as node-boxen, node-package-json, node-latest-version, node-request, node-npmlog, node-cliui, node-yargs, node-cacache, node-read-package-json, node-gyp, node-libnpa, npm, libwww-perl, liblwp-protocol-https-perl, libxml-parser-perl, libxml-twig-perl, libnet-dbus-perl, systemd, man-db, mime-support, and libc-bin. After the installation of dependencies, the command 'npm -v' is executed, resulting in the output '6.14.4'. The prompt 'mit@eth-vm:~\$' is visible at the bottom of the terminal.

```
Setting up node-boxen (4.2.0-2) ...  
Setting up node-package-json (4.0.1-1) ...  
Setting up node-latest-version (3.1.0-1) ...  
Setting up node-request (2.88.1-4) ...  
Setting up node-npmlog (4.1.2-2) ...  
Setting up node-cliui (4.1.0-2) ...  
Setting up node-yargs (15.3.0-1) ...  
Setting up node-cacache (11.3.3-2) ...  
Setting up node-read-package-json (2.1.1-1) ...  
Setting up node-gyp (6.1.0-3) ...  
Setting up node-libnpa (10.2.1-2) ...  
Setting up npm (6.14.4+ds-1ubuntu2) ...  
Setting up libwww-perl (6.43-1) ...  
Setting up liblwp-protocol-https-perl (6.07-2ubuntu2) ...  
Setting up libxml-parser-perl (2.46-1) ...  
Setting up libxml-twig-perl (1:3.50-2) ...  
Setting up libnet-dbus-perl (1.2.0-1) ...  
Processing triggers for systemd (245.4-4ubuntu3.18) ...  
Processing triggers for man-db (2.9.1-1) ...  
Processing triggers for mime-support (3.64ubuntu1) ...  
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...  
mit@eth-vm:~$ npm -v  
6.14.4  
mit@eth-vm:~$
```

Command:

```
sudo npm install -g ganache-cli truffle  
ganache-cli
```

```
(9) 0x2fb4eCba7D4C3A6E7E892697bED67F89D9D9795 (100 ETH)

Private Keys
=====
(0) 0x500bc9b0ccf5ea42df0cfdfff18d47d8cda639422878f97ea89f5d2888dd307
(1) 0x279ede4b484c550cf685f33ea56e12f86af20da9cf2239a350fe87de47ad33ba
(2) 0x64bfebf8486c7d9ebf12ce3304e1f00b4f1847a8e083a9af6a2d66475cc143491
(3) 0x2890e2c210ea335c77544796c43645965ec2d0b6db74f97476c93387231f3c4a
(4) 0xfceab99382426c0a27363d4e6f57a515d79c08403561d298ffb7957576dc88da
(5) 0x8d7d2474efe051b36ff976e17d89ee401e7055804cb46018d0d41144211ab65e
(6) 0x755cbd23ab3fe1c3e447bcad463cb7751f65811faa33faac7b2a4a10ae50ffee
(7) 0x5924b471171cf5af67b4f9dde43176f7b9907f37608add39d596a43a75c07802
(8) 0xe6d63d31c4b6d364945d286136c27ee7028a59566d5d485e25bf1db840b8bffa
(9) 0x8fcd6673bc6ca58dbe8187f34e88e13419490ded9e8f789efb231818ddf94aa3

HD Wallet
=====
Mnemonic:      pizza pizza arrive feed rabbit crunch kitchen earn speed rely present spot
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
█
```

Command:

mkdir SmartContractDemo

cd SmartContractDemo/

mkdir HelloWorld

cd HelloWorld/

truffle init

```
3 updates can be applied immediately.
3 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

New release '22.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Sat Nov 19 15:27:33 2022 from 1.38.167.163
mit@eth-vm:~$ mkdir SmartContractDemo
mit@eth-vm:~$ 
mit@eth-vm:~$ cd SmartContractDemo/
mit@eth-vm:~/SmartContractDemo$ 
mit@eth-vm:~/SmartContractDemo$ mkdir HelloWorld
mit@eth-vm:~/SmartContractDemo$ 
mit@eth-vm:~/SmartContractDemo$ cd HelloWorld/
mit@eth-vm:~/SmartContractDemo/HelloWorld$ 
mit@eth-vm:~/SmartContractDemo/HelloWorld$ truffle init

Starting init...
=====

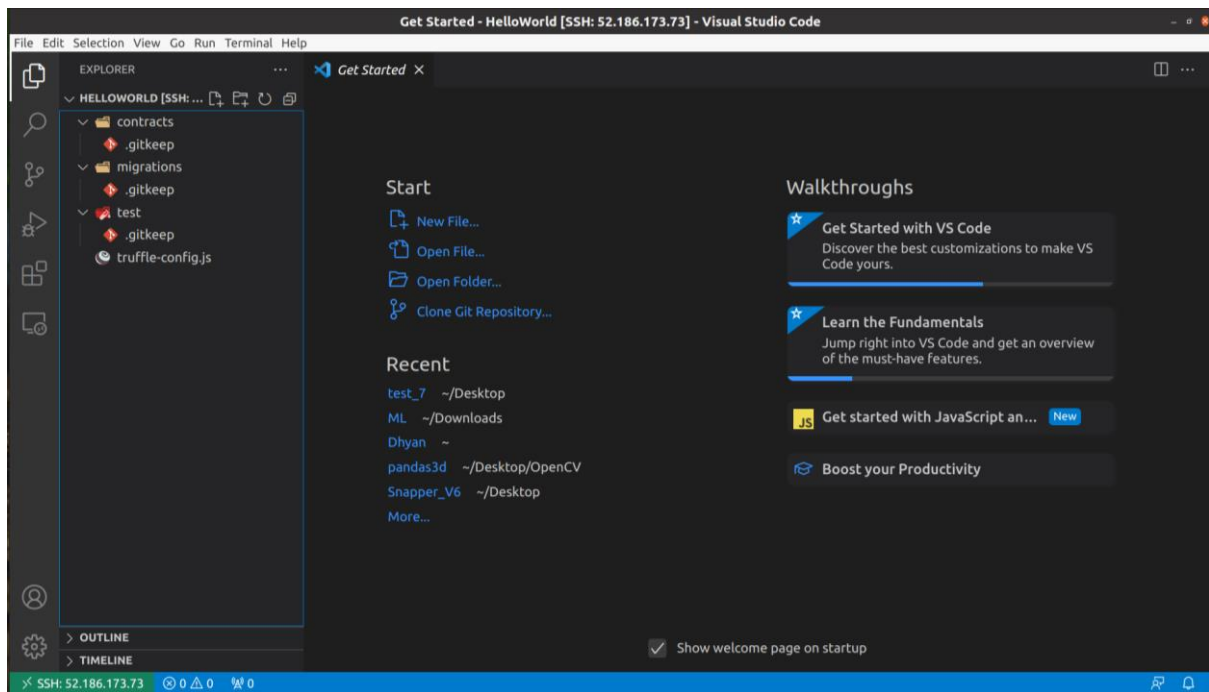
> Copying project files to /home/mit/SmartContractDemo/HelloWorld

Init successful, sweet!

Try our scaffold commands to get started:
  $ truffle create contract YourContractName # scaffold a contract
  $ truffle create test YourTestName         # scaffold a test

http://trufflesuite.com/docs

mit@eth-vm:~/SmartContractDemo/HelloWorld$ █
```



Command:

truffle create contract HelloWorld

truffle compile

```
Compilation failed. See above.
    at /usr/local/lib/node_modules/truffle/build/webpack:/packages/compile-solidity/dist/run.js:95:1
    at Generator.next (<anonymous>)
    at fulfilled (/usr/local/lib/node_modules/truffle/build/webpack:/packages/compile-solidity/dist/run.js:28:43)
Truffle v5.6.6 (core: 5.6.6)
Node v12.22.12
mit@eth-vm:~/SmartContractDemo/HelloWorld$ truffle compile

Compiling your contracts...
=====
> Compiling ./contracts/HelloWorld.sol

CompileError: TypeError: Data location must be "memory" or "calldata" for return parameter in function, but none was given.
--> project:/contracts/HelloWorld.sol:7:38:
7 |   function hi() public pure returns (string) {
  |                                     ^^^^^^

Compilation failed. See above.
    at /usr/local/lib/node_modules/truffle/build/webpack:/packages/compile-solidity/dist/run.js:95:1
    at Generator.next (<anonymous>)
    at fulfilled (/usr/local/lib/node_modules/truffle/build/webpack:/packages/compile-solidity/dist/run.js:28:43)
Truffle v5.6.6 (core: 5.6.6)
Node v12.22.12
mit@eth-vm:~/SmartContractDemo/HelloWorld$ truffle compile

Compiling your contracts...
=====
> Compiling ./contracts/HelloWorld.sol
> Artifacts written to /home/mit/SmartContractDemo/HelloWorld/build/contracts
> Compiled successfully using:
   - solc: 0.8.17+commit.8df45f5f.Emscripten.clang
mit@eth-vm:~/SmartContractDemo/HelloWorld$
```

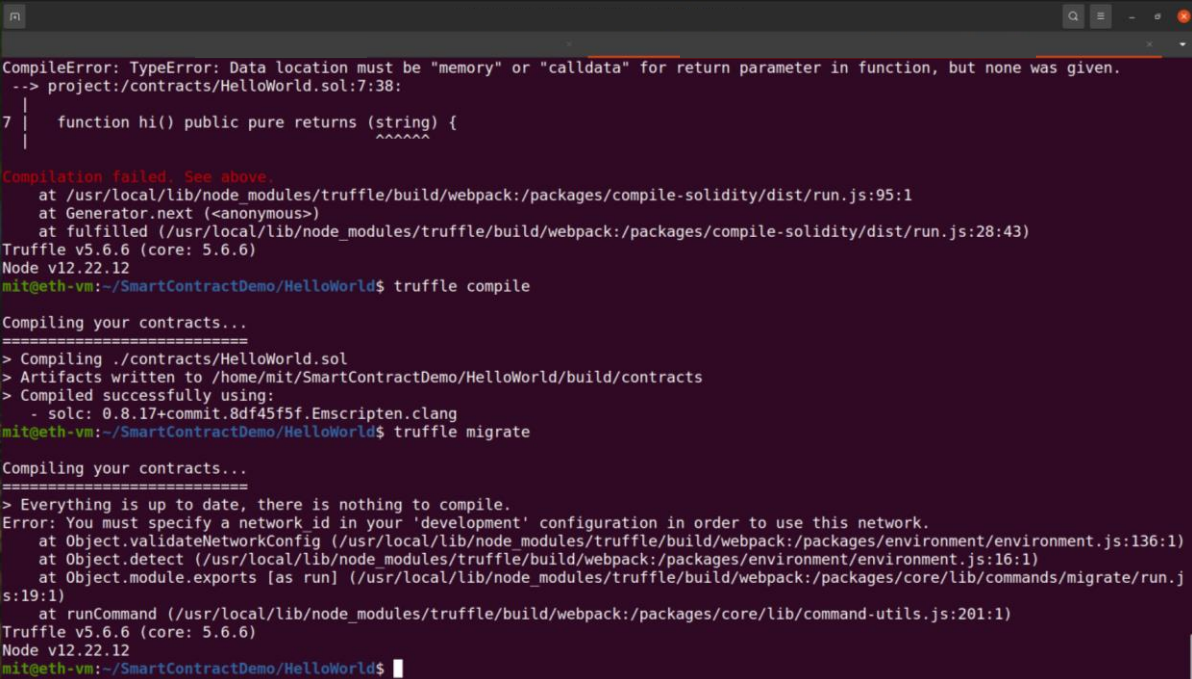
Command:

Change config

```
development: {  
  host: "localhost",  
  port: 8545  
}
```

Add to 2_deploy_contracts.js

```
var HelloWorld=artifacts.require ( "./HelloWorld.sol");  
module.exports = function(deployer) {  
  deployer.deploy(HelloWorld);  
}
```

A terminal window with a dark background and light text. It shows the output of Truffle commands. The first command, 'truffle compile', results in a 'CompileError: TypeError: Data location must be "memory" or "calldata" for return parameter in function, but none was given.' pointing to a Solidity function 'hi()'. The second command, 'truffle migrate', shows successful compilation but then fails with an error: 'Error: You must specify a network id in your 'development' configuration in order to use this network.' The terminal also shows the Truffle version (v5.6.6) and Node version (v12.22.12).

```
CompileError: TypeError: Data location must be "memory" or "calldata" for return parameter in function, but none was given.  
--> project:/contracts/HelloWorld.sol:7:38:  
7 |   function hi() public pure returns (string) {  
  |   ~~~~~  
Compilation failed. See above.  
    at /usr/local/lib/node_modules/truffle/build/webpack:/packages/compile-solidity/dist/run.js:95:1  
    at Generator.next (<anonymous>)  
    at fulfilled (/usr/local/lib/node_modules/truffle/build/webpack:/packages/compile-solidity/dist/run.js:28:43)  
Truffle v5.6.6 (core: 5.6.6)  
Node v12.22.12  
mit@eth-vm:~/SmartContractDemo/HelloWorld$ truffle compile  
  
Compiling your contracts...  
=====
```

```
> Compiling ./contracts/HelloWorld.sol  
> Artifacts written to /home/mit/SmartContractDemo/HelloWorld/build/contracts  
> Compiled successfully using:  
  - solc: 0.8.17+commit.8df45f5f.Emscripten.clang  
mit@eth-vm:~/SmartContractDemo/HelloWorld$ truffle migrate  
  
Compiling your contracts...  
=====
```

```
> Everything is up to date, there is nothing to compile.  
Error: You must specify a network id in your 'development' configuration in order to use this network.  
    at Object.validateNetworkConfig (/usr/local/lib/node_modules/truffle/build/webpack:/packages/environment/environment.js:136:1)  
    at Object.detect (/usr/local/lib/node_modules/truffle/build/webpack:/packages/environment/environment.js:16:1)  
    at Object.module.exports [as run] (/usr/local/lib/node_modules/truffle/build/webpack:/packages/core/lib/commands/migrate/run.js:19:1)  
    at runCommand (/usr/local/lib/node_modules/truffle/build/webpack:/packages/core/lib/command-utils.js:201:1)  
Truffle v5.6.6 (core: 5.6.6)  
Node v12.22.12  
mit@eth-vm:~/SmartContractDemo/HelloWorld$
```

Command:

truffle migrate

//To deploy the blockchain program.