



Vidyavardhini's College of Engineering & Technology

Department of Computer Engineering

Experiment No.8
To create a private ethereum blockchain using Ganache and Truffle
Date of Performance:7/10/23
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AIM: To create a private ethereum blockchain using Ganache and Truffle

Objective: To create private ethereum blockchain and deploy smart contract on it

Theory:

Smart contracts are programs stored on a blockchain. The term 'smart contract' was first coined by Nick Szabo in 1994. It's a collection of code (its functions) and data (its state) that resides at a specific address on the Ethereum blockchain. One of the main features is that they are immutable once deployed on the blockchain. Solidity and Vyper are the two most active programming languages used to write smart contracts on the Ethereum blockchain with Solidity being the top choice for most developers as it is an object-oriented, statically-typed language and is strongly influenced by more popular OOP languages like JavaScript and C++.

Ganache

Ganache is a personalized blockchain for Ethereum development. It can be used to run tests, execute commands, and inspect states while controlling how the chain operates. Ganache is an Ethereum simulator that makes developing Ethereum applications faster, easier, and safer. It is provided by Truffle Suite and can be downloaded from <https://www.trufflesuite.com/ganache>. The below image shows the view of Ganache



Fig.8.1 Ganache view

Truffle

CSDL7022: Blockchain Lab



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Truffle is the most popular development framework for Ethereum. managing your contract artifacts so you don't have to. Includes deployments, library linking and complex Ethereum applications. Truffle is used to test contracts in both javascript and solidity. Truffle takes care of support for custom

Process:

Step 1. Install Ganache , Download Ganache from the website <https://truffleframework.com/ganache>

Step 2. Install Truffle by executing the following command at the command prompt:

```
npm install -g truffle
```

To install Truffle you need to have Node and NPM along with Python setup on your machine.

Step 3. To verify if Truffle is installed successfully, execute the following command at the command prompt.

```
truffle version
```

Step 4. To start a project in Truffle, go into a directory and type the init command:

```
truffle init
```

This will create a new project with the required directory: contracts, migrations, test

Step 5. Create the required contract file in solidity and save it in the contracts directory

Step 6. Create a migration file in javascript and save it in migrations directory

Step 7. Run the following command to deploy the contract on Ganache

```
truffle Test
```

Ganache should be running while executing this command. The contract deployed will be visible in the contracts tab of the Ganache.



output:

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.22000.2416]
(c) Microsoft Corporation. All rights reserved.

C:\Users\admin\Election>truffle init

Starting init...
=====
> Copying project files to C:\Users\admin\Election

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

C:\Users\admin\Election>truffle test

Compiling your contracts...
=====
> Everything is up to date, there is nothing to compile.

0 passing (0ms)

C:\Users\admin\Election>truffle migrate

Compiling your contracts...
=====

> balance: 99.996081745820322654
> gas used: 193243 (0x2f2db)
> gas price: 2.968798929 gwei
> value sent: 0 ETH
> total cost: 0.000573699611436747 ETH

> Saving migration to chain.
> Saving artifacts
=====
> Total cost: 0.000573699611436747 ETH

2_deploy_contracts.js
=====
Replacing 'Election'
> transaction hash: 0x0331597545e0b56f6c1329ed7ee315e1b2f73bc698269b7516caf3ece027db57
> Blocks: 0 Seconds: 0
> contract address: 0x5c85f6ea79727752b03ba5Ca3974CAd79e1CF97c
> block number: 8
> block timestamp: 1697098506
> account: 0x870f1c8dda66f817832d0cf5c0c23b0c9Eb0b8EB
> balance: 99.99485308033259534
> gas used: 392664 (0x5d6c8)
> gas price: 2.862575783 gwei
> value sent: 0 ETH
> total cost: 0.001095404699425912 ETH

> Saving migration to chain.
> Saving artifacts
=====
> Total cost: 0.001095404699425912 ETH

Summary
=====
> Total deployments: 2
> Final cost: 0.001669104310862659 ETH

C:\Users\student\Election>
```



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S

```
C:\Windows\system32\cmd.exe

0 passing (0ms)

C:\Users\student\election1>truffle migrate

Compiling your contracts...
=====
> Compiling .\contracts\Election.sol
> Compiling .\contracts\Migrations.sol
> Artifacts written to C:\Users\student\election1\build\contracts
> Compiled successfully using:
   - solc: 0.5.16+commit.9c3226ce.Emscripten.clang

Starting migrations...
=====
> Network name:  'development'
> Network id:    5777
> Block gas limit: 6721975 (0x6691b7)

1_initial_migration.js
=====

  Replacing 'Migrations'
  -----
  > transaction hash:  0x125d44bdf21bd24a015f48ab4602cc58ecfdd23443399c846d36df6d47f7e619
  > Blocks: 0
  > contract address: 0xdfcbfa7AD9bA700B50424dfb248302438d9D5308
  > block number: 6
  > block timestamp: 1697098506
  > account: 0xB70f1C8dda66FB17832d0cF5c0c23b0c9Eb0b8EB
  > balance: 99.996081745820322654
  > gas used: 193243 (0x2f2db)
  > gas price: 2.968798929 gwei
  > value sent: 0 ETH
  > total cost: 0.000573699611436747 ETH

  > Saving migration to chain.
  > Saving artifacts
  -----
  > Total cost: 0.000573699611436747 ETH
```

Ganache

ACCOUNTS BLOCKS TRANSACTIONS CONTRACTS EVENTS LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK 9

GAS PRICE 2000000000

GAS LIMIT 6721975

HARDFORK MERGE

NETWORK ID 5777

RPC SERVER HTTP://127.0.0.1:7545

MINING STATUS AUTOMINING

WORKSPACE SORE-WHEEL

SWITCH

election1 C:\Users\student\election1

NAME	ADDRESS	TX COUNT	
Election	0x5c85feea79727752b03ba5Ca3974Cad79e1CF97c	0	DEPLOYED
Migrations	0xdfcbfa7AD9bA700B50424dfb248302438d9D5308	1	DEPLOYED



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Conclusion: Ganache and Truffle stand as indispensable tools in the creation of a personal Ethereum blockchain for several compelling reasons:

Ganache serves as a valuable resource for Ethereum developers, offering a local and lightweight blockchain environment that proves ideal for development and testing needs. It simplifies the setup process, reducing the need for extensive configurations and thereby expediting development. This tool additionally provides developers with complete control over vital blockchain parameters, including gas limits, block times, and network IDs, enabling the effective simulation of diverse network conditions and scenarios. Moreover, Ganache seamlessly integrates with the widely-used Truffle development framework, enhancing the development of smart contracts. This integration streamlines the compilation, migration, and testing of contracts, ensuring a more efficient and productive workflow.