# ASSIGNMENT

### 1). Steps for installing and instantiating the Chain code on HLF2.2

**Commands to installing and running Fabric***

- Download the script file install-fabric.sh from the hyperledger fabric github repository. Use the chmod +x to make it executable

  Curl -sSLO https://raw.githubusercontent.com/hyperledger/fabric/main/scripts/install-fabric.sh && chmod +x install-fabric.sh

- Install hyperledger fabric version 2.2.2 and fabric-CA version1.4.9

  "./install-fabric.sh -f '2.2.2' -c '1.4.9'"

- There will be a fabric samples folder which contains all the needed files for this sample network, navigate to the directory which contains the sample test network setup file

  "cd fabric-samples/test-network/"

- start the network and create a channel for communication between organizations using the cryptogen tool

  "./network.sh up createChannel"

- deploy the chaincode basic to the channel specifying its language and path

  "./network.sh deployCC -ccn basic -ccp ../asset-transfer-basic/chaincode-javascript -ccl javascript"

- setup the environment variables for specifying paths and configurations

  "export PATH=${PWD}/../bin:$PATH" - Tells your computer where to find Fabric tools like `peer`, by adding their location to the system's PATH.

  "export FABRIC_CFG_PATH=$PWD/../config/ " - Specifies the location of configuration files needed by Fabric tools

“export CORE_PEER_TLS_ENABLED=true” - Turns on TLS, ensuring communication between network components is encrypted

“export CORE_PEER_LOCALMSPID="Org1MSP" “ - Specifies the identity of the organization you’re acting as (`Org1`)

“export CORE_PEER_TLS_ROOTCERT_FILE=${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt” - Points to the file containing Org1's TLS certificate, needed for secure communication.

“export CORE_PEER_MSPCONFIGPATH=${PWD}/organizations/peerOrganizations/org1.example.com/users/Admin@org1.example.com/msp “ - Specifies the admin's credentials so you can act as the administrator of Org1.

“export CORE_PEER_ADDRESS=localhost:7051 “ - Specifies the address of Org1’s peer (at `localhost`, port `7051`)

- run the InitLedger function to initialize the ledger,it also adds assets to the chain

  “peer chaincode invoke -o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafile "${PWD}/organizations/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem" -C mychannel -n basic --peerAddresses localhost:7051 --tlsRootCertFiles "${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt" --peerAddresses localhost:9051 --tlsRootCertFiles "${PWD}/organizations/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt" -c '{"function":"InitLedger","Args":[]}' “

- use the getAllAssets function to retrieve all the functions

  “peer chaincode query -C mychannel -n basic -c '{"Args":["GetAllAssets"]}'”

- stop the network.

  “./network.sh down”

2). Explain Cryptogen and Configtxgen

## Cryptogen

Cryptogen is a command line tool which is provided by hyperledger fabric to generate cryptographic materials required to set up a Hyperleger fabric network.

These cryptographic materials include private keys,certificates and MSPs. This simplifies the process of creating necessary identities to the network participants such as organizations,peers and orderers.

Cryptogen relies on crypto-config.yaml to specify details like the number of peers, orderers, organizations,users,etc

The tool is run using the cryptogen generate command to create certificates and keys which is then used to configure the network and establish secure communication.

## Configtxgen

Configtxgen or configuration transaction generator is a tool provided by hyperledger fabric for creating configuration artifacts which is required for setting up and managing the blockchain network.

These artifacts define the structure, policies, and behavior of the network. The channel profiles required for the tool is defined in the configtx.yaml file Weuse configtxgen tool to create the genesis block, given below is a sample command used to create this genesis block,

Configtxgen -profile ChannelUsingRaft -outputBlock ./channel-artifacts/channel1.block-channelID channel1

The-profile flag is used to reference the ChannelUsingRaft profile from configtx.yaml file

The output of this command is the channel genesis block that is written to-output ./channel-artifacts/channel1.block

Its also has other functions such as creating channel configuration transactions and anchor peer updation.

3). Develop a chaincode for storing the data in to blockchain

a. Store

b. Retrieve

c. Update

d. GetHistory

e. GetbyNonPrimaryKey (Using CouchDB Rich Queries)

Link: https://github.com/akshaj-22/SimplyFI-Assignment.git