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Roll No: 20BCE218

Course: 2CSDE93 - Blockchain Technology

Practical No: 7

Aim: To perform a thorough study of blockchain development on Hyperledger Fabric using Composer

```
./Install-fabric.sh
echo $HOME
- ~ echo $HOME
/home/rajkp
- ~ cd
- ~ ls
Programming golib hadoop-3.3.2 hadoop-practicals sandbox vcpkg
- ~ pw
dzsh: command not found: pw
- ~ pd
zsh: command not found: pd
- ~ pwd
/home/rajkp
- ~
- ~ ls
Programming golib hadoop-3.3.2 hadoop-practicals sandbox vcpkg
- ~ cd Programming
- Programming ls
CP compiler file-uploader go-backend kilo mern raylib
advent-of-code-2022 dist-system go gocached letterboxd micro redis-from-scratch
- Programming cd go
- go ls
bin pkg src
- go cd src
- src ls
github.com
- src cd github.com
- github.com cd imrraaj
- imrraaj ls
firstapp
- imrraaj pwd
/home/rajkp/Programming/go/src/github.com/imrraaj
- imrraaj $ curl -sLO https://raw.githubusercontent.com/hyperledger/fabric/main/scripts/install-fabric
zsh: command not found: $
- imrraaj curl -sLO https://raw.githubusercontent.com/hyperledger/fabric/main/scripts/install-fabric
- imrraaj ls
firstapp install-fabric.sh
```

```

./install-fabric.sh
. src cd github.com
. github.com cd imrraaj
. imrraaj ls
firstapp
. imrraaj pwd
/home/rajkp/Programming/go/src/github.com/imrraaj
. imrraaj $ curl -sLO https://raw.githubusercontent.com/hyperledger/fabric/main/scripts/install-fabric.sh && chmod +x install-fabric.sh
zsh: command not found: $
. imrraaj curl -sLO https://raw.githubusercontent.com/hyperledger/fabric/main/scripts/install-fabric.sh && chmod +x install-fabric.sh
. imrraaj ls
firstapp install-fabric.sh
. imrraaj ./install-fabric.sh
No options selected: Getting all samples, binaries, and docker images
Abort now if not the intention

Clone hyperledger/fabric-samples repo

=> Cloning hyperledger/fabric-samples repo
Cloning into 'fabric-samples'...
remote: Enumerating objects: 12991, done.
remote: Counting objects: 100% (1023/1023), done.
remote: Compressing objects: 100% (589/589), done.
remote: Total 12991 (delta 537), reused 733 (delta 383), pack-reused 11968
Receiving objects: 100% (12991/12991), 22.93 MiB | 1.62 MiB/s, done.
Resolving deltas: 100% (6991/6991), done.
fabric-samples v2.5.4 does not exist, defaulting to main. fabric-samples main branch is intended to work with recent versions of fabric.

Pull Hyperledger Fabric binaries

=> Downloading version 2.5.4 platform specific fabric binaries
=> Downloading: https://github.com/hyperledger/fabric/releases/download/v2.5.4/hyperledger-fabric-linux-amd64-2.5.4.tar.gz
=> Will unpack to: /home/rajkp/Programming/go/src/github.com/imrraaj/fabric-samples
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left   Speed
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--    0
89 99.3M  89 88.7M    0     0  198k      0  0:08:33  0:07:38  0:00:55 280k

```

```

./install-fabric.sh
imrraaj ./install-fabric.sh
No options selected: Getting all samples, binaries, and docker images
Abort now if not the intention

Clone hyperledger/fabric-samples repo

==> Changing directory to fabric-samples
fabric-samples v2.5.4 does not exist, defaulting to main. fabric-samples main branch is intended

Pull Hyperledger Fabric binaries

==> Downloading version 2.5.4 platform specific fabric binaries
==> Downloading: https://github.com/hyperledger/fabric/releases/download/v2.5.4/hyperledger-fab
==> Will unpack to: /home/rajkp/Programming/go/src/github.com/imrraaj/fabric-samples
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
  0     0    0     0    0     0      0     0  --:--:-- --:--:-- --:--:--    0
100 99.3M  100 99.3M    0     0  966k     0  0:01:45  0:01:45 --:--:--  931k
==> Done.

==> Downloading version 1.5.7 platform specific fabric-ca-client binary
==> Downloading: https://github.com/hyperledger/fabric-ca/releases/download/v1.5.7/hyperledger-
==> Will unpack to: /home/rajkp/Programming/go/src/github.com/imrraaj/fabric-samples
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
  0     0    0     0    0     0      0     0  --:--:-- 0:00:04 --:--:--    0
100 34.0M  100 34.0M    0     0 1308k     0  0:00:26  0:00:26 --:--:-- 1613k
==> Done.

Pull Hyperledger Fabric docker images

FABRIC_IMAGES: peer orderer ccenv tools baseos
==> Pulling fabric Images
==> docker.io/hyperledger/fabric-peer:2.5.4
2.5.4: Pulling from hyperledger/fabric-peer
01085d60b3a6: Pull complete
5920bb1ab585: Pull complete

```

```
cc16ebc66c1e: Pull complete
cfb66da0a833: Pull complete
daa87923bf69: Pull complete
Digest: sha256:cab2ed27ed8d27e4cacde447a1de51884f0bd9e103a6119e74521e1b90b6d106
Status: Downloaded newer image for hyperledger/fabric-baseos:2.5.4
docker.io/hyperledger/fabric-baseos:2.5.4
==> Pulling fabric ca Image
==> docker.io/hyperledger/fabric-ca:1.5.7
1.5.7: Pulling from hyperledger/fabric-ca
edaedc954fb5: Pull complete
793f509072c1: Pull complete
40231dd4f3a4: Pull complete
5799c17ab94e: Pull complete
Digest: sha256:db814e013fc29f94f75a5df6e3920c08a4e96e53a079152df2ffa99e6db24861
Status: Downloaded newer image for hyperledger/fabric-ca:1.5.7
docker.io/hyperledger/fabric-ca:1.5.7
==> List out hyperledger images
```

hyperledger/fabric-ca	1.5	0f07bbee6fb8	2 months ago	223MB
hyperledger/fabric-ca	1.5.7	0f07bbee6fb8	2 months ago	223MB
hyperledger/fabric-ca	latest	0f07bbee6fb8	2 months ago	223MB
hyperledger/fabric-tools	2.5	b2f3af4021be	3 months ago	551MB
hyperledger/fabric-tools	2.5.4	b2f3af4021be	3 months ago	551MB
hyperledger/fabric-tools	latest	b2f3af4021be	3 months ago	551MB
hyperledger/fabric-peer	2.5	4f8d1b54d8b0	3 months ago	135MB
hyperledger/fabric-peer	2.5.4	4f8d1b54d8b0	3 months ago	135MB
hyperledger/fabric-peer	latest	4f8d1b54d8b0	3 months ago	135MB
hyperledger/fabric-orderer	2.5	7a73187b5c49	3 months ago	106MB
hyperledger/fabric-orderer	2.5.4	7a73187b5c49	3 months ago	106MB
hyperledger/fabric-orderer	latest	7a73187b5c49	3 months ago	106MB
hyperledger/fabric-ccenv	2.5	6dac93f94c87	3 months ago	656MB
hyperledger/fabric-ccenv	2.5.4	6dac93f94c87	3 months ago	656MB
hyperledger/fabric-ccenv	latest	6dac93f94c87	3 months ago	656MB
hyperledger/fabric-baseos	2.5	3854817b987d	3 months ago	122MB
hyperledger/fabric-baseos	2.5.4	3854817b987d	3 months ago	122MB
hyperledger/fabric-baseos	latest	3854817b987d	3 months ago	122MB

```
• imrraaj |
```

```
.. /test-network
• imrraaj ls
fabric-samples firstapp install-fabric.sh
• imrraaj cd fabric-samples/test-network
• test-network [main] ./network.sh down
Using docker and docker-compose
Stopping network
[+] Running 7/0
  ✓ Volume compose_peer0.org2.example.com Removed
  ✓ Volume compose_orderer2.example.com Removed
  ✓ Volume compose_orderer4.example.com Removed
  ✓ Volume compose_peer0.org1.example.com Removed
  ✓ Volume compose_orderer3.example.com Removed
  ✓ Volume compose_peer0.org3.example.com Removed
  ✓ Volume compose_orderer.example.com Removed
Error response from daemon: get docker_orderer.example.com: no such volume
Error response from daemon: get docker_peer0.org1.example.com: no such volume
Error response from daemon: get docker_peer0.org2.example.com: no such volume
Removing remaining containers
Removing generated chaincode docker images
Unable to find image 'busybox:latest' locally
latest: Pulling from library/busybox
3f4d90098f5b: Pull complete
Digest: sha256:3fbc632167424a6d997e74f52b878d7cc478225cfffac6bc977eedfe51c7f4e79
Status: Downloaded newer image for busybox:latest
• test-network [main] |
```

```
./test-network
Creating Org2 Identities
+ cryptogen generate --config=./organizations/cryptogen/crypto-config-org2.yaml --output=organizations
org2.example.com
+ res=0
Creating Orderer Org Identities
+ cryptogen generate --config=./organizations/cryptogen/crypto-config-orderer.yaml --output=organizations
+ res=0
Generating CCP files for Org1 and Org2
[+] Running 8/8
  ✓ Network fabric_test Created
  ✓ Volume "compose_peer0.org2.example.com" Created
  ✓ Volume "compose_orderer.example.com" Created
  ✓ Volume "compose_peer0.org1.example.com" Created
  ✓ Container peer0.org2.example.com Started
  ✓ Container peer0.org1.example.com Started
  ✓ Container orderer.example.com Started
  ✓ Container cli Started
CONTAINER ID   IMAGE                                     COMMAND                  CREATED        STATUS
2dc82591cb45   hyperledger/fabric-tools:latest         "/bin/bash"             2 seconds ago Up Less than a s
5edce006ead9   hyperledger/fabric-peer:latest          "peer node start"       2 seconds ago Up Less than a s
a9b199080c42   hyperledger/fabric-peer:latest          "peer node start"       2 seconds ago Up Less than a s
4dd39fa35a4a   hyperledger/fabric-orderer:latest       "orderer"               2 seconds ago Up Less than a s
tcp           orderer.example.com
cb7e42e90b5a   mysql:latest                             "docker-entrypoint.s..." 3 days ago    Exited (255) 7 m
nervous_cannon
e6959c78454b   node_kong                                "docker-entrypoint.s..." 3 days ago    Exited (255) 3 d
node_kong
bc9574e55c53   kong/kong-gateway:3.4.1.1               "/entrypoint.sh kong..." 3 days ago    Exited (255) 3 d
8446-8447/tcp   kong-gateway
1253d3c0ae5a   postgres:13                              "docker-entrypoint.s..." 3 days ago    Exited (255) 3 d
kong-database
. test-network [main] |
```



```

- test-network [main]
- test-network [main] ./network.sh deployCC -ccn basic -ccp ../asset-transfer-basic/chaincode-go -ccl go
Using docker and docker-compose
deploying chaincode on channel 'mychannel'
executing with the following
- CHANNEL_NAME: mychannel
- CC_NAME: basic
- CC_SRC_PATH: ../asset-transfer-basic/chaincode-go
- CC_SRC_LANGUAGE: go
- CC_VERSION: 1.0.1
- CC_SEQUENCE: auto
- CC_END_POLICY: NA
- CC_COLL_CONFIG: NA
- CC_INIT_FCN: NA
- DELAY: 3
- MAX_RETRY: 5
- VERBOSE: false
executing with the following
- CC_NAME: basic
- CC_SRC_PATH: ../asset-transfer-basic/chaincode-go
- CC_SRC_LANGUAGE: go
- CC_VERSION: 1.0.1
Vendoring Go dependencies at ../asset-transfer-basic/chaincode-go
~/Programming/go/src/github.com/imrtaaj/fabric-samples/asset-transfer-basic/chaincode-go ~/Programming/go/src/github.com/imrtaaj/fabric-samples/test-network
go: downloading github.com/hyperledger/fabric-chaincode-go v0.0.0-20230228194215-b84622ba6a7a
go: downloading github.com/hyperledger/fabric-protos-go v0.3.0
go: downloading github.com/hyperledger/fabric-contract-api-go v1.2.1
go: downloading github.com/stretchr/testify v1.8.2
go: downloading google.golang.org/grpc v1.53.0
go: downloading github.com/golang/protobuf v1.5.2
go: downloading github.com/xeipuuv/gojsonschema v1.2.0
go: downloading github.com/go-openapi/spec v0.20.8
go: downloading github.com/gobuffalo/packr v1.30.1
go: downloading github.com/gobuffalo/packd v1.0.1

```

```

Finished vendoring Go dependencies
+ '[' false = true ']'
+ peer lifecycle chaincode package basic.tar.gz --path ../asset-transfer-basic/chaincode-go --lang golang --label basic_1.0.1
+ res=0
Chaincode is packaged
Installing chaincode on peer0.org1...
Using organization 1
+ peer lifecycle chaincode queryinstalled --output json
+ jq -r 'try (.installed_chaincodes[].package_id)'
+ grep '^basic_1.0.1:650b7b4f5a8545d710651dc01edee8cf83518ef4b36a67a08be061ba14da653a$'
+ test 1 -ne 0
+ peer lifecycle chaincode install basic.tar.gz
+ res=0
2023-11-07 11:38:05.216 IST 0001 INFO [cli.lifecycle.chaincode] submitInstallProposal -> Installed remotely: response:<status:200 payload:518ef4b36a67a08be061ba14da653a\022\013basic_1.0.1" >
2023-11-07 11:38:05.218 IST 0002 INFO [cli.lifecycle.chaincode] submitInstallProposal -> Chaincode code package identifier: basic_1.0.1:650b7b4f5a8545d710651dc01edee8cf83518ef4b36a67a08be061ba14da653a
Chaincode is installed on peer0.org1
Install chaincode on peer0.org2...
Using organization 2
+ peer lifecycle chaincode queryinstalled --output json
+ jq -r 'try (.installed_chaincodes[].package_id)'
+ grep '^basic_1.0.1:650b7b4f5a8545d710651dc01edee8cf83518ef4b36a67a08be061ba14da653a$'
+ test 1 -ne 0
+ peer lifecycle chaincode install basic.tar.gz

```



```

./network.sh
Chaincode is installed on peer0.org1
Install chaincode on peer0.org2...
Using organization 2
+ peer lifecycle chaincode queryinstalled --output json
+ jq -r 'try (.installed_chaincodes[].package_id)'
+ grep '^basic_1.0.1:650b7b4f5a8545d710651dc01edee8cf83518ef4b36a67a08be061ba14da653a$'
+ test 1 -ne 0
+ peer lifecycle chaincode install basic.tar.gz
+ res=0
2023-11-07 11:38:28.377 IST 0001 INFO [cli.lifecycle.chaincode] submitInstallProposal -> Installed remotely: response:<status:200 payload:"\r
518ef4b36a67a08be061ba14da653a\022\013basic_1.0.1" >
2023-11-07 11:38:28.377 IST 0002 INFO [cli.lifecycle.chaincode] submitInstallProposal -> Chaincode code package identifier: basic_1.0.1:650b7
61ba14da653a
Chaincode is installed on peer0.org2
++ peer lifecycle chaincode querycommitted --channelID mychannel --name basic
++ sed -n '/Version:/{s/.*Sequence: //; s/, Endorsement Plugin:.*/; p;}'
Error: query failed with status: 404 - namespace basic is not defined
+ COMMITTED_CC_SEQUENCE=
+ res=0
Using organization 1
+ peer lifecycle chaincode queryinstalled --output json
+ jq -r 'try (.installed_chaincodes[].package_id)'
+ grep '^basic_1.0.1:650b7b4f5a8545d710651dc01edee8cf83518ef4b36a67a08be061ba14da653a$'
+ res=0
basic_1.0.1:650b7b4f5a8545d710651dc01edee8cf83518ef4b36a67a08be061ba14da653a
Query installed successful on peer0.org1 on channel
Using organization 1
+ peer lifecycle chaincode approveformyorg -o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafile /home/rajkp/Progr
s/test-network/organizations/ordererOrganizations/example.com/tlsca/tlsca.example.com-cert.pem --channelID mychannel --name basic --version 1
0651dc01edee8cf83518ef4b36a67a08be061ba14da653a --sequence 1
+ res=0
2023-11-07 11:38:30.696 IST 0001 INFO [chaincodeCmd] ClientWait -> txid [1722fc25c2ed15ffd598ca2bfee4a41ac86b5972ac7849e8f18b747cbce0c15a] co
Chaincode definition approved on peer0.org1 on channel 'mychannel'
Using organization 1
Checking the commit readiness of the chaincode definition on peer0.org1 on channel 'mychannel'...

```

```

Checking the commit readiness of the chaincode definition on peer0.org1 on channel 'mychannel'...
Attempting to check the commit readiness of the chaincode definition on peer0.org1, Retry after 3 seconds.
+ peer lifecycle chaincode checkcommitreadiness --channelID mychannel --name basic --version 1.0.1 --sequence 1 --output json
+ res=0
{
  "approvals": {
    "Org1MSP": true,
    "Org2MSP": false
  }
}
Checking the commit readiness of the chaincode definition successful on peer0.org1 on channel 'mychannel'
Using organization 2
Checking the commit readiness of the chaincode definition on peer0.org2 on channel 'mychannel'...
Attempting to check the commit readiness of the chaincode definition on peer0.org2, Retry after 3 seconds.
+ peer lifecycle chaincode checkcommitreadiness --channelID mychannel --name basic --version 1.0.1 --sequence 1 --output json
+ res=0
{
  "approvals": {
    "Org1MSP": true,
    "Org2MSP": false
  }
}
Checking the commit readiness of the chaincode definition successful on peer0.org2 on channel 'mychannel'
Using organization 2
+ peer lifecycle chaincode approveformyorg -o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafile /home/rajkp/Progra
s/test-network/organizations/ordererOrganizations/example.com/tlsca/tlsca.example.com-cert.pem --channelID mychannel --name basic --version 1.0
0651dc01edee8cf83518ef4b36a67a08be061ba14da653a --sequence 1
+ res=0
2023-11-07 11:38:39.158 IST 0001 INFO [chaincodeCmd] ClientWait -> txid [32e6107a665d7553665794d132b369df7b0f1a11db13f335f984d4954f50eed5] comm

```

```
./test-network
{
  "approvals": {
    "Org1MSP": true,
    "Org2MSP": true
  }
}
Checking the commit readiness of the chaincode definition successful on peer0.org2 on channel 'mychannel'
Using organization 1
Using organization 2
+ peer lifecycle chaincode commit -o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafile /home/rajkp/Programming/go/src/github.com/fabric/fabric-samples/test-network/organizations/peerOrganizations/org1.example.com/tlsca/tlsca.org1.example.com-cert.pem --peerAddresses localhost:7051 --peerCertificates /home/rajkp/Programming/go/src/github.com/fabric/fabric-samples/test-network/organizations/peerOrganizations/org2.example.com/tlsca/tlsca.org2
.1 --sequence 1
+ res=0
2023-11-07 11:38:47.759 IST 0001 INFO [chaincodeCmd] ClientWait -> txid [ec1a9805f43d521320f8fc802fcb51ed690f90f46f5f54ea947e6f60a49f5614] committed with
2023-11-07 11:38:47.774 IST 0002 INFO [chaincodeCmd] ClientWait -> txid [ec1a9805f43d521320f8fc802fcb51ed690f90f46f5f54ea947e6f60a49f5614] committed with
Chaincode definition committed on channel 'mychannel'
Using organization 1
Querying chaincode definition on peer0.org1 on channel 'mychannel'...
Attempting to Query committed status on peer0.org1, Retry after 3 seconds.
+ peer lifecycle chaincode querycommitted --channelID mychannel --name basic
+ res=0
Committed chaincode definition for chaincode 'basic' on channel 'mychannel':
Version: 1.0.1, Sequence: 1, Endorsement Plugin: escc, Validation Plugin: vscc, Approvals: [Org1MSP: true, Org2MSP: true]
Query chaincode definition successful on peer0.org1 on channel 'mychannel'
Using organization 2
Querying chaincode definition on peer0.org2 on channel 'mychannel'...
Attempting to Query committed status on peer0.org2, Retry after 3 seconds.
+ peer lifecycle chaincode querycommitted --channelID mychannel --name basic
+ res=0
Committed chaincode definition for chaincode 'basic' on channel 'mychannel':
Version: 1.0.1, Sequence: 1, Endorsement Plugin: escc, Validation Plugin: vscc, Approvals: [Org1MSP: true, Org2MSP: true]
Query chaincode definition successful on peer0.org2 on channel 'mychannel'
Chaincode initialization is not required
- test-network [main] |
```