

# Practical 7 -

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

## **2CSDE93- Blockchain**

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# Steps:

## Install GO

```
shreyviradiya@BlackBlood: ~  
manishgupta@blackblood1503:~$ cd Dow  
bash: cd: Dow: No such file or directory  
manishgupta@blackblood1503:~$ cd Downloads/  
manishgupta@blackblood1503:~/Downloads$ sudo tar -xvf go1.17.3.linux-amd64.tar.gz  
[sudo] password  
go/  
go/AUTHORS  
go/CONTRIBUTING.md  
go/CONTRIBUTORS  
go/LICENSE  
go/PATENTS  
go/README.md  
go/SECURITY.md  
go/VERSION  
go/api/  
go/api/README  
go/api/except.txt  
go/api/go1.1.txt  
go/api/go1.10.txt  
go/api/go1.11.txt  
go/api/go1.12.txt  
go/api/go1.13.txt  
go/api/go1.14.txt  
go/api/go1.15.txt  
go/api/go1.16.txt  
go/api/go1.17.txt  
go/api/go1.2.txt  
go/api/go1.3.txt  
go/api/go1.4.txt  
go/api/go1.5.txt  
go/api/go1.6.txt  
go/api/go1.7.txt  
go/api/go1.8.txt  
go/api/go1.9.txt  
go/api/go1.txt  
go/api/next.txt  
go/bin/  
go/bin/go  
go/bin/gofmt  
go/codereview.cfg  
go/depot
```

```
shreyviradiya@BlackBlood: ~  
go/test/varerr.go  
go/test/varinit.go  
go/test/winbatch.go  
go/test/writebarrier.go  
go/test/zerodivide.go  
manishgupta@blackblood1503:~/Downloads$ ls  
go go1.17.3.linux-amd64.tar.gz vaadin-crm.zip  
manishgupta@blackblood1503:~/Downloads$ cd go  
manishgupta@blackblood1503:~/Downloads$ go$ cd ..  
manishgupta@blackblood1503:~/Downloads$ sudo mv go /usr/local  
manishgupta@blackblood1503:~/Downloads$ cd ~  
manishgupta@blackblood1503:~$ nano .profile  
manishgupta@blackblood1503:~$ PATH="$HOME/bin:$HOME/.local/bin:/usr/local/go/bin:$HOME/gowork/bin:$PATH"  
manishgupta@blackblood1503:~$ echo $PATH  
/home/manishgupta153/bin:/home/manishgupta153/.local/bin:/usr/local/go/bin:/home/manishgupta153/gowork/bin:/home/manishgupta153/.local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin  
manishgupta@blackblood1503:~$ go version  
go version go1.17.3 linux/amd64  
manishgupta@blackblood1503:~$ sudo apt-get install libltdl-dev  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following package was automatically installed and is no longer required:  
  python-is-python2  
Use 'sudo apt autoremove' to remove it.  
The following additional packages will be installed:  
  autoconf automake autotools-dev libtool  
Suggested packages:  
  autoconf-archive gnu-stardards autoconf-doc gettext libtool-doc gfortran | fortran95-compiler  
  gcj-jdk  
The following NEW packages will be installed:  
  autoconf automake autotools-dev libltdl-dev libtool  
0 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.  
Need to get 1,206 kB of archives.  
After this operation, 5,820 kB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 autoconf all 2.69-11.1 [321 kB]  
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 autotools-dev all 20180224.1 [39.6 kB]  
Get:3 http://in.archive.ubuntu.com/ubuntu focal/main amd64 automake all 1:1.16.1-4ubuntu0 [522 kB]  
Get:4 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libltdl-dev amd64 2.4.6-14 [162 kB]  
Get:5 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libtool all 2.4.6-14 [144 kB]
```

## Installing Docker

```
Nov 5 22:29
shreyviradiya@BlackBlood: ~/Downloads

ca-certificates is already the newest version (20211119-20.04.2).
ca-certificates set to manually installed.
curl is already the newest version (7.68.0-1ubuntu2.7).
software-properties-common is already the newest version (0.98.9.5).
software-properties-common set to manually installed.
apt-transport-https is already the newest version (2.0.0).
The following package was automatically installed and is no longer required:
  python-is-python2
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
shreyviradiya@BlackBlood:~/Downloads$ sudo apt autoremove
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be REMOVED:
  python-is-python2
0 upgraded, 0 newly installed, 1 to remove and 0 not upgraded.
After this operation, 10.2 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 246769 files and directories currently installed.)
Removing python-is-python2 (2.7.17-4) ...
shreyviradiya@BlackBlood:~/Downloads$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -
OK
shreyviradiya@BlackBlood:~/Downloads$ sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu bionic stable"

Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:3 https://brave-browser-apt-release.s3.brave.com stable InRelease
Hit:4 https://dl.winehq.org/wine-builds/ubuntu focal InRelease
Get:5 https://download.docker.com/linux/ubuntu bionic InRelease [64.4 kB]
Hit:6 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:7 https://repo.steampowered.com/steam stable InRelease
Hit:8 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Hit:9 http://archive.canonical.com/ubuntu focal InRelease
Hit:10 http://ppa.launchpad.net/audio-recorder/ppa/ubuntu focal InRelease
Get:11 https://download.docker.com/linux/ubuntu bionic/stable amd64 Packages [21.2 kB]
Hit:12 http://ppa.launchpad.net/numix/ppa/ubuntu focal InRelease
Hit:13 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:14 http://ppa.launchpad.net/swi-prolog/stable/ubuntu focal InRelease
0% [Waiting for headers]
```

```
Nov 5 22:34
shreyviradiya@BlackBlood: ~

Run 'docker COMMAND --help' for more information on a command.

To get more help with docker, check out our guides at https://docs.docker.com/go/guides/
shreyviradiya@BlackBlood:~/Downloads$ sudo usermod -aG docker ${USER}
shreyviradiya@BlackBlood:~/Downloads$ su - ${USER}
Password:
shreyviradiya@BlackBlood:~$ id -nG
shreyviradiya adm cdrom sudo dip plugdev lpadmin lxd sambashare docker
shreyviradiya@BlackBlood:~$ sudo usermod -aG docker username
usermod: user 'username' does not exist
shreyviradiya@BlackBlood:~$ sudo usermod -aG docker shreyviradiya
shreyviradiya@BlackBlood:~$ docker info

Client:
 Context: default
 Debug Mode: false
 Plugins:
  app: Docker App (Docker Inc., v0.9.1-beta3)
  buildx: Build with BuildKit (Docker Inc., v0.6.3-docker)
  scan: Docker Scan (Docker Inc., v0.9.0)

Server:
 Containers: 0
  Running: 0
  Paused: 0
  Stopped: 0
 Images: 0
 Server Version: 20.10.10
 Storage Driver: overlay2
  Backing Filesystem: extfs
  Supports d_type: true
  Native Overlay Diff: true
 userxattr: false
 Logging Driver: json-file
 Cgroup Driver: cgroupfs
 Cgroup Version: 1
 Plugins:
  Volume: local
  Network: bridge host ipvlan macvlan null overlay
  Log: awslogs fluentd gcplogs gelf journald json-file local logentries splunk syslog
 Swarm: inactive
Docker version 20.10.10, build 34966ba
```

## Installation of HyperLedger fabric

```
Nov 5 22:48
shreyviradiya@Black8lood: ~/fabric-samples/test-network

Removing volume docker_peer0.org1.example.com
WARNING: Volume docker_peer0.org1.example.com not found.
Removing volume docker_peer0.org2.example.com
WARNING: Volume docker_peer0.org2.example.com not found.
WARNING: The IMAGE_TAG variable is not set. Defaulting to a blank string.
WARNING: The COMPOSE_PROJECT_NAME variable is not set. Defaulting to a blank string.
Removing network docker_test
WARNING: Network docker_test not found.
Removing volume docker_peer0.org3.example.com
WARNING: Volume docker_peer0.org3.example.com not found.
No containers available for deletion
No images available for deletion
Unable to find image 'busybox:latest' locally
latest: Pulling from library/busybox
01c2cdc13739: Pull complete
Digest: sha256:15e927f78df2cc772b70713543d0b651e3cd8370abf86b2ea4644a9fba21107f
Status: Downloaded newer image for busybox:latest
manishgupta@black8lood1503:~/fabric-samples/test-network$ ./network.sh up
Starting nodes with CLI timeout of '5' tries and CLI delay of '3' seconds and using database 'leveldb' with crypto from 'cryptogen'
LOCAL_VERSION=2.2.2
DOCKER_IMAGE_VERSION=2.2.2
/home/manishgupta153/fabric-samples/test-network/./bin/cryptogen
Generating certificates using cryptogen tool
Creating Org1 Identities
+ cryptogen generate --config=./organizations/cryptogen/crypto-config-org1.yaml --output=organizations
org1.example.com
+ res=0
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
/home/manishgupta153/fabric-samples/test-network/./bin/configtxgen
Generating Orderer Genesis block
+ configtxgen -profile TwoOrgsOrdererGenesis -channelID system-channel -outputBlock ./system-genesis-block/genesis.block
2021-11-05 22:48:25.850 IST [common.tools.configtxgen.main -> INFO 001 Loading configuration
2021-11-05 22:48:25.868 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 002 orderer type: etcdraft
```

```
Nov 5 22:48
shreyviradiya@Black8lood: ~/fabric-samples/test-network

hyperledger/fabric-baseos   latest      0483f4bff986   9 months ago   6.85MB
hyperledger/fabric-ca       1.4         dbbc768aec79   13 months ago  158MB
hyperledger/fabric-ca       1.4.9       dbbc768aec79   13 months ago  158MB
hyperledger/fabric-ca       latest      dbbc768aec79   13 months ago  158MB
manishgupta@black8lood1503:~/fabric-samples/test-network$ cd fabric-samples/test-network
manishgupta@black8lood1503:~/fabric-samples/test-network$ ./network.sh down
Stopping network
WARNING: The IMAGE_TAG variable is not set. Defaulting to a blank string.
WARNING: The COMPOSE_PROJECT_NAME variable is not set. Defaulting to a blank string.
Removing network docker_test
WARNING: Network docker_test not found.
Removing volume docker_orderer.example.com
WARNING: Volume docker_orderer.example.com not found.
Removing volume docker_peer0.org1.example.com
WARNING: Volume docker_peer0.org1.example.com not found.
Removing volume docker_peer0.org2.example.com
WARNING: Volume docker_peer0.org2.example.com not found.
WARNING: The IMAGE_TAG variable is not set. Defaulting to a blank string.
WARNING: The COMPOSE_PROJECT_NAME variable is not set. Defaulting to a blank string.
Removing network docker_test
WARNING: Network docker_test not found.
Removing volume docker_peer0.org3.example.com
WARNING: Volume docker_peer0.org3.example.com not found.
No containers available for deletion
No images available for deletion
Unable to find image 'busybox:latest' locally
latest: Pulling from library/busybox
01c2cdc13739: Pull complete
Digest: sha256:15e927f78df2cc772b70713543d0b651e3cd8370abf86b2ea4644a9fba21107f
Status: Downloaded newer image for busybox:latest
manishgupta@black8lood1503:~/fabric-samples/test-network$ ./network.sh up
Starting nodes with CLI timeout of '5' tries and CLI delay of '3' seconds and using database 'leveldb' with crypto from 'cryptogen'
LOCAL_VERSION=2.2.2
DOCKER_IMAGE_VERSION=2.2.2
/home/manishgupta153/fabric-samples/test-network/./bin/cryptogen
Generating certificates using cryptogen tool
Creating Org1 Identities
+ cryptogen generate --config=./organizations/cryptogen/crypto-config-org1.yaml --output=organizations
org1.example.com
+ res=0
```

```
Nov 5 22:53
shreyviradiya@BlackBlood: ~/fabric-samples/test-network

}
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 token_erc20 --version 1.0 --sequence 1 --output json
+ res=0
{
  "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/manishgupta153/fabric-samples/test-network/organizations/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem --channelID mychannel --name token_erc20 --peerAddresses localhost:7051 --tlsRootCertFiles /home/manishgupta153/fabric-samples/test-network/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt --peerAddresses localhost:9051 --tlsRootCertFiles /home/manishgupta153/fabric-samples/test-network/organizations/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt --version 1.0 --sequence 1
+ res=0
2021-11-05 22:52:42.429 IST [chaincodeCmd] ClientWait -> INFO 001 txid [b3c8b632828bc5b85b294718be64c9c3f0533de2099befcf6c8960799f03c95c2] committed with status (VALID) at localhost:9051
2021-11-05 22:52:42.429 IST [chaincodeCmd] ClientWait -> INFO 002 txid [b3c8b632828bc5b85b294718be64c9c3f0533de2099befcf6c8960799f03c95c2] committed with status (VALID) at localhost:7051
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 token_erc20
+ res=0
Committed chaincode definition for chaincode 'token_erc20' on channel 'mychannel':
Version: 1.0, Sequence: 1, Endorsement Plugin: escc, Validation Plugin: vsc, 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 token_erc20
+ res=0
Committed chaincode definition for chaincode 'token_erc20' on channel 'mychannel':
Version: 1.0, Sequence: 1, Endorsement Plugin: escc, Validation Plugin: vsc, Approvals: [Org1MSP: true, Org2MSP: true]
Query chaincode definition successful on peer0.org2 on channel 'mychannel'
```