

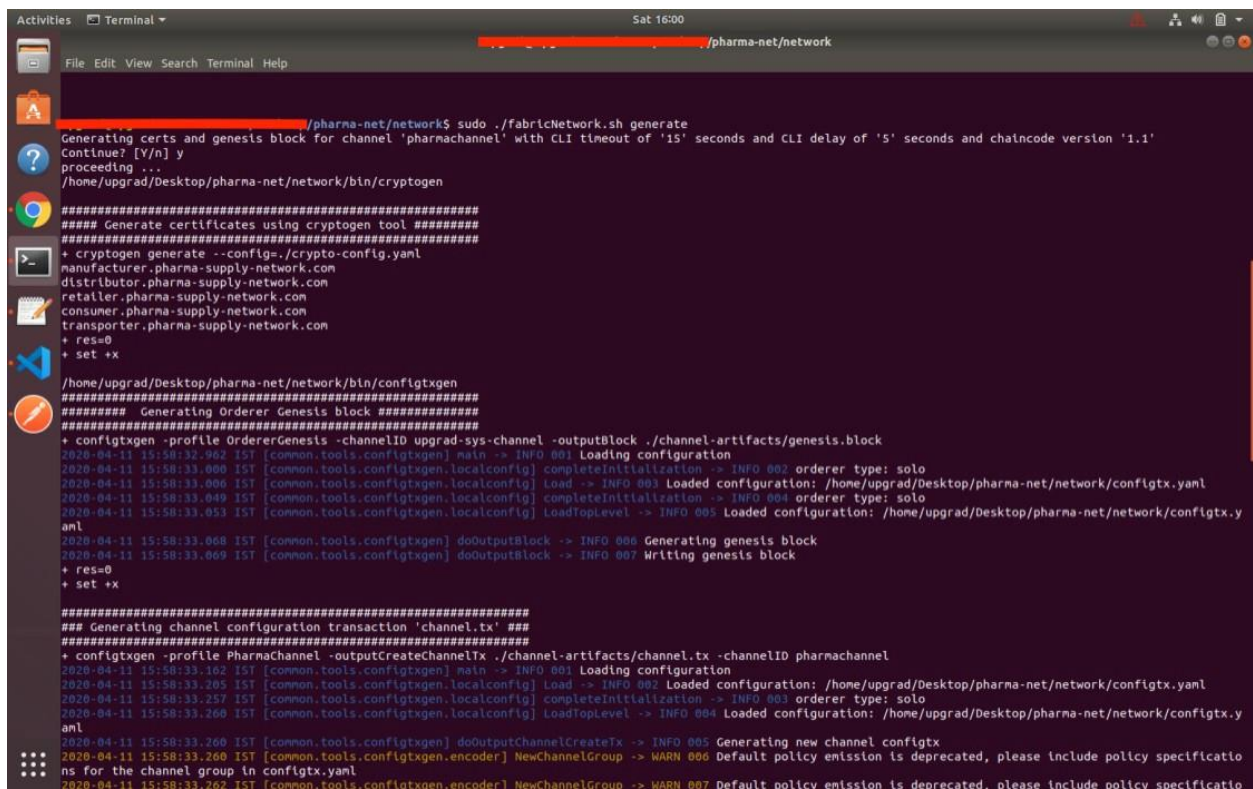
Instruction Document

Follow through to see the network setup and execution of smart contracts from postman.

1. Generating crypto-material and channel-artifacts for the network.

> cd pharma-net

> sudo ./fabricNetwork.sh generate



```
Activities Terminal Sat 16:00
File Edit View Search Terminal Help
/home/upgrad/Desktop/pharma-net/network
/home/upgrad/Desktop/pharma-net/network$ sudo ./fabricNetwork.sh generate
Generating certs and genesis block for channel 'pharmachannel' with CLI timeout of '15' seconds and CLI delay of '5' seconds and chaincode version '1.1'
Continue? [Y/n] y
proceeding ...
/home/upgrad/Desktop/pharma-net/network/bin/cryptogen
#####
##### Generate certificates using cryptogen tool #####
#####
+ cryptogen generate --config=/crypto-config.yaml
manufacturer.pharma-supply-network.com
distributor.pharma-supply-network.com
retailer.pharma-supply-network.com
consumer.pharma-supply-network.com
transporter.pharma-supply-network.com
+ res=0
+ set +x

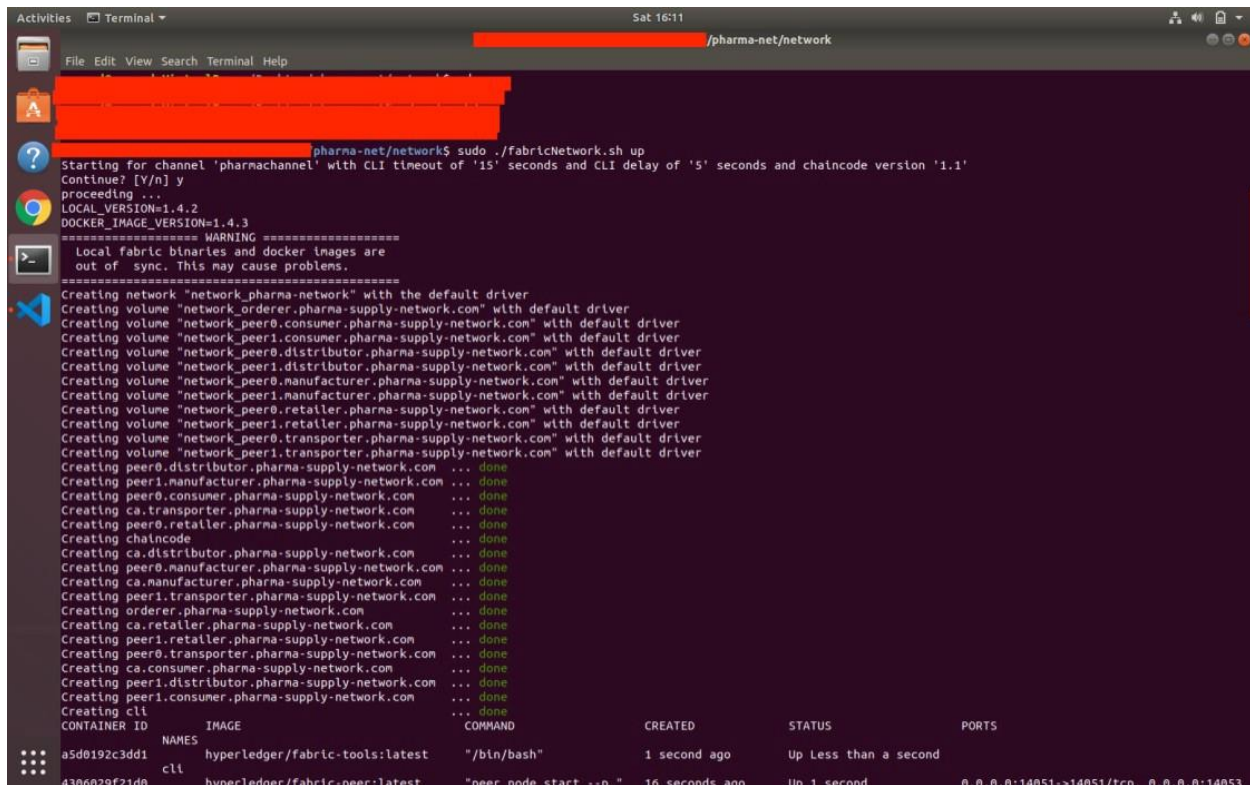
/home/upgrad/Desktop/pharma-net/network/bin/configtxgen
##### Generating Orderer Genesis block #####
+ configtxgen -profile OrdererGenesis -channelID upgrad-sys-channel -outputBlock ./channel-artifacts/genesis.block
2020-04-11 15:58:32.962 IST [common.tools.configtxgen] main -> INFO 001 Loading configuration
2020-04-11 15:58:33.000 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 002 orderer type: solo
2020-04-11 15:58:33.006 IST [common.tools.configtxgen.localconfig] Load -> INFO 003 Loaded configuration: /home/upgrad/Desktop/pharma-net/network/configtx.yaml
2020-04-11 15:58:33.049 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 004 orderer type: solo
2020-04-11 15:58:33.053 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 005 Loaded configuration: /home/upgrad/Desktop/pharma-net/network/configtx.yaml
2020-04-11 15:58:33.068 IST [common.tools.configtxgen] doOutputBlock -> INFO 006 Generating genesis block
2020-04-11 15:58:33.069 IST [common.tools.configtxgen] doOutputBlock -> INFO 007 Writing genesis block
+ res=0
+ set +x

#####
### Generating channel configuration transaction 'channel.tx' ###
#####
+ configtxgen -profile Pharmachannel -outputCreateChannelTx ./channel-artifacts/channel.tx -channelID pharmachannel
2020-04-11 15:58:33.162 IST [common.tools.configtxgen] main -> INFO 001 Loading configuration
2020-04-11 15:58:33.205 IST [common.tools.configtxgen.localconfig] Load -> INFO 002 Loaded configuration: /home/upgrad/Desktop/pharma-net/network/configtx.yaml
2020-04-11 15:58:33.257 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 003 orderer type: solo
2020-04-11 15:58:33.260 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 004 Loaded configuration: /home/upgrad/Desktop/pharma-net/network/configtx.yaml
2020-04-11 15:58:33.260 IST [common.tools.configtxgen] doOutputChannelCreateTx -> INFO 005 Generating new channel configtx
2020-04-11 15:58:33.260 IST [common.tools.configtxgen.encoder] NewChannelGroup -> WARN 006 Default policy emission is deprecated, please include policy specification for the channel group in configtx.yaml
2020-04-11 15:58:33.267 IST [common.tools.configtxgen.encoder] NewChannelGroup -> WARN 007 Default policy emission is deprecated, please include policy specification
```

Generate Crypto Materials

2. Instantiate all the docker containers for each peer that are mentioned in the docker-compose.yaml file.

> sudo ./fabricNetwork.sh up

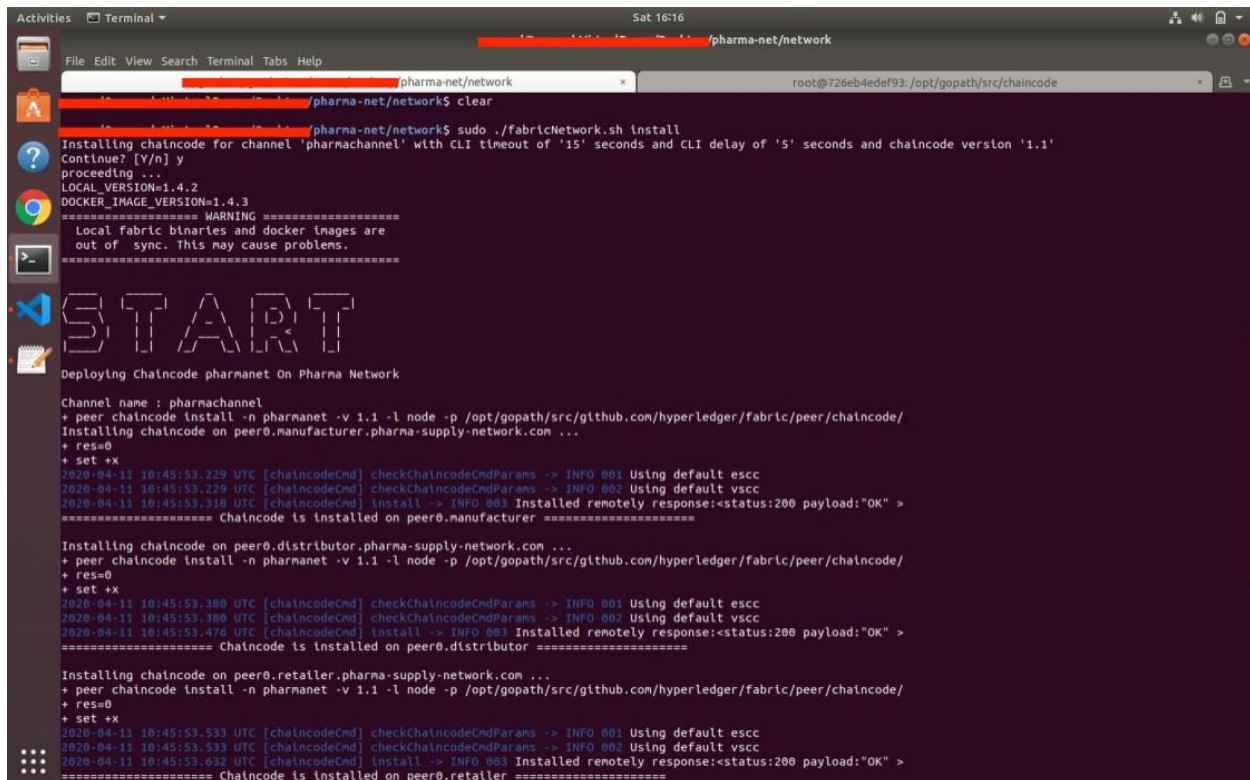


```
pharma-net/network$ sudo ./fabricNetwork.sh up
Starting for channel 'pharmachannel' with CLI timeout of '15' seconds and CLI delay of '5' seconds and chaincode version '1.1'
Continue? [Y/n] y
proceeding ...
LOCAL_VERSION=1.4.2
DOCKER_IMAGE_VERSION=1.4.3
***** WARNING *****
Local fabric binaries and docker images are
out of sync. This may cause problems.
*****
Creating network "network_pharma-network" with the default driver
Creating volume "network_orderer.pharma-supply-network.com" with default driver
Creating volume "network_peer0.consumer.pharma-supply-network.com" with default driver
Creating volume "network_peer1.consumer.pharma-supply-network.com" with default driver
Creating volume "network_peer0.distributor.pharma-supply-network.com" with default driver
Creating volume "network_peer1.distributor.pharma-supply-network.com" with default driver
Creating volume "network_peer0.manufacturer.pharma-supply-network.com" with default driver
Creating volume "network_peer1.manufacturer.pharma-supply-network.com" with default driver
Creating volume "network_peer0.retailer.pharma-supply-network.com" with default driver
Creating volume "network_peer1.retailer.pharma-supply-network.com" with default driver
Creating volume "network_peer0.transporter.pharma-supply-network.com" with default driver
Creating volume "network_peer1.transporter.pharma-supply-network.com" with default driver
Creating peer0.distributor.pharma-supply-network.com ... done
Creating peer1.manufacturer.pharma-supply-network.com ... done
Creating peer0.consumer.pharma-supply-network.com ... done
Creating ca.transporter.pharma-supply-network.com ... done
Creating peer0.retailer.pharma-supply-network.com ... done
Creating chaincode ... done
Creating ca.distributor.pharma-supply-network.com ... done
Creating peer0.manufacturer.pharma-supply-network.com ... done
Creating ca.manufacturer.pharma-supply-network.com ... done
Creating peer1.transporter.pharma-supply-network.com ... done
Creating orderer.pharma-supply-network.com ... done
Creating ca.retailer.pharma-supply-network.com ... done
Creating peer1.retailer.pharma-supply-network.com ... done
Creating peer0.transporter.pharma-supply-network.com ... done
Creating ca.consumer.pharma-supply-network.com ... done
Creating peer1.distributor.pharma-supply-network.com ... done
Creating peer1.consumer.pharma-supply-network.com ... done
Creating cli ... done
CONTAINER ID        IMAGE                                     COMMAND                  CREATED              STATUS              PORTS
a5d0192c3dd1       hyperledger/fabric-tools:latest         "/bin/bash"             1 second ago        Up Less than a second
4386029f21d9       hyperledger/fabric-peer:latest          "peer node start -cp"   16 seconds ago      Up 1 second         0.0.0.0:14051->14051/tcp, 0.0.0.0:14053
```

Fabric Network — Docker Container Set Up

3. Install and instantiate a basic chaincode on the hyperledger fabric network.

> sudo ./fabricNetwork.sh install



```
pharma-net/network$ clear
pharma-net/network$ sudo ./fabricNetwork.sh install
Installing chaincode for channel 'pharmachannel' with CLI timeout of '15' seconds and CLI delay of '5' seconds and chaincode version '1.1'
Continue? [Y/n] y
proceeding ...
LOCAL_VERSION=1.4.2
DOCKER_IMAGE_VERSION=1.4.3
***** WARNING *****
Local fabric binaries and docker images are
out of sync. This may cause problems.
*****

START
Deploying Chaincode pharmanet On Pharma Network

Channel name : pharmachannel
+ peer chaincode install -n pharmanet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
Installing chaincode on peer0.manufacturer.pharma-supply-network.com ...
+ res=0
+ set +x
2020-04-11 10:45:53.229 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default escc
2020-04-11 10:45:53.229 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vscc
2020-04-11 10:45:53.318 UTC [chaincodeCmd] install -> INFO 003 Installed remotely response:<status:200 payload:"OK" >
***** Chaincode is installed on peer0.manufacturer *****

Installing chaincode on peer0.distributor.pharma-supply-network.com ...
+ peer chaincode install -n pharmanet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
+ res=0
+ set +x
2020-04-11 10:45:53.380 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default escc
2020-04-11 10:45:53.380 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vscc
2020-04-11 10:45:53.476 UTC [chaincodeCmd] install -> INFO 003 Installed remotely response:<status:200 payload:"OK" >
***** Chaincode is installed on peer0.distributor *****

Installing chaincode on peer0.retailer.pharma-supply-network.com ...
+ peer chaincode install -n pharmanet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
+ res=0
+ set +x
2020-04-11 10:45:53.533 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default escc
2020-04-11 10:45:53.533 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vscc
2020-04-11 10:45:53.632 UTC [chaincodeCmd] install -> INFO 003 Installed remotely response:<status:200 payload:"OK" >
***** Chaincode is installed on peer0.retailer *****
```

Chaincode Installation on Fabric Network

This process completes the fabric network setup.

4. These are the steps that has to be done before execution of the chain code using Postman.

> cd ../application

> sudo dpkg --configure -a

> sudo apt install npm

Keys have to be set every time we generate a new crypto material.

Therefore change the certificatePath, privateKeyPath in the addToWallet files for all 5 files. Once the changes are done execute each file to add the keys to the wallet using which the user will authenticate himself to the network.

5. After this process you can import the all collection files to the postman.

Collection file named 'initiation' which contains the HTTP requests to perform the following functions:

1. Create a manufacturer with the following details:
 - Name: 'Sun Pharma'
 - CRN number: 'MAN001'
 - Location: 'Chennai'
2. Create a transporter with the following details:
 - Name: 'FedEx'
 - CRN number: 'TRA001'
 - Location: 'Delhi'
3. Create another transporter with the following details:
 - Name: 'Blue Dart'
 - CRN number: 'TRA002'
 - Location: 'Bangalore'
4. Create a distributor with the following details:
 - Name: 'VG Pharma'
 - CRN number: 'DIST001'
 - Location: 'Vizag'
5. Create a retailer with the following details:
 - Name: 'upgrad'
 - CRN number: 'RET002'

- Location: 'Mumbai'

6. Create 4 strips of a drug named 'Paracetamol' with serial number starting from '001' to '004'.

Expected Output: Each of the above requests should display the data corresponding to each new state being registered on the ledger.

Collection file named 'Supply Chain' which contains the HTTP requests to perform the following functions.

Part a:

2. Purchase Order raised by 'VG Pharma' to purchase 3 strips of paracetamol from 'Sun Pharma'.

Expected Output: Display the PO object created in the response body.

3. Shipment created by 'Sun Pharma' in response to the raised purchase order. 'FedEx' acts as the transporter.

Expected Output: Display the Shipment object created in the response body.

4. 'FedEx' delivers the shipment to 'VG pharma'.

Expected Output: Display the data of each asset of the shipment.

Part b:

5. Purchase Order raised by 'upgrad' to purchase 2 strips of paracetamol from 'VG Pharma'.

Expected Output: Display the PO object created in the response body.

6. Shipment created by 'VG Pharma' in response to the raised purchase order. 'Blue Dart' acts as the transporter.
Expected Output: Display the Shipment object created in the response body.
7. 'Blue Dart' delivers the shipment to 'upgrad'.
Expected Output: Display the data of each asset of the shipment in the response body.

Part c:

8. A customer named 'Akash' with Aadhar Number 'AAD001' buys 1 paracetamol strip from the retailer 'upgrad'.
Expected Output: Display the data of the asset bought by Akash in the response body.

Collection file named 'History' which contains the HTTP requests to perform the following functions.

9. The customer 'Akash' wishes to check the history of the paracetamol that he bought from 'upgrad'.
Expected Output: The response body should display the entire lifecycle of the asset.
10. The customer 'Akash' wishes to check the current state of the paracetamol that he bought from 'upgrad'.
Expected Output: The response body should display the current state of the asset.

This is how with Blockchain can be used in the drug supply chain for detecting counterfeit drugs and also track the history of a drug.