

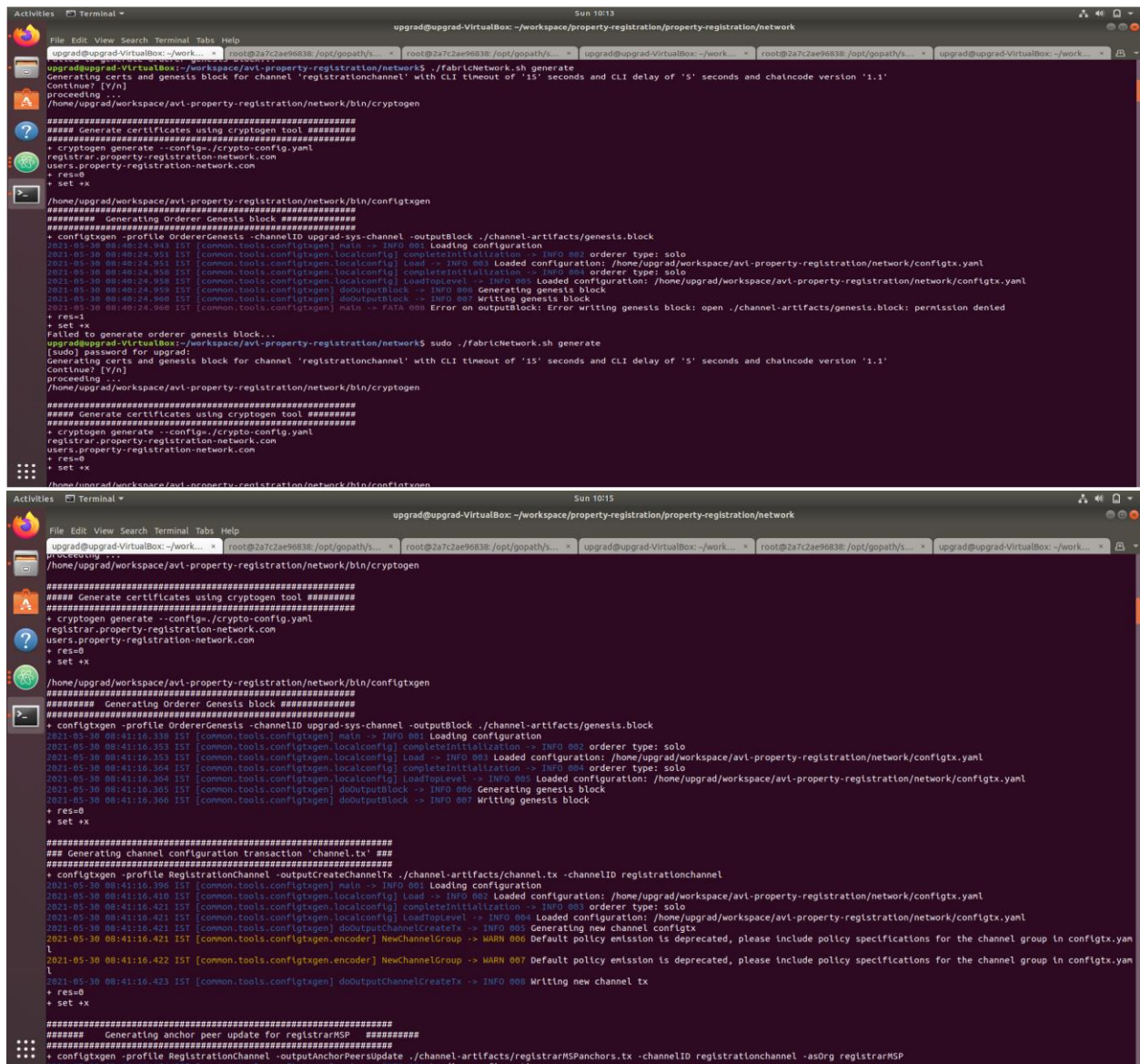
Property Registration Network is the Assignment-2 in the IIIT-Bangalore and Upgrad's Post Graduate Certificate in Blockchain Technology program. Commands required to start and stop the fabric network, commands required to create, approve, purchasing and selling of properties and their expected outputs is documented below:

This explained in two parts:

1. Setting up the fabric network
2. Accessing the functions of chaincode.

## Setting up the fabric network

1. Open the terminal and navigate to network directory within the property registration directory. Generate certificate files using `./fabricNetwork.sh generate`



```
upgrad@upgrad-VirtualBox: ~/workspace/property-registration/network$ ./fabricNetwork.sh generate
Generating certs and genesis block for channel 'registrationchannel' with CLI timeout of '15' seconds and CLI delay of '5' seconds and chaincode version '1.1'
Continue? [Y/n]
proceeding ...
/home/upgrad/workspace/avi-property-registration/network/bin/cryptogen

##### Generate certificates using cryptogen tool #####
+ cryptogen generate --config ./crypto-config.yaml
registrar:property-registration-network.com
users:property-registration-network.com
+ res=0
+ set +x

/home/upgrad/workspace/avi-property-registration/network/bin/configtxgen

##### Generating Orderer Genesis block #####
+ configtxgen -profile OrdererGenesis -channelID upgrad-sys-channel -outputBlock ./channel-artifacts/genesis.block
2021-05-30 08:40:24.953 IST [common.tools.configtxgen] main -> INFO 001 Loading configuration
2021-05-30 08:40:24.953 IST [common.tools.configtxgen.localconfig] Load -> INFO 002 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:40:24.958 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 003 orderer type: solo
2021-05-30 08:40:24.958 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 004 orderer type: solo
2021-05-30 08:40:24.958 IST [common.tools.configtxgen] doOutputBlock -> INFO 005 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:40:24.959 IST [common.tools.configtxgen] doOutputBlock -> INFO 006 Generating genesis block
2021-05-30 08:40:24.960 IST [common.tools.configtxgen] doOutputBlock -> INFO 007 Writing genesis block
2021-05-30 08:40:24.960 IST [common.tools.configtxgen] main -> FATA 008 Error on outputBlock: Error writing genesis block: open ./channel-artifacts/genesis.block: permission denied
+ res=1
+ set +x
failed to generate orderer genesis block...
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/network$ sudo ./fabricNetwork.sh generate
[sudo] password for upgrad:
Generating certs and genesis block for channel 'registrationchannel' with CLI timeout of '15' seconds and CLI delay of '5' seconds and chaincode version '1.1'
Continue? [Y/n]
proceeding ...
/home/upgrad/workspace/avi-property-registration/network/bin/cryptogen

##### Generate certificates using cryptogen tool #####
+ cryptogen generate --config ./crypto-config.yaml
registrar:property-registration-network.com
users:property-registration-network.com
+ res=0
+ set +x

/home/upgrad/workspace/avi-property-registration/network/bin/configtxgen

##### Generating Orderer Genesis block #####
+ configtxgen -profile OrdererGenesis -channelID upgrad-sys-channel -outputBlock ./channel-artifacts/genesis.block
2021-05-30 08:41:16.338 IST [common.tools.configtxgen] main -> INFO 001 Loading configuration
2021-05-30 08:41:16.353 IST [common.tools.configtxgen.localconfig] Load -> INFO 002 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.353 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 003 orderer type: solo
2021-05-30 08:41:16.364 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 004 orderer type: solo
2021-05-30 08:41:16.364 IST [common.tools.configtxgen] doOutputBlock -> INFO 005 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.365 IST [common.tools.configtxgen] doOutputBlock -> INFO 006 Generating genesis block
2021-05-30 08:41:16.366 IST [common.tools.configtxgen] doOutputBlock -> INFO 007 Writing genesis block
+ res=0
+ set +x

##### Generating channel configuration transaction 'channel.tx' #####
+ configtxgen -profile RegistrationChannel -outputCreateChannelTx ./channel-artifacts/channel.tx -channelID registrationchannel
2021-05-30 08:41:16.396 IST [common.tools.configtxgen] main -> INFO 001 Loading configuration
2021-05-30 08:41:16.410 IST [common.tools.configtxgen.localconfig] Load -> INFO 002 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.421 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 003 orderer type: solo
2021-05-30 08:41:16.421 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 004 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.421 IST [common.tools.configtxgen] doOutputChannelCreateTx -> INFO 005 Generating new channel configtx
2021-05-30 08:41:16.421 IST [common.tools.configtxgen.encoder] NewChannelGroup -> WARN 006 Default policy emission is deprecated, please include policy specifications for the channel group in configtx.yaml
2021-05-30 08:41:16.422 IST [common.tools.configtxgen.encoder] NewChannelGroup -> WARN 007 Default policy emission is deprecated, please include policy specifications for the channel group in configtx.yaml
2021-05-30 08:41:16.423 IST [common.tools.configtxgen] doOutputChannelCreateTx -> INFO 008 Writing new channel tx
+ res=0
+ set +x

##### Generating anchor peer update for registrarMSP #####
+ configtxgen -profile RegistrationChannel -outputAnchorPeersUpdate ./channel-artifacts/registrarMSPanchors.tx -channelID registrationchannel -asOrg registrarMSP
2021-05-30 08:41:16.423 IST [common.tools.configtxgen] main -> INFO 001 Loading configuration
```

```
Activities Terminal * Sun 10:15
upgrad@upgrad-VirtualBox: ~/workspace/property-registration/property-registration/network

upgrad@upgrad-VirtualBox:~/work... * root@2a7c2ae96838:/opt/gopath/s... * upgrad@upgrad-VirtualBox:~/work... * root@2a7c2ae96838:/opt/gopath/s... * upgrad@upgrad-VirtualBox:~/work... *
2021-05-30 08:41:16.364 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 003 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.365 IST [common.tools.configtxgen] doOutputBlock -> INFO 006 Generating genesis block
+ res=0
+ set +x

##### Generating channel configuration transaction 'channel.tx' #####
+ configtxgen -profile RegistrationChannel -outputCreateChannelTx ./channel-artifacts/channel.tx -channelID registrationchannel
2021-05-30 08:41:16.396 IST [common.tools.configtxgen.localconfig] Load -> INFO 003 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.410 IST [common.tools.configtxgen.localconfig] Load -> INFO 003 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.421 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 003 orderer type: solo
2021-05-30 08:41:16.421 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 004 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.421 IST [common.tools.configtxgen] doOutputChannelCreateTx -> INFO 005 Generating new channel configtx
2021-05-30 08:41:16.421 IST [common.tools.configtxgen.encoder] NewChannelGroup -> WARN 006 Default policy emission is deprecated, please include policy specifications for the channel group in configtx.yaml
2021-05-30 08:41:16.422 IST [common.tools.configtxgen.encoder] NewChannelGroup -> WARN 007 Default policy emission is deprecated, please include policy specifications for the channel group in configtx.yaml
2021-05-30 08:41:16.423 IST [common.tools.configtxgen] doOutputChannelCreateTx -> INFO 006 Writing new channel tx
+ res=0
+ set +x

##### Generating anchor peer update for registrarMSP #####
+ configtxgen -profile RegistrationChannel -outputAnchorPeersUpdate ./channel-artifacts/registrarMSPanchors.tx -channelID registrationchannel -asOrg registrarMSP
2021-05-30 08:41:16.454 IST [common.tools.configtxgen.localconfig] Load -> INFO 003 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.470 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 003 orderer type: solo
2021-05-30 08:41:16.479 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 004 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.479 IST [common.tools.configtxgen] doOutputAnchorPeersUpdate -> INFO 005 Generating anchor peer update
2021-05-30 08:41:16.479 IST [common.tools.configtxgen] doOutputAnchorPeersUpdate -> INFO 006 Writing anchor peer update
+ res=0
+ set +x

##### Generating anchor peer update for usersMSP #####
+ configtxgen -profile RegistrationChannel -outputAnchorPeersUpdate ./channel-artifacts/usersMSPanchors.tx -channelID registrationchannel -asOrg usersMSP
2021-05-30 08:41:16.501 IST [common.tools.configtxgen.localconfig] Load -> INFO 003 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.516 IST [common.tools.configtxgen.localconfig] Load -> INFO 003 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.526 IST [common.tools.configtxgen.localconfig] completeInitialization -> INFO 003 orderer type: solo
2021-05-30 08:41:16.526 IST [common.tools.configtxgen.localconfig] LoadTopLevel -> INFO 004 Loaded configuration: /home/upgrad/workspace/avi-property-registration/network/configtx.yaml
2021-05-30 08:41:16.526 IST [common.tools.configtxgen] doOutputAnchorPeersUpdate -> INFO 005 Generating anchor peer update
2021-05-30 08:41:16.526 IST [common.tools.configtxgen] doOutputAnchorPeersUpdate -> INFO 006 Writing anchor peer update
+ res=0
+ set +x
```

2. Set up the fabric network using  
a. ./fabricNetwork.sh up

```
Activities Terminal * Sun 10:17
upgrad@upgrad-VirtualBox: ~/workspace/property-registration/property-registration/network

upgrad@upgrad-VirtualBox:~/work... * root@2a7c2ae96838:/opt/gopath/s... * root@2a7c2ae96838:/opt/gopath/s... * upgrad@upgrad-VirtualBox:~/work... * root@2a7c2ae96838:/opt/gopath/s... * upgrad@upgrad-VirtualBox:~/work... *
upgrad@upgrad-VirtualBox:~/workspace/property-registration/property-registration/network$ ./fabricNetwork.sh up
Starting for channel 'registrationchannel' with CLI timeout of '15' seconds and CLI delay of '5' seconds and chaincode version '1.1'
Continue? [Y/n]
Proceeding ...
LOCAL_VERSION=1.4.2
DOCKER_IMAGE_VERSION=1.4.2
Creating network 'network_registration' with the default driver
Creating volume 'network_orderer.property-registration-network.com' with default driver
Creating volume 'network_peer0.registrar.property-registration-network.com' with default driver
Creating volume 'network_peer1.registrar.property-registration-network.com' with default driver
Creating volume 'network_peer0.users.property-registration-network.com' with default driver
Creating volume 'network_peer2.users.property-registration-network.com' with default driver
Creating ca.registrar.property-registration-network.com ... done
Creating ca.users.property-registration-network.com ... done
Creating peer0.registrar.property-registration-network.com ... done
Creating peer1.registrar.property-registration-network.com ... done
Creating chaincode ... done
Creating peer0.registrar.property-registration-network.com ... done
Creating peer1.registrar.property-registration-network.com ... done
Creating peer2.users.property-registration-network.com ... done
Creating peer0.users.property-registration-network.com ... done
Creating cli ... done
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
1ca2f7d37a5a   hyperledger/fabric-tools:1.4.9     "/bin/bash"             1 second ago  Up Less than a second
724f4eda7d78   hyperledger/fabric-peer:1.4.9      "peer node start --p..." 6 seconds ago  Up 2 seconds  0.0.0.0:9051->9051/tcp, :::9051->9051/tcp, 0.0.0.0:9053->9053/tcp, :::9053->9053/tcp
bcd16328c542   hyperledger/fabric-peer:1.4.9      "peer node start --p..." 6 seconds ago  Up 1 second  0.0.0.0:11051->11051/tcp, :::11051->11051/tcp, 0.0.0.0:11053->11053/tcp, :::11053->11053/tcp
247e8920b59c   hyperledger/fabric-orderer:1.4.3   "orderer"               6 seconds ago  Up 2 seconds  0.0.0.0:7050->7050/tcp, :::7050->7050/tcp
17850d07dc13   hyperledger/fabric-peer:1.4.9      "peer node start --p..." 6 seconds ago  Up 1 second  0.0.0.0:8051->8051/tcp, :::8051->8051/tcp, 0.0.0.0:8053->8053/tcp, :::8053->8053/tcp
2a7c2ae96838   hyperledger/fabric-ccenv:1.4.9     "/bin/bash -c 'sleep..." 6 seconds ago  Up 1 second
064958e96360   hyperledger/fabric-peer:1.4.9      "peer node start --p..." 6 seconds ago  Up 1 second  0.0.0.0:7051->7051/tcp, :::7051->7051/tcp, 0.0.0.0:7053->7053/tcp, :::7053->7053/tcp
5c0bcf28ede0   hyperledger/fabric-peer:1.4.9      "peer node start --p..." 6 seconds ago  Up 2 seconds  0.0.0.0:10051->10051/tcp, :::10051->10051/tcp, 0.0.0.0:10053->10053/tcp, :::10053->10053/tcp
24d5cedd159   hyperledger/fabric-ca:1.4.9        "sh -c 'fabric-ca-se..." 6 seconds ago  Up 3 seconds  0.0.0.0:8054->7054/tcp, :::8054->7054/tcp
bdf3fbc7ed     hyperledger/fabric-ca:1.4.9        "sh -c 'fabric-ca-se..." 6 seconds ago  Up 3 seconds  0.0.0.0:7054->7054/tcp, :::7054->7054/tcp
ca.registrar.property-registration-network.com
Sleeping 15s to allow cluster to complete booting
```

```
upgrad@upgrad-VirtualBox: ~/workspace/property-registration/property-registration/network
Channel name : registrationchannel
Creating channel...
+ peer channel create -o orderer.property-registration-network.com:7050 -c registrationchannel -f ./channel-artifacts/channel.tx
+ set +x
2021-05-30 03:35:53.741 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:35:53.777 UTC [cli.common] readBlock -> INFO 002 Received block: 0
===== Channel 'registrationchannel' created =====

Having all peers join the channel...
+ peer channel join -b registrationchannel.block
+ set +x
2021-05-30 03:35:53.833 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:35:53.857 UTC [channelCmd] executeJoin -> INFO 002 Successfully submitted proposal to join channel
===== peer0.registrar.property-registration-network.com joined channel 'registrationchannel' =====

+ peer channel join -b registrationchannel.block
+ set +x
2021-05-30 03:35:58.930 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:35:58.952 UTC [channelCmd] executeJoin -> INFO 002 Successfully submitted proposal to join channel
===== peer1.registrar.property-registration-network.com joined channel 'registrationchannel' =====

+ peer channel join -b registrationchannel.block
+ set +x
2021-05-30 03:36:04.020 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:36:04.050 UTC [channelCmd] executeJoin -> INFO 002 Successfully submitted proposal to join channel
===== peer0.users.property-registration-network.com joined channel 'registrationchannel' =====

+ peer channel join -b registrationchannel.block
+ set +x
2021-05-30 03:36:09.125 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:36:09.150 UTC [channelCmd] executeJoin -> INFO 002 Successfully submitted proposal to join channel
===== peer1.users.property-registration-network.com joined channel 'registrationchannel' =====

+ peer channel join -b registrationchannel.block
+ set +x
2021-05-30 03:36:09.930 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:36:09.952 UTC [channelCmd] executeJoin -> INFO 002 Successfully submitted proposal to join channel
===== peer1.registrar.property-registration-network.com joined channel 'registrationchannel' =====

+ peer channel join -b registrationchannel.block
+ set +x
2021-05-30 03:36:04.020 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:36:04.050 UTC [channelCmd] executeJoin -> INFO 002 Successfully submitted proposal to join channel
===== peer0.users.property-registration-network.com joined channel 'registrationchannel' =====

+ peer channel join -b registrationchannel.block
+ set +x
2021-05-30 03:36:09.125 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:36:09.150 UTC [channelCmd] executeJoin -> INFO 002 Successfully submitted proposal to join channel
===== peer1.users.property-registration-network.com joined channel 'registrationchannel' =====

+ peer channel join -b registrationchannel.block
+ set +x
2021-05-30 03:36:14.221 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:36:14.243 UTC [channelCmd] executeJoin -> INFO 002 Successfully submitted proposal to join channel
Updating anchor peers for REGISTRAR...
+ peer channel update -o orderer.property-registration-network.com:7050 -c registrationchannel -f ./channel-artifacts/registrarMSPanchors.tx
+ set +x
2021-05-30 03:36:14.302 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:36:14.317 UTC [channelCmd] update -> INFO 002 Successfully submitted channel update
===== Anchor peers updated for org 'registrarMSP' on channel 'registrationchannel' =====

Updating anchor peers for USERS...
+ peer channel update -o orderer.property-registration-network.com:7050 -c registrationchannel -f ./channel-artifacts/usersMSPanchors.tx
+ set +x
2021-05-30 03:36:19.390 UTC [channelCmd] InitCndFactory -> INFO 001 Endorser and orderer connections initialized
2021-05-30 03:36:19.403 UTC [channelCmd] update -> INFO 002 Successfully submitted channel update
===== Anchor peers updated for org 'usersMSP' on channel 'registrationchannel' =====

===== All GOOD, Hyperledger Fabric Property Registration Network Is Now Up and Running! =====
```

3. Install and instantiate the chaincode using
  - a. `./fabricNetwork.sh install`



```
Activities Terminal Sun 10:20
upgrad@upgrad-VirtualBox: ~/workspace/property-registration/property-registration/network

upgrad@upgrad-VirtualBox:~/workspace/property-registration/property-registration/network$ ./fabricnetwork.sh install
Installing chaincode for channel 'registrationchannel' with CLI timeout of '15' seconds and CLI delay of '5' seconds and chaincode version '1.1'
Continue? [y/n]
proceeding ...
LOCAL_VERSION=1.4.2
DOCKER_IMAGE_VERSION=1.4.2

START

Deploying Chaincode REGNET On Certification Network

Channel name : registrationchannel
Installing chaincode on peer0.registrar.property-registration-network.com ...
+ peer chaincode install -n regnet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
+ res=0
+ set +x
2021-05-30 03:37:53.122 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default esc
2021-05-30 03:37:53.122 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vsc
2021-05-30 03:37:53.562 UTC [chaincodeCmd] install -> INFO 001 Installed remotely response:<status:200 payload:"OK" >
===== Chaincode is installed on peer0.registrar =====

Installing chaincode on peer1.registrar.property-registration-network.com ...
+ peer chaincode install -n regnet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
+ res=0
+ set +x
2021-05-30 03:37:53.630 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default esc
2021-05-30 03:37:53.630 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vsc
2021-05-30 03:37:53.736 UTC [chaincodeCmd] install -> INFO 001 Installed remotely response:<status:200 payload:"OK" >
===== Chaincode is installed on peer1.registrar =====

Installing chaincode on peer0.users.property-registration-network.com ...
+ peer chaincode install -n regnet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
+ res=0
+ set +x
2021-05-30 03:37:53.799 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default esc
2021-05-30 03:37:53.799 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vsc
2021-05-30 03:37:53.884 UTC [chaincodeCmd] install -> INFO 001 Installed remotely response:<status:200 payload:"OK" >
===== Chaincode is installed on peer0.users =====

Instantiating chaincode on channel using peer0.registrar.property-registration-network.com ...
+ peer chaincode instantiate -o orderer.property-registration-network.com:7050 -c registrationchannel -n regnet -l node -v 1.1 -c '{"Args":["org.property-registration-network.user:Instantiate"]}' -P 'OR (
  'registrationMSP.member','usersMSP.member')'
+ res=0
+ set +x

Channel name : registrationchannel
Installing chaincode on peer0.registrar.property-registration-network.com ...
+ peer chaincode install -n regnet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
+ res=0
+ set +x
2021-05-30 03:37:53.122 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default esc
2021-05-30 03:37:53.122 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vsc
2021-05-30 03:37:53.562 UTC [chaincodeCmd] install -> INFO 001 Installed remotely response:<status:200 payload:"OK" >
===== Chaincode is installed on peer0.registrar =====

Installing chaincode on peer1.registrar.property-registration-network.com ...
+ peer chaincode install -n regnet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
+ res=0
+ set +x
2021-05-30 03:37:53.630 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default esc
2021-05-30 03:37:53.630 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vsc
2021-05-30 03:37:53.736 UTC [chaincodeCmd] install -> INFO 001 Installed remotely response:<status:200 payload:"OK" >
===== Chaincode is installed on peer1.registrar =====

Installing chaincode on peer0.users.property-registration-network.com ...
+ peer chaincode install -n regnet -v 1.1 -l node -p /opt/gopath/src/github.com/hyperledger/fabric/peer/chaincode/
+ res=0
+ set +x
2021-05-30 03:37:53.799 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default esc
2021-05-30 03:37:53.799 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vsc
2021-05-30 03:37:53.884 UTC [chaincodeCmd] install -> INFO 001 Installed remotely response:<status:200 payload:"OK" >
===== Chaincode is installed on peer0.users =====

Instantiating chaincode on channel using peer0.registrar.property-registration-network.com ...
+ peer chaincode instantiate -o orderer.property-registration-network.com:7050 -c registrationchannel -n regnet -l node -v 1.1 -c '{"Args":["org.property-registration-network.user:Instantiate"]}' -P 'OR (
  'registrationMSP.member','usersMSP.member')'
+ res=0
+ set +x
2021-05-30 03:37:53.949 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default esc
2021-05-30 03:37:53.949 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vsc
===== Chaincode is instantiated on peer0.registrar on channel 'registrationchannel' =====

===== All GOOD, Chaincode REGNET Is Now Installed & Instantiated On Registration Network =====

END
upgrad@upgrad-VirtualBox:~/workspace/property-registration/property-registration/network$
```

## Accessing the Functions of Chaincode

1. Installing the dependencies from package.json file in chaincode container

**Step1:** Connect to chaincode container

*docker exec -it chaincode /bin/bash*

**Step2:** Run npm install to install dependencies from package.json

**Step3:** Run npm run start-dev

2. To invoke a function from user contract using peer0.users:

**Step1:** Connect to chaincode container

```
docker exec -it chaincode /bin/bash
```

**Step2:** Run the script

```
npm run start-dev1(as this script is pointing to peer0.users in package.json run script)
```

**Step3:** On another terminal connect to peer0.users.property-registration-network.com using *docker exec -it peer0.users.property-registration-network.com /bin/bash*

**Step4:** Invoke any function from the user contract here.

3. To invoke a function from registrar contract using registrar:

**Step1:** Connect to chaincode container

```
docker exec -it chaincode /bin/bash
```

**Step2:** Run the script

```
npm run start-dev(as this script is pointing to registrar in package.json run script)
```

**Step3:** On another terminal connect to registrar.property-registration-network.com using

```
docker exec -it registrar.property-registration-network.com /bin/bash
```

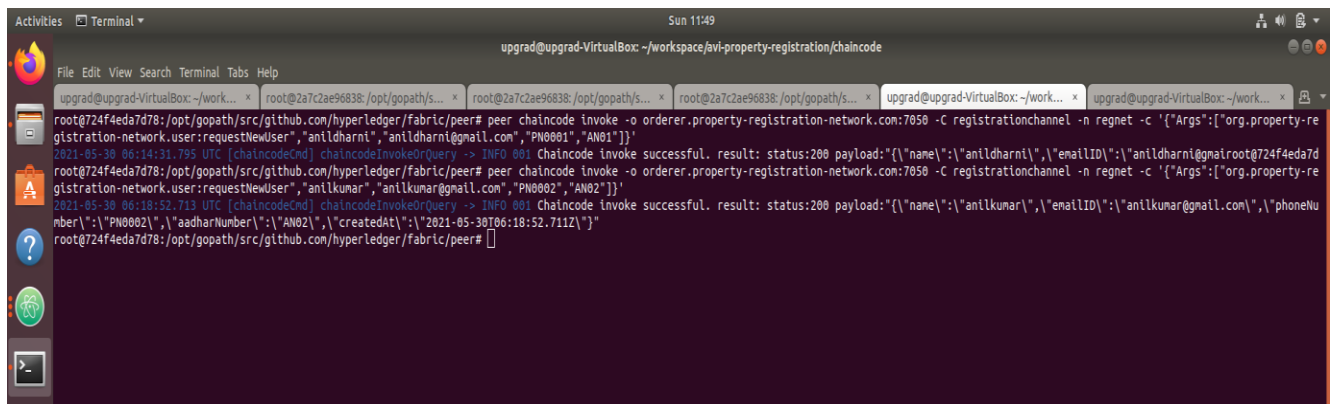
**Step4:** Invoke any function from the registrar contract here.

## Functions for creating and approving users, purchase and resale of properties

1. Request user. Let's raise User requests for convenience, so that we can use them in later stages.

a. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:requestNewUser","anildharni","[anildharni@gmail.com](mailto:anildharni@gmail.com)","PN0001","AN01"]}'*

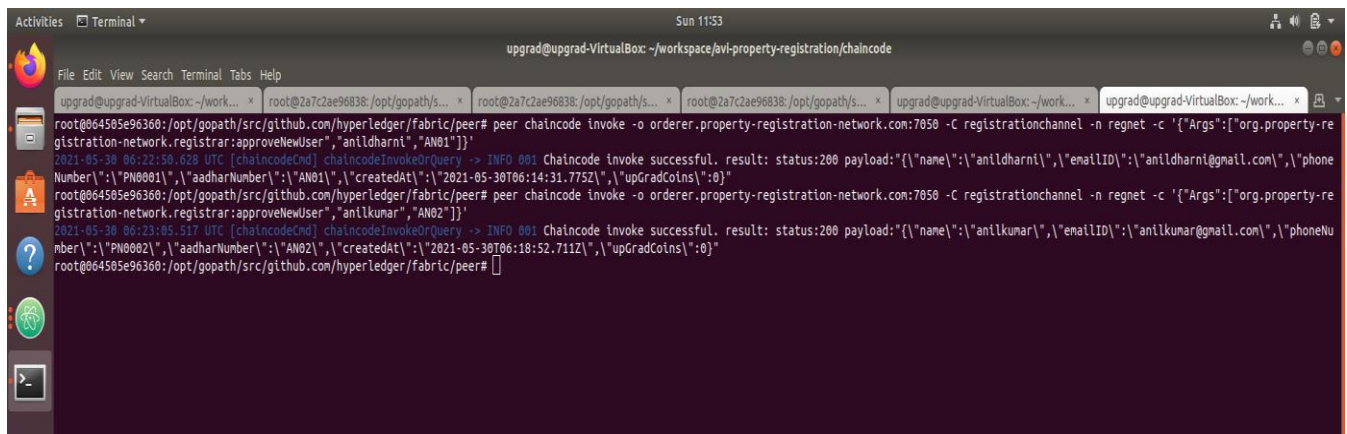
b. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:requestNewUser","anilkumar","[anilkumar@gmail.com](mailto:anilkumar@gmail.com)","PN0002","AN02"]}'*



```
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/chaincode
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:requestNewUser","anildharni","anildharni@gmail.com","PN0001","AN01"]}'
2021-05-30 06:14:31.795 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anildharni","emailID":"anildharni@gmail.com","phoneNumber":"PN0001","aadharNumber":"AN01","createdAt":"2021-05-30T06:14:31.775Z","upGradCoins":0}
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:requestNewUser","anilkumar","anilkumar@gmail.com","PN0002","AN02"]}'
2021-05-30 06:18:52.713 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anilkumar","emailID":"anilkumar@gmail.com","phoneNumber":"PN0002","aadharNumber":"AN02","createdAt":"2021-05-30T06:18:52.711Z","upGradCoins":0}
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer#
```

## 2. Approve user request

- Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:approveNewUser","anildharni","AN01"]}'
- Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:approveNewUser","anilkumar","AN02"]}'



```
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/chaincode
root@064505e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:approveNewUser","anildharni","AN01"]}'
2021-05-30 06:22:50.628 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anildharni","emailID":"anildharni@gmail.com","phoneNumber":"PN0001","aadharNumber":"AN01","createdAt":"2021-05-30T06:14:31.775Z","upGradCoins":0}
root@064505e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:approveNewUser","anilkumar","AN02"]}'
2021-05-30 06:23:05.517 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anilkumar","emailID":"anilkumar@gmail.com","phoneNumber":"PN0002","aadharNumber":"AN02","createdAt":"2021-05-30T06:18:52.711Z","upGradCoins":0}
root@064505e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer#
```

## 3. Recharge Account

- Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:rechargeAccount","anildharni","AN01","upg1000"]}'
- Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:rechargeAccount","anilkumar","AN02","upg1000"]}'

```
upgrad@upgrad-VirtualBox: ~/workspace/avl-property-registration/chaincode
root@8724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:rechargeAccount","anilkumar","AN02","upg1000"]}'
2021-05-30 06:26:29.266 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anilkumar","emailID":"anilkumar@gmail.com","phoneNumber":"PN0002","aadharNumber":"AN02","createdAt":"2021-05-30T06:18:52.711Z","upGradCoins":1000}
root@8724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:rechargeAccount","anildharni","AN01","upg1000"]}'
2021-05-30 06:26:39.065 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anildharni","emailID":"anildharni@gmail.com","phoneNumber":"PN0001","aadharNumber":"AN01","createdAt":"2021-05-30T06:14:31.775Z","upGradCoins":1000}
root@8724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer#
```

#### 4. Viewing approved users

##### a. From Registrar

- i. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:viewUser","anildharni","AN01"]}'*
- ii. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:viewUser","anilkumar","AN02"]}'*

```
upgrad@upgrad-VirtualBox: ~/workspace/avl-property-registration/chaincode
root@864585e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:viewUser","anilkumar","AN02"]}'
2021-05-30 06:36:39.128 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anilkumar","emailID":"anilkumar@gmail.com","phoneNumber":"PN0002","aadharNumber":"AN02","createdAt":"2021-05-30T06:18:52.711Z","upGradCoins":1000}
root@864585e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:viewUser","anildharni","AN01"]}'
2021-05-30 06:36:49.464 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anildharni","emailID":"anildharni@gmail.com","phoneNumber":"PN0001","aadharNumber":"AN01","createdAt":"2021-05-30T06:14:31.775Z","upGradCoins":1000}
root@864585e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer#
```

##### b. From User

- i. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:viewUser","anildharni","AN01"]}'*
- ii. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:viewUser","anilkumar","AN02"]}'*

```
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/chaincode
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:viewUser","anildharni","AN01"]}'
2021-05-30 06:36:11.073 UTC [chaincodeCmd] chaincodeInvokeOrQuery => INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anildharni","emailID":"anildharni@gmail.com","phoneNumber":"PN0001","aadharNumber":"AN01","createdAt":"2021-05-30T06:14:31.775Z","upGradCoins":1000}
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:viewUser","anilkumar","AN02"]}'
2021-05-30 06:36:22.133 UTC [chaincodeCmd] chaincodeInvokeOrQuery => INFO 001 Chaincode invoke successful. result: status:200 payload:{"name":"anilkumar","emailID":"anilkumar@gmail.com","phoneNumber":"PN0002","aadharNumber":"AN02","createdAt":"2021-05-30T06:18:52.711Z","upGradCoins":1000}
```

## 5. Property Registration request from the user

- a. Let's say user anildharni wants to raise a property registration request.
  - i. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:propertyRegistrationRequest","RN101","anildharni","1000","registered","anildharni","AN01"]}'*

```
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/chaincode
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:propertyRegistrationRequest","RN101","anildharni","1000","registered","anildharni","AN01"]}'
2021-05-30 06:40:29.621 UTC [chaincodeCmd] chaincodeInvokeOrQuery => INFO 001 Chaincode invoke successful. result: status:200 payload:{"propertyID":"RN101","owner":"\u0000org.property-registration-network.regnet.approvedUser\u0000anildharni-AN01\u0000","price":1000,"status":"registered"}
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer#
```

## 6. Property approval

- a. After receiving a request from the user a registrar can run
  - i. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:approvePropertyRegistration","RN101"]}'*

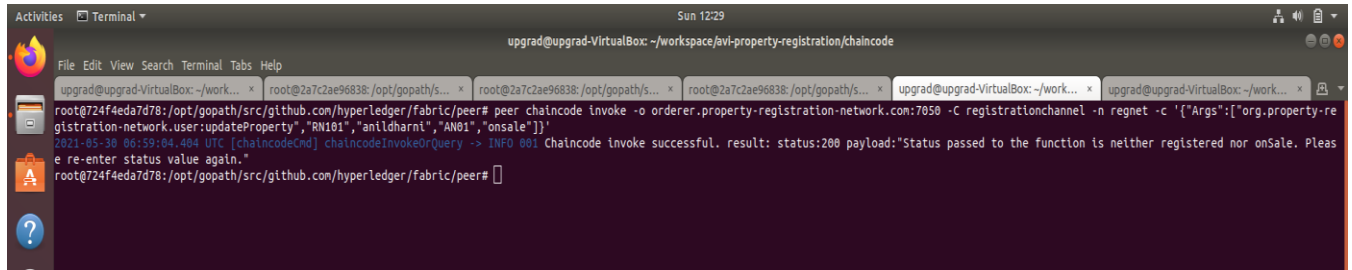
```
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/chaincode
root@064505e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:approvePropertyRegistration","RN101"]}'
2021-05-30 06:44:56.941 UTC [chaincodeCmd] chaincodeInvokeOrQuery => INFO 001 Chaincode invoke successful. result: status:200 payload:{"propertyID":"RN101","owner":"\u0000org.property-registration-network.regnet.approvedUser\u0000anildharni-AN01\u0000","price":1000,"status":"registered"}
root@064505e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer#
```



## 7. View property

### a. User:

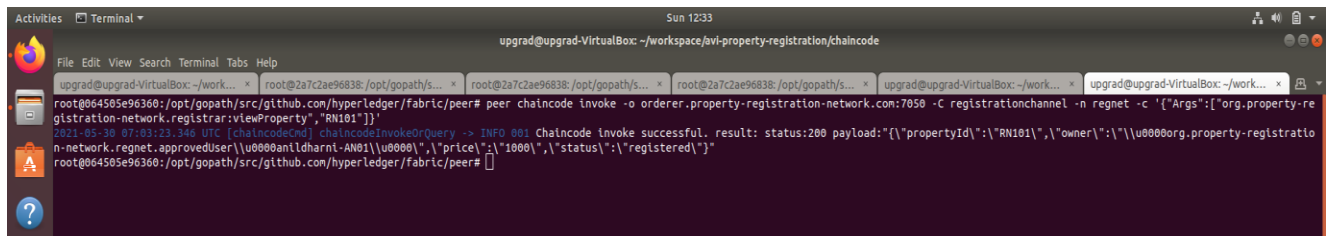
- i. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:viewProperty","RN101"]}'*



```
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/chaincode
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:viewProperty","RN101"]}'
2021-05-30 06:59:04.404 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:"Status passed to the function is neither registered nor onSale. Please re-enter status value again."
```

### b. Registrar:

- i. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:viewProperty","RN101"]}'*

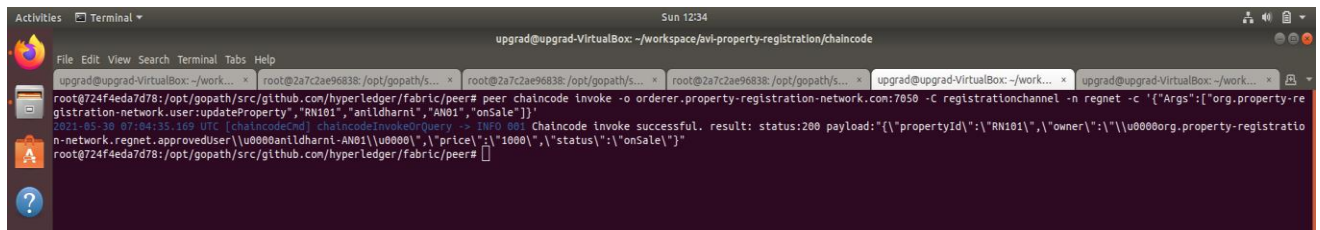


```
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/chaincode
root@064505e96360:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.registrar:viewProperty","RN101"]}'
2021-05-30 07:03:23.346 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"propertyId":"RN101","owner":"u0000org.property-registration-network.regnet.approvedUser\\u0000anildharini-AN01\\u0000","price":"1000","status":"registered"}
```

## 8. Update Property

### a. Let's say the user wants to put up his property for sale

- i. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:updateProperty","RN101","anildharini","AN01","onSale"]}'*
- ii.

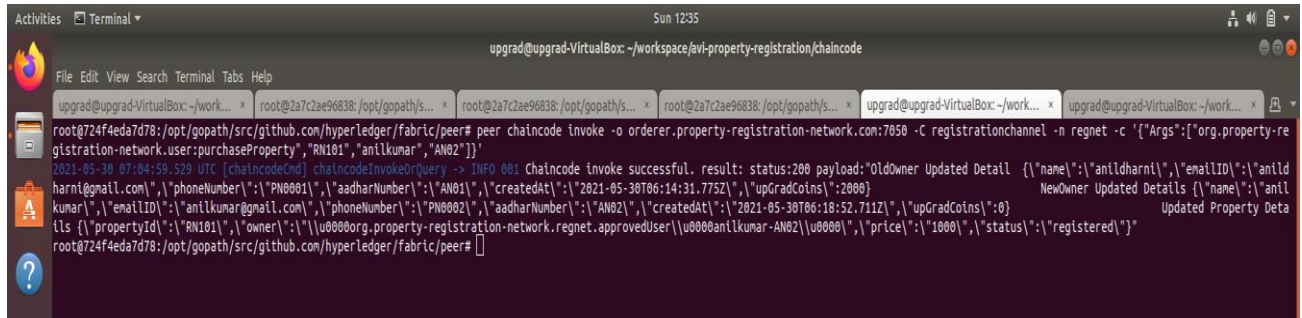


```
upgrad@upgrad-VirtualBox: ~/workspace/avi-property-registration/chaincode
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:updateProperty","RN101","anildharini","AN01","onSale"]}'
2021-05-30 07:04:35.169 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:{"propertyId":"RN101","owner":"u0000org.property-registration-network.regnet.approvedUser\\u0000anildharini-AN01\\u0000","price":"1000","status":"onSale"}
```

## 9. Purchase Property

a. Let's say user anilkumar wants to buy the property from anildharni

- i. *Peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:purchaseProperty","101","anilkumar","AN02"]}'*



The screenshot shows a terminal window with the following command and output:

```
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.user:purchaseProperty","RN101","anilkumar","AN02"]}'
2021-05-30 07:04:59.529 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. result: status:200 payload:OldOwner Updated Detail {"name":"anildharni","emailID":"anildharni@gmail.com","phoneNumber":"PN0001","aadharNumber":"AN01","createdAt":"2021-05-30T06:14:31.775Z","upGradCoins":2000} NewOwner Updated Details {"name":"anilkumar","emailID":"anilkumar@gmail.com","phoneNumber":"PN0002","aadharNumber":"AN02","createdAt":"2021-05-30T06:18:52.711Z","upGradCoins":0} Updated Property Details {"propertyId":"RN101","owner":"u0000org.property-registration-network.regnet.approvedUser\\u0000anilkumar-AN02\\u0000","price":"1000","status":"registered"}
root@724f4eda7d78:/opt/gopath/src/github.com/hyperledger/fabric/peer#
```