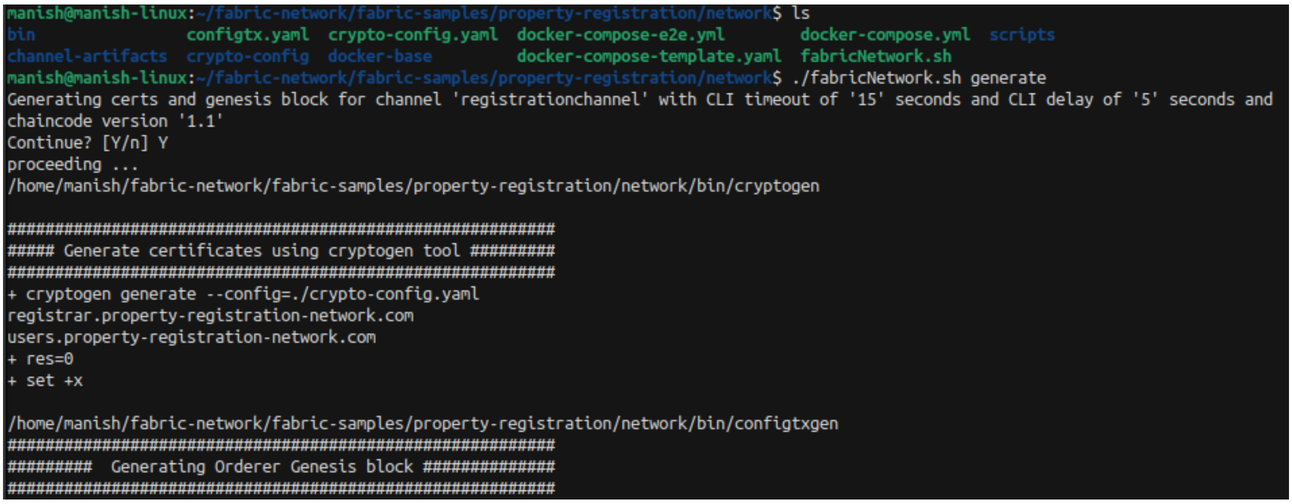
**Command To BootStrap the network**

Go to the folder containing the project.
And run the following command to create the certificates and artifacts
1. ./fabricnetwork.sh generate



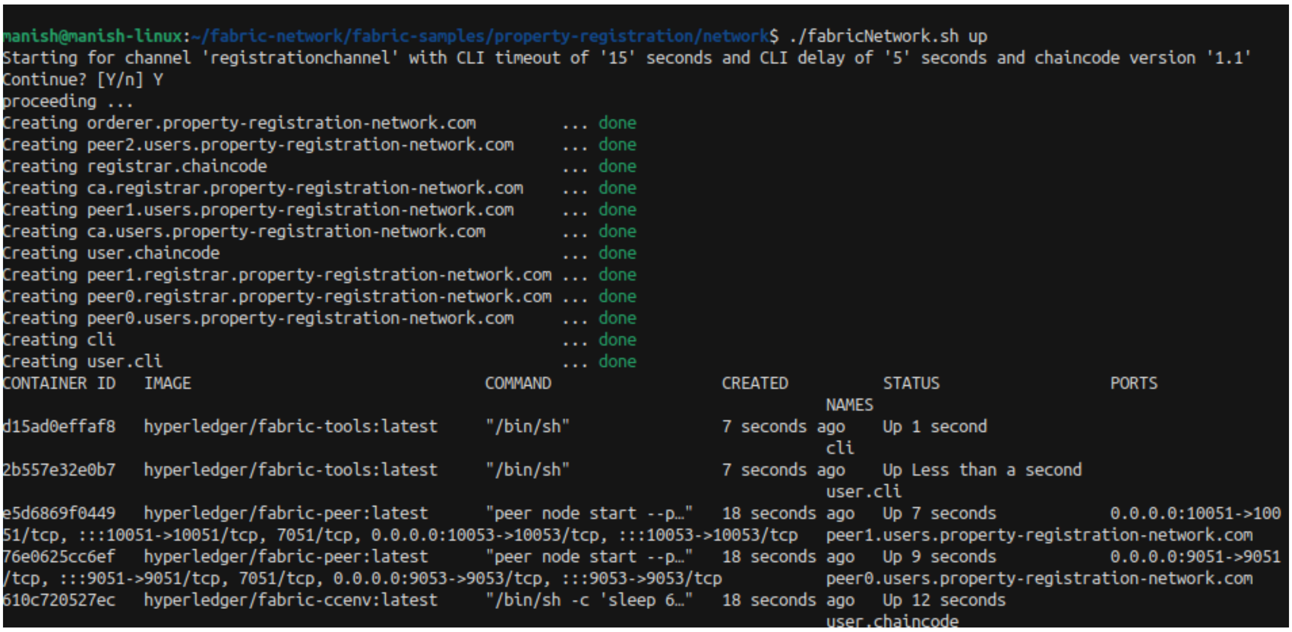
```
manish@manish-linux:~/fabric-network/fabric-samples/property-registration/network$ ls
bin                configtx.yaml  crypto-config.yaml  docker-compose-e2e.yml        docker-compose.yml  scripts
channel-artifacts  crypto-config  docker-base         docker-compose-template.yaml  fabricNetwork.sh
manish@manish-linux:~/fabric-network/fabric-samples/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] Y
proceeding ...
/home/manish/fabric-network/fabric-samples/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/manish/fabric-network/fabric-samples/property-registration/network/bin/configtxgen
##########################################################
#########  Generating Orderer Genesis block ##############
##########################################################
```

2. run the following command to bring the network up.
./fabricnetwork.sh up

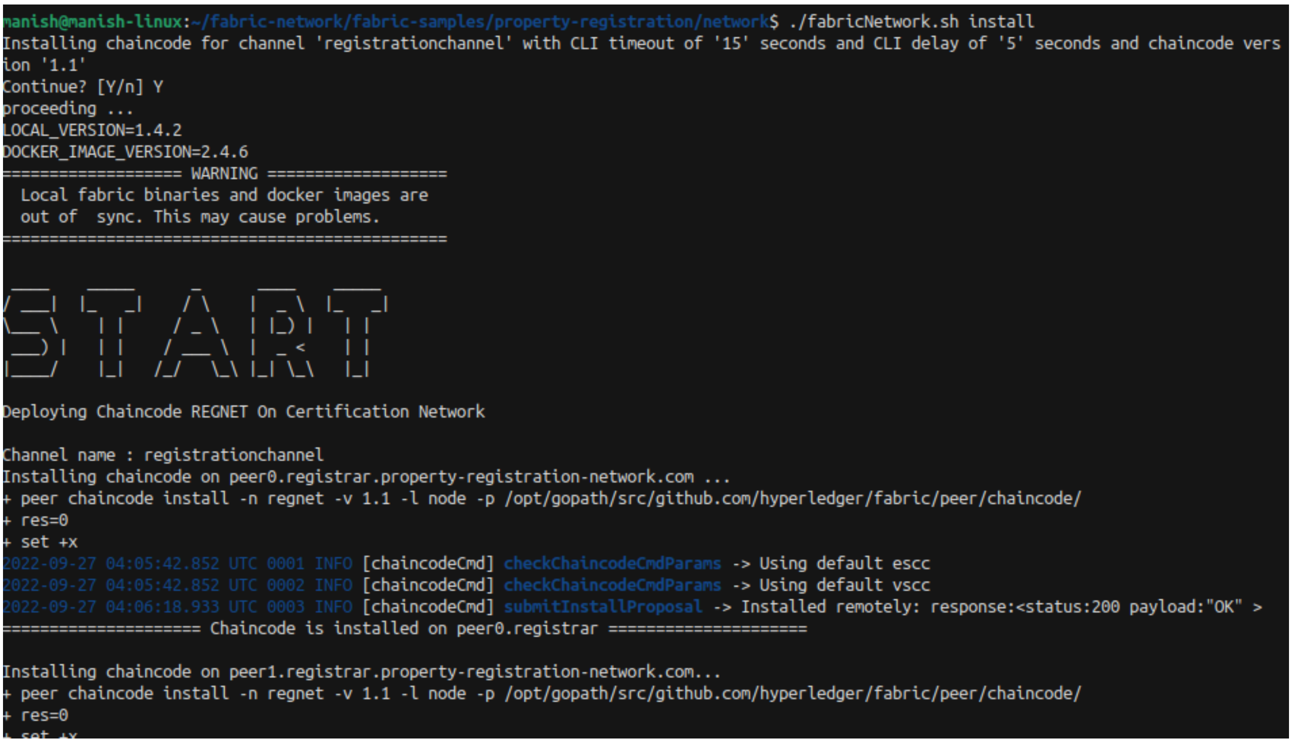
I’ve made changes in the dockercompose template file to create two cli containers 1 for user and one for registrar namely user.cli and cli.
Also, there are two chaincode instances running in the network naming registrar.chaincode and user.chaincode



```
manish@manish-linux:~/fabric-network/fabric-samples/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] Y
proceeding ...
Creating orderer.property-registration-network.com         ... done
Creating peer2.users.property-registration-network.com     ... done
Creating registrar.chaincode                               ... done
Creating ca.registrar.property-registration-network.com    ... done
Creating peer1.users.property-registration-network.com     ... done
Creating ca.users.property-registration-network.com        ... done
Creating user.chaincode                                    ... done
Creating peer1.registrar.property-registration-network.com ... done
Creating peer0.registrar.property-registration-network.com ... done
Creating peer0.users.property-registration-network.com     ... done
Creating cli                                               ... done
Creating user.cli                                          ... done
CONTAINER ID   IMAGE                           COMMAND                  CREATED          STATUS                   PORTS
                                                                                   NAMES
d15ad0effaf8   hyperledger/fabric-tools:latest     "/bin/sh"                7 seconds ago    Up 1 second
                                                                                   cli
2b557e32e0b7   hyperledger/fabric-tools:latest     "/bin/sh"                7 seconds ago    Up Less than a second
                                                                                   user.cli
e5d6869f0449   hyperledger/fabric-peer:latest      "peer node start --p…"   18 seconds ago   Up 7 seconds             0.0.0.0:10051->100
51/tcp, :::10051->10051/tcp, 7051/tcp, 0.0.0.0:10053->10053/tcp, :::10053->10053/tcp   peer1.users.property-registration-network.com
76e0625cc6ef   hyperledger/fabric-peer:latest      "peer node start --p…"   18 seconds ago   Up 9 seconds             0.0.0.0:9051->9051
/tcp, :::9051->9051/tcp, 7051/tcp, 0.0.0.0:9053->9053/tcp, :::9053->9053/tcp           peer0.users.property-registration-network.com
610c720527ec   hyperledger/fabric-ccenv:latest     "/bin/sh -c 'sleep 6…"   18 seconds ago   Up 12 seconds
                                                                                   user.chaincode
```

**Command to install the instantiate the chaincode**

1. run the following command to install the chaincode on the network.
./fabricnetwork.sh install



```
manish@manish-linux:~/fabric-network/fabric-samples/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 vers
ion '1.1'
Continue? [Y/n] Y
proceeding ...
LOCAL_VERSION=1.4.2
DOCKER_IMAGE_VERSION=2.4.6
================== WARNING ==================
  Local fabric binaries and docker images are
  out of  sync. This may cause problems.
==============================================

 ____    _____      _      ____    _____
/ ___|  |_   _|    / \    |  _ \  |_   _|
\___ \    | |     / _ \   | |_) |   | |
 ___) |   | |    / ___ \  |  _ <    | |
|____/    |_|   /_/   \_\ |_| \_\   |_|

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
2022-09-27 04:05:42.852 UTC 0001 INFO [chaincodeCmd] checkChaincodeCmdParams -> Using default escc
2022-09-27 04:05:42.852 UTC 0002 INFO [chaincodeCmd] checkChaincodeCmdParams -> Using default vscc
2022-09-27 04:06:18.933 UTC 0003 INFO [chaincodeCmd] submitInstallProposal -> 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
```

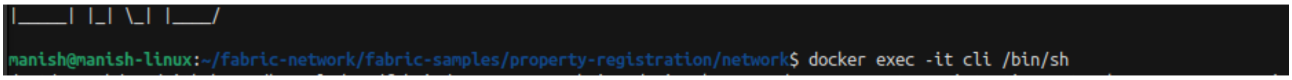
**Command to execute transactions.**

To execute transaction, we will login to two different screen, one for user and other for registrar for clear distinction between who executes what transaction.

I had to make change in the docker-compose-template.yaml to use sh as bin/bash was not working for me.

To login to registrar cli we use following command.

docker exec -it *bin*/sh

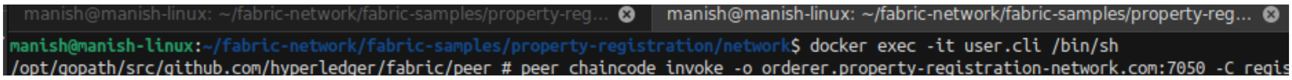


```
|_____| |_| \_| |____/

manish@manish-linux:~/fabric-network/fabric-samples/property-registration/network$ docker exec -it cli /bin/sh
```

To login to user cli from a different window, run the following command.

docker exec -it user.cli *bin*/sh



manish@manish-linux: ~/fabric-network/fabric-samples/property-reg...
manish@manish-linux: ~/fabric-network/fabric-samples/property-reg...

```
manish@manish-linux:~/fabric-network/fabric-samples/property-registration/network$ docker exec -it user.cli /bin/sh
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C regis
```

Now we run the transaction command from cli

We will use two differnt users here- Manish and Mayank.

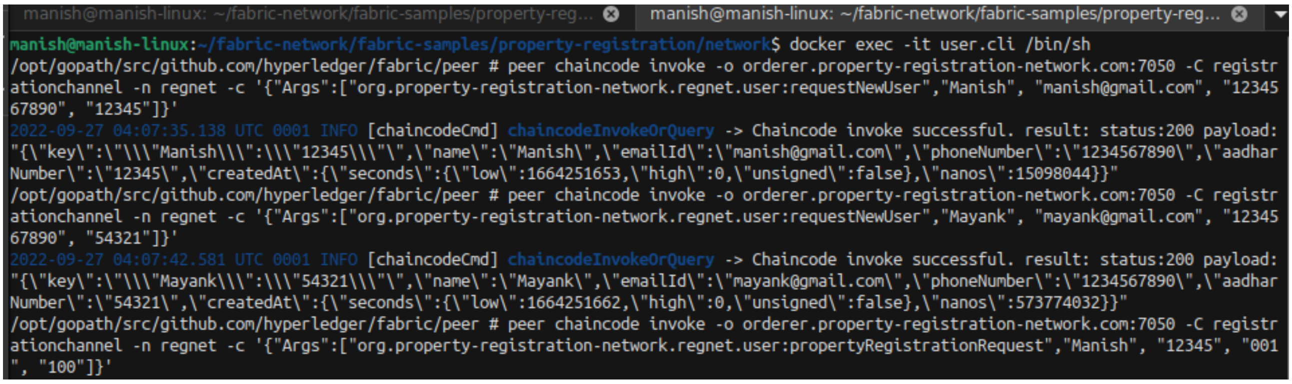
From the user.cli, we call these commands.

Manish requests to register himself on the network:

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:requestNewUser","Manish", "manish@gmail.com", "1234567890", "12345"]}'

Mayank requests to register himself on the network:

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:requestNewUser","Mayank", "mayank@gmail.com", "1234567890", "54321"]}'

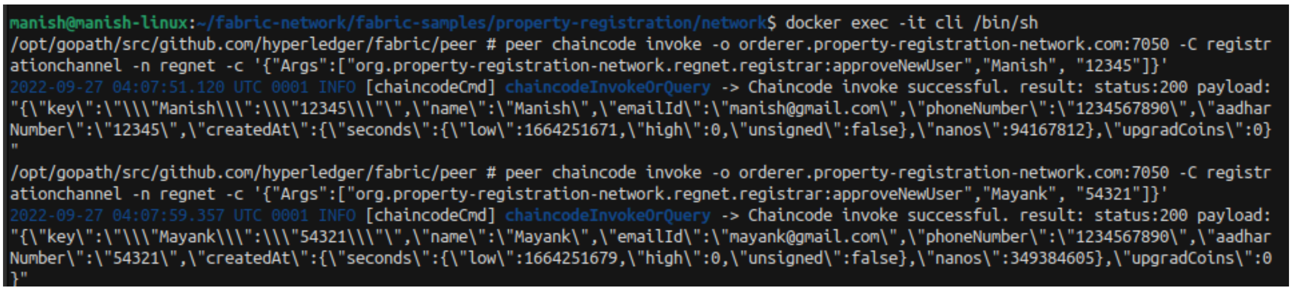

manish@manish-linux: ~/fabric-network/fabric-samples/property-reg...
manish@manish-linux: ~/fabric-network/fabric-samples/property-reg...

```
manish@manish-linux:~/fabric-network/fabric-samples/property-registration/network$ docker exec -it user.cli /bin/sh
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:requestNewUser","Manish", "manish@gmail.com", "12345
67890", "12345"]}'
2022-09-27 04:07:35.138 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"Manish\\\":\\\"12345\\\"\",\"name\":\"Manish\",\"emailId\":\"manish@gmail.com\",\"phoneNumber\":\"1234567890\",\"aadhar
Number\":\"12345\",\"createdAt\":{\"seconds\":{\"low\":1664251653,\"high\":0,\"unsigned\":false},\"nanos\":15098044}}"
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:requestNewUser","Mayank", "mayank@gmail.com", "12345
67890", "54321"]}'
2022-09-27 04:07:42.581 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"Mayank\\\":\\\"54321\\\"\",\"name\":\"Mayank\",\"emailId\":\"mayank@gmail.com\",\"phoneNumber\":\"1234567890\",\"aadhar
Number\":\"54321\",\"createdAt\":{\"seconds\":{\"low\":1664251662,\"high\":0,\"unsigned\":false},\"nanos\":573774032}}"
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:propertyRegistrationRequest","Manish", "12345", "001
", "100"]}'
```

After request is raised, from the registrar cli, we will invoke two command to approve both the users.

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.registrar:approveNewUser","Manish", "12345"]}'

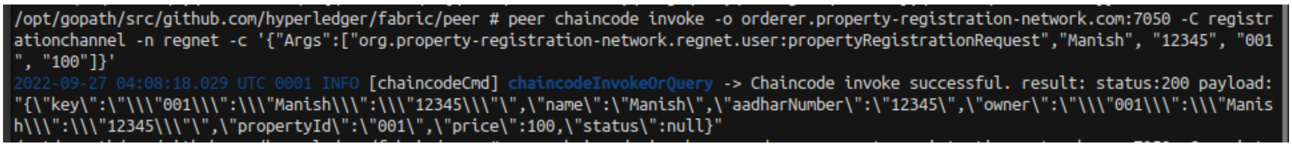
peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.registrar:approveNewUser","Mayank", "54321"]}



```
manish@manish-linux:~/fabric-network/fabric-samples/property-registration/network$ docker exec -it cli /bin/sh
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.registrar:approveNewUser","Manish", "12345"]}'
2022-09-27 04:07:51.120 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"Manish\\\":\\\"12345\\\"\",\"name\":\"Manish\",\"emailId\":\"manish@gmail.com\",\"phoneNumber\":\"1234567890\",\"aadhar
Number\":\"12345\",\"createdAt\":{\"seconds\":{\"low\":1664251671,\"high\":0,\"unsigned\":false},\"nanos\":94167812},\"upgradCoins\":0}
"
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.registrar:approveNewUser","Mayank", "54321"]}'
2022-09-27 04:07:59.357 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"Mayank\\\":\\\"54321\\\"\",\"name\":\"Mayank\",\"emailId\":\"mayank@gmail.com\",\"phoneNumber\":\"1234567890\",\"aadhar
Number\":\"54321\",\"createdAt\":{\"seconds\":{\"low\":1664251679,\"high\":0,\"unsigned\":false},\"nanos\":349384605},\"upgradCoins\":0
}"
```

from user.cli, Manish will request from property registration.

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:propertyRegistrationRequest","Manish", "12345", "001", "100"]}'
Price for the propert is 100 as passed in the arguments.

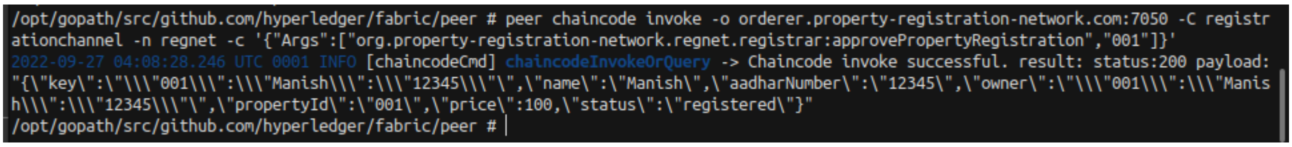


```
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:propertyRegistrationRequest","Manish", "12345", "001
", "100"]}'
2022-09-27 04:08:18.029 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"001\\\":\\\"Manish\\\":\\\"12345\\\"\",\"name\":\"Manish\",\"aadharNumber\":\"12345\",\"owner\":\"\\\"001\\\":\\\"Manis
h\\\":\\\"12345\\\"\",\"propertyId\":\"001\",\"price\":100,\"status\":null}"
```

Initially the status is set to null when user requests for registration.

from registrar cli, we will invoke command to approve the registration.

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.registrar:approvePropertyRegistration","001"]}'

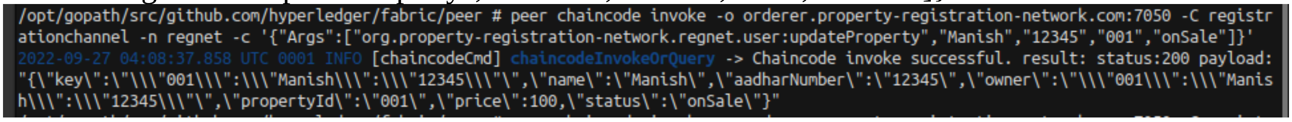


```
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.registrar:approvePropertyRegistration","001"]}'
2022-09-27 04:08:28.246 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"001\\\":\\\"Manish\\\":\\\"12345\\\"\",\"name\":\"Manish\",\"aadharNumber\":\"12345\",\"owner\":\"\\\"001\\\":\\\"Manis
h\\\":\\\"12345\\\"\",\"propertyId\":\"001\",\"price\":100,\"status\":\"registered\"}"
/opt/gopath/src/github.com/hyperledger/fabric/peer # |
```

Once the approval is done, property status is changes to registered.

from user cli, we will invoke command to update the property to onSale status for Manish

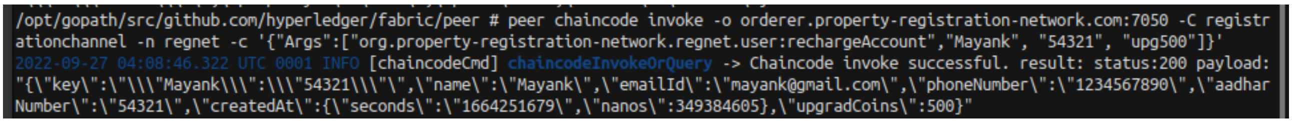
peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:updateProperty","Manish","12345","001","onSale"]}'



```
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:updateProperty","Manish","12345","001","onSale"]}'
2022-09-27 04:08:37.858 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"001\\\":\\\"Manish\\\":\\\"12345\\\"\",\"name\":\"Manish\",\"aadharNumber\":\"12345\",\"owner\":\"\\\"001\\\":\\\"Manis
h\\\":\\\"12345\\\"\",\"propertyId\":\"001\",\"price\":100,\"status\":\"onSale\"}"
```

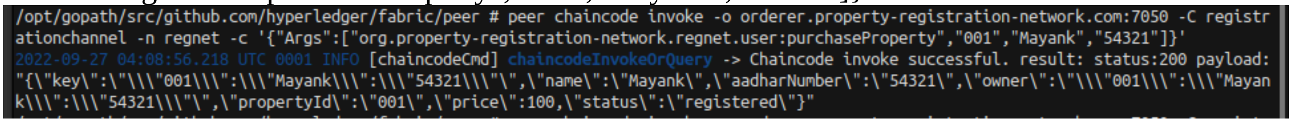
from user cli again, mayank will raise a request to recharge his account

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:rechargeAccount","Mayank", "54321", "upg500"]}'



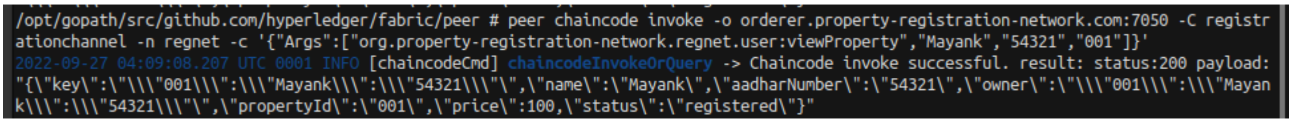
```
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:rechargeAccount","Mayank", "54321", "upg500"]}'
2022-09-27 04:08:46.322 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"Mayank\\\":\\\"54321\\\"\",\"name\":\"Mayank\",\"emailId\":\"mayank@gmail.com\",\"phoneNumber\":\"1234567890\",\"aadhar
Number\":\"54321\",\"createdAt\":{\"seconds\":\"1664251679\",\"nanos\":349384605},\"upgradCoins\":500}"
```

from user.cli again, Mayank will raise a request to purchase the property
peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:purchaseProperty","001","Mayank","54321"]}'



```
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:purchaseProperty","001","Mayank","54321"]}'
2022-09-27 04:08:56.218 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"001\\\":\\\"Mayank\\\":\\\"54321\\\"\",\"name\":\"Mayank\",\"aadharNumber\":\"54321\",\"owner\":\"\\\"001\\\":\\\"Mayan
k\\\":\\\"54321\\\"\",\"propertyId\":\"001\",\"price\":100,\"status\":\"registered\"}"
```

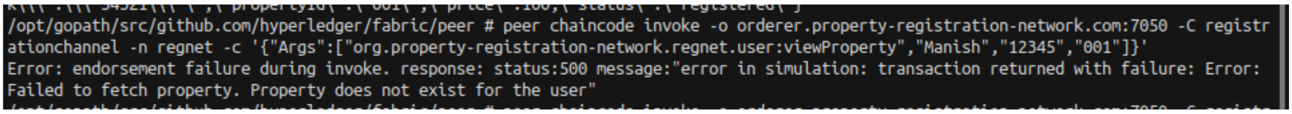
from user.cli Mayank will invoke a command to view his property.
peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:viewProperty","Mayank","54321","001"]}'



```
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:viewProperty","Mayank","54321","001"]}'
2022-09-27 04:09:08.207 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"001\\\":\\\"Mayank\\\":\\\"54321\\\"\",\"name\":\"Mayank\",\"aadharNumber\":\"54321\",\"owner\":\"\\\"001\\\":\\\"Mayan
k\\\":\\\"54321\\\"\",\"propertyId\":\"001\",\"price\":100,\"status\":\"registered\"}"
```

from user.cli Manish will invoke a command to view his property.

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:viewProperty","Manish","12345","001"]}'



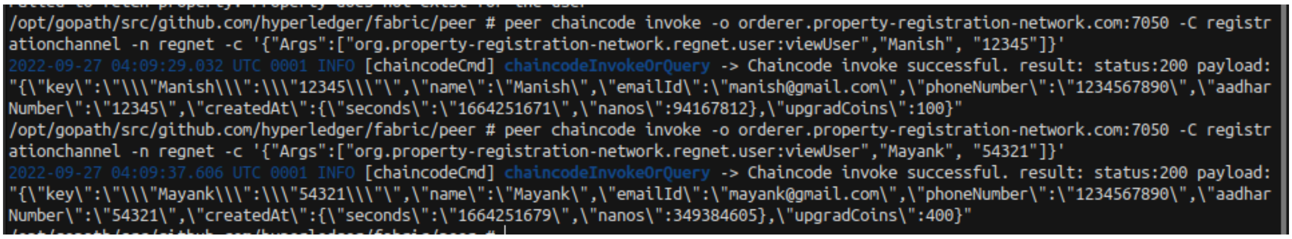
```
k\\\":\\\"54321\\\"\",\"propertyId\":\"001\",\"price\":100,\"status\":\"registered\"}"
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:viewProperty","Manish","12345","001"]}'
Error: endorsement failure during invoke. response: status:500 message:"error in simulation: transaction returned with failure: Error:
Failed to fetch property. Property does not exist for the user"
```

Manish gets an error saying property doesnot exist for him.

We can send a command to view the user details of Manish and Mayank from the user.cli

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:viewUser","Manish", "12345"]}'

peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registrationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:viewUser","Mayank", "54321"]}'



```
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:viewUser","Manish", "12345"]}'
2022-09-27 04:09:29.032 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"Manish\\\":\\\"12345\\\"\",\"name\":\"Manish\",\"emailId\":\"manish@gmail.com\",\"phoneNumber\":\"1234567890\",\"aadhar
Number\":\"12345\",\"createdAt\":{\"seconds\":\"1664251671\",\"nanos\":94167812},\"upgradCoins\":100}"
/opt/gopath/src/github.com/hyperledger/fabric/peer # peer chaincode invoke -o orderer.property-registration-network.com:7050 -C registr
ationchannel -n regnet -c '{"Args":["org.property-registration-network.regnet.user:viewUser","Mayank", "54321"]}'
2022-09-27 04:09:37.606 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:
"{\"key\":\"\\\"Mayank\\\":\\\"54321\\\"\",\"name\":\"Mayank\",\"emailId\":\"mayank@gmail.com\",\"phoneNumber\":\"1234567890\",\"aadhar
Number\":\"54321\",\"createdAt\":{\"seconds\":\"1664251679\",\"nanos\":349384605},\"upgradCoins\":400}"
```

we can see that the balance has been updated for Manish and Mayank to 100 and 400 respectively as the cost of the property was 100 upgCoins.