**Sudo ls**

**Su –**

**Apt-get update**

**Apt-get install sudo**

**Usermod -aG sudo cad**

**Su -c ‘shutdown -r now’**

**Sudo apt-get update**

**VM installation guide -** <https://www.youtube.com/watch?v=x5MhydijWmc>

**Hyperleder Fabric Prerequisites Setup**

1. Curl Installation
2. NodeJs Installation
3. Git Installation
4. Python Installation
5. Libtool
6. Docker CE
7. Docker Compose

***Curl Installation***

* Run below command to install Curl.
* sudo apt-get install curl
* **sudo apt install curl**
* Verify the installation and check the version of Curl using below command.
* curl --version

**NodeJs Installation**

* Open the terminal window and run below command to download and execute the nodejs file.
* curl -sL https://deb.nodesource.com/setup\_10.x | sudo -E bash –
* Then run below command.
* sudo apt-get update
* Run below command to start the installation for NodeJs.
* sudo apt-get install nodejs
* Run below command to check if Nodejs is successfully installed or not. This should return the version
* of NodeJs.
* node --version

**Git Installation**

* Open the terminal window and run below command. This will start the installation for Git.
* sudo apt-get install git
* Run below command to check if Git is successfully installed or not. This should return the version of Git.
* git --version

**Python Installation**

* In the terminal window, run below command to install Python.
* sudo apt-get install python
* Verify the installation by running below command and that should return the version of Python.
* python --version

**Lib Tools Installation**

* Install Lib tools using below command.
* sudo apt-get install libltdl-dev

**Install Docker CE (Community Edition )**

* First download and then install it using below commands.
* wget https://download.docker.com/linux/ubuntu/dists/xenial/pool/stable/amd64/[docker-ce\_18.06.3~ce~3-0~ubuntu\_amd64.deb](https://download.docker.com/linux/ubuntu/dists/xenial/pool/stable/amd64/docker-ce_18.06.3~ce~3-0~ubuntu_amd64.deb)
* sudo dpkg -i [docker-ce\_18.06.3~ce~3-0~ubuntu\_amd64.deb](https://download.docker.com/linux/ubuntu/dists/xenial/pool/stable/amd64/docker-ce_18.06.3~ce~3-0~ubuntu_amd64.deb)
* Check the version of docker using below command and this should return the version of docker.
* docker –version
* **Docker sudo apt install docker**

**Install Docker Compose**

* Run below commands to setup Docker compose.
* sudo apt-get install python-pip
* pip --version
* sudo pip install docker-compose
* Verify the installation and check the version from below command.
* docker-compose version

**Docker Compose**

**Sudo apt install docker-compose**

**Hyperledger Installation**

Step 1: Run below command to download and setup Fabric.

* curl **-**sSL https:**//**bit**.**ly**/**2ysbOFE **|** bash **-**s

You may encounter below issue when you run above command.

failed to get default registry endpoint from daemon (Got permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock:

To fix this you need run below command.

* sudo chmod 666 /var/run/docker.sock

**Peer channel**

Step 1: Go to fabric-samples folder by using below command.

* cd fabric-samples

Step 2: Go to test-network folder by using below command.

* cd test-network

Step 3: Run below command to start your test-network

* sudo ./network.sh up

This start the network, you can run below command to check docker containers.

* sudo docker ps

This shows you three docker containers

1. One for Org1 peer node
2. One for Org2 peer node
3. One for Orderer

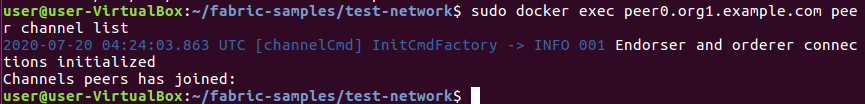
A screenshot of a computer screen

Description automatically generated

When you start the network, you will also not get any channel by default. You can check the channel by using below command.

* sudo docker exec peer0.org1.example.com peer channel list

This command shows you that, you don't have any channel created.



Step 4: Create new channel by using below command.

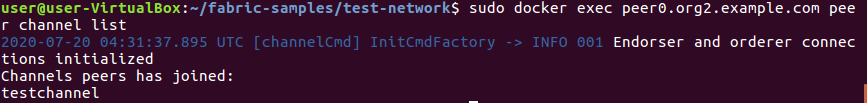
* sudo ./network.sh createChannel -c testchannel

This will create a new channel with the name testchannel.

To verify this channel creation, run below command on both the peers.

* sudo docker exec peer0.org1.example.com peer channel list
* sudo docker exec peer0.org2.example.com peer channel list

A computer screen shot of a computer

Description automatically generated

Step 5: To stop the network, you need to run below command.

* sudo ./network.sh down

**couchdb**

Step 1: Go to fabric-samples folder by using below command.

* cd fabric-samples

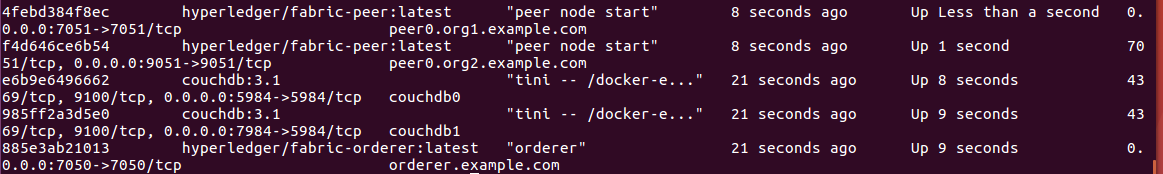
Step 2: Go to test-network folder by using below command.

* cd test-network

Step 3: Run below command to start the network and create couchDB containers as well.

* sudo ./network.sh up -s couchdb

This command starts your network and create couchdb container for each peer as well.



Step 4: Create new channel by using below command.

* sudo ./network.sh createChannel -c testchannel1

This will create a new channel with the name testchannel1.

Step 5: To stop the network, you need to run below command.

* sudo ./network.sh down

**CA**

Step 1: Go to fabric-samples folder by using below command.

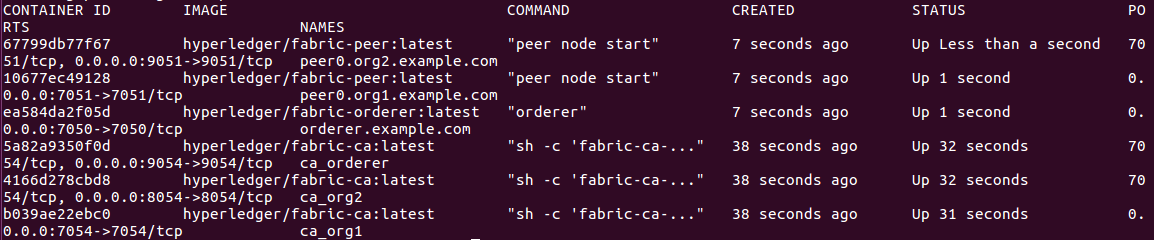
* cd fabric-samples

Step 2: Go to test-network folder by using below command.

* cd test-network

Step 3: Run below command to start your test-network and create CA container for each organization ( one for orderer, one for org1 peer and one for org2 peer)

* sudo ./network.sh up -ca



Step 4: Create new channel by using below command.

* sudo ./network.sh createChannel -c testchannel2

This will create a new channel with the name testchannel2.

Step 5: To stop the network, you need to run below command.

* sudo ./network.sh down

ALL

Step 1: Go to fabric-samples folder by using below command.

* cd fabric-samples

Step 2: Go to test-network folder by using below command.

* cd test-network

Step 3: Run below command to start your test-network with all the containers (2 peers, orderer, 3 ca, 2 couchdb).

* sudo ./network.sh up -ca -s couchdb

A computer screen shot of text

Description automatically generated

Step 4: Create new channel by using below command.

* sudo ./network.sh createChannel -c testchannel3

This will create a new channel with the name testchannel3.

Step 5: To stop the network, you need to run below command.

* sudo ./network.sh down

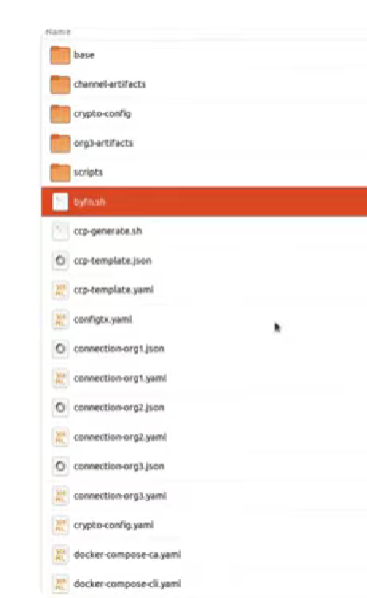


Cat byfn.sh









Hyperledger: Hyperledger -[https://www.hyperledger.org/](https://www.youtube.com/redirect?event=video_description&redir_token=QUFFLUhqbFgtMURFcGx3Vmh1RjRsQVJkclRFRXk3dTRvd3xBQ3Jtc0tsdzR5TkxIaS1kQnVndlR6LUVpeGVGTTZfQkM1aTVRRTI2VWhOM0Z6alNmSUFEU0NZYnhyenBzdy1FOVhXVUtOZUExV2o1RURfc2pTcFVCY0hRLUZNX0U3VTdEYnhtd1NDWjRLSmFlNzllbWl2LWx0RQ&q=https%3A%2F%2Fwww.hyperledger.org%2F&v=uFwkLlZQEGY)

<https://hyperledger-fabric.readthedocs.io/en/release-2.2/write_first_app.html>

Curl –

sudo apt install curl

Docker

Sudo apt install docker

Docker Compose

Sudo apt install docker-compose

Golang

Sudo apt install golang-go

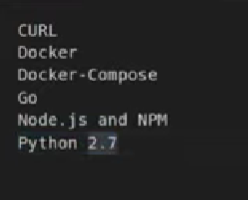
For Git clone

git config --global core.autocrlf false

git config --global core.longpaths true

Run the script

curl -sSL [http://bit.ly/2ysbOFE](https://www.youtube.com/redirect?event=video_description&redir_token=QUFFLUhqa29vbTVYUXN2VGxvY3Qya1dZOWRhOGgzMFpGUXxBQ3Jtc0tuOXR3anFKSTMxQjl6eWMydkN5bG5DRlZORlloYzBZWFVHb1RBU2ZlSGtYNTUxY3lLLUJfNHl3RUNEVng3SDlPN0d4b181RnQxdVNuX2RQdFBvSjl2TDFyZzAyNldsUmphSzJpendINjhXQ3BkbUFQOA&q=http%3A%2F%2Fbit.ly%2F2ysbOFE&v=acHiHRJ-dVM) | bash -s



Code: A57078

|  |
| --- |
| **R20** |

A logo of a university

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**Anurag University**

**IV- B Tech I-Semester End Examinations**

**Course: Introduction to BlockChain Technology**

**(Common to IT/CSE CS)**

**Time:3Hours MaxMarks:60**

**Section –A(Short Answer type questions)**

**Answer all questions: (10 x 2 =20Marks)**

**Unit-I**

1. Explain the concept of a "distributed ledger" and how it relates to blockchain technology. (CO1,L2)

1. What is Proof of Stake (PoS), and how does it differ from Proof of Work? (CO1,L1)

**Unit-II**

1. Define "enum" in Solidity and explain its typical use. (CO2, L1)
2. Develop a Solidity function that uses a loop to iterate through an array of numbers and return the sum of all even numbers. (CO2,L3)

**Unit-III**

1. Explain the steps involved in developing a DApp with Truffle IDE. (CO3,L2)
2. Explain the importance of privacy and permissions in MultiChain. (CO3,L2) **Unit-IV**
3. What is the role of APIs in Hyperledger, and how do they enable interaction with the blockchain network? (CO4,L2)
4. Discuss the concept of consensus in the context of Hyperledger. (CO4,L2)

**Unit-V**

1. Illustrate the role of blockchain in transforming the real estate industry. (CO5,L3)
2. Discuss the potential impact of blockchain on reducing corruption in government operations and public services. (CO5,L3)

### Section—B (Essay Answer type questions)

**Answer all questions: (5x8=40 Marks)**

**Unit-I**

1. A) Differentiate between a "soft fork" and a "hard fork" in blockchain. (CO1,L2)

**OR**

B) i. Describe how blockchain technology can ensure transaction anonymity while maintaining transparency. What are the potential challenges associated with balancing anonymity and transparency? (CO1,L3)

ii. Describe the purpose and structure of a Merkle Tree in blockchain data organization. (CO1,L2)

**Unit-II**

1. A) Discuss the concept of inheritance in Solidity. How does it enable code reuse and organization in smart contracts? (CO2,L2)

**OR**

B) i. Explain the concept of self-destruction in Solidity. (CO2, L1)

ii. Implement a constructor in a Solidity contract that initializes key variables when the contract is deployed. Provide a practical example where this would be necessary. (CO2, L3)

**Unit-III**

1. A) Discuss the significance of truffle test in the context of DApp development. How does it ensure the functionality and security of smart contracts? (CO3,L3)

**OR**

B) i. Describe the key steps involved in setting up a private blockchain using MultiChain. What are the essential configuration parameters? (CO3, L2)

ii. Define "Blockchain Bytes" and explain their relevance in the context of MultiChain and blockchain data representation. (CO3, L1)

**Unit-IV**

1. A) Discuss the concept of consensus in the context of Hyperledger. How does it ensure trust and agreement among network participants?

(CO4,L2)

**OR**

B) Explain the Hyperledger Fabric model and its role in creating a private, permissioned blockchain network. What are the key components of this model? (CO4, L2)

**Unit-V**

15. A) Discuss a healthcare-related case study where blockchain has been utilized to enhance patient data security and interoperability. What were the key benefits of this implementation?. (CO5,L2)

**OR**

B) i. What are some challenges that businesses may face when implementing blockchain solutions, and how can they address these challenges? (CO5,L2)

ii. Discuss the potential impact of blockchain on reducing corruption in government operations and public services. Provide specific examples or case studies to support your analysis. (CO5,L3)