

Practical 1

Aim: Install and understand Docker container, Node.js, java and Hyperledger fabric, Ethereum and perform necessary software installation on local machine/create instance on cloud to run

1. What is Docker ?

Docker is an open platform for developing, shipping, and running applications. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly. With Docker, you can manage your infrastructure in the same ways you manage your applications. By taking advantage of Docker's methodologies for shipping, testing, and deploying code quickly, you can significantly reduce the delay between writing code and running it in production.

2. What can I use Docker for?

Fast, consistent delivery of your applications

Docker streamlines the development lifecycle by allowing developers to work in standardized environments using local containers which provide your applications and services. Containers are great for continuous integration and continuous delivery (CI/CD) workflows.

Consider the following example scenario:

- Your developers write code locally and share their work with their colleagues using Docker containers.
- They use Docker to push their applications into a test environment and execute automated and manual tests.
- When developers find bugs, they can fix them in the development environment and redeploy them to the test environment for testing and validation.
- When testing is complete, getting the fix to the customer is as simple as pushing the updated image to the production environment.

Responsive deployment and scaling

Docker's container-based platform allows for highly portable workloads. Docker containers can run on a developer's local laptop, on physical or virtual machines in a data center, on cloud providers, or in a mixture of environments.

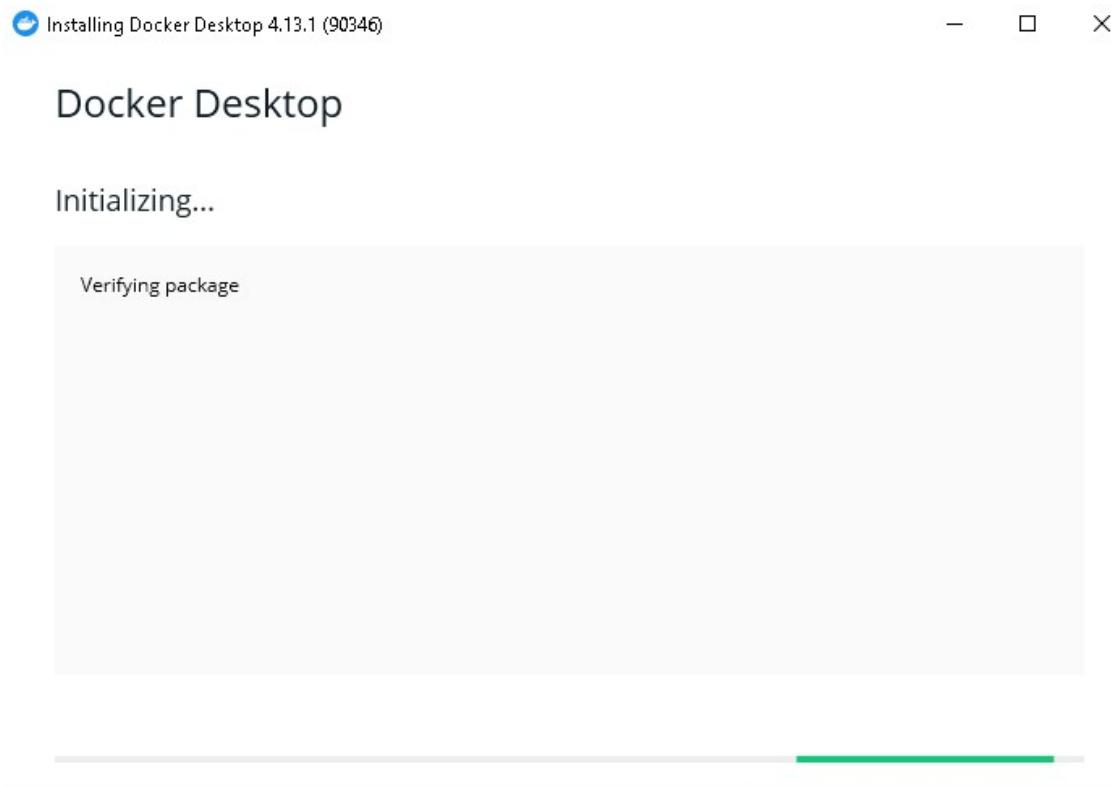
Docker's portability and lightweight nature also make it easy to dynamically manage workloads, scaling up or tearing down applications and services as business needs dictate, in near real time.

Running more workloads on the same hardware

Docker is lightweight and fast. It provides a viable, cost-effective alternative to hypervisor-based virtual machines, so you can use more of your server capacity to achieve your business goals. Docker is perfect for high density environments and for small and medium deployments where you need to do more with fewer resources.

- **Install docker in your machine**

The screenshot shows a web browser window with the URL docs.docker.com/desktop/install/windows-install/. The page title is "Install Docker Desktop on Windows". The left sidebar has a "Manuals" section with "Install on Windows" selected. The main content area starts with "Estimated reading time: 7 minutes". It includes sections for "Docker Desktop terms" (warning about commercial use), "Download Docker Desktop for Windows", and "Welcome to Docker Desktop for Windows". A sidebar on the right lists "Contents" such as "System requirements", "WSL 2 backend", and "Hyper-V backend and Windows containers". At the bottom, there's a cookie consent banner with "Cookies Settings", "Reject All", and "Accept All Cookies" buttons.



Docker Desktop 4.13.1

Unpacking files...

```
Unpacking file: frontend/resources/app.asar
Unpacking file: frontend/resources.pak
Unpacking file: frontend/locales/zh-TW.pak
Unpacking file: frontend/locales/zh-CN.pak
Unpacking file: frontend/locales/vi.pak
Unpacking file: frontend/locales/ur.pak
Unpacking file: frontend/locales/uk.pak
Unpacking file: frontend/locales/tr.pak
Unpacking file: frontend/locales/th.pak
Unpacking file: frontend/locales/te.pak
Unpacking file: frontend/locales/ta.pak
Unpacking file: frontend/locales/sw.pak
Unpacking file: frontend/locales/sv.pak
Unpacking file: frontend/locales/sr.pak
```

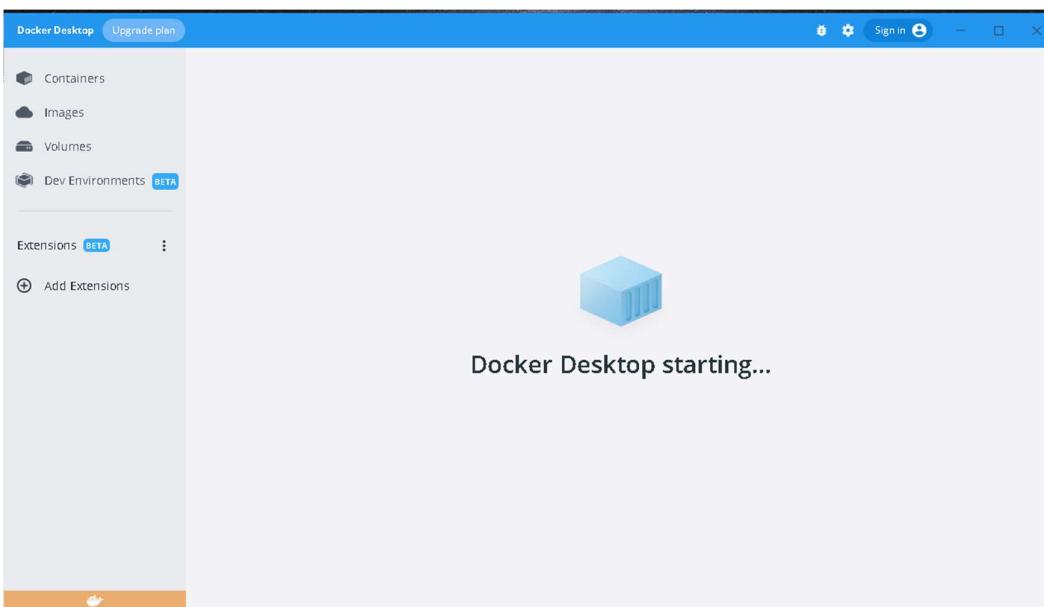
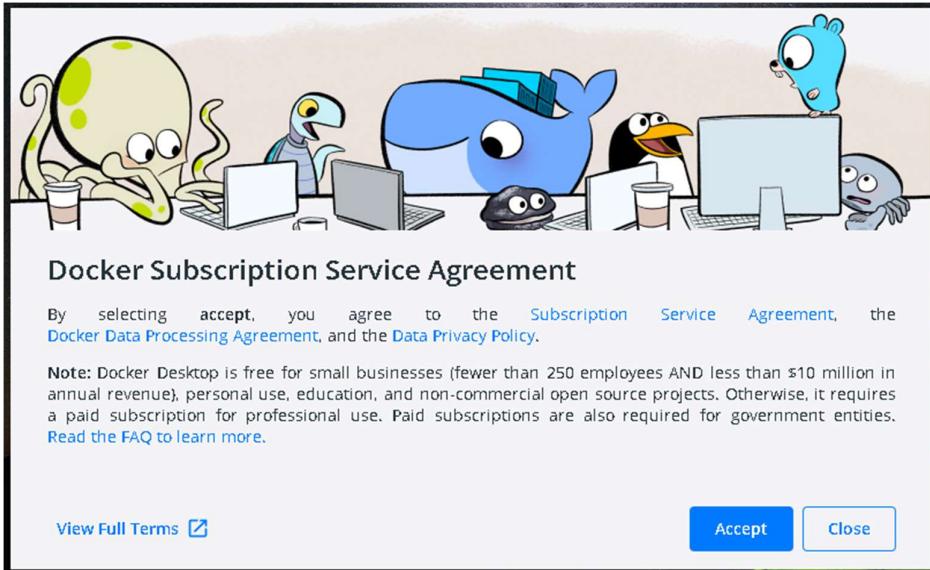
-
- After successfully installing docker restart your machine

Docker Desktop 4.13.1

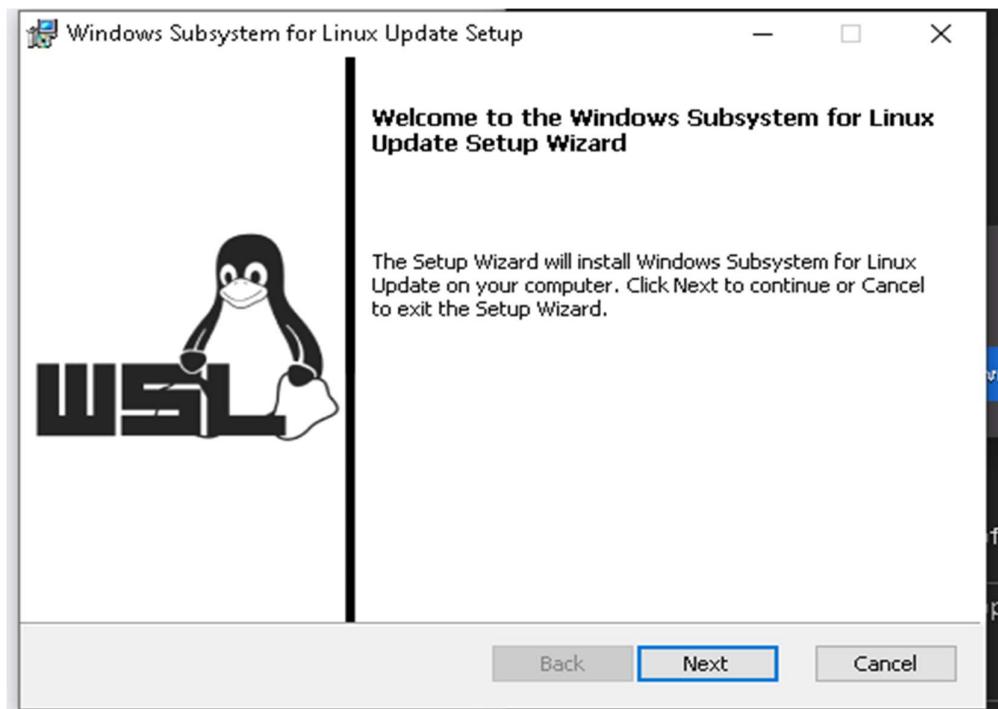
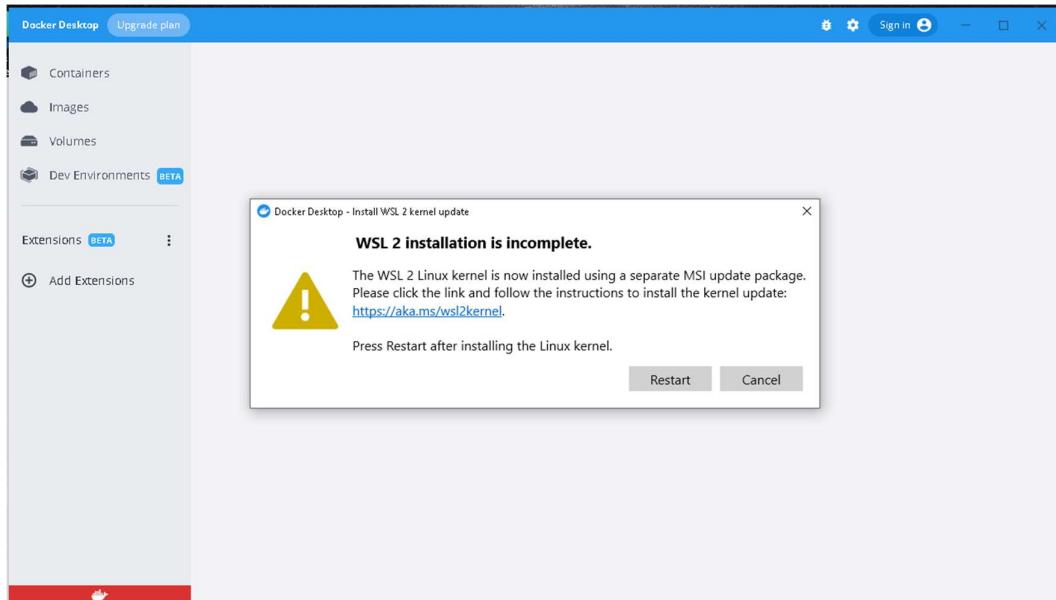
Installation succeeded

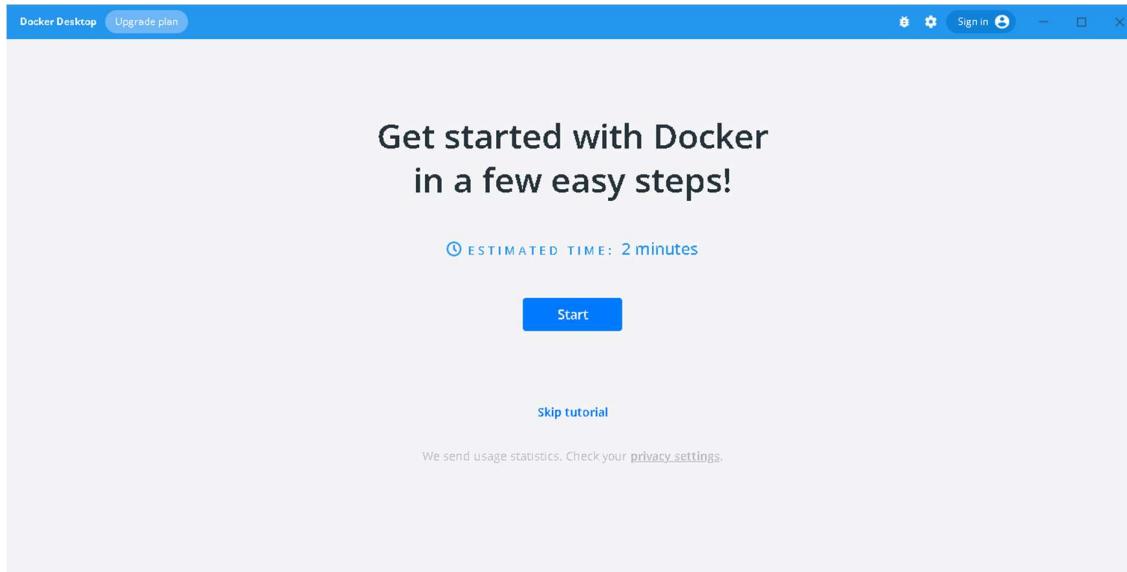
You must restart Windows to complete installation.

[Close and restart](#)



- After opening docker you will see a popup go to that link and download WSL





- After completing all this above installation open cmd and run this all command

```
C:\Windows\system32>docker --version
Docker version 20.10.20, build 9fdeb9c

C:\Windows\system32>docker pull busybox
Using default tag: latest
latest: Pulling from library/busybox
22b70bdd3ac: Pull complete
Digest: sha256:6bdd92bf5240be1b5f3bf71324f5e371fe59f0e153b27fa1f1620f78ba16963c
Status: Downloaded newer image for busybox:latest
docker.io/library/busybox:latest

C:\Windows\system32>docker pull fedora
Using default tag: latest
latest: Pulling from library/fedora
e1deda52ffad: Pull complete
Digest: sha256:2c5b21348e9b2a0b4c49bd5013be6d406be8594831aba21043393fcfb7252e0
Status: Downloaded newer image for fedora:latest
docker.io/library/fedora:latest

C:\Windows\system32>docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
busybox         latest        bc01a3326866   8 days ago    1.24MB
fedora          latest        98ffdbffd207   5 months ago   163MB

C:\Windows\system32>docker tag bc01a3326866 sam

C:\Windows\system32>
```

Docker Desktop Upgrade plan

Last refresh: Never Refresh to see disk usage

Images [Give feedback](#)

An image is a read-only template with instructions for creating a Docker container. [Learn more](#)

LOCAL REMOTE REPOSITORIES

Extensions [BETA](#) :

Add Extensions

	NAME	TAG	STATUS	CREATED	SIZE	ACTIONS
<input type="checkbox"/>	busybox bc01a3326866	latest	Unused	20 days ago	1.24 MB	▶ ⋮ trash
<input type="checkbox"/>	sam bc01a3326866	latest	Unused	20 days ago	1.24 MB	▶ ⋮ trash
<input type="checkbox"/>	fedora 98ffdbffd207	latest	Unused	6 months ago	163.02 MB	▶ ⋮ trash

```
C:\Users\acer>docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
busybox          latest   bc01a3326866  2 weeks ago  1.24MB
sam              latest   bc01a3326866  2 weeks ago  1.24MB
fedora           latest   98ffdbffd207  6 months ago  163MB

C:\Users\acer>docker tag 98ffdbffd207 samreen

C:\Users\acer>
```

	NAME	TAG	STATUS	CREATED
<input type="checkbox"/>	busybox bc01a3326866	latest	Unused	20 day
<input type="checkbox"/>	sam bc01a3326866	latest	Unused	20 day
<input type="checkbox"/>	fedora 98ffdbffd207	latest	Unused	6 mon
<input type="checkbox"/>	samreen 98ffdbffd207	latest	Unused	6 mon

- Now install node.js

Node.js® is an open-source, cross-platform JavaScript runtime environment.

New security releases to be made available November 3rd, 2022

Download for Windows (x64)

18.12.0 LTS

Recommended For Most Users

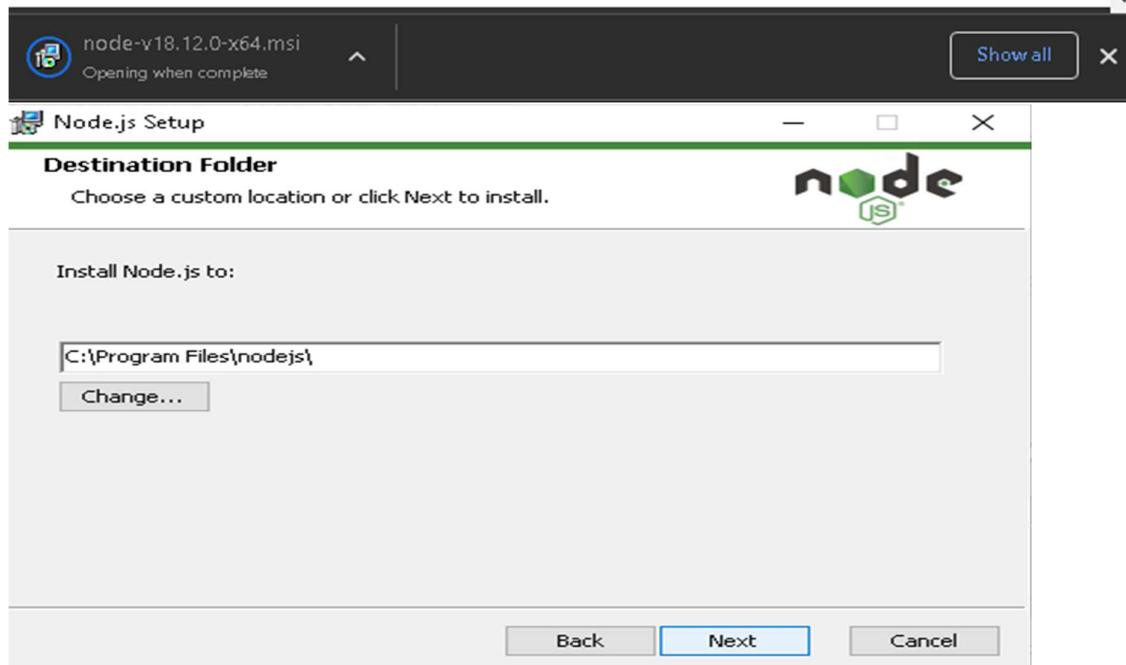
19.0.0 Current

Latest Features

[Other Downloads](#) | [Changelog](#) | [API Docs](#)

[Other Downloads](#) | [Changelog](#) | [API Docs](#)

For information about supported releases, see the [release schedule](#).



End-User License Agreement

Please read the following license agreement carefully

**Node.js is licensed for use as follows:**

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I accept the terms in the License Agreement

Print

Back

Next

Cancel

Welcome to the Node.js Setup Wizard

The Setup Wizard will install Node.js on your computer.

Back

Next

Cancel

- **First code of node js**

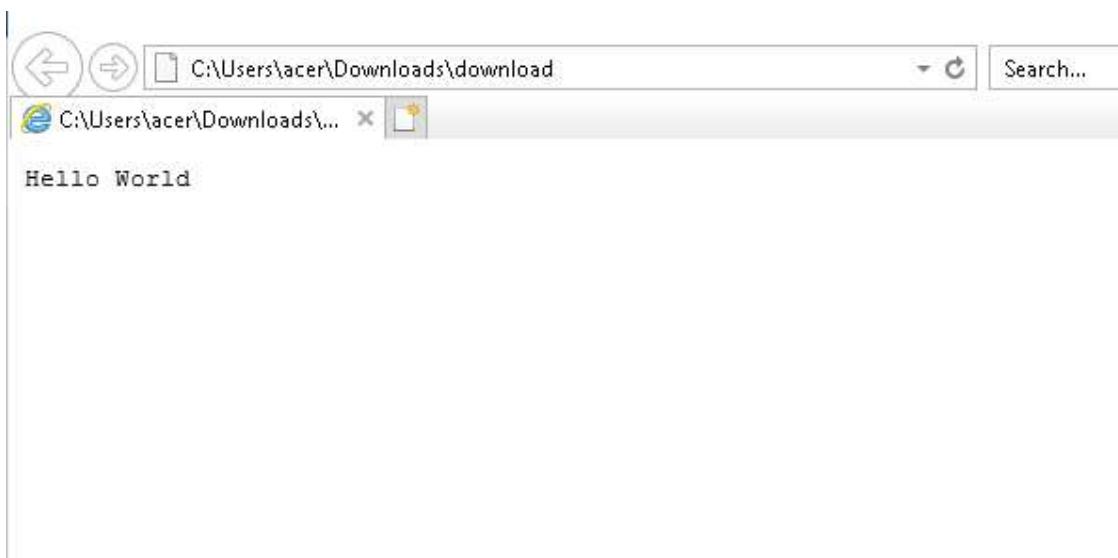
```
var http = require('http');

http.createServer(function(req,res){
  res.writeHead(200,{'Content-Type':'txt/html'});
  res.end('Hello World');
}).listen(8081);
```

For running this code go to cmd give “command node myfirst.js” after that go to browser and type “localhost:8081” the port number that u have written in the code

```
C:\Windows\System32\cmd.exe - node myfirst.js
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\acer\OneDrive\Desktop\msc cs\web3 tec>node myfirst.js
```



- **Second code of js**

1st file name is “myfirstmodule.js” this is a function file

```
exports.myDateTime=function()
{
    return Date();
};
```

2nd file name is “Modulepro.js”

```
var http=require('http');
var dt=require('./myfirstmodule');
http.createServer(function(reg,res){
    res.writeHead(200,['Content-Type':'text/html']);
    res.write('the data and a time are currently:' +dt.myDateTime());
    res.end();
}).listen(8081);
```

For running this code go to cmd give “command node modulepro.js” after that go to browser and type “localhost:8081” the port number that u have written in the code



the data and a time are currently Wed Nov 16 2022 00:28:31 GMT+0530 (India Standard Time)

A screenshot of a Windows Command Prompt window. The title bar says "C:\Windows\System32\cmd.exe - node modulepro.js". The window displays the following text:

```
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\acer\OneDrive\Desktop\msc cs\web3 tec>node modulepro.js
```

The command "node modulepro.js" was entered at the prompt, and the window shows the output of the script execution.

Practical 2

Aim: Create and deploy a block chain network using Hyperledger Fabric SDK for Java.

First install below command in Ubuntu

Curl

sudo apt install curl

```
rdnc@DESKTOP-MA1MMGC:~$ curl --version
curl 7.81.0 (x86_64-pc-linux-gnu) libcurl/7.81.0 OpenSSL/3.0.2 zlib/1.2.11 brotli/1.0.9 zstd/1.4.8 libidn2/2.3.2 libpsl/
0.21.0 (+libidn2/2.3.2) libssh/0.9.6/openssl/zlib nghttp2/1.43.0 librtmp/2.3 OpenLDAP/2.5.13
Release-Date: 2022-01-05
Protocols: dict file ftp ftps gopher gophers http https imap imaps ldap ldaps mqtt pop3 pop3s rtmp rtsp scp sftp smb smb-
s smtp smtps telnet tftp
Features: alt-svc AsynchDNS brotli GSS-API HSTS HTTP2 HTTPS-proxy IDN IPv6 Kerberos Largefile libz NTLM NTLM_WB PSL SPNE
GO SSL TLS-SRP UnixSockets zstd
```

Docker

sudo apt install docker

Docker Compose

sudo apt install docker-compose

Go

sudo apt install golang-go

```
rdnc@DESKTOP-MA1MMGC:~$ sudo apt install golang-go
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bzip2 cpp cpp-11 fontconfig-config fonts-dejavu-core g++ g++-11 gcc gcc-11-base golang-1.18-go
  golang-1.18-src golang-src libasan6 libatomic1 libc-dev-bin libc-devtools libc6-dev libcc1-0 libcrypt-dev
  libdeflate0 libdpkg-perl libfile-fcntllock-perl libfontconfig1 libfreetype6 libgcc-11-dev libgd3 libgomp1 libis123
  libitm1 libjbig0 libjpeg-turbo8 libjpeg8 liblsan0 libmpc3 libnsl-dev libquadmath0 libstdc++-11-dev libtiff5
  libtirpc-dev libtsan0 libubsan1 libwebp7 libxpm4 linux-libc-dev manpages-dev pkg-config rpcsvc-proto
Suggested packages:
  bzip2-doc cpp-doc gcc-11-locales g++-multilib g++-11-multilib gcc-11-doc gcc-multilib make autoconf automake libtool
  flex bison gdb gcc-doc gcc-11-multilib bzr | brz mercurial subversion glibc-doc debian-keyring bzr libgd-tools
  libstdc++-11-doc dpkg-dev
The following NEW packages will be installed:
  bzip2 cpp cpp-11 fontconfig-config fonts-dejavu-core g++ g++-11 gcc gcc-11-base golang-1.18-go
  golang-1.18-src golang-go golang-src libasan6 libatomic1 libc-dev-bin libc-devtools libc6-dev libcc1-0 libcrypt-dev
  libdeflate0 libdpkg-perl libfile-fcntllock-perl libfontconfig1 libfreetype6 libgcc-11-dev libgd3 libgomp1 libis123
  libitm1 libjbig0 libjpeg-turbo8 libjpeg8 liblsan0 libmpc3 libnsl-dev libquadmath0 libstdc++-11-dev libtiff5
  libtirpc-dev libtsan0 libubsan1 libwebp7 libxpm4 linux-libc-dev manpages-dev pkg-config rpcsvc-proto
0 upgraded, 49 newly installed, 0 to remove and 0 not upgraded.
Need to get 145 MB of archives.
After this operation, 640 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu jammy/main amd64 bzip2 amd64 1.0.8-5build1 [34.8 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 gcc-11-base amd64 11.3.0-1ubuntu1~22.04 [20.8 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 libis123 amd64 0.24-2build1 [727 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/main amd64 libmpc3 amd64 1.2.1-2build1 [46.9 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 cpp-11 amd64 11.3.0-1ubuntu1~22.04 [9967 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy/main amd64 cpp amd64 4:11.2.0-1ubuntu1 [27.7 kB]
Get:7 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-dejavu-core all 2.37-2build1 [1041 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy/main amd64 fontconfig-config all 2.13.1-4.2ubuntu5 [29.1 kB]
Get:9 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libcc1-0 amd64 12.1.0-2ubuntu1~22.04 [47.4 kB]
```

Node js and NPM

sudo apt install nodejs & sudo apt install npm

```
rdnc@DESKTOP-MA1MMGC:~$ sudo apt install nodejs
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  javascript-common libc-ares2 libjs-highlight.js libnode72 nodejs-doc
Suggested packages:
  apache2 | lighttpd | httpd npm
The following NEW packages will be installed:
  javascript-common libc-ares2 libjs-highlight.js libnode72 nodejs nodejs-
0 upgraded, 6 newly installed, 0 to remove and 0 not upgraded.
Need to get 13.7 MB of archives.
After this operation, 53.9 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu jammy/main amd64 javascript-common
Get:2 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libjs-highlight
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 libc-ares2 amd64 1
Get:4 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libnode72 amd6
Get:5 http://archive.ubuntu.com/ubuntu jammy/universe amd64 nodejs-doc all
Get:6 http://archive.ubuntu.com/ubuntu jammy/universe amd64 nodejs amd64 1
Fetched 13.7 MB in 33s (412 kB/s)
Selecting previously unselected package javascript-common.
(Reading database ... 43365 files and directories currently installed.)
Preparing to unpack .../0-javascript-common_11+nmu1_all.deb ...
Unpacking javascript-common (11+nmu1) ...
Selecting previously unselected package libjs-highlight.js.
Preparing to unpack .../1-libjs-highlight.js_9.18.5+dfsg1-1_all.deb ...
Unpacking libjs-highlight.js (9.18.5+dfsg1-1) ...
Selecting previously unselected package libc-ares2:amd64.
Preparing to unpack .../2-libc-ares2_1.18.1-1build1_amd64.deb ...
Unpacking libc-ares2:amd64 (1.18.1-1build1) ...
Selecting previously unselected package libnode72:amd64.
Preparing to unpack .../3-libnode72_12.22.9~dfsg-1ubuntu3_amd64.deb ...
```

```
npm@9.2.0 C:\Program Files\nodejs\node_modules\npm
rdnc@DESKTOP-MA1MMGC:~$ npm --version
9.2.0
```

Python 2.7

```
sudo apt install python3
```

```
rdnc@DESKTOP-MA1MMGC:~$ sudo apt install python2.7
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libpython2.7-minimal libpython2.7-stdlib python2.7-minimal
Suggested packages:
  python2.7-doc binfmt-support
The following NEW packages will be installed:
  libpython2.7-minimal libpython2.7-stdlib python2.7-minimal
0 upgraded, 4 newly installed, 0 to remove and 0 not upgraded.
Need to get 3967 kB of archives.
After this operation, 16.0 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libpython2.7-minimal amd64 2.7.18-13ub
Get:2 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 python2.7-minimal amd64 2.7.18-13ubuntu1.1 [1977 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 python2.7 amd64 2.7.18-13ubuntu1.1 [25
Fetched 3967 kB in 11s (350 kB/s)
Selecting previously unselected package libpython2.7-minimal:amd64.
(Reading database ... 42648 files and directories currently installed.)
Preparing to unpack .../libpython2.7-minimal_2.7.18-13ubuntu1.1_amd64.deb ...
Unpacking libpython2.7-minimal:amd64 (2.7.18-13ubuntu1.1) ...
Selecting previously unselected package python2.7-minimal.
```

Maven

```
sudo apt install maven
```

```

Java                                     sudo apt install jdk

samreen@DESKTOP-11GFK07:~$ docker --version
Docker version 20.10.12, build 20.10.12-0ubuntu2~20.04.1
samreen@DESKTOP-11GFK07:~$ docker-compose --version
docker-compose version 1.25.0, build unknown
  . . .

samreen@DESKTOP-11GFK07:~$ python3 --version
Python 3.8.10
samreen@DESKTOP-11GFK07:~$ go --version
flag provided but not defined: -version
Go is a tool for managing Go source code.
>

Usage:

      go <command> [arguments]

The commands are:

      bug          start a bug report
      build        compile packages and dependencies
      clean        remove object files and cached files

```

```

samreen@DESKTOP-11GFK07:~$ node -v
v10.19.0
samreen@DESKTOP-11GFK07:~$ npm --version
8.19.2

```

To download hyperledger fabric

```
git config --global core.autocrlf false
```

```
git config --global core.longpaths true
```

```

samreen@DESKTOP-11GFK07:~$ git config --global core.autocrlf false
samreen@DESKTOP-11GFK07:~$ git config --global core.longpaths true

```

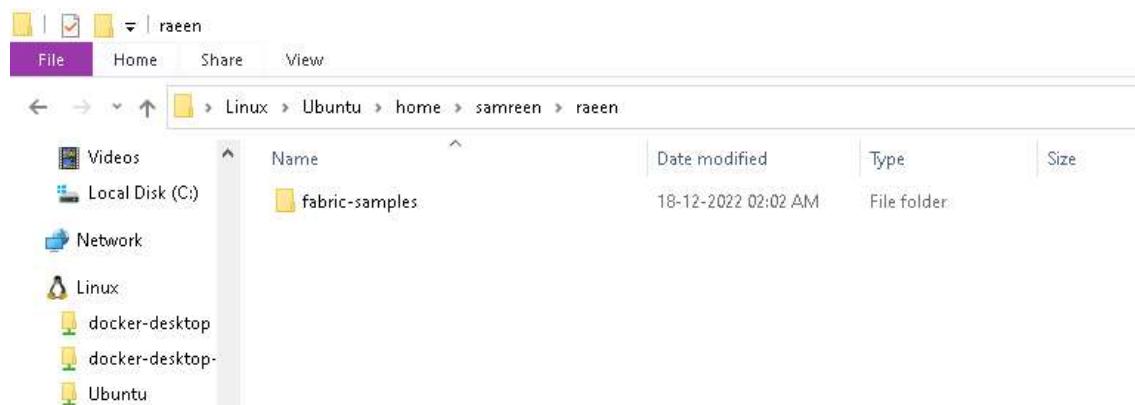
```

samreen@DESKTOP-11GFK07:~$ mkdir samweb3
samreen@DESKTOP-11GFK07:~$ cd samweb3
samreen@DESKTOP-11GFK07:~/samweb3$ curl -sSL http://bit.ly/2ysbOFE | bash -s

Clone hyperledger/fabric-samples repo

==> Cloning hyperledger/fabric-samples repo
Cloning into 'fabric-samples'...
remote: Enumerating objects: 11717, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (5/5), done.

```



fabric-samples			
File	Home	Share	View
←	→	↑	Linux > Ubuntu > home > samreen > raeen > fabric-samples
Videos	Name	Date modified	Type
Local Disk (C)	.git	18-12-2022 02:01 AM	File folder
Network	.github	18-12-2022 02:01 AM	File folder
Linux	asset-transfer-abac	18-12-2022 02:01 AM	File folder
docker-desktop	asset-transfer-basic	18-12-2022 02:01 AM	File folder
docker-desktop-	asset-transfer-events	18-12-2022 02:01 AM	File folder
Ubuntu	asset-transfer-ledger-queries	18-12-2022 02:01 AM	File folder
boot	asset-transfer-private-data	18-12-2022 02:01 AM	File folder
dev	asset-transfer-sbe	18-12-2022 02:01 AM	File folder
etc	asset-transfer-secured-agreement	18-12-2022 02:01 AM	File folder
home	auction-dutch	18-12-2022 02:01 AM	File folder
lost+found	auction-simple	18-12-2022 02:01 AM	File folder
media	bin	08-07-2022 03:02 PM	File folder
mnt	builders	26-10-2022 09:31 PM	File folder
opt	chaincode	18-12-2022 02:01 AM	File folder
proc	ci	18-12-2022 02:01 AM	File folder
root	commercial-paper	18-12-2022 02:01 AM	File folder
run	config	26-10-2022 09:31 PM	File folder
snap	fabcar	18-12-2022 02:01 AM	File folder
srv	full-stack-asset-transfer-guide	18-12-2022 02:01 AM	File folder
sys	hardware-security-module	18-12-2022 02:01 AM	File folder
tmp	high-throughput	18-12-2022 02:01 AM	File folder
usr	interest_rate_swaps	18-12-2022 02:01 AM	File folder
var	off_chain_data	18-12-2022 02:01 AM	File folder
	scripts	18-12-2022 02:01 AM	File folder
	test-application	18-12-2022 02:01 AM	File folder
	test-network	07-01-2023 01:31 AM	File folder
	test-network-k8s	18-12-2022 02:01 AM	File folder
	test-network-nano-bash	18-12-2022 02:01 AM	File folder

Practical 3

Aim: Interact with a block chain network. Execute transactions and requests against a block chain network by creating an app to test the network and its rules.

Installing geth (go ethereum)

```
samreen@DESKTOP-11GFK07:~$ sudo add-apt-repository -y ppa:ethereum/ethereum
[sudo] password for samreen:
Hit:1 http://archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://ppa.launchpad.net/ethereum/ethereum/ubuntu focal InRelease [17.5 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:5 http://ppa.launchpad.net/ethereum/ethereum/ubuntu focal/main amd64 Packages [2824 B]
Get:6 http://ppa.launchpad.net/ethereum/ethereum/ubuntu focal/main Translation-en [828 B]
Get:7 http://archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
```

```
samreen@DESKTOP-11GFK07:~$ sudo apt-get install ethereum
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libfwupdplugin1 libxml2
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  abiword bootnode clef evm geth puppeth rlpdump
The following NEW packages will be installed:
  abiword bootnode clef ethereum evm geth puppeth rlpdump
```

The Genesis Block

All blockchains start with the genesis block. This block define the initial configuration to a blockchain. The configuration to genesis block is defined in *genesis.json* file.

So, let's create a folder to start the private network and create the *genesis.json* file.

```
samreen@DESKTOP-11GFK07:~$ mkdir my-blockchain
samreen@DESKTOP-11GFK07:~$ cd my-blockchain
samreen@DESKTOP-11GFK07:~/my-blockchain$ touch genesis.json
samreen@DESKTOP-11GFK07:~/my-blockchain$
```

Add the following content to *genesis.json* file:

```
{
  "config": {
    "chainId": 1234,
    "homesteadBlock": 0,
    "eip150Block": 0,
    "eip155Block": 0,
    "eip158Block": 0,
    "byzantiumBlock": 0,
    "constantinopleBlock": 0,
    "petersburgBlock": 0,
    "ethash": {}
  },
  "difficulty": "4",
  "gasLimit": "8000000",
  "alloc": {}
}
```

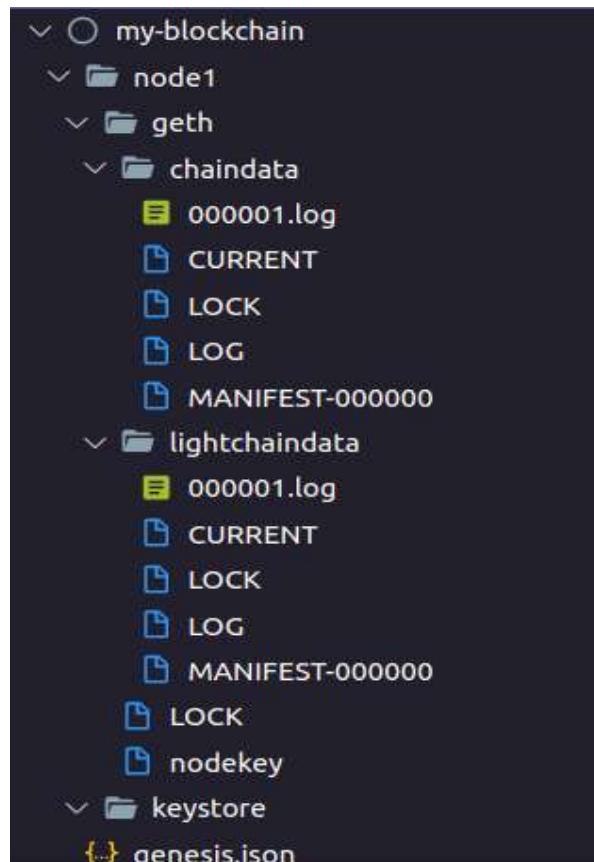
Start Database (the bootnode)

The bootnode is the first node created when the blockchain is started. To start the database to first node execute:

```
geth init --datadir node1 genesis.json
```

```
 samreen@DESKTOP-11GFK07:~/my-blockchain$ geth init --datadir node1 genesis.json
INFO [01-07|00:27:07.285] Maximum peer count          ETH=50 LES=0 total=50
INFO [01-07|00:27:07.306] Smartcard socket not found, disabling   err="stat /run/pcscd/pcscd.comm: no such file or
ctory"
INFO [01-07|00:27:07.328] Set global gas cap           cap=50,000,000
INFO [01-07|00:27:07.333] Allocated cache and file handles   database=/home/samreen/my-blockchain/node1/geth/c
data_cache=16.00MB handles=16
INFO [01-07|00:27:07.434] Opened ancient database        database=/home/samreen/my-blockchain/node1/geth/c
data/ancient/chain readonly=false
INFO [01-07|00:27:07.436] Writing custom genesis block
INFO [01-07|00:27:07.450] Persisted trie from memory database  nodes=0 size=0.00B time="264.145µs" gcnodes=0 gcs
0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [01-07|00:27:07.456] Successfully wrote genesis state
INFO [01-07|00:27:07.457] Allocated cache and file handles   database=chaindata hash=ac4d9a..2ca582
chaindata_cache=16.00MB handles=16
INFO [01-07|00:27:07.542] Opened ancient database        database=/home/samreen/my-blockchain/node1/geth/c
data/ancient/chain readonly=false
INFO [01-07|00:27:07.542] Writing custom genesis block
INFO [01-07|00:27:07.548] Persisted trie from memory database  nodes=0 size=0.00B time="57.567µs" gcnodes=0 gcs
0.00B gctime=0s livenodes=1 livesize=0.00B
INFO [01-07|00:27:07.551] Successfully wrote genesis state
database=lightchaindata hash=ac4d9a..2ca582
```

The directory result should be something like this:



Start node

```
geth --datadir node1 --networkid 1234 --http --allow-insecure-unlock --nodiscover
```

```

samreen@DESKTOP-11GFK07:~/my-blockchain$ geth --datadir node1 --networkid 1234 --http --allow-insecure-unlock
INFO [01-07|00:57:59.519] Maximum peer count
INFO [01-07|00:57:59.529] Smartcard socket not found, disabling
category
INFO [01-07|00:57:59.547] Set global gas cap
INFO [01-07|00:57:59.555] Allocated trie memory caches
INFO [01-07|00:57:59.556] Allocated cache and file handles
data cache=512.00MiB handles=2048
INFO [01-07|00:57:59.666] Opened ancient database
data/ancient/chain readonly=false
INFO [01-07|00:57:59.674]
INFO [01-07|00:57:59.674] -----
INFO [01-07|00:57:59.679] Chain ID: 1234 (unknown)

```

geth attach node1/geth.ipc

```

jefferson in ~/projects/my-blockchain
→ geth attach node1/geth.ipc
Welcome to the Geth JavaScript console! MEREHEAD
Source: https://geth.ethereum.org/
instance: Geth/v1.10.16-stable-20356e57/linux-amd64/go1.17.5
at block: 0 (Wed Dec 31 1969 21:00:00 GMT-0300 (-03))
  datadir: /home/jefferson/projects/my-blockchain/node1
modules: admin:1.0 debug:1.0 eth:1.0 ethash:1.0 miner:1.0 net:1.0 personal:1.0 rpc:1.0 txp:1.0 web3:1.0
To exit, press ctrl-d or type exit
> 

```

admin.nodeInfo

```

> admin.nodeInfo
{
  enode: "enode://662bee1f164619b9423fb9300bde3e6e73950c6a45584cbe54cd556a8cd372624
  enr: "enr:-K04Q3wrlUrPsdWxTJagEPapgcouZEluvsaP2bVob3Ns792C--XLpRKTEx9oHs3CtotF-1
  RvNv1TNVooM833jcRzbmFwzIN0Y3CCd1-DdMrwgnZf",
  id: "e16bf08b454637c2d28127e4e16451bba7172#be338dc0d5943455472efacc5",
  ip: "127.0.0.1",
  listenAddr: "[::]:30303",
  name: "Geth/v1.10.16-stable-20356e57/linux-amd64/go1.17.5",
  ports: {
    discovery: 30303,
    listener: 30303
  },
  protocols: {
    eth: {
      config: {
        byzantiumBlock: 0,
        chainId: 1234,
        constantinopleBlock: 0,
        eip158Block: 0,
        eip158Hash: "0x0000000000000000000000000000000000000000000000000000000000000000",
        eip155Block: 0,
        eip1588Block: 0,
        ethash: {},
        homesteadBlock: 0,
        petersburgBlock: 0
      },
      difficulty: 4,
      genesis: "0xac4d9a5f75e2d6ce6831373d57279fe25c60cbfe82da5b3adfe620d7fe2ca582",
      head: "0xac4d9a5f75e2d6ce6831373d57279fe25c60cbfe82da5b3adfe620d7fe2ca582",
      network: 1551
    },
    snap: {}
  }
}

```

Adding member peers

```

geth init --datadir node2 genesis.json
geth --datadir node2 --networkid 1234 --port 30304

```

Open a new javascript terminal to second node created and verify the informations executing:

```
geth attach node2/geth.ipc
```

```
admin.nodeInfo
```

The result should be something like this:

```
jefferson in ~/projects/my-blockchain
→ geth attach node2/geth.ipc
Welcome to the Geth JavaScript console!

instance: Geth/v1.10.16-stable-28356e57/linux-amd64/go1.17.5
at block: 0 (Wed Dec 31 1969 21:00:00 GMT-0300 (-03))
datadir: /home/jefferson/projects/my-blockchain/node2
modules: admin:1.0 debug:1.0 eth:1.0 ethash:1.0 miner:1.0 net:1.0
To exit, press ctrl-d or type exit
> admin.nodeInfo
{
  enode: "enode://431fa50a676b35dd750a68656cf8a822edb2c083ddf2359b6c246216d
  enr: "enr://KQ4Q15oOknFOAPmcY60rBanzp80tae6pCxKoEhbMlt25ntof3T
  id: "4cf015cc5ac80d62c11485e8de21cf51cad4bib1a056beddabed96
  ip: "127.0.0.1",
  listenAddr: "[::]:30304",
  name: "Geth/v1.10.16-stable-28356e57/linux-amd64/go1.17.5",
  ports: {
    discovery: 30304,
    listener: 30304
  },
  protocols: {
    eth: {
      config: {
        byzantiumBlock: 0,
        chainId: 1234,
        constantinopleBlock: 0,
        eip150Block: 0,
        eip150Hash: "0x0000000000000000000000000000000000000000000000000000000000000000",
        eip155Block: 0,
        eip158Block: 0,
        ethash: {},
        homesteadBlock: 0,
        petersburgBlock: 0
      },
      difficulty: 4,
      genesis: "0xac4d9a5f75e2d6ce6831373d57279fe25c68cbfe82da5
      head: "0xac4d9a5f75e2d6ce6831373d57279fe25c68cbfe82da5b3e
```

Connecting peers

```
admin.addPeer("enode://431fa50a676b35dd750a68656cf8a822edb2c083ddf2359b6c246216d
fbef0f1dad517b53b9ba0a35f4d2f1d44274ae4fc4b2bdf69e774af892b097d082eff1c@127.0.0.
1:30304?discport=0")
```

And to see all peers connected execute to both nodes the following command:

```
admin.peers
```

```
> admin.addPeer("enode://431fa50a676b35dd750a6865
true
> admin.peers
[{
  caps: ["eth/66", "snap/1"],
  enode: "enode://431fa50a676b35dd750a68656cf8a
  id: "4cf015cc55ac80d62c11485e8de21cf51cada4b1
  name: "Geth/v1.10.16-stable-20356e57/linux-am
  network: {
    inbound: false,
    localAddress: "127.0.0.1:58234",
    remoteAddress: "127.0.0.1:30304",
    static: true,
    trusted: false
  },
  protocols: {
    eth: {
      difficulty: 4,
      head: "0xac4d9a5f75e2d6ce6831373d57279fe2
      version: 66
    },
    snap: {
      version: 1
    }
  }
}]
> 
```

Mining

```
personal.newAccount()

> personal.newAccount()
Passphrase:
Repeat passphrase:
"0xbd3156b239e2bb8d073406e67eba59a651be18f0"
> 
```

You can see account balance executing:

```
eth.getBalance("0xbd3156b239e2bb8d073406e67eba59a651be18f0")
```

Now, you can start the mining in the first node. Before that run the command to see the current height of the blocks, must be **0**, because no blocks have been mined yet:

```
eth.blockNumber
```

Start the mining, and stop after some seconds to see updated **block**.

```
miner.start() // Start Mining
miner.stop() // Stop Mining
```

Now Verify again the **blockNumber** and **balance** of account created. Some blocks must have been created and values must have been earned as a reward.

```
> miner.start()
null
> miner.stop()
null
> eth.blockNumber
57
> eth.getBalance("0xbd3156b239e2bb8d073406e67eba59a651be18f0")
11400000000000000000000000
> █
```

Practical 4

Aim: Deploy an asset-transfer app using block chain. Learn app development within a Hyperledger Fabric network

We can use the Fabric test network to deploy and interact with the asset-transfer-abac smart contract. Run the following command to change into the test network directory and bring down any running nodes:

```
cd fabric-samples/test-network  
.network.sh down
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ ./network.sh down  
Using docker and docker-compose  
Stopping network  
Removing cli ... done  
Removing peer0.org2.example.com ... done  
Removing peer0.org1.example.com ... done  
Removing orderer.example.com ... done  
Removing couchdb1 ... done  
Removing couchdb0 ... done  
Removing ca_org1 ... done  
Removing ca_org2 ... done  
Removing ca_orderer ... done  
Removing network fabric_test  
Removing network compose_default  
WARNING: Network compose_default not found.  
Removing volume compose_orderer.example.com  
Removing volume compose_peer0.org1.example.com  
Removing volume compose_peer0.org2.example.com  
Removing volume compose_peer0.org3.example.com  
WARNING: Volume compose_peer0.org3.example.com not found.  
Error: No such volume: docker_orderer.example.com  
Error: No such volume: docker_peer0.org1.example.com  
Error: No such volume: docker_peer0.org2.example.com  
Removing remaining containers  
Removing generated chaincode docker images  
"docker kill" requires at least 1 argument.  
See 'docker kill --help'.
```

Run the following command to deploy the test network using Certificate Authorities:

```
./network.sh up createChannel -ca
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ ./network.sh up createChannel -ca  
Using docker and docker-compose  
Creating channel 'mychannel'.  
If network is not up, starting nodes with CLI timeout of '5' tries and CLI delay of '3' seconds and using data  
Ldb with crypto from 'Certificate Authorities'  
Bringing up network  
LOCAL_VERSION=2.4.7  
DOCKER_IMAGE_VERSION=2.4.7  
CA_LOCAL_VERSION=1.5.5  
CA_DOCKER_IMAGE_VERSION=1.5.5  
generating certificates using Fabric CA  
Creating network "fabric_test" with the default driver  
Creating ca_org1 ... done  
Creating ca_orderer ...  
Creating ca_org2 ...
```

```
./network.sh up createChannel -ca
```

You can then use the test network script to deploy the asset-transfer-abac smart contract to a channel on the network:

```
./network.sh deployCC -ccn abac -ccp ../asset-transfer-abac/chaincode-go/ -c
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ ./network.sh deployCC -ccn abac -ccp ../asset-transfer-abac  
/chaincode-go/ -cc1 go  
Using docker and docker-compose  
deploying chaincode on channel 'mychannel'  
executing with the following  
- CHANNEL_NAME: mychannel  
- CC_NAME: abac  
- CC_SRC_PATH: ../asset-transfer-abac/chaincode-go/  
- CC_SRC_LANGUAGE: go  
- CC_VERSION: 1.0  
- CC_SEQUENCE: 1  
- CC_END_POLICY: NA  
- CC_COLL_CONFIG: NA  
- CC_INIT_FCN: NA  
- DELAY: 3  
- MAX_RETRY: 5  
- VERBOSE: false  
Vendoring Go dependencies at ../asset-transfer-abac/chaincode-go/
```

Register identities with attributes

We can use the one of the test network Certificate Authorities to register and enroll identities with the attribute of abac.creator=true. First, we need to set the following environment variables in order to use the Fabric CA client.

```
export PATH=${PWD}/..bin:${PWD}:$PATH  
export FABRIC_CFG_PATH=$PWD/../config/
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export PATH=${PWD}/..bin:${PWD}:$PATH  
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export FABRIC_CFG_PATH=$PWD/../config/
```

We will create the identities using the Org1 CA. Set the Fabric CA client home to the MSP of the Org1 CA admin:

```
export FABRIC_CA_CLIENT_HOME=${PWD}/organizations/peerOrganizations/org1.example.com/  
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export FABRIC_CA_CLIENT_HOME=${PWD}/organizations/peerOrganiza  
tions/org1.example.com/
```

There are two ways to generate certificates with attributes added. We will use both methods and create two identities in the process. The first method is to specify that the attribute be added to the certificate by default when the identity is registered. The following command will register an identity named creator1 with the attribute of abac.creator=true.

```
fabric-ca-client register --id.name creator1 --id.secret creator1pw --id.type client --id.affiliation org1 --id.attrs  
'abac.creator=true:ecert' --tls.certfiles "${PWD}/organizations/fabric-ca/org1/tls-cert.pem"
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ fabric-ca-client register --id.name creator1 --id.secret cr  
eator1pw --id.type client --id.affiliation org1 --id.attrs 'abac.creator=true:ecert' --tls.certfiles "${PWD}/organizatio  
ns/fabric-ca/org1/tls-cert.pem"  
2023/01/07 01:34:53 [INFO] Configuration file location: /home/samreen/raeen/fabric-samples/test-network/organizations/pe  
erOrganizations/org1.example.com/fabric-ca-client-config.yaml  
2023/01/07 01:34:53 [INFO] TLS Enabled  
2023/01/07 01:34:53 [INFO] TLS Enabled  
Password: creator1pw  
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$
```

The ecert suffix adds the attribute to the certificate automatically when the identity is enrolled. As a result, the following enroll command will contain the attribute that was provided in the registration command.

```
fabric-ca-client enroll -u https://creator1:creator1pw@localhost:7054 --caname ca-org1 -M  
"${PWD}/organizations/peerOrganizations/org1.example.com/users/creator1@org1.example  
.com/msp" --tls.certfiles "${PWD}/organizations/fabric-ca/org1/tls-cert.pem"
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ fabric-ca-client enroll -u https://creator1:creator1pw@loca  
lhost:7054 --caname ca-org1 -M "${PWD}/organizations/peerOrganizations/org1.example.com/users/creator1@org1.example.com/  
msp" --tls.certfiles "${PWD}/organizations/fabric-ca/org1/tls-cert.pem"  
2023/01/07 01:35:54 [INFO] TLS Enabled  
2023/01/07 01:35:54 [INFO] generating key: &{A:ecdsa S:256}  
2023/01/07 01:35:54 [INFO] encoded CSR  
2023/01/07 01:35:54 [INFO] Stored client certificate at /home/samreen/raeen/fabric-samples/test-network/organizations/pe  
erOrganizations/org1.example.com/users/creator1@org1.example.com/msp/signcerts/cert.pem  
2023/01/07 01:35:54 [INFO] Stored root CA certificate at /home/samreen/raeen/fabric-samples/test-network/organizations/p  
eerOrganizations/org1.example.com/users/creator1@org1.example.com/msp/cacerts/localhost-7054-ca-org1.pem  
2023/01/07 01:35:54 [INFO] Stored Issuer public key at /home/samreen/raeen/fabric-samples/test-network/organizations/pee  
rOrganizations/org1.example.com/users/creator1@org1.example.com/msp/IssuerPublicKey  
2023/01/07 01:35:54 [INFO] Stored Issuer revocation public key at /home/samreen/raeen/fabric-samples/test-network/organ  
izations/peerOrganizations/org1.example.com/users/creator1@org1.example.com/msp/IssuerRevocationPublicKey
```

Now that we have enrolled the identity, run the command below to copy the Node OU configuration file into the creator1 MSP folder.

```
cp "${PWD}/organizations/peerOrganizations/org1.example.com/msp/config.yaml"  
"${PWD}/organizations/peerOrganizations/org1.example.com/users/creator1@org1.example.com/msp/config.y  
aml"
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ cp "${PWD}/organizations/peerOrganizations/org1.example.com/  
msp/config.yaml" "${PWD}/organizations/peerOrganizations/org1.example.com/users/creator1@org1.example.com/msp/config.ya  
ml"
```

The second method is to request that the attribute be added upon enrollment. The following command will register an identity named creator2 with the same abac.creator attribute.

```
fabric-ca-client register --id.name creator2 --id.secret creator2pw --id.type client --id.affiliation org1 --id.attrs  
'abac.creator=true:' --tls.certfiles "${PWD}/organizations/fabric-ca/org1/tls-cert.pem"
```

```

samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ fabric-ca-client register --id.name creator2 --id.secret.creator2pw --id.type client --id.affiliation org1 --id.attrs 'abac.creator=true:' --tls.certfiles "${PWD}/organizations/fabric-ca/org1/tls-cert.pem"
2023/01/07 01:38:48 [INFO] Configuration file location: /home/samreen/raeen/fabric-samples/test-network/organizations/peerOrganizations/org1.example.com/fabric-ca-client-config.yaml
2023/01/07 01:38:48 [INFO] TLS Enabled
2023/01/07 01:38:48 [INFO] TLS Enabled
Password: creator2pw

```

The following enroll command will add the attribute to the certificate:

```

fabric-ca-client enroll -u https://creator2:creator2pw@localhost:7054 --caname ca-org1 --enrollment.attrs "abac.creator" -M
"${PWD}/organizations/peerOrganizations/org1.example.com/users/creator2@org1.example.com/msp" --tls.certfiles "${PWD}/organizations/fabric-ca/org1/tls-cert.pem"
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ fabric-ca-client enroll -u https://creator2:creator2pw@localhost:7054 --caname ca-org1 --enrollment.attrs "abac.creator" -M "${PWD}/organizations/peerOrganizations/org1.example.com/users/creator2@org1.example.com/msp" --tls.certfiles "${PWD}/organizations/fabric-ca/org1/tls-cert.pem"
2023/01/07 01:40:01 [INFO] TLS Enabled
2023/01/07 01:40:01 [INFO] generating key: &{A:ecdsa S:256}
2023/01/07 01:40:01 [INFO] encoded CSR
2023/01/07 01:40:01 [INFO] Stored client certificate at /home/samreen/raeen/fabric-samples/test-network/organizations/peerOrganizations/org1.example.com/users/creator2@org1.example.com/msp/signcerts/cert.pem
2023/01/07 01:40:01 [INFO] Stored root CA certificate at /home/samreen/raeen/fabric-samples/test-network/organizations/peerOrganizations/org1.example.com/users/creator2@org1.example.com/msp/cacerts/localhost-7054-ca-org1.pem
2023/01/07 01:40:01 [INFO] Stored Issuer public key at /home/samreen/raeen/fabric-samples/test-network/organizations/peerOrganizations/org1.example.com/users/creator2@org1.example.com/msp/IssuerPublicKey
2023/01/07 01:40:01 [INFO] Stored Issuer revocation public key at /home/samreen/raeen/fabric-samples/test-network/organizations/peerOrganizations/org1.example.com/users/creator2@org1.example.com/msp/IssuerRevocationPublicKey
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ 

```

Run the command below to copy the Node OU configuration file into the creator2 MSP folder.

```

cp "${PWD}/organizations/peerOrganizations/org1.example.com/msp/config.yaml"
"${PWD}/organizations/peerOrganizations/org1.example.com/users/creator2@org1.example.com/msp/config.yaml"
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ cp "${PWD}/organizations/peerOrganizations/org1.example.com/msp/config.yaml" "${PWD}/organizations/peerOrganizations/org1.example.com/users/creator2@org1.example.com/msp/config.yaml"

```

Create an asset

You can use either identity with the abac.creator=true attribute to create an asset using the asset-transfer-abac smart contract. We will set the following environment variables to use the first identity that was generated, creator1:

```

export CORE_PEER_TLS_ENABLED=true
export CORE_PEER_LOCALMSPID="Org1MSP"
export
CORE_PEER_MSPCONFIGPATH=${PWD}/organizations/peerOrganizations/org1.example.com/users/creator1@org1.example.com/msp
export
CORE_PEER_TLS_ROOTCERT_FILE=${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt
export CORE_PEER_ADDRESS=localhost:7051
export TARGET_TLS_OPTIONS=(-o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafle
"${PWD}/organizations/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem" --peerAddresses localhost:7051 --tlsRootCertFiles
"${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt" --peerAddresses localhost:9051 --tlsRootCertFiles
"${PWD}/organizations/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt")

```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export CORE_PEER_TLS_ENABLED=true
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export CORE_PEER_LOCALMSPID="Org1MSP"
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export CORE_PEER_MSPCONFIGPATH="${PWD}/organizations/peerOrganizations/org1.example.com/users/creator1@org1.example.com/msp"
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export CORE_PEER_TLS_ROOTCERT_FILE="${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt"
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export CORE_PEER_ADDRESS=localhost:7051
$_OPSamreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ export TARGET_TLS_OPTIONS=(-o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafile "${PWD}/organizations/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem" --peerAddresses localhost:7051 --tlsRootCertFiles "${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt" --peerAddresses localhost:9051 --tlsRootCertFiles "${PWD}/organizations/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt")
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ -
```

Run the following command to create Asset1:

```
peer chaincode invoke "${TARGET_TLS_OPTIONS[@]}" -C mychannel -n abac -c '{"function":"CreateAsset","Args":["Asset1","blue","20","100"]}'
```

You can use the command below to query the asset on the ledger:

```
peer chaincode query -C mychannel -n abac -c '{"function":"ReadAsset","Args":["Asset1"]}'
```

The result will list the creator1 identity as the asset owner. The GetID() API reads the name and issuer from the certificate of the identity that submitted the transaction and assigns that identity as the asset owner:

```
{"ID":"Asset1","color":"blue","size":20,"owner":"x509::CN=creator1,OU=client+OU=org1,O=Hyperledger,ST=North Carolina,C=US::CN=ca.org1.example.com,O=org1.example.com,L=Durham,ST=North Carolina,C=US","appraisedValue":100}
```

Practical 5

Aim: Car auction network

- First install java in Ubuntu

Sudo apt update

Sudo apt install default-jdk

```
samreen@DESKTOP-11GFK07:~$ java --version
openjdk 11.0.17 2022-10-18
OpenJDK Runtime Environment (build 11.0.17+8-post-Ubuntu-1ubuntu220.04)
OpenJDK 64-Bit Server VM (build 11.0.17+8-post-Ubuntu-1ubuntu220.04, mixed mode, sharing)
samreen@DESKTOP-11GFK07:~$ sudo apt update
[sudo] password for samreen:
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://archive.ubuntu.com/ubuntu focal InRelease
Get:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Hit:4 http://ppa.launchpad.net/ethereum/ethereum/ubuntu focal InRelease
Get:5 http://archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:6 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [1503 kB]
Get:7 http://archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 Packages [25.2 kB]
```

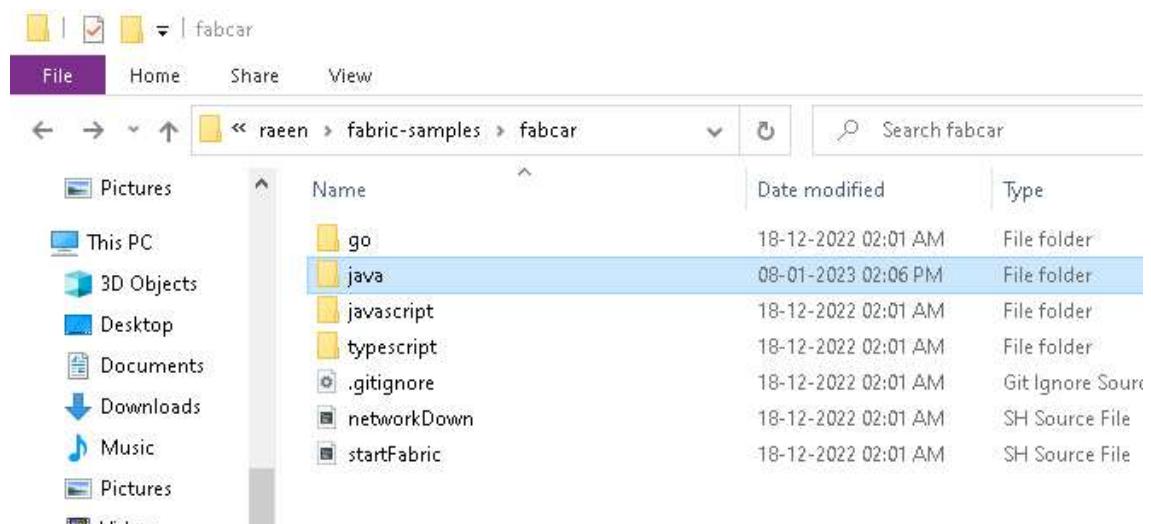
First down the network using

./network.sh down

```
samreen@DESKTOP-11GFK07:~$ cd raeen
samreen@DESKTOP-11GFK07:~/raeen$ cd fabric-samples
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples$ cd test-network
-bash: cd: test-network: No such file or directory
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples$ cd test-network
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/test-network$ ./network.sh down
Using docker and docker-compose
Stopping network
ERROR: Couldn't connect to Docker daemon at http+docker://localhost - is it running?

If it's at a non-standard location, specify the URL with the DOCKER_HOST environment variable.
Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?
Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?
Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?
```

Visit folder fabcar



Change directory to fabric samples and run command

```
docker rm -f $(docker ps -aq)
```

```
docker rmi -f $(docker images | grep gabcar | awk'{print $3}')
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar$ cd ..
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples$ docker rm -f $(docker ps -aq)
Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?
"docker rm" requires at least 1 argument.
See 'docker rm --help'.
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples$ docker rmi -f $(docker images | grep gabcar | awk'{print $3}')
Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?
awk{print $3}: command not found
"docker rmi" requires at least 1 argument.
See 'docker rmi --help'.

Usage: docker rmi [OPTIONS] IMAGE [IMAGE...]
```

Make sure that golang is installed then go to fabcar directory and perform this all command

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples$ cd fabcar
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar$ go env -w
GO111MODULE=on
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar$ go env -w
GOPROXY=http://goproxy.cn,direct
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar$ ./startFabric.sh
```

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples$ cd fabcar
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar$ go env -w GO111MODULE=on
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar$ go env -w GOPROXY=http://goproxy.cn,direct
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar$ ./startFabric.sh
~/raeen/fabric-samples/test-network ~/raeen/fabric-samples/fabcar
Using docker and docker-compose
```

After that install maven

Sudo apt install maven

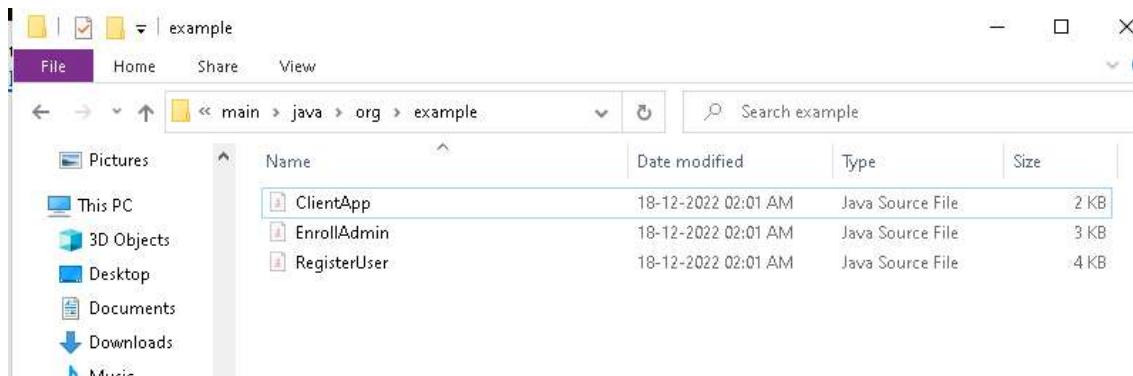
Go to java directory and test mvn

```
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar$ cd java
samreen@DESKTOP-11GFK07:~/raeen/fabric-samples/fabcar/java$ mvn test
```

```
ders-2.12.4.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/surefire-providers/2.12.4
ers-2.12.4.pom (2.3 kB at 7.3 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/surefire-junit4/2.12.4/s
.12.4.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/surefire-junit4/2.12.4/su
12.4.jar (37 kB at 95 kB/s)

-----
T E S T S
-----
Running org.example.ClientTest
log4j:WARN No appenders could be found for logger (org.hyperledger.fabric_ca.sdk.helper.Config).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
Tests run: 1, Failures: 0, Errors: 1, Skipped: 0, Time elapsed: 4.423 sec <<< FAILURE!testFabCar(org.example.Cli
apsed: 4.179 sec <<< ERROR!
org.hyperledger.fabric_ca.sdk.exception.EnrollmentException: Url:https://localhost:7054, Failed to enroll user ad
        at org.hyperledger.fabric_ca.sdk.HFCAClient.enroll(HFCAClient.java:518)
        at org.example.EnrollAdmin.main(EnrollAdmin.java:50)
        at org.example.ClientTest.testFabCar(ClientTest.java:13)
        at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
        at java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
        at java.base/jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:4
        at java.base/java.lang.reflect.Method.invoke(Method.java:566)
        at org.junit.runners.model.FrameworkMethod$1.runReflectiveCall(FrameworkMethod.java:50)
        at org.junit.internal.runners.model.ReflectiveCallable.run(ReflectiveCallable.java:12)
        at org.junit.runners.model.FrameworkMethod.invokeExplosively(FrameworkMethod.java:47)
        at org.junit.internal.runners.statements.InvokeMethod.evaluate(InvokeMethod.java:17)
```

Visit to folder location <\\wsl.localhost\Ubuntu\home\samreen\raeen\fabric-samples\fabcar\java\src\main\java\org\example>



Download IntelliJ IDEA

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Windows macOS Linux

Ultimate
The Leading Java and Kotlin IDE
Version: 2022.3
Build: 223.7571.182
30 November 2022
[Release notes](#)

Community Edition
The IDE for pure Java and Kotlin development
Free 30-day trial available
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IntelliJ IDEA Ultimate IntelliJ IDEA Community Edition

Open project in any IDE notepad/netbeans and run

Practical 6

Aim: Develop a voting application using Hyperledger and Ethereum. Build a decentralized app that combines Ethereum's Web3 and Solidity smart contracts with Hyperledger's hosting fabric and chaincode EVM

- **Remix.ethereum**

Using remix.ethereum link: <https://remix.ethereum.org/>

What is remix.ethereum?

Remix Project is a platform for development tools that use a plugin architecture. It encompasses sub-projects including Remix Plugin Engine, Remix Libraries, and of course Remix IDE. Remix IDE is an open source web and desktop application. It fosters a fast development cycle and has a rich set of plugins with intuitive GUIs. Remix is used for the entire journey of contract development with Solidity language as well as a playground for learning and teaching Ethereum.

```
pragma solidity 0.8.17;

contract VotingForTopper{

    address owner;

    string purpose;

    struct Voter{
        bool authorized;
        bool voted;
    }

    uint TotalVotes;
    uint teamA;
    uint teamB;
    uint teamC;

    mapping(address=>Voter) info;

    constructor(string memory _name) public{
        purpose = _name;
        owner = msg.sender;
    }

    modifier ownerOn(){
        require(msg.sender==owner);
        _;
    }

    function authorize(address _person) ownerOn public{
        info[_person].authorized = true;
    }

    function teamAF(address _address) public {
        require(!info[_address].voted,"already voter person");
    }
}
```

```

require(info[_address].authorized,"You have no right for Vote");
info[_address].voted = true;
teamA++;
TotalVotes++;
}

function teamBF(address _address) public {
    require(!info[_address].voted,"already voter person");
    require(info[_address].authorized,"You have no right for Vote");
    info[_address].voted = true;
    teamB++;
    TotalVotes++;
}

function teamCF(address _address) public returns(string memory){
    require(!info[_address].voted,"already voter person");
    require(info[_address].authorized,"You have no right for Vote");
    info[_address].voted = true;
    teamC++;
    TotalVotes++;
    return("Thanks for Voting");
}

function TotalVotesF() public view returns(uint){
    return TotalVotes;
}

function resultOfVoting() public view returns(string memory){
    if(teamA>teamB){
        if(teamA>teamC){
            return "A is Winning";
        }
        else if(teamC>teamA){
            return "C is Winiing";
        }
    }
    else if(teamB>teamC){
        return "B is Winiing";
    }
    else if(teamC>teamB){
        return "C is Winiing";
    }
    else if(teamA==teamB && teamA==teamC || teamB==teamC){
        return "No One is Winiing";
    }
}

```

The screenshot shows a blockchain development environment with a sidebar and a main panel.

Left Sidebar:

- Balance: 0 ETH
- authorize: 0xAb8483F64d9C6d1EcF9b34
- teamAF: address_address
- teamBF: address_address
- teamCF: address_address
- resultOfV...
- TotalVotesF

Bottom Left:

- Low level interactions
- CALLDATA
- Transact

Main Panel:

```
42 function teamBF(address _address) public {
43     require(!info[_address].voted,"already voter person");
44     require(info[_address].authorized,"You have no right for Vote");
45     info[_address].voted = true;
46     teamB++;
47     TotalVotes++;
48 }
49
50
51 function teamCF(address _address) public returns(string memory){
52     require(!info[_address].voted,"already voter person");
53     require(info[_address].authorized,"You have no right for Vote");
54     info[_address].voted = true;
55     teamC++;
56     TotalVotes++;
57     return("Thanks for Voting");
58 }
```

Bottom Right:

- listen on all transactions
- Search with transaction hash or address

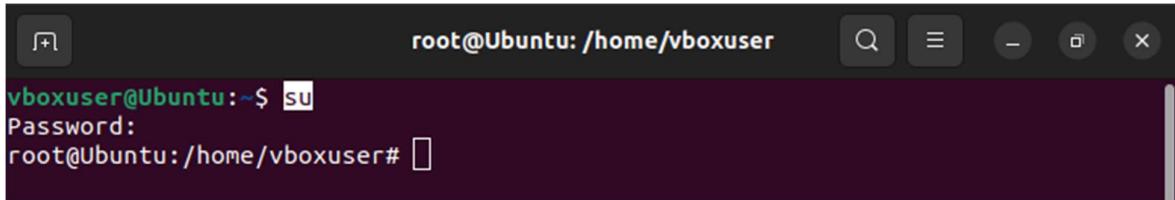
Log:

[vm] from: 0xAb84...35cb2 to: VotingForTopper.authorize(address) 0xBBa...f0Ce8 value: 0 wei data: 0xb6a...35cb2 logs: 0 hash: 0x3dc...9eff6

Practical No 7

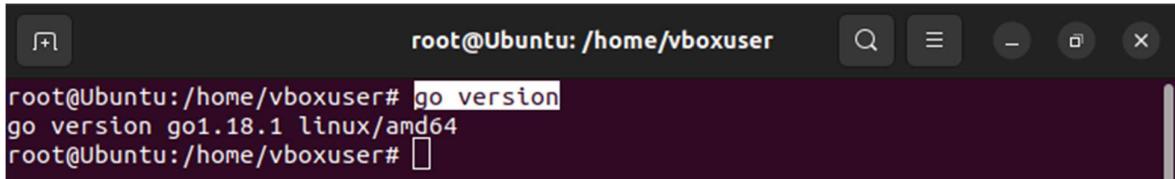
Aim: Create a block chain app for loyalty points with Hyperledger Fabric Ethereum Virtual Machine. Deploy Fabric locally with EVM and create a proxy for interacting with a smart contract through a Node.js web app

- Login as root user



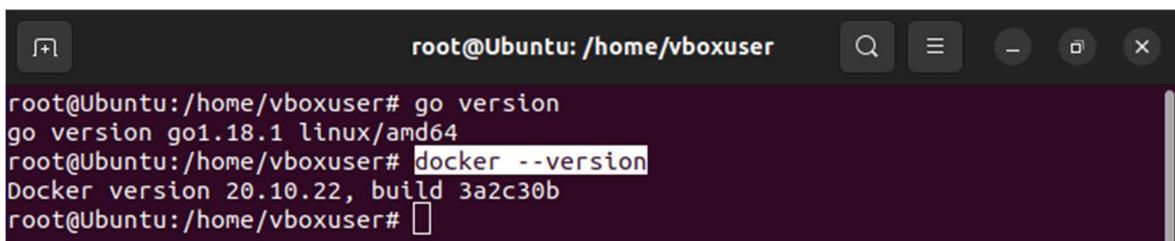
```
vboxuser@Ubuntu:~$ su
Password:
root@Ubuntu:/home/vboxuser#
```

- Install go



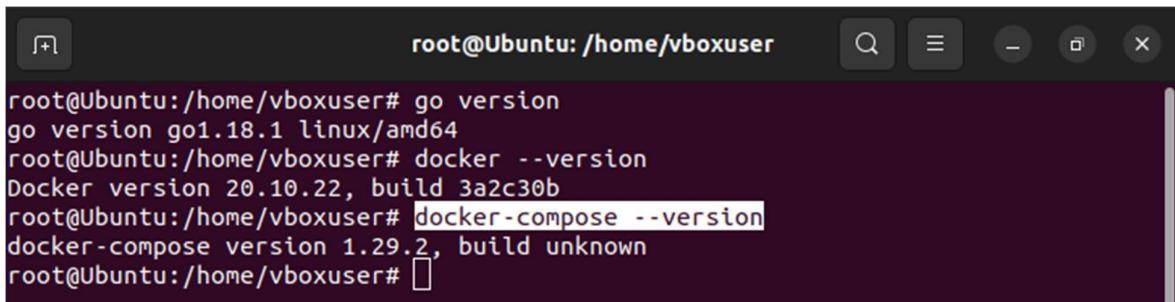
```
root@Ubuntu:/home/vboxuser# go version
go version go1.18.1 linux/amd64
root@Ubuntu:/home/vboxuser#
```

- Install Docker



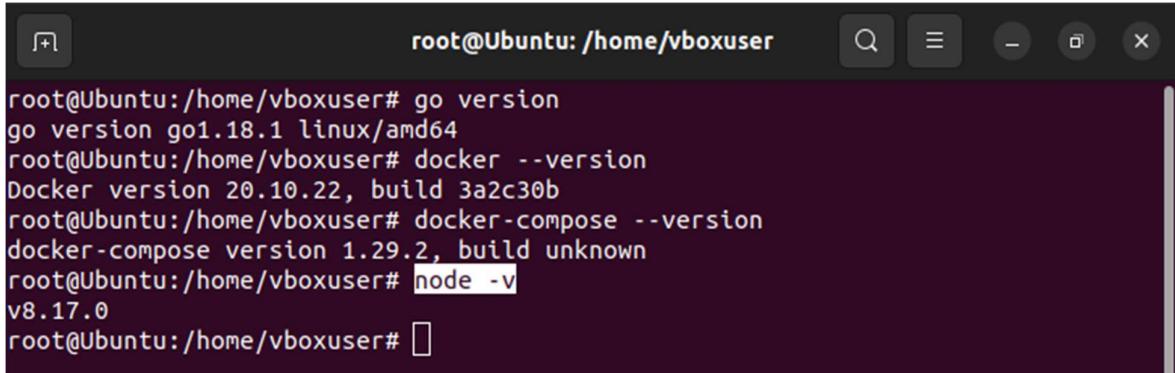
```
root@Ubuntu:/home/vboxuser# go version
go version go1.18.1 linux/amd64
root@Ubuntu:/home/vboxuser# docker --version
Docker version 20.10.22, build 3a2c30b
root@Ubuntu:/home/vboxuser#
```

- Install Docker-Compose



```
root@Ubuntu:/home/vboxuser# go version
go version go1.18.1 linux/amd64
root@Ubuntu:/home/vboxuser# docker --version
Docker version 20.10.22, build 3a2c30b
root@Ubuntu:/home/vboxuser# docker-compose --version
docker-compose version 1.29.2, build unknown
root@Ubuntu:/home/vboxuser#
```

- Install node

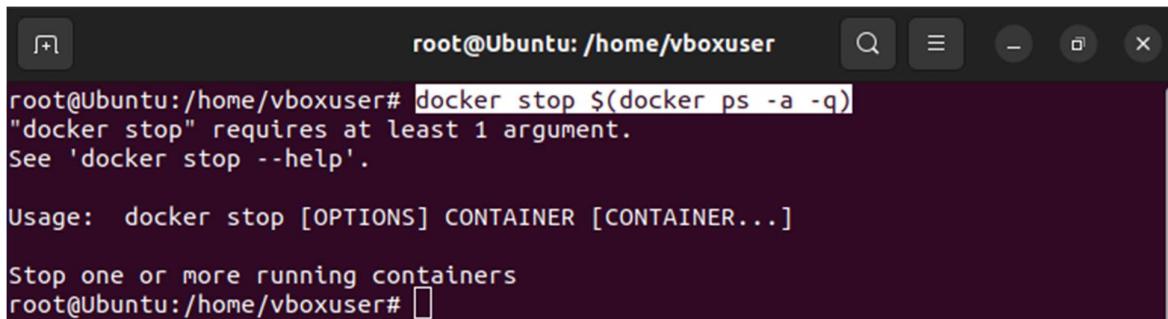


```
root@Ubuntu:/home/vboxuser# go version
go version go1.18.1 linux/amd64
root@Ubuntu:/home/vboxuser# docker --version
Docker version 20.10.22, build 3a2c30b
root@Ubuntu:/home/vboxuser# docker-compose --version
docker-compose version 1.29.2, build unknown
root@Ubuntu:/home/vboxuser# node -v
v8.17.0
root@Ubuntu:/home/vboxuser#
```

- Install npm

```
root@Ubuntu:/home/vboxuser# docker --version
Docker version 20.10.22, build 3a2c30b
root@Ubuntu:/home/vboxuser# docker-compose --version
docker-compose version 1.29.2, build unknown
root@Ubuntu:/home/vboxuser# node -v
v8.17.0
root@Ubuntu:/home/vboxuser# npm -v
6.13.4
root@Ubuntu:/home/vboxuser# 
```

- Remove all your docker containers and images.

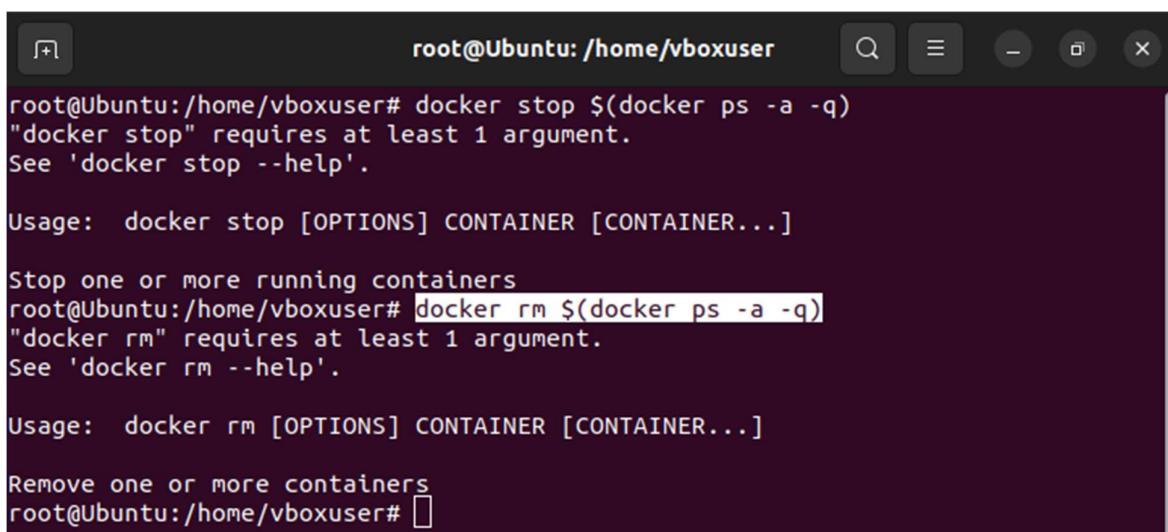


This screenshot shows a terminal window with the title bar "root@Ubuntu: /home/vboxuser". The terminal displays the command "docker stop \$(docker ps -a -q)" followed by an error message: "'docker stop' requires at least 1 argument. See 'docker stop --help'. Usage: docker stop [OPTIONS] CONTAINER [CONTAINER...]. Stop one or more running containers".

```
root@Ubuntu:/home/vboxuser# docker stop $(docker ps -a -q)
"docker stop" requires at least 1 argument.
See 'docker stop --help'.

Usage: docker stop [OPTIONS] CONTAINER [CONTAINER...]

Stop one or more running containers
root@Ubuntu:/home/vboxuser# 
```



This screenshot shows a terminal window with the title bar "root@Ubuntu: /home/vboxuser". The terminal displays the command "docker rm \$(docker ps -a -q)" followed by an error message: "'docker rm' requires at least 1 argument. See 'docker rm --help'. Usage: docker rm [OPTIONS] CONTAINER [CONTAINER...]. Remove one or more containers".

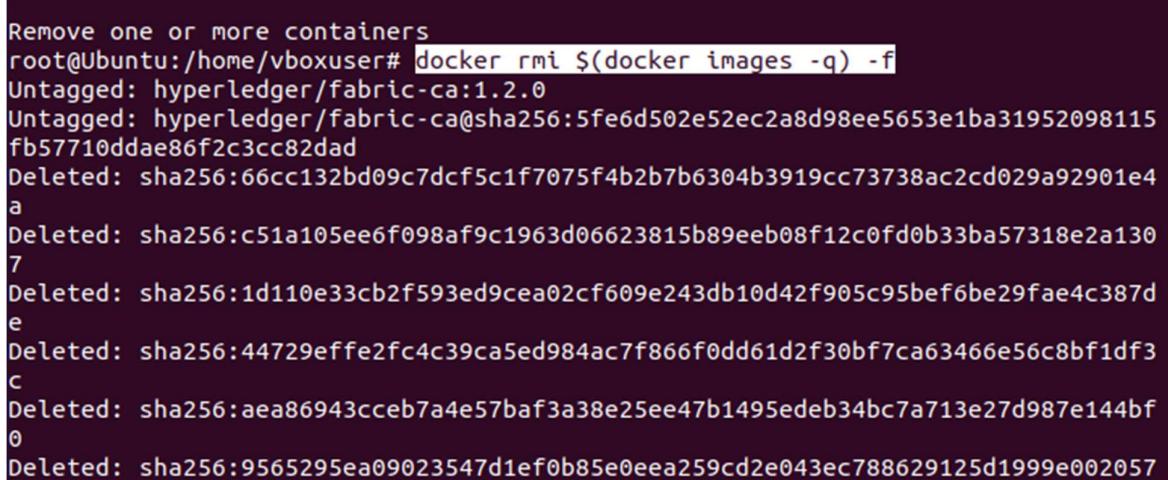
```
root@Ubuntu:/home/vboxuser# docker stop $(docker ps -a -q)
"docker stop" requires at least 1 argument.
See 'docker stop --help'.

Usage: docker stop [OPTIONS] CONTAINER [CONTAINER...]

Stop one or more running containers
root@Ubuntu:/home/vboxuser# docker rm $(docker ps -a -q)
"docker rm" requires at least 1 argument.
See 'docker rm --help'.

Usage: docker rm [OPTIONS] CONTAINER [CONTAINER...]

Remove one or more containers
root@Ubuntu:/home/vboxuser# 
```



This screenshot shows a terminal window with the title bar "root@Ubuntu: /home/vboxuser". The terminal displays the command "docker rmi \$(docker images -q) -f" followed by a list of deleted images. The output includes: Untagged: hyperledger/fabric-ca:1.2.0, Untagged: hyperledger/fabric-ca@sha256:5fe6d502e52ec2a8d98ee5653e1ba31952098115fb57710ddae86f2c3cc82dad, Deleted: sha256:66cc132bd09c7dcf5c1f7075f4b2b7b6304b3919cc73738ac2cd029a92901e4a, Deleted: sha256:c51a105ee6f098af9c1963d06623815b89eeb08f12c0fd0b33ba57318e2a1307, Deleted: sha256:1d110e33cb2f593ed9cea02cf609e243db10d42f905c95bef6be29fae4c387de, Deleted: sha256:44729effe2fc4c39ca5ed984ac7f866f0dd61d2f30bf7ca63466e56c8bf1df3c, Deleted: sha256:aea86943cce7a4e57baf3a38e25ee47b1495edeb34bc7a713e27d987e144bf0, Deleted: sha256:9565295ea09023547d1ef0b85e0eea259cd2e043ec788629125d1999e002057

```
Remove one or more containers
root@Ubuntu:/home/vboxuser# docker rmi $(docker images -q) -f
Untagged: hyperledger/fabric-ca:1.2.0
Untagged: hyperledger/fabric-ca@sha256:5fe6d502e52ec2a8d98ee5653e1ba31952098115fb57710ddae86f2c3cc82dad
Deleted: sha256:66cc132bd09c7dcf5c1f7075f4b2b7b6304b3919cc73738ac2cd029a92901e4a
Deleted: sha256:c51a105ee6f098af9c1963d06623815b89eeb08f12c0fd0b33ba57318e2a1307
Deleted: sha256:1d110e33cb2f593ed9cea02cf609e243db10d42f905c95bef6be29fae4c387de
Deleted: sha256:44729effe2fc4c39ca5ed984ac7f866f0dd61d2f30bf7ca63466e56c8bf1df3c
Deleted: sha256:aea86943cce7a4e57baf3a38e25ee47b1495edeb34bc7a713e27d987e144bf0
Deleted: sha256:9565295ea09023547d1ef0b85e0eea259cd2e043ec788629125d1999e002057
```

- Set gopath to your go installation

```
root@Ubuntu:/home/vboxuser# export GOPATH=$HOME/go
root@Ubuntu:/home/vboxuser# 
```

```
root@Ubuntu:/home/vboxuser# export GOPATH=$HOME/go
root@Ubuntu:/home/vboxuser# pwd
/home/vboxuser
root@Ubuntu:/home/vboxuser# cd GOPATH
bash: cd: GOPATH: No such file or directory
root@Ubuntu:/home/vboxuser# cd $GOPATH
root@Ubuntu:~/go# pwd
/root/go
```

- Clone the fabric-chaincode-evm repo in your go path directory

```
root@Ubuntu:~/go# mkdir src
root@Ubuntu:~/go# ls
src
root@Ubuntu:~/go# 
```

```
root@Ubuntu:~/go# mkdir src
root@Ubuntu:~/go# ls
src
root@Ubuntu:~/go# cd src
root@Ubuntu:~/go/src# 
```

```
root@Ubuntu:~/go# cd src
root@Ubuntu:~/go/src# mkdir github.com
root@Ubuntu:~/go/src# ls
github.com
root@Ubuntu:~/go/src# 
```

```
root@Ubuntu:~/go/src# ls
github.com
root@Ubuntu:~/go/src# cd github.com/
root@Ubuntu:~/go/src/github.com# 
```

```
root@Ubuntu:~/go/src# cd github.com/
root@Ubuntu:~/go/src/github.com# mkdir hyperledger
root@Ubuntu:~/go/src/github.com# ls
hyperledger
```

```
root@Ubuntu:~/go/src/github.com# mkdir hyperledger
root@Ubuntu:~/go/src/github.com# ls
hyperledger
root@Ubuntu:~/go/src/github.com# cd hyperledger/
root@Ubuntu:~/go/src/github.com/hyperledger# ls
```

```
root@Ubuntu:~/go/src/github.com# cd hyperledger/
root@Ubuntu:~/go/src/github.com/hyperledger# ls
root@Ubuntu:~/go/src/github.com/hyperledger# cd $GOPATH/src/github.com/hyperledger/
root@Ubuntu:~/go/src/github.com/hyperledger# 
```

```
root@Ubuntu:~/go/src/github.com/hyperledger# cd $GOPATH/src/github.com/hyperledger/
root@Ubuntu:~/go/src/github.com/hyperledger# git clone https://github.com/hyperledger/fabric-samples.git
Cloning into 'fabric-samples'...
remote: Enumerating objects: 11694, done.
remote: Counting objects: 100% (131/131), done.
remote: Compressing objects: 100% (94/94), done.
remote: Total 11694 (delta 51), reused 83 (delta 29), pack-reused 11563
Receiving objects: 100% (11694/11694), 22.43 MiB | 4.93 MiB/s, done.
Resolving deltas: 100% (6235/6235), done.
root@Ubuntu:~/go/src/github.com/hyperledger# 
```

- Checkout release-0.1

```
root@Ubuntu:~/go/src/github.com/hyperledger# ls
fabric-samples
root@Ubuntu:~/go/src/github.com/hyperledger# cd fabric-samples
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# 
```

```
root@Ubuntu:~/go/src/github.com/hyperledger# cd fabric-samples
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# git checkout release-1.4
branch 'release-1.4' set up to track 'origin/release-1.4'.
Switched to a new branch 'release-1.4'
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# 
```

- Now navigate back to your fabric-samples folder. Here we will use first-network to launch the network.

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm# cd $GOPATH/src/github.com/hyperledger/fabric-samples/first-network
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# 
```

- Update the docker-compose-cli.yaml with the volumes to include the fabric-chaincode-evm.

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# ls
base                      docker-compose-cli.yaml
byfn.sh                   docker-compose-couch-org3.yaml
ccp-generate.sh           docker-compose-couch.yaml
ccp-template.json          docker-compose-e2e-template.yaml
ccp-template.yaml          docker-compose-etcdraft2.yaml
channel-artifacts          docker-compose-kafka.yaml
configtx.yaml              docker-compose-org3.yaml
connection-org3.json       eyfn.sh
connection-org3.yaml       org3-artifacts
crypto-config.yaml          README.md
docker-compose-ca.yaml     scripts
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# chmod
+x docker-compose-cli.yaml
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# 
```

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# chmod
+x docker-compose-cli.yaml
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# gedit
docker-compose-cli.yaml 
```

*docker-compose-cli.yaml

```

76      - CORE_PEER_TLS_KEY_FILE=/opt/gopath/src/github.com/hyperledger/fabric/
    peer/crypto/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/
    tls/server.key
77      - CORE_PEER_TLS_ROOTCERT_FILE=/opt/gopath/src/github.com/hyperledger/
    fabric/peer/crypto/peerOrganizations/org1.example.com/peers/
    peer0.org1.example.com/tls/ca.crt
78      - CORE_PEER_MSPCONFIGPATH=/opt/gopath/src/github.com/hyperledger/
    fabric/peer/crypto/peerOrganizations/org1.example.com/users/
    Admin@org1.example.com/msp
79      working_dir: /opt/gopath/src/github.com/hyperledger/fabric/peer
80      command: /bin/bash
81      volumes:
82        - /var/run/:/host/var/run/
83        - ./chaincode/:/opt/gopath/src/github.com/chaincode
84        - ./crypto-config:/opt/gopath/src/github.com/hyperledger/fabric/peer/
    crypto/
85        - ./scripts:/opt/gopath/src/github.com/hyperledger/fabric/peer/
    scripts/
86        - ./channel-artifacts:/opt/gopath/src/github.com/hyperledger/fabric/
    peer/channel-artifacts
87        - ../../fabric-chaincode-evm:/opt/gopath/src/github.com/
    hyperledger/fabric-chaincode-evm
88      depends_on:
89        - orderer.example.com
90        - peer0.org1.example.com
91        - peer1.org1.example.com
92        - peer0.org2.example.com
93        - peer1.org2.example.com

```

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- Generate certificates and bring up the network

```

root@Ubuntu: ~/go/src/github.com/hyperledger/fabric-sam...
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# cd ..
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# cd bin/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/bin# 

root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/bin# cp cryptogen ..
/fist-network/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/bin# cd ..

root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/bin# cp cryptogen ..
/fist-network/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/bin# cd ..
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# cd first-network/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/bin# cp cryptogen ..
/fist-network/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/bin# cd ..
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# cd first-network/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# ./byfn.sh generate

```

```

root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/bin# cd ..
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# cd first-network/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# ./byfn.sh generate
Generating certs and genesis block for channel 'mychannel' with CLI timeout of
'10' seconds and CLI delay of '3' seconds
Continue? [Y/n] Y
proceeding ...
/root/go/src/github.com/hyperledger/fabric-samples/first-network/../bin/cryptogen

#####
##### Generate certificates using cryptogen tool #####
#####
+ cryptogen generate --config=./crypto-config.yaml
org1.example.com
org2.example.com
+ res=0
+ set +x

```

```

root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# ./byfn.sh up
Starting for channel 'mychannel' with CLI timeout of '10' seconds and CLI delay
of '3' seconds
Continue? [Y/n] Y
proceeding ...
LOCAL_VERSION=1.4.4
DOCKER_IMAGE_VERSION=1.4.4
Creating network "net_byfn" with the default driver
Creating volume "net_orderer.example.com" with default driver
Creating volume "net_peer0.org1.example.com" with default driver
Creating volume "net_peer1.org1.example.com" with default driver
Creating volume "net_peer0.org2.example.com" with default driver
Creating volume "net_peer1.org2.example.com" with default driver
Creating orderer.example.com ... done
Creating peer1.org2.example.com ... done
Creating peer0.org2.example.com ... done
Creating peer1.org1.example.com ... done
Creating peer0.org1.example.com ... done
Creating cli ... done
CONTAINER ID     IMAGE                                     COMMAND          CREATED

```

- Navigate into the cli docker container

```

root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples/first-network# cd ..
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# ls
balance-transfer      commercial-paper  interest_rate_swaps
basic-network          config           Jenkinsfile
bin                   CONTRIBUTING.md   LICENSE
chaincode              docs             MAINTAINERS.md
chaincode-docker-devmode fabcar           off_chain_data
ci                     fabric-samples   README.md
ci.properties          first-network   scripts
CODE_OF_CONDUCT.md    high-throughput SECURITY.md
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-samples# cd ..
root@Ubuntu:~/go/src/github.com/hyperledger#

```

root@cc16dc6a4ec2: /opt/gopath/src/github.com/hyperled...
root@Ubuntu:~/go/src/github.com/hyperledger# docker exec -it cli bash
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer#

```
root@cc16dc6a4ec2: /opt/gopath/src/github.com/hyperled...  
root@Ubuntu:~/go/src/github.com/hyperledger# docker exec -it cli bash  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_MSPCONFIGPATH=/opt/gopath/src/github.com/hyperledger/fabric/peer/crypto  
/peerOrganizations/org1.example.com/users/Admin@org1.example.com/msp  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# 
```

```
root@cc16dc6a4ec2: /opt/gopath/src/github.com/hyperled...  
root@Ubuntu:~/go/src/github.com/hyperledger# docker exec -it cli bash  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_MSPCONFIGPATH=/opt/gopath/src/github.com/hyperledger/fabric/peer/crypto  
/peerOrganizations/org1.example.com/users/Admin@org1.example.com/msp  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_ADDRESS=peer0.org1.example.com:7051  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# 
```

```
root@cc16dc6a4ec2: /opt/gopath/src/github.com/hyperled...  
root@Ubuntu:~/go/src/github.com/hyperledger# docker exec -it cli bash  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_MSPCONFIGPATH=/opt/gopath/src/github.com/hyperledger/fabric/peer/crypto  
/peerOrganizations/org1.example.com/users/Admin@org1.example.com/msp  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_ADDRESS=peer0.org1.example.com:7051  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_LOCALMSPID="Org1MSP"  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# 
```

```
root@cc16dc6a4ec2: /opt/gopath/src/github.com/hyperled...  
root@Ubuntu:~/go/src/github.com/hyperledger# docker exec -it cli bash  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_MSPCONFIGPATH=/opt/gopath/src/github.com/hyperledger/fabric/peer/crypto  
/peerOrganizations/org1.example.com/users/Admin@org1.example.com/msp  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_ADDRESS=peer0.org1.example.com:7051  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_LOCALMSPID="Org1MSP"  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# export CO  
RE_PEER_TLS_ROOTCERT_FILE=/opt/gopath/src/github.com/hyperledger/fabric/peer/cr  
ypto/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# 
```

- Next install the EVM chaincode on all the peers

```
root@cc16dc6a4ec2: /opt/gopath/src/github.com/hyperledger/fabric/peer# peer chai  
ncode install -n evmcc -l golang -v 0 -p github.com/hyperledger/fabric-chaincod  
e-evm/evmcc  
2023-01-02 10:56:22.323 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001  
Using default escc  
2023-01-02 10:56:22.324 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002  
Using default vscc  
2023-01-02 10:56:34.255 UTC [chaincodeCmd] install -> INFO 003 Installed remote  
ly response:<status:200 payload:"OK" >  
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# 
```

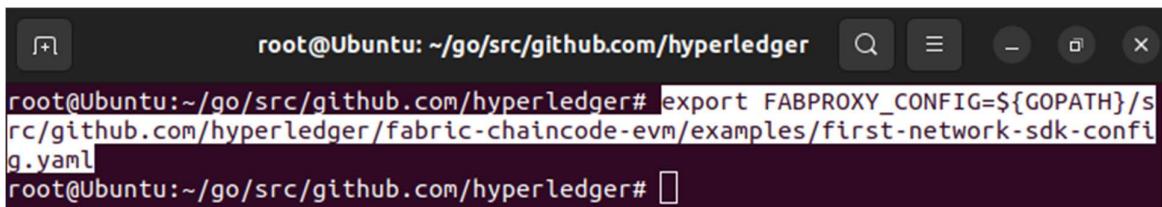
- Instantiate the chaincode.

```
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode instantiate -n evmcc -v 0 -C mychannel -c '{"Args":[]}' -o orderer.example.com:7050 --tls --cafile /opt/gopath/src/github.com/hyperledger/fabric/peer/crypto/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem
2023-01-02 10:57:02.120 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default escc
2023-01-02 10:57:02.121 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vscc
```

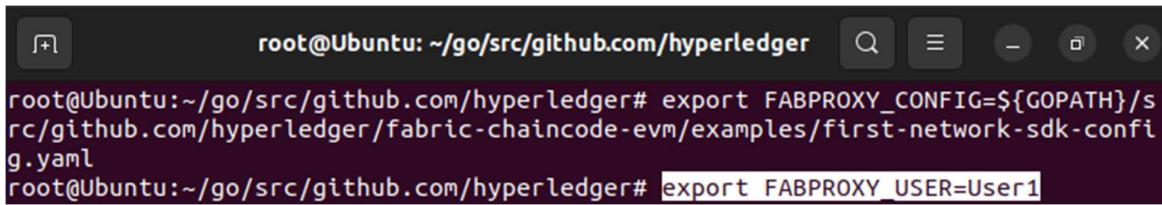
- You can exit out of the cli container and return to your terminal.

```
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# peer chaincode instantiate -n evmcc -v 0 -C mychannel -c '{"Args":[]}' -o orderer.example.com:7050 --tls --cafile /opt/gopath/src/github.com/hyperledger/fabric/peer/crypto/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem
2023-01-02 10:57:02.120 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default escc
2023-01-02 10:57:02.121 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vscc
root@cc16dc6a4ec2:/opt/gopath/src/github.com/hyperledger/fabric/peer# exit
```

- Execute the following to set certain environment variables required for setting up Fab3

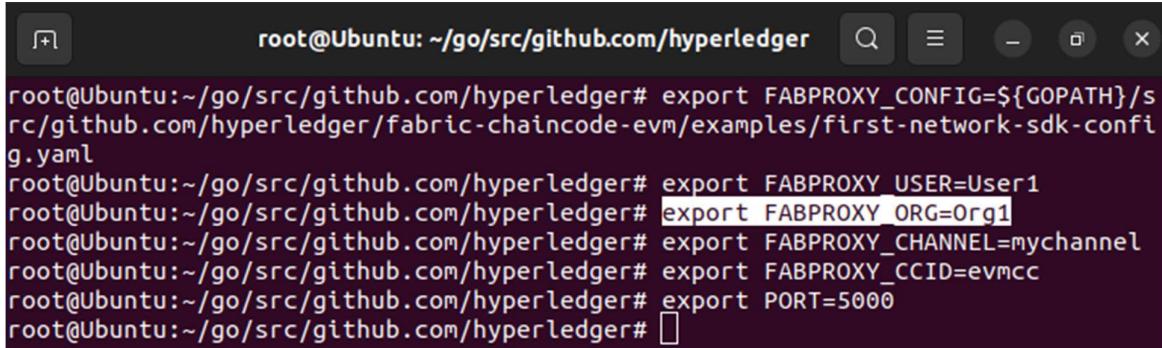


root@Ubuntu: ~/go/src/github.com/hyperledger# export FABPROXY_CONFIG=\${GOPATH}/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml



root@Ubuntu: ~/go/src/github.com/hyperledger# export FABPROXY_CONFIG=\${GOPATH}/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml

root@Ubuntu: ~/go/src/github.com/hyperledger# export FABPROXY_USER=User1



root@Ubuntu: ~/go/src/github.com/hyperledger# export FABPROXY_CONFIG=\${GOPATH}/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml

root@Ubuntu: ~/go/src/github.com/hyperledger# export FABPROXY_USER=User1

root@Ubuntu: ~/go/src/github.com/hyperledger# export FABPROXY_ORG=Org1

root@Ubuntu: ~/go/src/github.com/hyperledger# export FABPROXY_CHANNEL=mychannel

root@Ubuntu: ~/go/src/github.com/hyperledger# export FABPROXY_CCID=evmcc

root@Ubuntu: ~/go/src/github.com/hyperledger# export PORT=5000

root@Ubuntu: ~/go/src/github.com/hyperledger#

```
root@Ubuntu:~/go/src/github.com/hyperledger
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CONFIG=${GOPATH}/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_USER=User1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_ORG=Org1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CHANNEL=mychannel
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CCID=evmcc
root@Ubuntu:~/go/src/github.com/hyperledger# export PORT=5000
root@Ubuntu:~/go/src/github.com/hyperledger#
```

```
root@Ubuntu:~/go/src/github.com/hyperledger
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CONFIG=${GOPATH}/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_USER=User1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_ORG=Org1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CHANNEL=mychannel
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CCID=evmcc
root@Ubuntu:~/go/src/github.com/hyperledger# export PORT=5000
root@Ubuntu:~/go/src/github.com/hyperledger#
```

```
root@Ubuntu:~/go/src/github.com/hyperledger
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CONFIG=${GOPATH}/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_USER=User1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_ORG=Org1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CHANNEL=mychannel
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CCID=evmcc
root@Ubuntu:~/go/src/github.com/hyperledger# export PORT=5000
root@Ubuntu:~/go/src/github.com/hyperledger#
```

- Redirect to fabric-chaincode-evm directory

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chai...
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CONFIG=${GOPATH}/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_USER=User1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_ORG=Org1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CHANNEL=mychannel
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CCID=evmcc
root@Ubuntu:~/go/src/github.com/hyperledger# export PORT=5000
root@Ubuntu:~/go/src/github.com/hyperledger# cd fabric-chaincode-evm/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm#
```

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chai... 
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CONFIG=${GOPATH}/src/github.com/hyperledger/fabric-chaincode-evm/examples/first-network-sdk-config.yaml
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_USER=User1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_ORG=Org1
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CHANNEL=mychannel
root@Ubuntu:~/go/src/github.com/hyperledger# export FABPROXY_CCID=evmcc
root@Ubuntu:~/go/src/github.com/hyperledger# export PORT=5000
root@Ubuntu:~/go/src/github.com/hyperledger# cd fabric-chaincode-evm/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm# cd $GOPATH/src/github.com/hyperledger/fabric-chaincode-evm/
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm# 
```

- Run the following to build the fab proxy

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chai...
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm# go mod init
go: creating new go.mod: module github.com/hyperledger/fabric-chaincode-evm
go: downloading github.com/Azure/go-ansiterm v0.0.0-20170929234023-d6e3b3328b78
go: downloading github.com/Microsoft/go-winio v0.4.8
go: downloading github.com/Nvveen/Gotty v0.0.0-20120604004816-cd527374f1e5
go: downloading github.com/beorn7/perks v0.0.0-20180321164747-3a771d992973
go: downloading github.com/btcsuite/btcd v0.0.0-20180706232521-fdfc19097e7a
go: downloading github.com/cactus/go-statsd-client v3.1.1+incompatible
go: downloading github.com/cloudflare/cfssl v0.0.0-20180323000720-5d63dbd981b5
go: downloading github.com/containerd/continuity v0.0.0-20180612233548-246e49050efd
go: downloading github.com/davecgh/go-spew v1.1.0
go: downloading github.com/docker/docker v17.12.0-ce-rc1.0.20180827131323-0c5f8d2b9b23+incompatible
go: downloading github.com/docker/go-connections v0.3.0
go: downloading github.com/docker/go-units v0.3.3
go: downloading github.com/docker/libnetwork v0.8.0-dev.2.0.20180608203834-19279f049241
go: downloading github.com/facebookgo/clock v0.0.0-20150410010913-600d898af40a
go: downloading github.com/fsnotify/fsnotify v1.4.7
go: downloading github.com/fsouza/go-dockerclient v1.3.0
go: downloading github.com/go-kit/kit v0.6.0
go: downloading github.com/go-logfmt/logfmt v0.3.0
go: downloading github.com/go-stack/stack v1.7.0
go: downloading github.com/gogo/protobuf v1.0.0
go: downloading github.com/golang/mock v1.1.2-0.20180503014854-22bbf0ddf081
go: downloading github.com/golang/protobuf v1.1.0
go: downloading github.com/google/certificate-transparency-go v1.0.10-0.2018022191210-5ab67e519c93 
```

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chai... go mod tidy -e
go: finding module for package github.com/btcsuite/btcutil/base58
go: finding module for package github.com/fortytw2/leaktest
go: finding module for package github.com/BurntSushi/toml
go: finding module for package github.com/agl/ed25519/edwards25519
go: finding module for package github.com/stretchr/objx
go: finding module for package github.com/Knetic/govaluate
go: finding module for package github.com/Shopify/sarama
go: finding module for package github.com/hashicorp/go-version
go: found github.com/tendermint/go-wire in github.com/tendermint/go-wire v0.7.3
go: found github.com/tendermint/go-wire/data in github.com/tendermint/go-wire v0.7.3
go: found github.com/btcsuite/btcutil/base58 in github.com/btcsuite/btcutil v1.0.2
go: found github.com/fortytw2/leaktest in github.com/fortytw2/leaktest v1.3.0
go: found github.com/BurntSushi/toml in github.com/BurntSushi/toml v1.2.1
go: found github.com/stretchr/objx in github.com/stretchr/objx v0.5.0
go: found github.com/Knetic/govaluate in github.com/Knetic/govaluate v3.0.0+inc
ompatible
go: found github.com/Shopify/sarama in github.com/Shopify/sarama v1.37.2
go: found github.com/hashicorp/go-version in github.com/hashicorp/go-version v1.6.0
go: finding module for package github.com/agl/ed25519/edwards25519
github.com/hyperledger/fabric-chaincode-evm/evmcc imports
    github.com/hyperledger/burrow/account imports
    github.com/tendermint/go-crypto imports
    github.com/tendermint/ed25519 tested by
    github.com/tendermint/ed25519.test imports
```

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm# go mod vendor
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm# 
```

```
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chai... go build -o fab3 ./fabproxy/cmd
root@Ubuntu:~/go/src/github.com/hyperledger/fabric-chaincode-evm# 
```

- You can then run the proxy

```
./fab3
```

This will start Fab3 at `http://localhost:5001`

