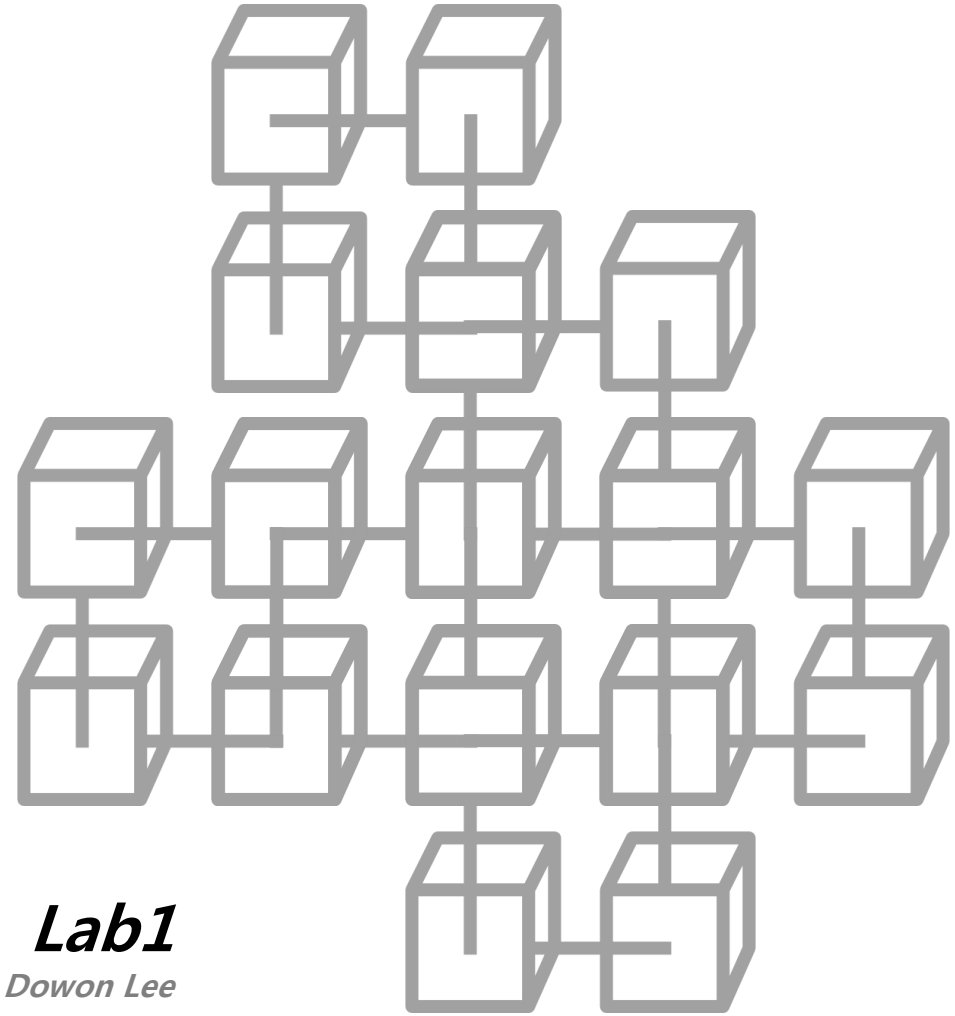
HYPERLEDGER
FABRIC



Lab1

written by Dowon Lee

SW 준비

- 가상화 환경 SW
  - VirtualBox (https://www.virtualbox.org)
  - Vagrant (https://www.vagrantup.com)
- Linux Guest OS (Hyperledger Fabric을 구축하는 OS 환경)
  - Ubuntu 16.04.3 LTS x86/64bit (https://www.ubuntu.com)

SW 준비

- 필요한 Tool 또는 SW (Guest OS에 설치)
  - Docker Community Edition(CE) 17.03.0-ce 이상 (https://www.docker.com)
  - Docker Compose 1.8.0 이상
  - Python 2.7 (https://www.python.org)
  - Go 언어 1.7.x (https://golang.org)
  - Node.js 6.x (https://nodejs.org)
  - npm 3.10.10
  - GNU make, gcc/g++, libtool
- 설치 순서
  1) VirtualBox와 Vagrant의 인스톨
  2) Ubuntu Linux 게스트 OS의 인스톨과 초기설정
  3) 필요한 툴 또는 소프트웨어의 인스톨
  4) HLF의 인스톨과 동작 확인

Step1. VirtualBox와 Vagrant의 인스톨

- VirtualBox 인스톨
  - https://www.virtualbox.org

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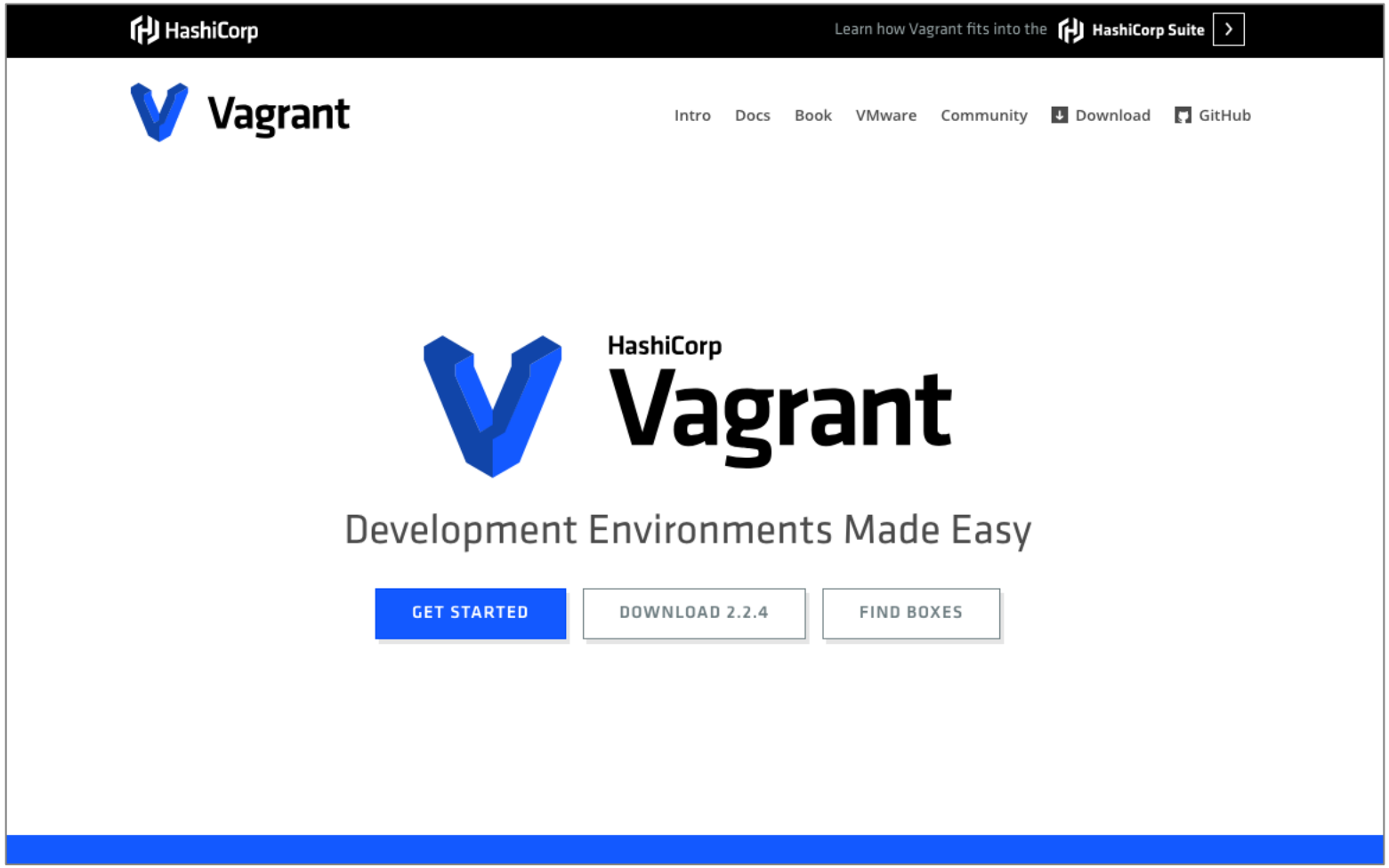
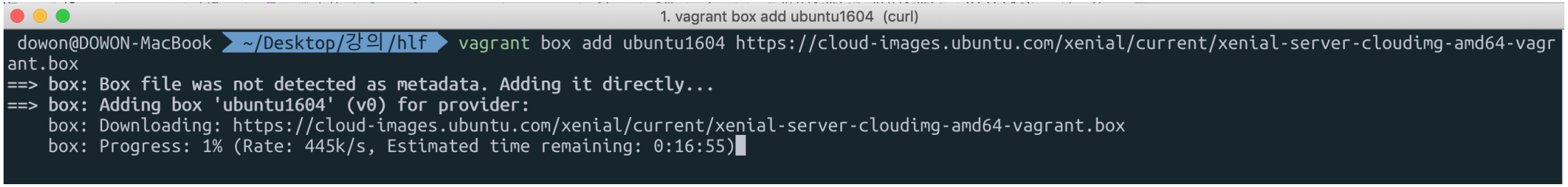
- Vagrant 인스톨
  - https://www.virtualbox.org

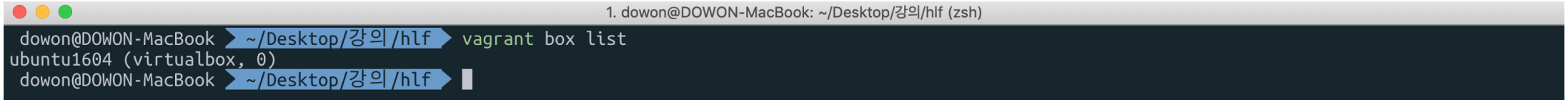


Step2. Ubuntu Linux 게스트OS 설치와 초기설정

- Vagrant box
  - Guest OS 이미지 (*.box)
- Ubuntu vagrant box 파일 다운로드와 인스톨

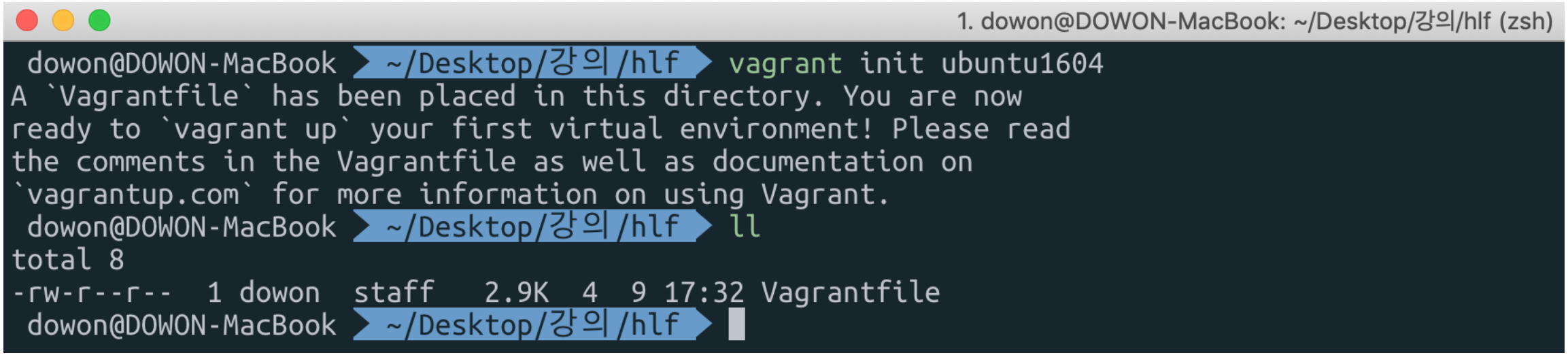
  > ***vagrant box add*** ubuntu1604 https://cloud-images.ubuntu.com/xenial/current/xenial-server-cloudimg-amd64-vagrant.box





Step2. Ubuntu Linux 게스트OS 설치와 초기설정

- Ubuntu Guest OS 설치
  - > ***vagrant init*** ubuntu1604



Step2. Ubuntu Linux 게스트OS 설치와 초기설정

- Guest OS 메모리 설정 → Vagrantfile 수정

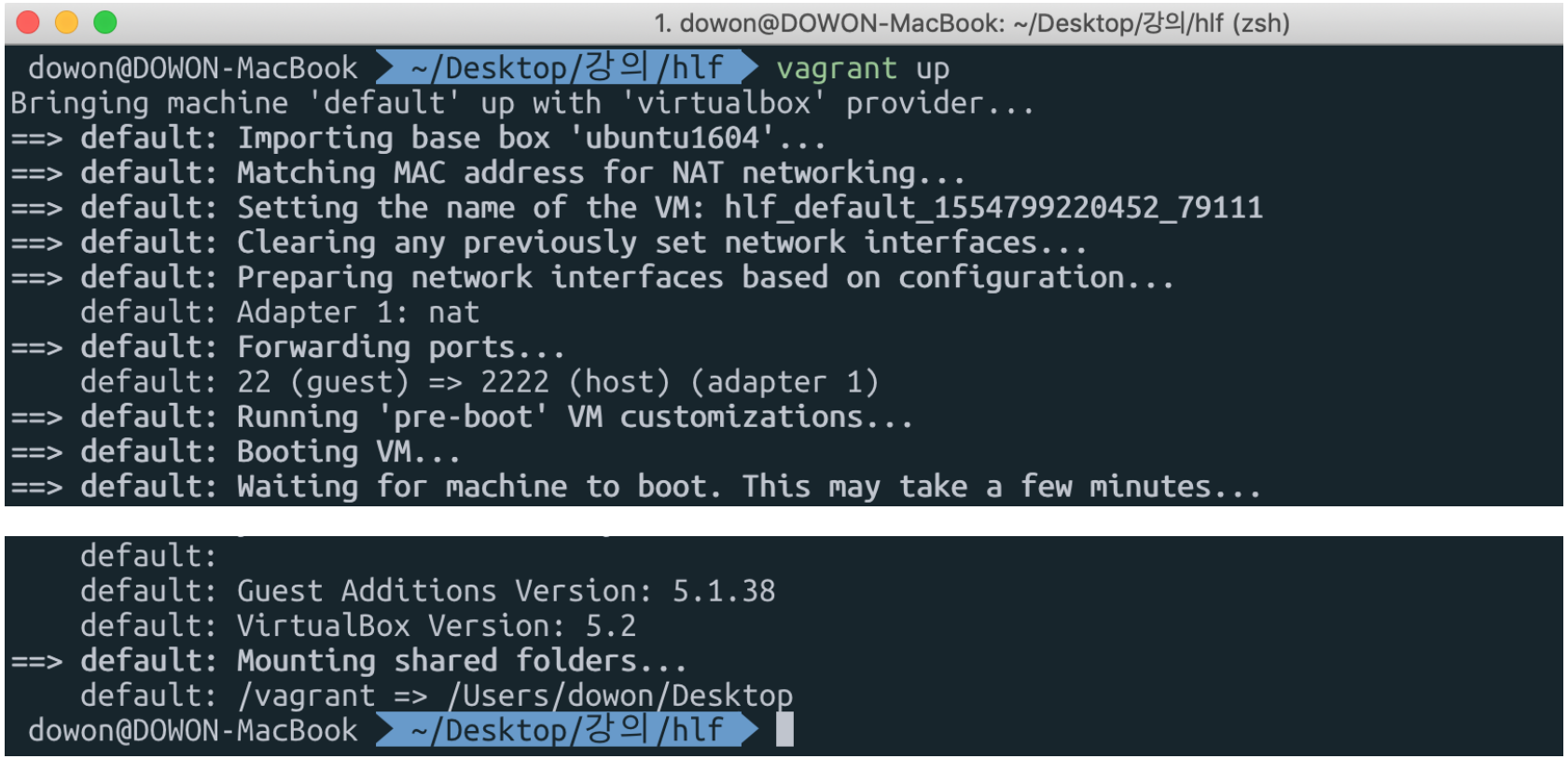
  vb.memory = "***4096***"

```
48   # Provider-specific configuration so you can fine-tune various
49   # backing providers for Vagrant. These expose provider-specific options.
50   # Example for VirtualBox:
51   #
52     config.vm.provider "virtualbox" do |vb|
53   #   # Display the VirtualBox GUI when booting the machine
54   #   vb.gui = true
55   #
56   #   # Customize the amount of memory on the VM:
57       vb.memory = "4096"
58     end
59   #
```

Step2. Ubuntu Linux 게스트OS 설치와 초기설정

- 가상머신과 Guest OS 기동

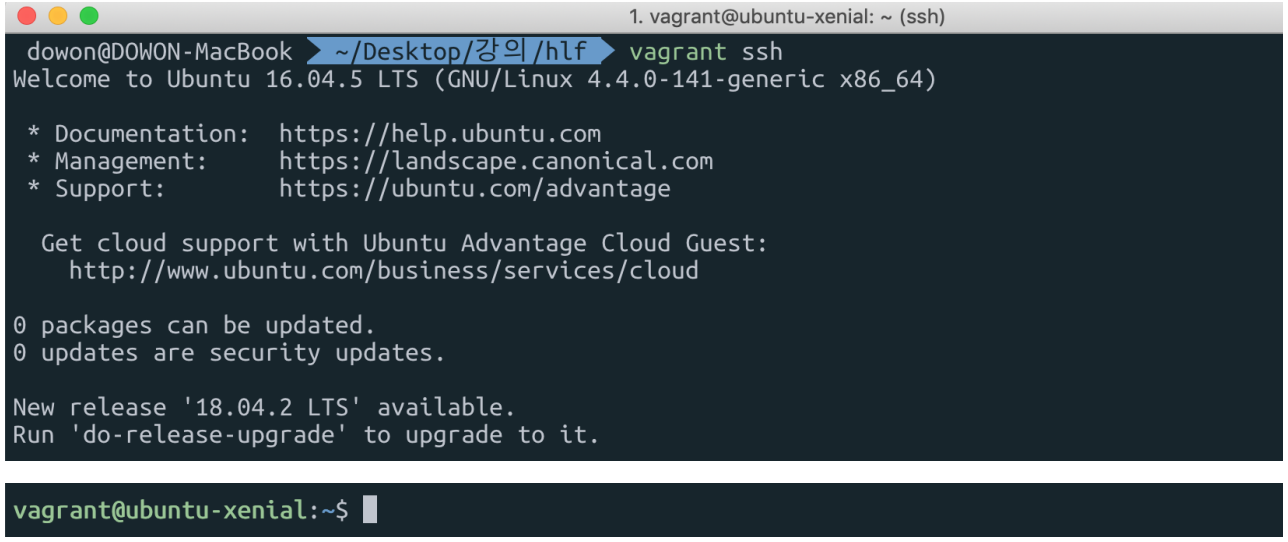
  > ***vagrant up***



Step2. Ubuntu Linux 게스트OS 설치와 초기설정

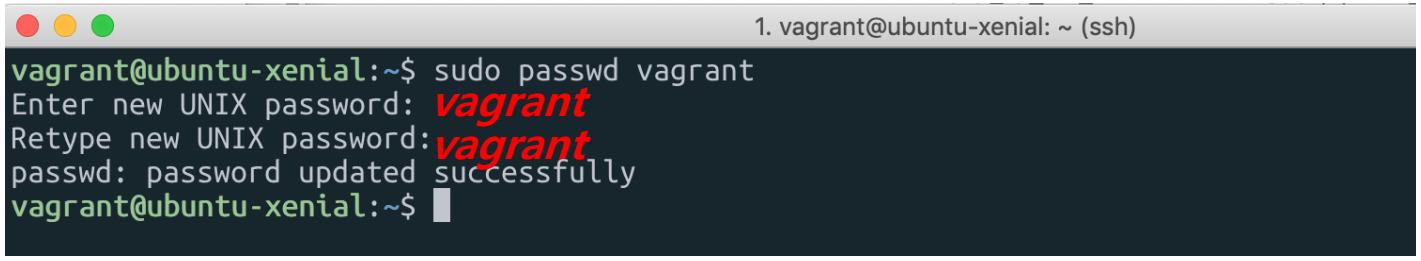
- Guest OS 로그인

  > ***vagrant ssh***



- 유저 비밀번호 변경

  $ ***sudo passwd vagrant***

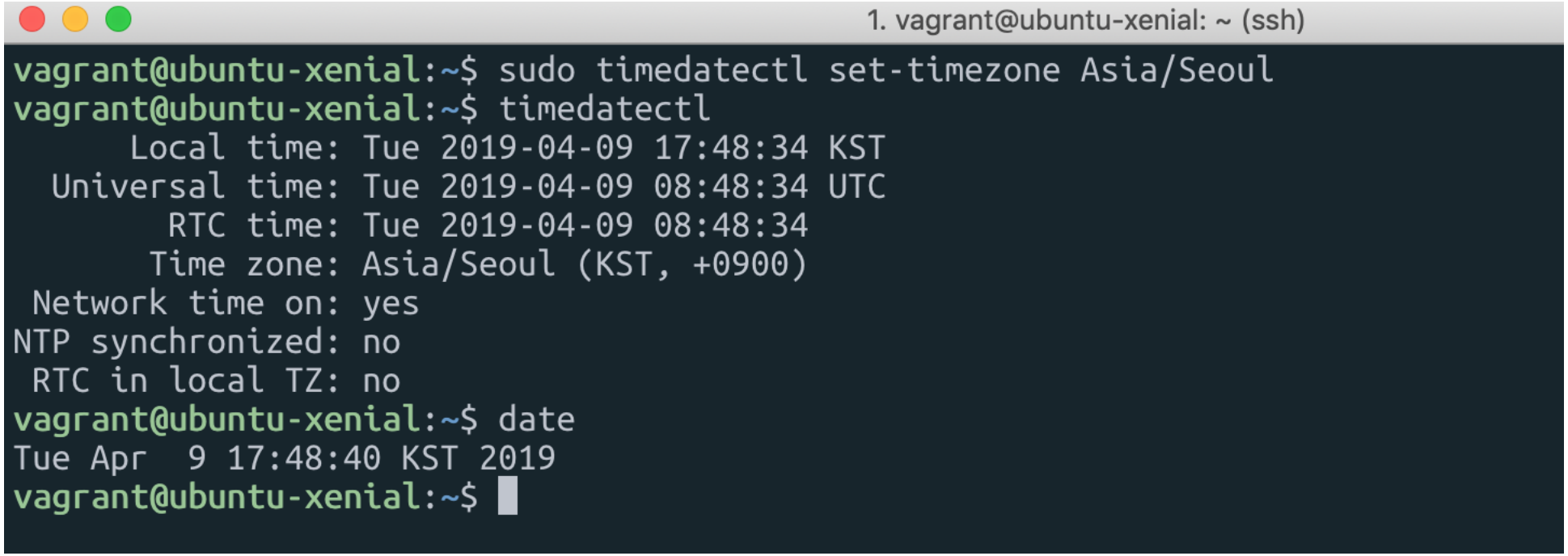


Step2. Ubuntu Linux 게스트OS 설치와 초기설정

- Timezone 설정

  $ ***sudo timedatectl set-timezone Asia/Seoul***

  $ ***timedatectl***

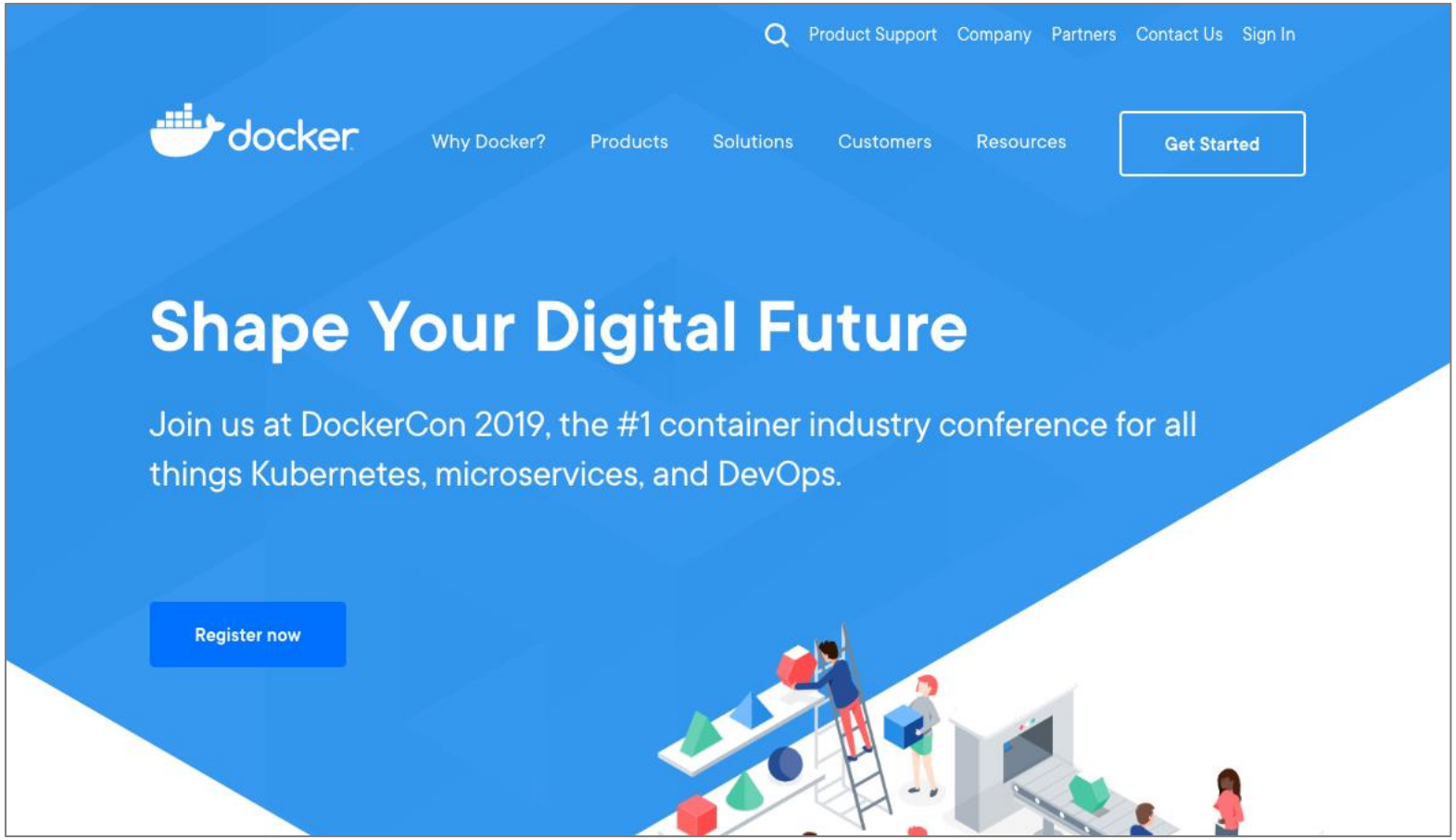


Step2. Ubuntu Linux 게스트OS 설치와 초기설정

- Guest OS 정지
  - > ***vagrant halt***
- Guest OS 중단, 재개
  - > ***vagrant suspend***
  - > ***vagrant resume***
- Guest OS 제거
  - > ***vagrant destroy***

Step3. 필수 Tool, SW 설치

- Docker CE (and Docker Compose) 설치 (https://www.docker.com/)
  - 컨테이너형 가상화 SW
  - Docker Compose → 컨테이너형 애플리케이션이나 그 네트워크를 구성하는 툴



Step3. 필수 Tool, SW 설치

- Docker CE (and Docker Compose) 설치 (https://www.docker.com/)

  $ sudo apt update

  $ sudo apt upgrade

  $ sudo apt –y install ***apt-transport-https ca-certificates curl software-properties-common***

  $ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -

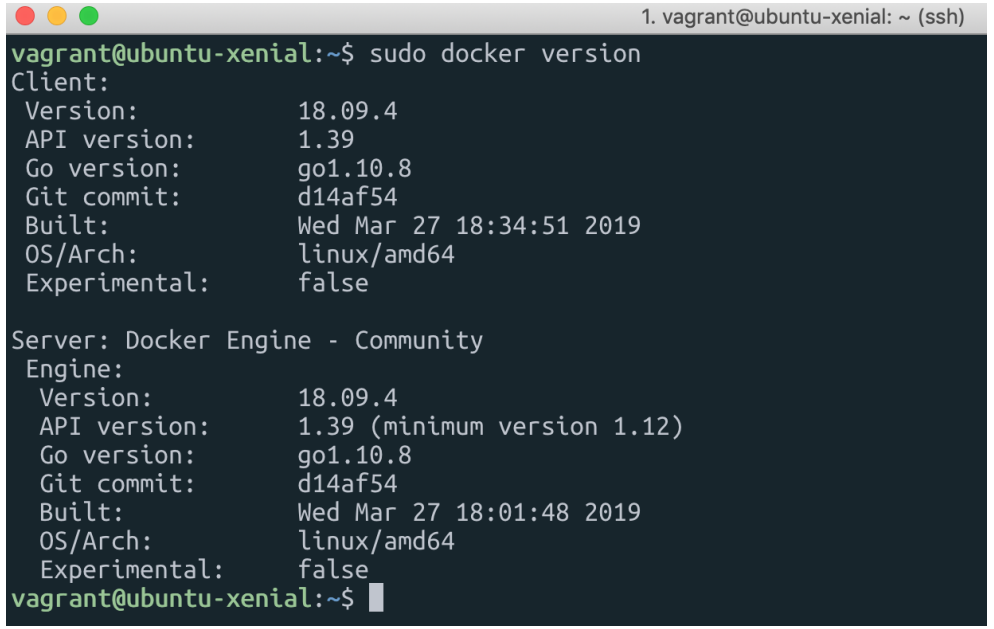
  $ sudo add-apt-repository ***"deb [arch=amd64] https://download.docker.com/linux/ubuntu*** ₩

  $(lsb_release –cs) stable"

  $ sudo apt update

  $ sudo apt –y install ***docker-ce***

  $ sudo docker version



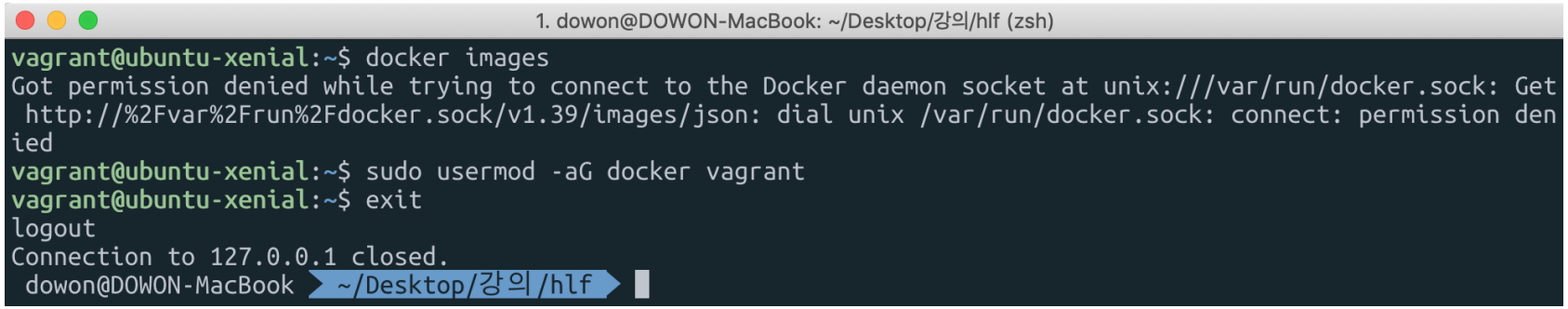
Step3. 필수 Tool, SW 설치

- docker group에 유저 추가

  $ docker images

  $ sudo usermod -aG docker vagrant

  $ exit



- 로그인

  > ***vagrant ssh***

  $ ***docker images***

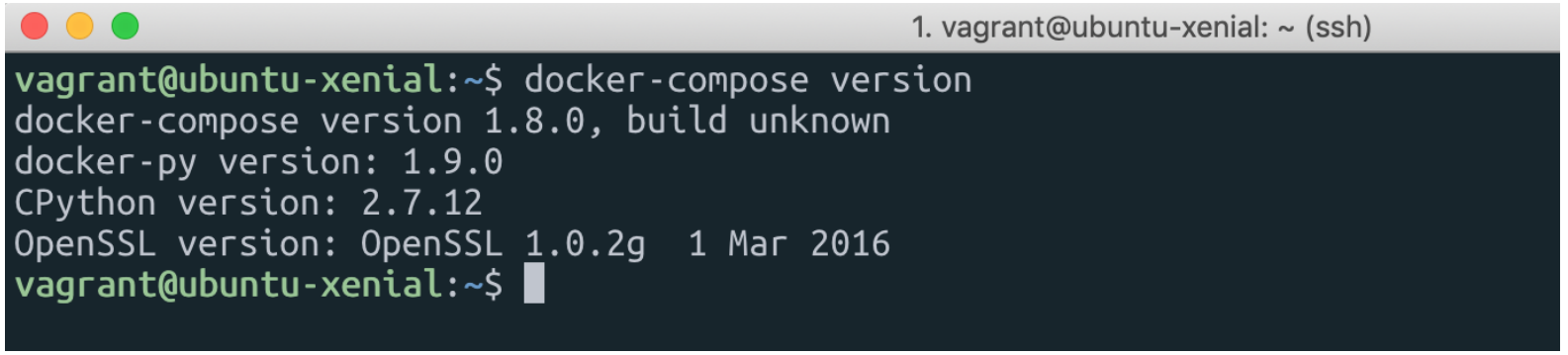
Step3. 필수 Tool, SW 설치

- Docker Composer 설치

  $ sudo apt –y install ***docker-compose***

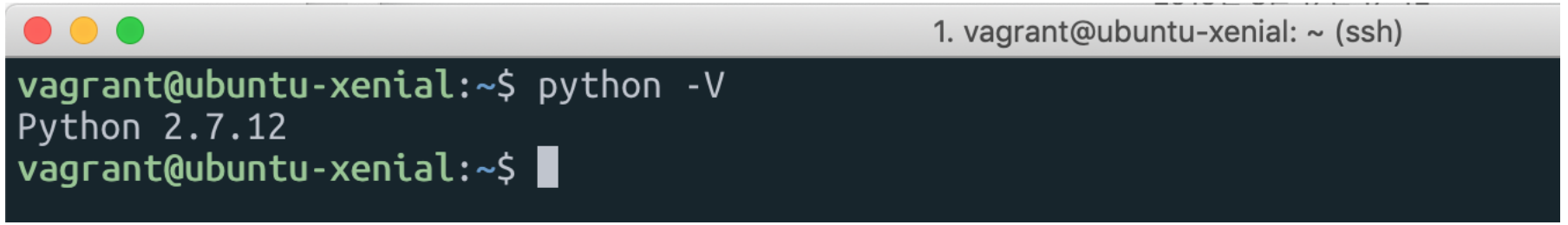
```
vagrant@ubuntu-xenial:~$ sudo apt -y install docker-compose
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
```

```
Setting up python-texttable (0.8.1-1) ...
Setting up python-yaml (3.11-3build1) ...
Setting up docker-compose (1.8.0-2~16.04.1) ...
Setting up python-cffi-backend (1.5.2-1ubuntu1) ...
Setting up python-idna (2.0-3) ...
Setting up python-pyasn1 (0.1.9-1) ...
Setting up python-cryptography (1.2.3-1ubuntu0.2) ...
Setting up python-openssl (0.15.1-2ubuntu0.2) ...
Setting up python-ndg-httpsclient (0.4.0-3) ...
vagrant@ubuntu-xenial:~$
```



Step3. 필수 Tool, SW 설치

- Python 2.7 설치
  - docker-compose 설치 시 같이 설치 되어 있음



(설치 되어있지 않을 경우)

$ sudo apt -y install ***python***

Step3. 필수 Tool, SW 설치

- Golang 설치

  $ wget *https://dl.google.com/go/go1.10.linux-amd64.tar.gz*

  $ sudo *tar -C /usr/local -xvf go1.10.linux-amd64.tar.gz*

  $ echo *'export PATH=$PATH:/usr/local/go/bin' >> ~/.progile*

  $ *. ~/.profile*

  $ *go version*

```
vagrant@ubuntu-xenial:~$ echo 'export PATH=$PATH:/usr/local/go/bin' >> ~/.profile
vagrant@ubuntu-xenial:~$ . ~/.profile
vagrant@ubuntu-xenial:~$ go version
go version go1.10 linux/amd64
vagrant@ubuntu-xenial:~$
```

Step3. 필수 Tool, SW 설치

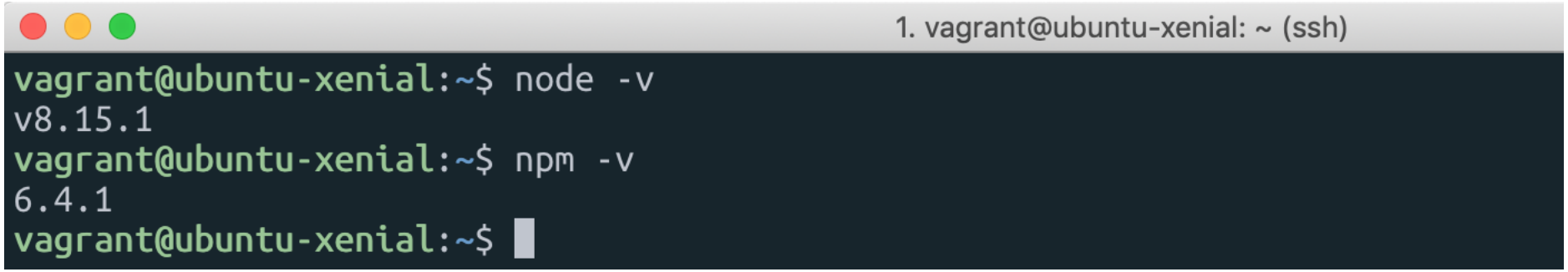
- Node.js, npm 설치

  $ curl -sL *https://deb.nodesource.com/setup_8.x* | ***sudo bash -***

  $ sudo ***apt install nodejs***

  $ ***node -v***

  $ ***npm -v***



Step3. 필수 Tool, SW 설치

- GNU make, gcc/g++, libtool 설치
  - npm 커맨드로 native module 빌드하기 위해 필요

$ sudo ***apt –y install make gcc g++ libtool***

```
vagrant@ubuntu-xenial:~$ sudo apt -y  install  make  gcc  g++  libtool
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libuv1
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  autotools-dev binutils cpp cpp-5 g++-5 gcc-5 libasan2 libatomic1 libc-dev-bin libc6-dev libcc1-0
  libcilkrts5 libgcc-5-dev libgomp1 libisl15 libitm1 liblsan0 libltdl-dev libmpc3 libmpx0 libquadmath0
  libstdc++-5-dev libtsan0 libubsan0 linux-libc-dev manpages-dev
```

```
Setting up g++ (4:5.3.1-1ubuntu1) ...
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Setting up libltdl-dev:amd64 (2.4.6-0.1) ...
Setting up libtool (2.4.6-0.1) ...
Setting up make (4.1-6) ...
Setting up manpages-dev (4.04-2) ...
Processing triggers for libc-bin (2.23-0ubuntu11) ...
vagrant@ubuntu-xenial:~$
```

Step4. Hyperledger Fabric 설치, 동작확인

- CLI, Docker 컨테이너 설치

  $ mkdir fabric

  $ cd fabric

  $ ***curl -sSL http://bit.ly/2ysbOFE | bash -s 1.3.0***

```
vagrant@ubuntu-xenial:~/fabric$ curl -sSL http://bit.ly/2ysbOFE | bash -s 1.3.0

Installing hyperledger/fabric-samples repo

===> Cloning hyperledger/fabric-samples repo and checkout v1.3.0
Cloning into 'fabric-samples'...
remote: Enumerating objects: 2874, done.
remote: Total 2874 (delta 0), reused 0 (delta 0), pack-reused 2874
Receiving objects: 100% (2874/2874), 1004.81 KiB | 192.00 KiB/s, done.
Resolving deltas: 100% (1423/1423), done.
Checking connectivity... done.
Note: checking out 'v1.3.0'.
```

```
Installing Hyperledger Fabric binaries

===> Downloading version 1.3.0 platform specific fabric binaries
===> Downloading:  https://nexus.hyperledger.org/content/repositories/releases/org/hyperledger/fabric/hyperle
dger-fabric/linux-amd64-1.3.0/hyperledger-fabric-linux-amd64-1.3.0.tar.gz
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  3 43.3M    3 1686k    0     0   159k      0  0:04:38  0:00:10  0:04:28  202k
```

Step4. Hyperledger Fabric 설치, 동작 확인

- PATH에 Hyperledger Fabric Command 추가

  $ cd fabric-samples

  $ ls bin

  $ echo ***'export PATH=$PATH:$HOME/fabric/fabric-samples/bin' >> ~/.profile***

  $. ~/.profile

- 설치된 Docker 컨테이너 확인

  $ ***docker images***

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples$ docker images
REPOSITORY                    TAG                 IMAGE ID            CREATED             SIZE
hyperledger/fabric-zookeeper  0.4.15              20c6045930c8        3 weeks ago         1.43GB
hyperledger/fabric-zookeeper  latest              20c6045930c8        3 weeks ago         1.43GB
hyperledger/fabric-kafka      0.4.15              b4ab82bbaf2f        3 weeks ago         1.44GB
hyperledger/fabric-kafka      latest              b4ab82bbaf2f        3 weeks ago         1.44GB
hyperledger/fabric-couchdb    0.4.15              8de128a55539        3 weeks ago         1.5GB
hyperledger/fabric-couchdb    latest              8de128a55539        3 weeks ago         1.5GB
hyperledger/fabric-ca         1.4.0               1a804ab74f58        2 months ago        244MB
hyperledger/fabric-ca         latest              1a804ab74f58        2 months ago        244MB
hyperledger/fabric-javaenv    1.3.0               2476cefaf833        6 months ago        1.7GB
hyperledger/fabric-javaenv    latest              2476cefaf833        6 months ago        1.7GB
hyperledger/fabric-tools      1.3.0               c056cd9890e7        6 months ago        1.5GB
hyperledger/fabric-tools      latest              c056cd9890e7        6 months ago        1.5GB
hyperledger/fabric-ccenv      1.3.0               953124d80237        6 months ago        1.38GB
hyperledger/fabric-ccenv      latest              953124d80237        6 months ago        1.38GB
hyperledger/fabric-orderer    1.3.0               f430f581b46b        6 months ago        145MB
hyperledger/fabric-orderer    latest              f430f581b46b        6 months ago        145MB
hyperledger/fabric-peer       1.3.0               f3ea63abddaa        6 months ago        151MB
hyperledger/fabric-peer       latest              f3ea63abddaa        6 months ago        151MB
```

Lab1. fabcar 실행

- Hyperledger Fabric 동작 확인
- Hyperledger Fabric SDK for Node.js를 개발된 자동차 거래 애플리케이션
- npm tool로 의존성 모듈 설치 → 설치 스크립트 실행

  $ cd fabcar

  $ npm install → Fabric SDK 설치 (fabric-ca-client, fabric-client)

  $ ***./startFabric.sh***

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ ./startFabric.sh

# don't rewrite paths for Windows Git Bash users
export MSYS_NO_PATHCONV=1

docker-compose -f docker-compose.yml down
Removing network net_basic
WARNING: Network net_basic not found.

docker-compose -f docker-compose.yml up -d ca.example.com orderer.example.com peer0.org1.example.com couchdb
Creating network "net_basic" with the default driver
Creating orderer.example.com
Creating ca.example.com
Creating couchdb
Creating peer0.org1.example.com
```

Lab1. fabcar 실행

- Organization X 1
- Certificate Authority X 1
- Orderer X 1
- Peer X 1
- CouchDB X1

1. vagrant@ubuntu-xenial: ~/fabric/fabric-samples/fabcar (ssh)

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ docker ps --format "table {{.Names}}\t{{.Command}}" --no-trunc
NAMES                                     COMMAND
dev-peer0.org1.example.com-fabcar-1.0     "chaincode -peer.address=peer0.org1.example.com:7052"
cli                                       "/bin/bash"
peer0.org1.example.com                    "peer node start"
couchdb                                   "tini -- /docker-entrypoint.sh /opt/couchdb/bin/couchdb"
ca.example.com                            "sh -c 'fabric-ca-server start -b admin:adminpw'"
orderer.example.com                       "orderer"
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$
```

Lab1. fabcar 실행

```
Creating cli
2019-04-09 14:09:50.160 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default escc
2019-04-09 14:09:50.161 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vscc
2019-04-09 14:09:50.602 UTC [chaincodeCmd] install -> INFO 003 Installed remotely response:<status:200 payloa
d:"OK" >
2019-04-09 14:09:50.875 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 001 Using default escc
2019-04-09 14:09:50.876 UTC [chaincodeCmd] checkChaincodeCmdParams -> INFO 002 Using default vscc
2019-04-09 14:10:22.179 UTC [chaincodeCmd] chaincodeInvokeOrQuery -> INFO 001 Chaincode invoke successful. re
sult: status:200

Total setup execution time : 47 secs ...


Start by installing required packages run 'npm install'
Then run 'node enrollAdmin.js', then 'node registerUser'

The 'node invoke.js' will fail until it has been updated with valid arguments
The 'node query.js' may be run at anytime once the user has been registered

vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$
```

- 관리 유저 admin 등록

  $ ***node enrollAdmin.js***

- 일반 유저 user1 등록

  $ ***node registerUser.js***

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ node enrollAdmin.js
 Store path:/home/vagrant/fabric/fabric-samples/fabcar/hfc-key-store
(node:22345) DeprecationWarning: grpc.load: Use the @grpc/proto-loader module with grpc.loadPackageDefinition instead
Successfully enrolled admin user "admin"
Assigned the admin user to the fabric client ::{"name":"admin","mspid":"Org1MSP","roles":null,"affiliation":"","enrollm
entSecret":"","enrollment":{"signingIdentity":"69a7e03273ad3ef35576fce302bb049b66d1ed46f80cf47fa8c4afe4e23bb73c","ident
ity":{"certificate":"-----BEGIN CERTIFICATE-----\nMIICAjCCAaigAwIBAgIUDT31fSqXADndpK0pRdf3d3jKRMkwCgYIKoZIzj0EAwIw\nczE
LMAkGA1UEBhMCVVMxEzARBgNVBAgTCkNhbGlmb3JuaWExFjAUBgNVBAcTDVNh\nbiBGcmFuY2lzY28xGTAXBgNVBAoTEG9yZzEuZXhhbXBsZS5jb20xHDAa
BgNVBAMT\nE2NhLm9yZzEuZXhhbXBsZS5jb20wHhcNMTkwNDA5MTQxMjAwWhcNMjAwNDA4MTQx\nNzAwWjAhMQ8wDQYDVQQLEwZjbGllbnQxDjAMBgNVBAM
TBWFkbWluMFkwEwYHKoZI\nzj0CAQYIKoZIzj0DAQcDQgAEyNhoPffbt+P4BuHipGoIl9gTrpWk6HqdAdAjpDrs\nCCJ6LsyBGqffe0S27gf2R9ZsyH1mW2
oWShnoz7Hket6T9aNsMGowDgYDVR0PAQH/\nBAQDAgeAMAwGA1UdEwEB/wQCMAAwHQYDVR0OBBYEFN6o2r0uYGeJVau1APNBhzzy\ni3lsMCsGA1UdIwQkM
CKAIEI5qg3NdtruuLoM2nAYUdFFBNMarRst3dusalc2Xkl8\nMAoGCCqGSM49BAMCA0gAMEUCIQCAIWw20T7dsLhT98GBNc4iIMOeJtCUDU6lKgkK\n9Lmn
xAIgWuOkdeq2HQtWv/l3NvVr5fFFsXbSbgNLoRVU9KptvUQ=\n-----END CERTIFICATE-----\n"}}}
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ node registerUser.js
 Store path:/home/vagrant/fabric/fabric-samples/fabcar/hfc-key-store
(node:22361) DeprecationWarning: grpc.load: Use the @grpc/proto-loader module with grpc.loadPackageDefinition instead
Successfully loaded admin from persistence
Successfully registered user1 - secret:jGnSTgBbNqSv
Successfully enrolled member user "user1"
User1 was successfully registered and enrolled and is ready to interact with the fabric network
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$
```

Lab1. fabcar 실행

- 유저 user1로 모든 데이터를 조회 → 결과 출력

  $ ***node query.js***

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ node query.js
Store path:/home/vagrant/fabric/fabric-samples/fabcar/hfc-key-store
(node:22379) DeprecationWarning: grpc.load: Use the @grpc/proto-loader module with grpc.loadPackageDefinition instead
Successfully loaded user1 from persistence
Query has completed, checking results
Response is  [{"Key":"CAR0", "Record":{"colour":"blue","make":"Toyota","model":"Prius","owner":"Tomoko"}},{"Key":"CAR1"
, "Record":{"colour":"red","make":"Ford","model":"Mustang","owner":"Brad"}},{"Key":"CAR2", "Record":{"colour":"green","
make":"Hyundai","model":"Tucson","owner":"Jin Soo"}},{"Key":"CAR3", "Record":{"colour":"yellow","make":"Volkswagen","mo
del":"Passat","owner":"Max"}},{"Key":"CAR4", "Record":{"colour":"black","make":"Tesla","model":"S","owner":"Adriana"}},
{"Key":"CAR5", "Record":{"colour":"purple","make":"Peugeot","model":"205","owner":"Michel"}},{"Key":"CAR6", "Record":{"
colour":"white","make":"Chery","model":"S22L","owner":"Aarav"}},{"Key":"CAR7", "Record":{"colour":"violet","make":"Fiat
","model":"Punto","owner":"Pari"}},{"Key":"CAR8", "Record":{"colour":"indigo","make":"Tata","model":"Nano","owner":"Val
eria"}},{"Key":"CAR9", "Record":{"colour":"brown","make":"Holden","model":"Barina","owner":"Shotaro"}}]
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$
```

Lab1. fabcar 실행

- 새로운 자동차 등록

$ *vi invoke.js → 새로운 자동차 정보 입력*

```
58          // createCar chaincode function - requires 5 args, ex: args: ['CAR12', 'Honda', 'Accord', 'Black', 'Tom'],
59          // changeCarOwner chaincode function - requires 2 args , ex: args: ['CAR10', 'Dave'],
60          // must send the proposal to endorsing peers
61          var request = {
62                  //targets: let default to the peer assigned to the client
63                  chaincodeId: 'fabcar',
64                  fcn: 'createCar',
65                  args: ['CAR12', 'Honda', 'Accord', 'Black', 'Tom'],
66                  chainId: 'mychannel',
67                  txId: tx_id
68          };
```

$ *node invoke.js*

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ node invoke.js
Store path:/home/vagrant/fabric/fabric-samples/fabcar/hfc-key-store
(node:22411) DeprecationWarning: grpc.load: Use the @grpc/proto-loader module with grpc.loadPackageDefinition instead
Successfully loaded user1 from persistence
Assigning transaction_id:  010cc080b7abf26880b47877d283b3e4612bc25ba07fb34240abdff4b4fb7abe
Transaction proposal was good
Successfully sent Proposal and received ProposalResponse: Status - 200, message - ""
The transaction has been committed on peer localhost:7051
Send transaction promise and event listener promise have completed
Successfully sent transaction to the orderer.
Successfully committed the change to the ledger by the peer
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$
```

Lab1. fabcar 실행

- 새로운 추가된 자동차 검색

$ ***vi query.js → 새로운 추가된 자동차 정보 입력***

```
52          // queryCar chaincode function - requires 1 argument, ex: args: ['CAR4'],
53          // queryAllCars chaincode function - requires no arguments , ex: args: [''],
54          const request = {
55                  //targets : --- letting this default to the peers assigned to the channel
56                  chaincodeId: 'fabcar',
57                  fcn: 'queryCar',
58                  args: ['CAR12']
59          };
60
```

$ ***node query.js***

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ node query.js
Store path:/home/vagrant/fabric/fabric-samples/fabcar/hfc-key-store
(node:22436) DeprecationWarning: grpc.load: Use the @grpc/proto-loader module with grpc.loadPackageDefinition instead
Successfully loaded user1 from persistence
Query has completed, checking results
Response is  {"colour":"Black","make":"Honda","model":"Accord","owner":"Tom"}
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$
```

Lab1. fabcar 실행

Q) CAR12의 소유권 변경

- CAR12의 소유권을 "Tom" → "Barry"로 변경

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ node invoke.js
Store path:/home/vagrant/fabric/fabric-samples/fabcar/hfc-key-store
(node:22475) DeprecationWarning: grpc.load: Use the @grpc/proto-loader module with grpc.loadPackageDefinition instead
Successfully loaded user1 from persistence
Assigning transaction_id:  c3057f596bd000c998a2e9eb4cbd5237893a3b6c742ef4e3e2fd5b8ce2523bd3
Transaction proposal was good
Successfully sent Proposal and received ProposalResponse: Status - 200, message - ""
The transaction has been committed on peer localhost:7051
Send transaction promise and event listener promise have completed
Successfully sent transaction to the orderer.
Successfully committed the change to the ledger by the peer
vagrant@ubuntu-xenial:~/fabric/fabric-samples/fabcar$ node query
Store path:/home/vagrant/fabric/fabric-samples/fabcar/hfc-key-store
(node:22488) DeprecationWarning: grpc.load: Use the @grpc/proto-loader module with grpc.loadPackageDefinition instead
Successfully loaded user1 from persistence
Query has completed, checking results
Response is  {"colour":"Black","make":"Honda","model":"Accord","owner":"Barry"}
```

Lab1. fabcar 실행

- fabcar 샘플 삭제
  - basic-network에 포함되어 있는 스크립트 사용

$ cd ***../basic-network***

$ ***./stop.sh***

$ ***docker rm $(docker ps –aq)*** ***→ 체인코드 컨테이너 삭제***

$ ***./teardown.sh***

```
vagrant@ubuntu-xenial:~/fabric/fabric-samples/basic-network$ ./stop.sh

# Shut down the Docker containers that might be currently running.
docker-compose -f docker-compose.yml stop
Stopping cli ... done
Stopping peer0.org1.example.com ... done
Stopping couchdb ... done
Stopping ca.example.com ... done
Stopping orderer.example.com ... done
vagrant@ubuntu-xenial:~/fabric/fabric-samples/basic-network$ docker rm $(docker ps -qa)
be04be50b251
bfb9000094c2
0d0ed35cea1f
4f472850b6e9
33cb81858685
2f1c686fcb8f
vagrant@ubuntu-xenial:~/fabric/fabric-samples/basic-network$ ./teardown.sh
Removing network net_basic
```