**Practical 2**

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

**Background Information:**

**Block chain network:**

* Blockchain is a type of shared database that differs from a typical database in the way it stores information.
* Blockchains store data in blocks linked together via cryptography.

**Hyperledger Fabric:**

* Hyperledger Fabric is an open-source platform for developing blockchain applications.
* It is designed to support the development of scalable and secure blockchain applications and is suitable for a wide range of use cases, including supply chain management, identity management, and financial services.

## **Hyperledger Fabric SDK:**

* [Hyperledger Fabric](https://www.geeksforgeeks.org/hyperledger-fabric-in-blockchain/) SDK is a software development kit (SDK) that provides a set of tools and libraries for building applications that interact with a Hyperledger Fabric blockchain.
* The Hyperledger Fabric SDK is available for a variety of programming languages, including Java, Go, Node.js, and Python.

## **Hyperledger Fabric SDK for Java:**

* The Hyperledger Fabric SDK for Java is a set of Java libraries that provides a Java API for interacting with a Hyperledger Fabric blockchain.
* It allows Java developers to build applications that can interact with a Hyperledger Fabric network, such as by submitting transactions or querying the blockchain.
* The Hyperledger Fabric Docker images and samples, you can deploy a test network by using scripts that are provided in the fabric-samples repository.
* The network is meant to be used only as a tool for education and testing and not as a model for how to set up a network

**Prerequisites:**To use the Hyperledger Fabric SDK for Java, you will need to have the following prerequisites installed:

* **Java:**You will need to have a recent version of the [Java Development Kit (JDK)](https://www.geeksforgeeks.org/download-and-install-java-development-kit-jdk-on-windows-mac-and-linux/) installed on your machine.
* Curl
* Docker

**Contract APIs**: To develop smart contracts executed on a Fabric Network.

**Application SDKS**: To develop your blockchain application.

The Application: Blockchain application will utilize the Application SDKs to call smart contracts running on a Fabric network.

**Installation steps:**

1. **Java Development Kit (JDK) 11 or later**: Install JDK 11 or a later version

on your system. You can download it from

[Java Downloads | Oracle](https://www.oracle.com/java/technologies/downloads/)

1. Install **Ubuntu app** from windows store:

Open the Microsoft Store and install Ubuntu 20.04.02 LTS .

1. Open Windows Terminal (Command Prompt) and add a new ubuntu tab.

Now “Ubuntu 20.04.02 LTS” is linked to Windows terminal.

1. Updating and installing basic packages for Ubuntu.

**#sudo apt update && sudo apt upgrade**

1. **Docker Desktop 4.25.2 or later (if using Dockized environment**):

Install Docker Desktop 4.25.2 or a later version if you want to use the

Dockerized environment. You can download it from

[Docker Desktop: The #1 Containerization Tool for Developers | Docker](https://www.docker.com/products/docker-desktop/)

Enable Docker for Ubuntu

* Go to Settings
* Resources
* WSL integration
* Enable Ubuntu-20.04
* Then hit Apply & restart
* After Enabling this we will get docker in the ubuntu command line.

1. Run following command to check if you are able to access it on Ubuntu.

**#docker version**

**#docker compose version**

1. Run following command to install and update basic packages on Ubuntu.

**#sudo apt update**

**#sudo apt upgrade**

1. We will check if curl exist, if curl doesn’t exist we will install it with

**#curl –v**

**#sudo apt-get install curl**

1. We will check if go exist

**#go version**

If go doesn’t exist we will install it with

**#sudo wget https://golang.org/dl/go1.16.3.linux-amd64.tar.gz**

Checking if go is installed

1. This command will extract zip file at the downloaded location.

**#tar xvf go1.16.3.linux-amd64.tar.gz**

1. Now we will set the path using following command

**#export GOPATH=$HOME/go**

**#export PATH=$PATH:$GOPATH/bin**

Run the following command to verify that Go lang is installed successfully.

**#go version**

1. Run the following command to if git is installed

**#git –version**

1. Install Hyperledger Fabric and Fabric samples.
2. Create a directory with following command

Creating a directory: **mkdir -p $HOME/go/src/github.com/**

Changing the directory: **cd $HOME/go/src/github.com/**

1. Download the latest release of fabric samples and docker images.

Run following command under $HOME/go/src/github.com/ directory.

Cloning Hyperledger Fabric:

**#curl -sSL https://bit.ly/2ysbOFE | bash -s 1.4.4**

1. Go to test-network.

**#cd test-network**

**#ll**

**#pwd**

**# cd first-network/**

**#ls**

1. Generate ‘mychannel’.

**#./byfn.sh generate**

1. Running following will boot up fabric test network.

**#./byfn.sh up**

1. Windows Security screen will be appeared on the screen => Click on Allow.
2. **Final output:**

**Conclusion:**

Thus, blockchain network using Hyperledger Fabric SDK for Java Set up is created and the channel initializes successfully.