

Hyperledger Training: Developing on Hyperledger Fabric

Course Summary

Description

You will learn the need for blockchain applications, where blockchain is used, and about Hyperledger Fabric, the open source framework for developing blockchain applications and solutions with a modular architecture. It will introduce you to the Hyperledger Composer tool that helps you create Hyperledger Fabric applications through several hands-on labs.

Objective

Upon completion of this course, students will:

- Understand why Blockchain is needed and where
- Explore the major components of Blockchain
- Learn about Hyperledger Fabric and the structure of the Hyperledger Architecture
- Learn the features of the Fabric model including chaincode, SDKs, Ledger, Security and Membership Services
- Perform comprehensive labs on writing chaincode
- Explore the architecture of Hyperledger Fabric
- Understand and perform in depth labs on Bootstrapping the Network
- Gain a detailed understanding of the benefits, components and architecture of Hyperledger Composer
- Learn Hyperledger Explorer and Hyperledger Composer Playground
- Perform comprehensive labs to integrate/develop an application with Hyperledger Fabric running a smart contract
- Build applications on Hyperledger Fabric

Audience

This Hyperledger training course is designed for developers and administrators who want to take a comprehensive deep dive on Hyperledger Fabric and Hyperledger Composer.

Topics

- Introduction To Blockchain
- How Blockchain Works
- Introduction To Hyperledger Fabric
- Getting Started With Fabric Model
- Chaincode
- Architecture Of Hyperledger Fabric
- Bootstrapping
- Introduction To Hyperledger Explorer
- Introduction To Hyperledger Composer
- Hyperledger Composer Playground

Prerequisite

This course is highly technical in nature and would require the student to be comfortable with coding. To prepare for the class all students MUST:

- Provide their own computer (Mac/PC/Linux). Note that all labs are hosted in a virtual environment
- Understanding of Golang, Java, or Javascript
- Understanding of PKI and Docker

Duration

Three Days

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Course Outline

- I. **Introduction To Blockchain**
 - A. Introduction to Blockchain
 - B. What is Blockchain
 - C. Types of network
 1. Public network
 2. Permissioned network
 3. Private network
 - D. Need for Blockchain Components of Blockchain
 1. Consensus
 2. Provenance
 3. Immutability
 4. Finality
 - E. Where can Blockchain be used
 - F. Example on Blockchain
- II. **How Blockchain Works**
 - A. How Blockchain Works
 - B. Structure of Blockchain
 1. Block
 2. Hash
 3. Blockchain
 4. Distributed
 - C. Lifecycle of Blockchain
 - D. Smart Contract
 - E. Consensus Algorithm
 1. Proof of Work
 2. Proof of Stake
 3. Practical Byzantine
 4. Fault Tolerance
 - F. Actors of Blockchain
 1. Blockchain developer
 2. Blockchain operator
 3. Blockchain regulator
 4. Blockchain user
 5. Membership service provider
 - G. Building A Small Blockchain Application
- III. **Introduction To Hyperledger Fabric**
 - A. Introduction to Hyperledger
 1. What is Hyperledger
 2. Why Hyperledger
 3. Where can Hyperledger be used
 - B. Hyperledger Architecture
 1. Membership
 2. Blockchain
 3. Transaction
 4. Chaincode
- IV. **Getting Started With Fabric Model**
 - A. The Fabric Model
 - B. Features of Fabric Model
 1. Chaincode
 2. SDKs
 3. Ledger
 4. Privacy through channels
 5. Security and Membership services
 6. Assets
 7. Consensus
 - C. Components of Fabric Model
 1. Peer
 2. Orderer
 3. Certificate Authority
 - D. Building your network
- V. **Chaincode**
 - A. Chaincode
 1. Chaincode API
 2. How to write a Chaincode
 - Lab Work
- VI. **Architecture Of Hyperledger Fabric**
 - A. Architecture of Hyperledger Fabric
 1. Transaction
 2. Ledger
 3. Nodes
 4. Peer
 5. Endorser
 6. Ordering Nodes
 7. Channels
 8. Certificate Authority
 - B. Transaction Flow
 - Lab Work

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Course Outline (cont.)

VII. *Bootstrapping*

- A. Bootstrapping the Network
- B. Introduction
 - Lab Work
 - Task 1 - Generate the crypto material for the various participants.
 - Task 2 - Generate the genesis block for the Orderer node and start ordering service (solo node).
 - Task 3 - Generated the configuration transaction block to create a new channel.
 - Task 4 - Sign the configuration block and create the new channel.
 - Task 5 - Make peers of all the organizations join the channel that we created in Task 4.

VIII. *Introduction To Hyperledger explorer*

- A. Introduction To Hyperledger Explorer
- B. Block Details Peer List
- C. Chaincode List
- D. Transaction Details
- E. Installation of Hyperledger Explorer
- F. Starting the Explorer App

IX. *Introduction To Hyperledger Composer*

- A. Introduction
- B. Components of Hyperledger Composer
- C. Benefits of Hyperledger Composer
- D. Key Concepts
- E. Hyperledger Composer Solution
- F. Installation

X. *Hyperledger Composer Playground*

- A. Hyperledger Composer Playground
- B. Introduction
- C. Playground Overview Lab Work