TUTORIAL: Introduction to Blockchain Technology

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Abstract

The introduction of cryptocurrencies, especially Bitcoin, has introduced the idea of blockchain technology to the mainstream. A blockchain is a constantly growing distributed database which protects data against tampering and revision of information. The idea behind blockchain is to have the ability to establish and verify trust with no requirement for a centralized system. Rather, this power could be given into a decentralized community, which makes it not just more secure but also both more effective and quicker to scale. Blockchains can be classified to Public/ permissionless and Private/ permissioned. Any organization can choose among the prominent frameworks available i.e. Ethereum, Hyperledger Fabric, Quorum, Corda, Ripple, etc. to build a blockchain application to solve their challenges.

Hyperledger Fabric is a permissioned blockchain infrastructure providing a modular architecture with a delineation of roles between the nodes in the infrastructure, execution of Smart Contracts (called "chaincode" in Fabric) and configurable consensus and membership services. This tutorial will teach the basics of blockchain and participants will get the opportunity to build simple blockchain applications using Hyperledger Fabric. It will be a very hands on tutorial experience and the participants will get an opportunity to understand and apply blockchain to their industry sector.

Keywords: Blockchain, Hyperledger, BlockchainApplication, DistributedLedger, PrivateBlockchains.

1   INTRODUCTION

Blockchain technology is emerging as a business focus for organizations in several industries including consumer products, manufacturing, financial services, healthcare, life sciences, and the public sector. Blockchain will act as a universal ledger and data-storage platform, which dramatically cuts the time, costs and exposures associated with processing and verifying transactions.

Irrespective of which industry you are working in, today business and technology are inextricably linked, and keeping pace with the emerging technology landscape is a business imperative. Blockchain technology is rapidly gaining traction, but the majority of senior executives still do not know how blockchain can benefit their organisations.

This tutorial will address the growing need for understanding the fundamentals of blockchain technology and provide users with hands-on experience of developing and using Blockchain application for real use cases.

2   TARGET AUDIENCE

University students, researchers, industry participants including CXOs, Senior Executives, start-up founders and anyone interested to understand the Blockchain concepts and working.

2.1   Special requirements

Note: Regular equipment includes a computer, data projector and screen.
(√) Computers / Participants with a Laptop
(√) Internet access

3   TUTORIAL DESCRIPTION AND OBJECTIVES

The objective of this tutorial is to impart the core concepts of Blockchain technology, the importance of blockchain, building a blockchain application using the Hyperledger fabric platform and give a live demonstration of creating and deploying an application. We will also discuss case studies on how blockchain is revolutionizing supplychain and food provenance.

3.1   Format of the session:

Following is the proposed tutorial format:

- **Part 1:** (duration: 45 minutes): Key concepts of blockchain and how blockchain works.

- **Part 2:** (duration: 45 minutes): Discussion on popular blockchain platforms available and how a blockchain application can be developed over those platforms.

- **Morning Tea:** 30 minutes

- **Part 3:** (duration: 60 minutes): Session will cover the underlying concepts of Hyperledger fabric and how tobuild a blockchain application using Hyperledger fabric.

- **Lunch Break:** 60 minutes

- **Part 4:** (duration: 60 minutes): Live demonstration of creating and deploying a blockchain application using Hyperledger fabric.

- **Part 5:** (duration: 30 minutes): Case studies in supply chain using blockchain.

- **Q&A:** 30 minutes

3.2   Ways in which the audience is encouraged to participate:

The sessions will be interactive and will encourage participants to actively participate in the topics discussed. Some of the participants will also be asked to assist with performing certain steps in the demo. We will have a Q&A session which will encourage people to put their questions and points across

3.3   Outcome measures:

At the end of the session, the audience will have to take multiple-choice questions based assessment and they will be assessed on their understanding of the concepts covered.

Presenters

Dr Vidy Potdar a multi-award winning researcher and the Founding Director of the Blockchain R&D Lab, which is a joint-partnership between Curitn University and Natsoft Corporation. He has secured over $1.5 million in external research funding by building strong industry partnerships. He has an outstanding publications track record along with 9 on-time PhD completions. He is also very active in media. His research interests are in Blockchain, Internet of Things, Wireless Sensor Networks, Smart Grids and Smart Cities.

Sai Charan Mamidi, currently working for Natsoft Corporation as solution architect and leading Blockchain team in Hyderabad. He is working on multiple blockchain use cases including Agricultural Supply Chain Tracking, Insurance Claims etc. In the past he worked for Zebi Data which was the first in India to develop a Blockchain based Land Registry model for Lands in Amaravathi, Andra Pradesh. He has won multiple contests in different coding platforms including HackerRank, Codechef etc. Participated and qualified for ACM-ICPC 2014 Asia finals. In 2014, he was the DC Finalist for Aspirations 2020, programming contest by Infosys. In 2015, he qualified for ACM-ICPC Asia Regionals from Gwalior and Amrithapuri. He also served as a Problem Setter in Codechef, SPOJ.