**Assignment 17**

**Name**:Bhavin Patil

**Roll No:** 66

**TY-CS-D**

**A Case Study on Hyperledger Fabric**

***Abstract***

***The Linux Foundation manages Hyperledger's operations. They want to increase the use of corporate blockchain through global open-source collaborations. Enterprise use of Hyperledger is appropriate and entails the development and administration of permissioned networks. Better performance, trust levels, and scalability are provided by the permissioned network. We will talk about the Hyperledger frameworks, use cases, and case study examples in this paper***.

***Keywords:- Hyper-ledger, Blockchain, use cases, case studies.***

**INTRODUCTION**

Hyperledger Fabric an open-source distributed ledger system announced by the Linux Foundation in December 2015 and has since been developed by IBM for industrial use. HLF is neither a firm nor a crypto-currency nor a blockchain. HL is a private, authorised network. All users of the Hyper-ledger Fabric must log in using a legitimate membership service provider. Among the various components that make up Fabric are smart contracts, endorsers, committers, validators, and orders. It is intended to assist businesses in expanding their blockchain network to support more than 1000 transactions per second, allowing numerous businesses to contribute to BC.

Additionally, the fabric includes fewer nodes than a public blockchain to improve efficiency for processing large amounts of data. it doesn’t have native currency but allows users to define assets from the client-side. fabric permits users to participate in open as well as private interaction.

**HYPERLEDGER FRAMEWORK**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Hyperledger  Framework | Usage | Hyperledger  tools | Usage |
| 1 | Sawtooth | Offers robust and scalable architecture separating the core system from the application domain, and simplifying smart contracts. Composer This is a series of collaborative tools that create networks of blockchains. | Composer | It's a set of collaborative tools that build blockchain networks |
| 2 | Iroha | Built to integrate simple architecture, modular, domain-driven C++ design, focus on customer application development and a new, crash resistant consensus algorithm, called YAC, into infrastructure or IoT features | Avlon | Published by Enterprise Ethereum Alliance is an independent implementation with trusted computer specifications by enabling secure movement of blockchain. |
| 3 | Indy | provides tools, libraries, and  reusable components rooted  in blockchains so as to ensure  interoperable across  administrative domains.  provides tools, libraries, and  reusable components rooted  in blockchains so as to ensure  interoperable across  administrative domains.  provides tools, libraries, and reusable components rooted in blockchains so as to ensure interoperable across administrative domains. | Explorer | It is a user-friendly web application platform used for accessing, invoking, installing or querying blocks, transactions and related data, network data |
| 4 | BESU | Ethereum client design for public and private runs on test networks like Rinke by, Ropsten, and Görli also includes consensus algorithms PoW, and PoA (IBFT, IBFT 2.0. | Quilt | It is a java involving interledger protocol and makes transfers through any payment network — fiat or crypto. |
| 5 | Burrow | Single-binary blockchain deployment focussed on the ergonomics of usability, speed and developer. It supports smart contracts based on EVM and WASM, and uses the Tendermint algorithm for BFT consensus | Caliper | Blockchain benchmark tool measures performance with predetermined use cases. |
| 6 | Fabric | Foundation for developing applications or software’s consensus that enables performance at scale while preserving privacy | cello | It is an operational dashboard for blockchain and facilitates and creates BaaS. |

**HYPERLEDGER USE CASES**

**HealthCare**

The healthcare industry is one of the most clear and well-known use cases for Hyperledger. For instance, Hyperledger can be used by the pharmaceutical industry to build a blockchain network that can completely take over the supply chain.

Every medication that leaves the factory is registered to the supply chain in accordance with established standards, and the information is shared with the end users and other interested parties so they may follow it at every step. Of course, this breaks the cycle of illicit substances. Blockchain in the healthcare industry has many advantages.

**Education and Training**

Education and training are among the exciting use cases of Hyperledger. In recent decades, little has changed in the educational system. Its technological integration served as a spark, and as a result, educational institutions are now more keen to update their system.

Additionally, students are now required to take lessons online due to the pandemic that is sweeping the globe. There are more use cases for Hyperledger besides enhancing the various parts of the educational system, such as offering digital certifications that are available everywhere and verified.

**Supply Chain Management**

The global industry is built around the supply chain. Companies will struggle to meet demand without an effective supply chain, which will result in revenue loss.

Also, the e-commerce industry is expanding quickly, which calls for increased supply chain efficiency. Worldwide sales of eCommerce products have increased by 246.15%, indicating the industry's tremendous expansion.

Real-time tracking and transparency of the supply chain must be ensured if the supply chain is to perform better overall. Therefore, the use of blockchain in supply chains is expanding quickly.

**Energy Management**

Everything in our life is powered by energy. Without it, we would not have made the progress we have. The existing energy market, however, has severe restrictions. Every time a cyclone strikes a region, power would be lost as a result of uprooted trees. The area's electricity provider is in charge of finding a solution. Even though they fix the problem, they take their time to do so. The centralised approach slows down both the restoration and repair processes overall.

Not to mention that energy is always centralized, making it impossible for everyone to have their own energy production or grid.

**Government**

Governmental organisations and services must keep up with numerous issues at once. However, they are still forced to use their outdated systems, which are inherently insufficient to handle all of their services. As a result, you notice a lot of security, corruption, and fraudulent activity difficulties.

There is now no way to save this industry without adequate security. In this field, Hyperledger blockchain use cases can be helpful. In fact, application cases for Hyperledger Fabric can provide a tracking system that will guarantee that all sensitive data held by government entities is safe, secure, and impenetrable. The use of Fabric in blockchain for governmental projects is already widespread.

**CASE STUDIES OF HYPERLEDGER**

**ChainYard and IBM Reducing Onboarding Process**

**Technology used**: Hyperledger Fabric

**Industry**: Manufacturing

Through the development of a new private blockchain platform, IBM and ChainYard hope to reduce risk and streamline the onboarding process for B2B suppliers. The transition to the new platform will take just three days instead of two months. One of the most well-known Hyperledger blockchain use cases to date is this.

**Honeywell Aerospace Creates an Online Marketplace for Parts**

**Technology used**: Hyperledger Fabric

**Industry**: Manufacturing

As they intend to develop an eCommerce platform for aeroplane parts, Honeywell Aerospace is another intriguing case study. The lengthy process of purchasing replacement parts, which typically takes months, will be shortened by the eCommerce platform. Additionally, it comprises intermediates, which entails paying more to airline firms. Without a sure, integrating blockchain in manufacturing is increasing a lot of other aspects, such as greater availability, shipment, and transparency.

**National Associations Improving Members Services with Fabric**

**Technology used:** Hyperledger Fabric

**Industry:** Digital Identity and Real Estate

Hyperledger Fabric is being used by National Associations to improve the service they offer to their members. With the help of 1200 local associations and 54 territory associations, they currently represent the 1.3 million members.

By collaborating, they hope to strengthen their code of ethics. To achieve this, they plan to create the REALTOR Associations Blockchain, where they will exchange member data and boost engagement. A great use case for blockchain in real estate is this.

**Change Healthcare is Using Hyperledger Fabric to Improve the Claims Process**

**Technology used:** Hyperledger Fabric

**Industry:** Healthcare

Change The goal of healthcare is to use Hyperledger to enhance the claims process and, as a result, the transparency around it. Their strategy attempts to improve the healthcare system by giving healthcare networks a way to enhance claims and transactions.

The outcomes were especially astonishing because use cases for Hyperledger Fabric demonstrate excellent transaction processing capabilities. In a test in 2018, it was able to complete 50 million transactions daily, or 550 transactions every second.

**BTP Simplifying Enterprise Blockchain Adoption**

**Technology used:** Hyperledger Sawtooth

**Industry:** Cloud Computing, Blockchain, IT services, and Technology

Blockchain Technology Partners (BTP) is working to make sure that once built or operational, blockchain networks will last for a very long time rather than dissipate. They chose Kubernetes for the operational layer and Hyperledger Sawtooth for the network.

By the end of 2018, the project had performed admirably, and it is now accessible through the AWS marketplace. Recently, it has added support for the DAML smart contract language to further benefit users.

**British Columbia Cuts Red Tape with the Use of Hyperledger Indy**

**Technology used:** Hyperledger Indy

**Industry:** Tech, Blockchain, Government, Small Business

Canada, Ontario, and British Columbia created Verifiable Organizations Network (VON), which is sponsoring the project.. They are building the platform with Hyperledger Indy. By offering an open software stack, the project seeks to increase small- to medium-sized businesses' trust in the government. The stack will assist in the creation and management of digital partnerships by businesspeople as well as the reduction or elimination of red tape by the government.

The initiative was well received and a success because it was able to integrate the digital identities of 529 000 firms and 1.4 million login credentials.

**Walmart Improving Transparency in Food Supply**

**Technology used:** Hyperledger Fabric

**Industry:** Agriculture, Retailers, Supply Chain, Food

The food supply is one of the well-known Hyperledger use cases. Walmart is utilising Hyperledger Fabric to increase food supply chain transparency. Their goal was to reduce food-borne illnesses, and improving the traceability of the food supply chain is one of the greatest methods to do this. Companies will benefit from being able to react more quickly, and it will also protect farmers' livelihoods because they will be alerted if something goes wrong.

The strategy makes use of the permissioned distributed ledger technology Hyperleder Fabric. Then, Walmart and IBM collaborated to develop a platform that will track food across countries. The company is improving its food traceability by using blockchain in retail.

**CONCLUSION**

We have now reached the conclusion of our Hyperledger Use Cases. A number of intriguing Hyperledger application cases and case studies were covered. Fabric is without a doubt one of the most significant frameworks Hyperledger has to offer.

However, it does not imply that fewer use cases or other initiatives are being implemented. Because other Hyperledger projects provide more specialised usage, they are used less frequently.

**REFRENCES**

<https://www.researchgate.net/publication/349705260_Blockchain_based_Service_A_Case_Study_on_IBM_Blockchain_Services_Hyperledger_Fabric>

<https://101blockchains.com/hyperledger-fabric-use-cases/>

<https://www.hyperledger.org/learn/case-studies>

it doesn’t have native currency but allows users to

define assets from the client-side. fabric permits users to participate in open as well as private

interactio

it doesn’t have native currency but allows users to

define assets from the client-side. fabric permits users to participate in open as well as private

interactio

it doesn’t have native currency but allows users to

define assets from the client-side. fabric permits users to participate in open as well as private

interaction