PROJECT 2 PROPOSAL

Title of topic – AWS Blockchain to implement Supply Chain Management

Team – Group 1

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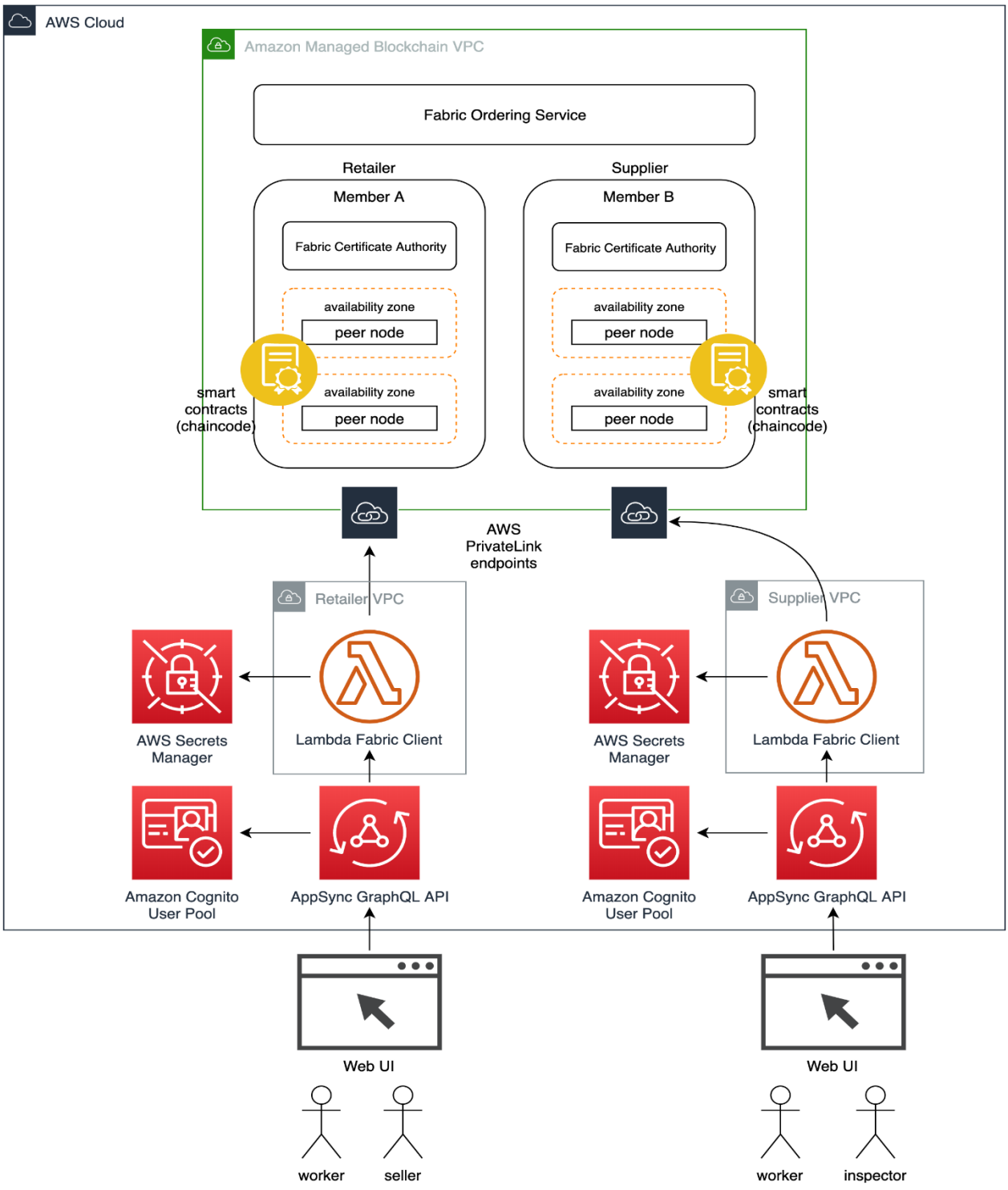
Description –

This project will teach you how to build a decentralized application (dapp) for managing a supply chain based on Amazon Managed Blockchain. Our application will support the management of track-and-trace supply chain. In this supply chain we are considering two different members Supplier and Retailer. The supplier is responsible for manufacturing, inspecting the products and ships the products to retailers. The retailer is responsible for stocking, labelling the products and selling them to the consumers. In our project we are considering only two workers under each sector to be responsible for their activities alone [1].

We picked Blockchain technology to implement our task because blockchain can greatly improve supply chains by enabling faster and more cost-efficient delivery of products, enhancing products' traceability, improving coordination between partners, and aiding access to financing. In this project we are using many Amazon Web Services like Cloud9, Amazon Managed Blockchain, EC2, IAM, Lambda, Secrets Manager, Cognito and AWS AppSync [2]. All these services are very useful and important services to build this efficient application. We are dividing our application into five modules, in module 1 we will be creating Blockchain Network for grouping retailer and supplier, in module 2 we will be Installing fabric client on each member of consortium, in module 3 we will be writing our own chain code that is more tailored to our supply chain use case, then in module 4 we will be invoking the chain code via API, and finally in module 5 we will build Frontend.



ARCHITECTURE DIAGRAM

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It is a decentralized blockchain platform that establishes a peer-to-peer network that securely executes and verifies application code, called smart contracts. Smart contracts allow participants to transact with each other without a trusted central authority.

3.2) Benefits of Amazon Managed Blockchain

Scalable and secure, Reliability, Fully Managed, and choice of Hyperledger Fabric or Ethereum framework.

3.3) Benefits of Decentralization

Provides a trustless environment, Improves data reconciliation, Reduces points of weakness, Optimize resource distribution.

4) EC2

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud.

5) IAM

AWS Identity and Access Management (IAM) provides fine-grained access control across all of AWS. With IAM, you can specify who can access which services and resources, and under which conditions. With IAM policies, you manage permissions to your workforce and systems to ensure least-privilege permissions.

6) Lambda

Lambda is a compute service that lets you run code without provisioning or managing servers. Lambda runs your code on a high-availability compute infrastructure and performs all the administration of the compute resources, including server and operating system maintenance, capacity provisioning and automatic scaling, code monitoring and logging.

7) Secrets Manager

AWS Secrets Manager helps you protect secrets needed to access your applications, services, and IT resources. The service enables you to easily rotate, manage, and retrieve database credentials, API keys, and other secrets throughout their lifecycle. Users and applications retrieve secrets with a call to Secrets Manager APIs, eliminating the need to hardcode sensitive information in plain text. Secrets Manager offers secret rotation with built-in integration for Amazon RDS, Amazon Redshift, and Amazon Document DB. Also, the service is extensible to other types of secrets, including API keys and OAuth tokens. In addition, Secrets Manager enables you to control access to secrets using fine-grained permissions and audit secret rotation centrally for resources in the AWS Cloud, third-party services, and on-premises.

8) Cognito

Amazon Cognito is a simple user identity and data synchronization service that helps you securely manage and synchronize app data for your users across their mobile devices. You can create unique identities for your users through several public login providers (Amazon, Facebook, and Google) and also support unauthenticated guests.

9) AWS AppSync

AWS AppSync is a new service that enables developers to manage and synchronize mobile app data in real time across devices and users, but still allows the data to be accessed and altered when the mobile device is in an offline state. The service further allows developers to optimize the user experience by selecting which data is automatically synchronized to each user's device when changes are made, minimizing storage and bandwidth requirements, with a query language called GraphQL.

10) WEB UI

The frontend of the application is built using React framework, it is an open-source JavaScript library that is used for building user interfaces specifically for single-page applications. React allows developers to create large web applications that can change data, without reloading the page. The main purpose of React is to be fast, scalable, and simple. It is also well-suited to interacting with GraphQL data sources.

11) Actors

In Supplier sector we are considering two workers, one is responsible for Manufacturing and Shipping, another worker is responsible for Inspecting the products. In Retailer sector we are considering two workers, one is responsible for Stocking and Labelling, another worker is responsible for Selling products to the consumer.

References –

1) In [Amazon 2022] Blockchain for Supply Chain at https://aws.amazon.com/blockchain/blockchain-for-supply-chain-track-and-trace/
2) In [Foley 2022] Supply Chain Management with Blockchain at https://www.foley.com/en/insights/publications/2021/08/overview-blockchain-in-supply-chain-whats-link
3) In [AWS 2022] Hyperledger Fabric Blockchain Network at https://docs.aws.amazon.com/managed-blockchain/latest/hyperledger-fabric-dev/managed-blockchain-get-started-tutorial.html