Build on blockchain with reliable APIs and without specialized infrastructure

Prepared for Cloud Computing

Created by Divyanshu Puri Goswami

| Roll No. - 8th |

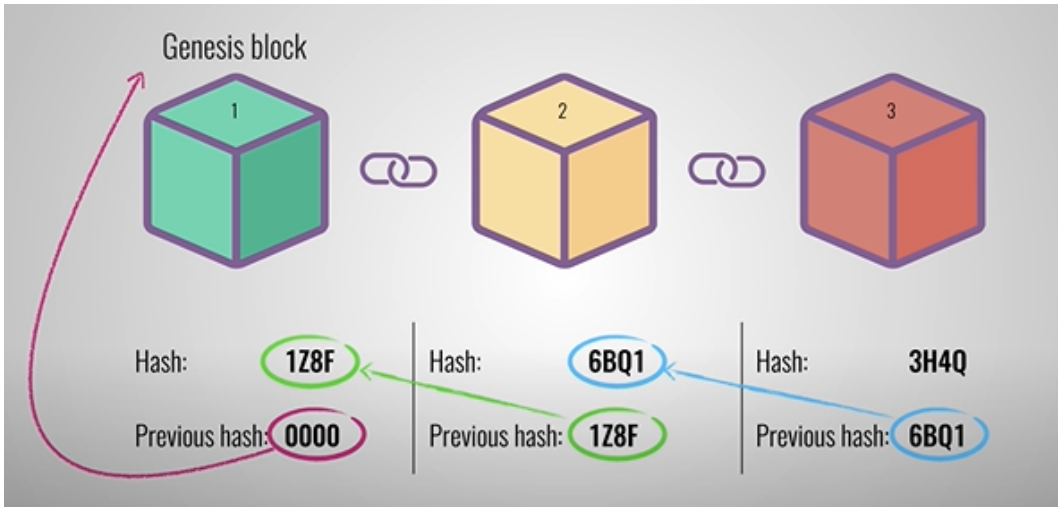
1. Introduction to Blockchain

What is Blockchain?

Blockchain is a distributed ledger technology that records transactions across multiple computers so that the registered transactions cannot be altered retroactively. This immutable and transparent nature of blockchain makes it a secure and reliable method for recording data, especially in financial services and supply chain management.

Key Characteristics of Blockchain:

- **Decentralization:** Unlike traditional centralized databases, blockchain operates on a decentralized network of computers (nodes), where each maintains a copy of the ledger. This reduces the risk of a single point of failure.
- **Immutability:** Once data is recorded in the blockchain, it is difficult to alter. Cryptographic hashing ensures that each block's data is secure, and the consensus mechanism among network participants confirms the validity of transactions.
- **Transparency:** The ledger is accessible to all participants, promoting transparency and trust among parties.
- **Security:** Blockchain uses cryptographic techniques to secure data, making it resistant to unauthorized changes and fraud.
- **Consensus Mechanisms:** Protocols such as Proof of Work (PoW) and Proof of Stake (PoS) are used to ensure all copies of the distributed ledger are synchronized and agreed upon.



Graphic Diagram of Blockchain

- **Blocks:** Fundamental units containing:
  - A list of transactions
  - A timestamp
  - A cryptographic hash of the previous block
  - A cryptographic hash of the current block's contents
- **Chain:** Blocks are linked sequentially, starting from the genesis block to the latest block. Each block references the hash of the previous one, forming a continuous chain.
- **Nodes:** Computers in the network that validate and record transactions, ensuring the network's data consistency.
- **Transaction:** Actions or exchanges recorded in the blockchain, such as transferring

cryptocurrency between addresses.
- **Consensus Mechanism:** The process used by nodes to agree on the state of the blockchain. Examples include PoW and PoS.

2. Introduction to Amazon Managed Blockchain (AMB)

What is Amazon Managed Blockchain (AMB)?

Amazon Managed Blockchain is a fully managed service that simplifies the creation and management of scalable blockchain networks using popular frameworks like Ethereum, Polygon, Bitcoin, and Hyperledger Fabric. It provides tools and infrastructure to manage blockchain networks without requiring specialized expertise.

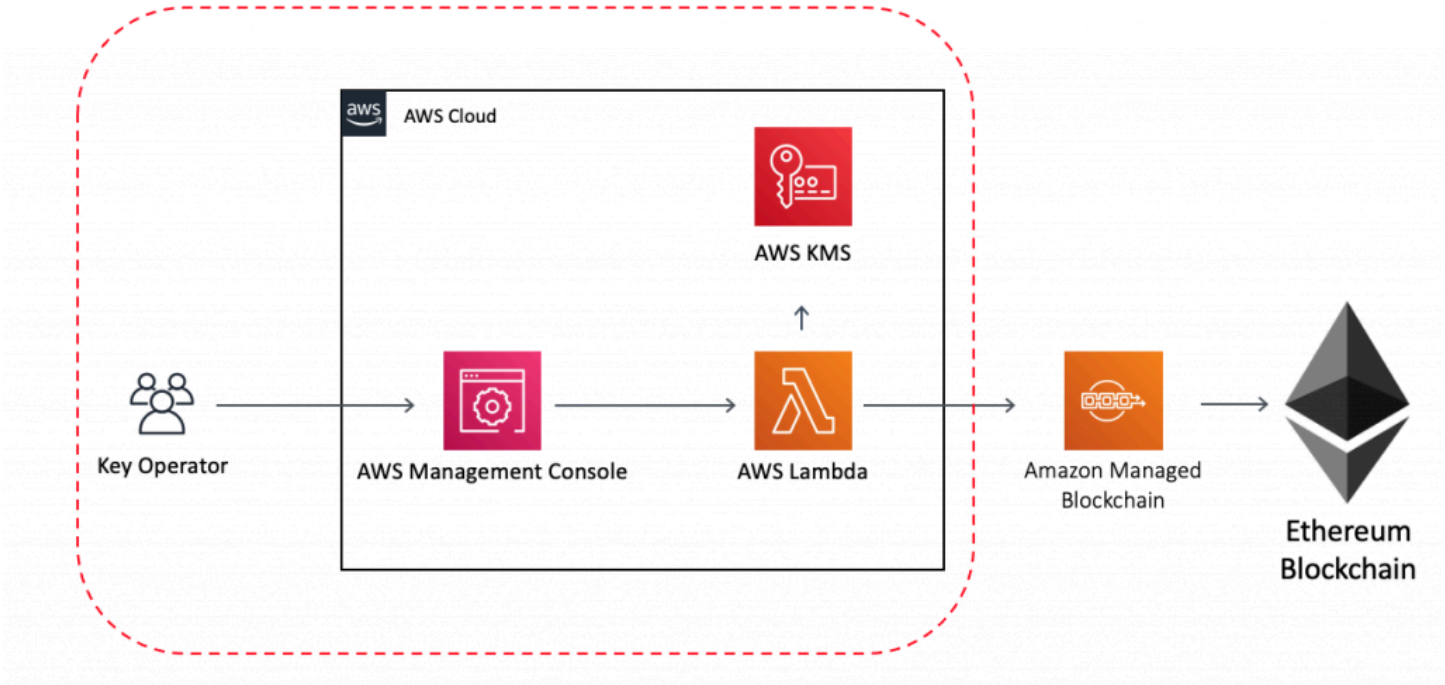
Key Features of Amazon Managed Blockchain:

- **Supports Popular Frameworks:** AMB supports frameworks such as Hyperledger Fabric and Ethereum, catering to various use cases.
- **Fully Managed:** AWS handles network creation, management, maintenance, and scaling, allowing users to focus on application development.
- **Scalability:** Easily scale your blockchain network with minimal effort, accommodating growing transaction volumes.
- **Secure and Reliable:** Built on AWS's infrastructure, AMB ensures high availability, durability, and security. Features include access control, encryption, and secure communication.
- **Integration with AWS Services:** Seamlessly integrates with AWS services like CloudWatch for monitoring and AWS Key Management Service (KMS) for key management.
- **Easy Membership Management:** Quickly invite AWS accounts to join your network and manage permissions through an intuitive interface.

How Amazon Managed Blockchain Works:

- **Network Creation:** Users can create new blockchain networks or join existing ones, selecting the appropriate framework and configuring network settings.
- **Node Management:** AMB handles the creation, management, and scaling of nodes that process transactions and maintain the blockchain ledger.
- **Smart Contracts and Applications:** Deploy and manage smart contracts to automate processes and transactions based on predefined rules.
- **Monitoring and Analytics:** Utilize AWS CloudWatch and other tools to monitor network performance, transaction volumes, and system health.

3. Working with AWS Managed Blockchain



1. Access Multi-Blockchain Data

AMB Query

AMB Query provides APIs for accessing blockchain data across multiple networks. This feature supports applications that need to interact with or analyze data from various blockchains.

Steps to Access Multi-Blockchain Data:

- **Explore AMB Query Documentation:** Visit the AWS AMB Query Documentation for information on using the APIs.
- **Learn More About AMB Query:** Access the AWS AMB Query Learn More page for detailed tutorials and information.

2. Choose Your AMB Offering

AWS Managed Blockchain offers two main options:

Serverless Offering

Provides on-demand, scalable access without managing infrastructure.

Steps to Explore Serverless Options:

- **Check AWS Serverless Blockchain Documentation:** Refer to the AWS Serverless Blockchain Documentation for setup and usage details.

Dedicated Offering

Offers more control and performance, suitable for applications requiring dedicated resources.

Steps to Explore Dedicated Options:

- **Visit AWS Dedicated Blockchain Documentation:** Learn about configuring and managing dedicated nodes by visiting the AWS Dedicated Blockchain Documentation.

3. Start Using AMB

Developer Guides:

- **Public Blockchains:** Consult the AWS Managed Blockchain Developer Guides for working with public blockchains like Ethereum.
- **Private Blockchains:** Learn about setting up and managing private blockchain networks.

Key Resources:

- **AWS Managed Blockchain Overview:** AWS Managed Blockchain
- **Getting Started with AWS Managed Blockchain:** Getting Started
- **API Reference for AMB Query:** AMB Query API Reference

Conclusion

This assignment covered the fundamentals of blockchain technology, the features and functionalities of AWS Managed Blockchain, and provided a guide on accessing multi-blockchain data, choosing between serverless and dedicated offerings, and starting with AMB. By leveraging AWS Managed Blockchain, you can efficiently manage and scale blockchain networks, integrate with AWS services, and develop blockchain-based applications with ease.