**Task-2**

**Types of Blockchain:**

* **Public Blockchain:** (e.g., Ethereum, Bitcoin, Solana)
* **Private Blockchain:** (e.g., Hyperledger Fabric, R3 Corda in private mode)
* **Consortium Blockchain:** (e.g., R3 Corda, Quorum, IBM Food Trust)

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| **Blockchain Name** | **Ethereum** | **Hyperledger Fabric** | **Quorum** |
| **Type (Public/Private/Consortium)** | Public | Private | Consortium |
| **Consensus Mechanism Used** | Proof of Stake (PoS) | Pluggable (e.g., Solo, Kafka, Raft, IBFT) | Istanbul BFT, Raft, Raft-based consensus |
| **Permission Model (Open/Permissioned)** | Open | Permissioned | Permissioned |
| **Speed / Throughput (TPS if available)** | very slow, 15-30 TPS | Faster, 100s to 1000s TPS (depends on setup) | Faster, 200-3000 TPS (varies based on configuration) |
| **Smart Contract Support (Y/N + Language)** | Yes, Written in Solidity  Programming Language | Yes, Chaincode (can be Golang, Java programming language) | Yes, Solidity (via EVM compatibility), Chaincode (Go, JavaScript) |
| **Token Support (Native or not)** | Ether (ETH) is the native cryptocurrency, used for transaction fees and network participation. | Does not have a native cryptocurrency, focuses on enterprise use cases. | No Native but, (We can create own tokens compatible with Ethereum standards) |
| **Typical Use Case** | Popular in decentralized finance (DeFi), gaming, NFTs | Industries such as finance, supply chain, healthcare, and government. | Enterprise-grade private transactions, finance |
| **Notable Technical Feature (e.g., privacy, pluggable consensus)** | Turing-complete EVM, large developer ecosystem, robust L2 scaling solutions. | Modular architecture (pluggable components like consensus, identity) | Transaction privacy,  high transaction throughput |

**Comparison table between Three types of Blockchain:**

**Short Report:**

**Ethereum:**

Ethereum is a decentralized global software platform powered by blockchain technology. It's designed to be scalable, programmable, secure, and decentralized—to create any secured digital technology. Its global accessibility and robust smart contract capabilities (Solidity, EVM) make it ideal for broad, open innovation, decentralized finance (DeFi), and non-fungible tokens (NFTs). However, its throughput is inherently limited by its public nature, and all transactions are publicly visible.

**Hyperledger Fabric:**

Hyperledger Fabric represents a private, permissioned blockchain that excels in enterprise settings where control, privacy, and high performance are of utmost importance. Its modular architecture enables organizations to customize consensus mechanisms and establish private data channels for sensitive information, facilitating thousands of transactions per second. This emphasis on privacy and throughput renders it appropriate for internal business operations or supply chain networks involving closely acquainted, trusted partners.

**Quorum:**

Quorum serves as a consortium blockchain that bridges the gap, constructed on the foundation of Ethereum but enhanced with additional features for privacy and performance.

It preserves compatibility with Ethereum's smart contracts (Solidity) while providing transaction privacy and more rapid consensus mechanisms (such as IBFT).

This combination renders Quorum especially attractive for situations that necessitate a fusion of enterprise-level privacy and the advantages of an Ethereum-like development ecosystem within a consortium.

**Platform Choices:**

**For a decentralized application (dApp):** **(Ethereum)** Its open and permissionless characteristics, vast developer community, and established ecosystem of tools and users are unmatched for creating public-facing dApps, where minimizing trust and encouraging widespread participation are essential. The comprehensive token standards (ERC-20, ERC-721) play a vital role in the economies of dApps.

**For a supply chain network involving known partners:** **(Hyperledger Fabric)** The permissioned framework facilitates strict access control, ensuring that only authorized partners are involved. Its private data channels are essential for the secure sharing of confidential supply chain information (such as pricing and order specifics) exclusively with relevant parties, while also supporting high transaction throughput for complex logistical operations.

**For an inter-bank financial application: (Quorum)** Financial institutions requires both rapid transaction speeds and utmost privacy for sensitive transactions. Quorum's compatibility with Ethereum allows for the utilization of existing Solidity smart contracts, while its private transaction features and permissioned network gives the strict regulatory and confidentiality requirements of the banking industry, without revealing all transaction details to the public.