Task – 2

* **Create a comparison table or markdown sheet** with the following columns for each platform:

**Public Blockchain:** Ethereum

**Private Blockchain:** Hyperledger Fabric

**Consortium Blockchain:** Quorum

| **Blockchain Name** | **Type** | **Consensus Mechanism** | **Permission Model** | **Speed / Throughput** | **Smart Contract Support** | **Smart Contract Support** | **Typical Use Case** | **Notable Technical Feature** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ethereum | Public | Prrof of Stake | Open | ~15-30 TPS | Yes (Solidity) | Yes (ETH - Native) | Decentralized apps | Public, decentralized |
| Hyperledger Fabric | Private | Pluggable | Permissioned | Up to 3,000+ TPS | Yes ( JavaScript) | No (no native token) | Enterprise solutions, supply chain | Modular architecture |
| Quorum | Consortium | Istanbul BFT, Raft | Permissioned | ~100-200+ TPS | Yes (Solidity) | Optional (custom tokens) | Private DeFi, interbank transfers | Enhanced privacy |

* **Write a Short Report (150–200 words):**

Compare and contrast the **technical capabilities** of each.

Ethereum, Hyperledger Fabric, and Quorum all operate with different architectures and use cases.

1. Ethereum is a public blockchain that utilizes a Proof of Stake (PoS) consensus. Smart contracts are supported in Solidity, but its throughput is low (~15-30 TPS) and is an open ecosystem of large developers making it fit for decentralized, trustless applications.
2. Hyperledger Fabric is a permissioned and modular blockchain that has pluggable consensus protocol (Raft). Chaincode can be written in Go, Java or Javascript and it has a high throughput of 3,000+ TPS. However, its channel privacy model makes it more appropriate for an enterprise network.
3. Quorum is a permissioned, Ethereum fork that has Istanbul BFT or Raft consensus. It takes the same smart contracts in Solidity that Ethereum does and adds the benefit of private transactions. Quorum is more efficient than Ethereum however (-100-200 TPS) but is better suited for finance and enterprise.

**Decentralized App (dApp)** → **Ethereum**

* **Justification**: Ethereum is a **public, open-source blockchain** with a large ecosystem and widespread adoption for dApps. It supports smart contracts in **Solidity**, has a robust developer community, and ensures **trustless, decentralized execution**. Despite its lower TPS, it’s the best fit for apps needing broad accessibility and decentralization.

**Supply Chain Network Among Known Partners** → **Hyperledger Fabric**

* **Justification**: Fabric is **permissioned**, supports **private channels**, and uses **modular, pluggable consensus** for **high throughput (3,000+ TPS)**. It enables data privacy between parties and fine-grained access control, which are essential in multi-organization supply chains with known participants.

**Inter-Bank Financial Application** → **Quorum**

* **Justification**: Quorum combines **Ethereum compatibility** with **enterprise features** like **private transactions** and **faster consensus (Istanbul BFT/Raft)**. It’s ideal for banks needing **transaction privacy**, **moderate scalability**, and **smart contract flexibility**, while operating within a **trusted consortium**.

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