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| --- | --- | --- | --- |
| **Features** |  |  |  |
| **Blockchain Name** | Ethereum | Hyperledger Fabric | Quorum |
| **Type (Public/Private/Consortium)** | Public | Private | Consortium |
| **Consensus Mechanism Used** | Proof of stake | Kafta | RAFT |
| **Permission Model (Open/Permissioned)** | Open | Permisssioned | Permissioned |
| **Speed / Throughput (TPS if available)** | ~30-100 TPS (base layer) | 1000+ TPS | 200- 2000 TPS |
| **Smart Contract Support (Y/N + Language)** | Yes (Solidity) | Yes (Chaincode in Go, Java ,JavaScript) | Yes (Solidity) |
| **Token Support (Native or not)** | Native (ETH) | No Native token | Optional (can support ) |
| **Typical Use Case** | Decentralized applications , DeFis , NFTs | Enterprise applications, supply chain , logistics | Interbank settlements, enterprise finance |
| **Notable Technical Feature** | Fully Decentralized , global state | Modular architecture, privacy concerns | Enchanced privacy, supports Ethereum smart contracts |

**Short Report**

1. **Technical Capabilities Comparison Report**

Ethereum, Hyperledger Fabric, and Quorum represent three distinct blockchain categories—public, private, and consortium—with varying technical capabilities.

Ethereum, as a public blockchain, offers complete decentralization and strong community-driven security. It supports smart contracts written in Solidity and has native token support (ETH). However, it has relatively low throughput (~30–100 TPS) and higher latency, making it less suitable for high-performance enterprise use cases.

Hyperledger Fabric, a private permissioned blockchain, prioritizes modularity, performance, and confidentiality. It supports smart contracts (Chaincode) in Go, Java, and JavaScript. Fabric’s pluggable consensus (e.g., Raft, Kafka) allows for greater flexibility, and its performance exceeds 1,000 TPS. It lacks a native token, making it well-suited for closed enterprise systems like supply chain management.

Quorum, a consortium blockchain built on Ethereum, merges Ethereum’s smart contract capabilities with enhanced privacy and higher throughput (200–2,000 TPS). Using consensus protocols like Istanbul BFT or Raft, it provides faster finality and permissioned control, making it suitable for applications involving semi-trusted entities, such as banking consortia.

In summary, Ethereum excels in decentralization, Fabric in enterprise control and scalability, and Quorum in bridging decentralized logic with enterprise-grade privacy and speed.

1. **Platform Recommendations**

* A Decentralized App → Ethereum  
  Why?  
  Ethereum is a public, open blockchain designed for decentralized applications (dApps). It supports a wide developer ecosystem, robust smart contract functionality via Solidity, and a highly secure, censorship-resistant environment. Its decentralized nature ensures trustless interaction, ideal for DeFi, NFTs, DAOs, and global user bases.
* A Supply Chain Network Among Known Partners → Hyperledger Fabric  
  Why?  
  Hyperledger Fabric is a private, permissioned blockchain built for enterprise use. It enables high throughput, modular architecture, and privacy via channels—allowing data to be shared only with relevant participants. It’s perfect for known partners in supply chains where data confidentiality, auditability, and scalability are crucial.
* An Inter-Bank Financial Application → Quorum  
  Why?  
  Quorum, a consortium blockchain based on Ethereum, offers enterprise-grade privacy features (e.g., private transactions) and fast consensus mechanisms like IBFT or Raft. It’s ideal for financial institutions needing smart contract capabilities with restricted access and high security, while maintaining Ethereum compatibility.

1. **Technical Justification for Platform Choices**

* Decentralized App → Ethereum

Ethereum is a public blockchain with a fully decentralized, open-access model. It supports Turing-complete smart contracts written in Solidity and runs on the Proof of Stake (PoS) consensus, ensuring strong security through economic incentives. Its large developer community, mature tooling (e.g., Truffle, Hardhat), and extensive documentation make it ideal for building scalable decentralized applications. While Ethereum has moderate throughput (~30–100 TPS), Layer-2 solutions (e.g., Optimism, Arbitrum) address scalability without sacrificing decentralization.

* Supply Chain Network Among Known Partners → Hyperledger Fabric

Hyperledger Fabric uses a modular architecture with pluggable consensus (e.g., Raft), allowing enterprises to tailor the system to their performance and trust requirements. Its permissioned model ensures only authorized participants access specific data. Channels and private data collections provide strong data privacy—essential in supply chain contexts. Its ability to process 1,000+ TPS supports large-scale operations. It also supports smart contracts (chaincode) in familiar languages like Go and Java, easing enterprise integration.

* Inter-Bank Financial Application → Quorum

Quorum builds on Ethereum but introduces enterprise-focused enhancements, such as private transactions, permissioning, and pluggable consensus (Raft, IBFT). This combination allows for faster finality and greater privacy, critical in financial networks. Quorum also maintains compatibility with Ethereum smart contracts, allowing the reuse of existing tools and protocols. Its performance (200–2,000 TPS) and support for confidential contracts make it ideal for inter-bank settlements and digital asset issuance within semi-trusted environments.