| **Blockchain Name** | **Type** | **Consensus Mechanism** | **Permission Model** | **Speed/Throughput** | **Smart Contract Support** | **Token Support** | **Typical Use Case** | **Notable Technical Feature** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Ethereum** | Public | Proof of Stake (PoS) | Open/Permissionless | ~15 TPS (mainnet), up to 100,000 TPS with Layer 2 | Yes - Solidity, Vyper | Native (ETH) + ERC tokens | DeFi, NFTs, dApps, Smart Contracts | EVM compatibility and largest developer ecosystem |
| **Hyperledger Fabric** | Private | Pluggable (PBFT, Raft, Solo) | Permissioned | 1,000-20,000+ TPS | Yes - Go, Node.js, Java | No native token (can create custom) | Enterprise solutions, Supply chain, Identity management | Modular architecture with pluggable consensus |
| **R3 Corda** | Consortium | Notary-based consensus | Permissioned | 170-1,700 TPS | Yes - Kotlin, Java | No native token (supports digita asset | Financial services, Trade finance, Insurance | Point-to-point transactions with privacy |

**Comparison Table**

**Detailed Analysis**

**Ethereum (Public Blockchain)**

* **Consensus Evolution:** Transitioned from Proof of Work to Proof of Stake in September 2022
* **Scalability Solutions:** Layer 2 solutions like Polygon, Arbitrum, and Optimism significantly increase throughput
* **Developer Ecosystem:** Largest blockchain developer community with extensive tooling and libraries
* **Gas Fees:** Variable transaction costs based on network congestion

**Hyperledger Fabric (Private Blockchain)**

* **Enterprise Focus:** Designed specifically for business use cases requiring privacy and control
* **Modular Design:** Pluggable consensus algorithms allow organizations to choose the most suitable mechanism
* **Identity Management:** Built-in Certificate Authority (CA) for member identity verification
* **Channels:** Private sub-networks within the blockchain for confidential transactions

**R3 Corda (Consortium Blockchain)**

* **Financial Focus:** Specifically designed for financial institutions and regulated industries
* **Privacy Model:** Only parties involved in a transaction can see its details (not global state)
* **Legal Integration:** Smart contracts (CorDapps) are designed to be legally enforceable
* **Notary Services:** Specialized nodes that prevent double-spending without seeing transaction details

**Key Differences Summary**

**Decentralization vs Control**

* **Ethereum:** Fully decentralized, no single point of control
* **Hyperledger Fabric:** Centralized control by organization/consortium
* **R3 Corda:** Semi-decentralized within known network participants

**Privacy Levels**

* **Ethereum:** Public transactions (though privacy solutions exist)
* **Hyperledger Fabric:** Private channels and data isolation
* **R3 Corda:** Point-to-point privacy with selective disclosure

**Governance**

* **Ethereum:** Community-driven governance through EIPs
* **Hyperledger Fabric:** Organization-controlled governance
* **R3 Corda:** Network participant governance with defined rules

**Tokenization**

* **Ethereum:** Native cryptocurrency with extensive token ecosystem
* **Hyperledger Fabric:** Token-agnostic, custom implementations possible
* **R3 Corda:** Supports digital assets without native cryptocurrency

**Q-2**

**Technical Capabilities Report: Blockchain Platform Analysis**

**Comparative Analysis of Technical Capabilities**

The three blockchain platforms exhibit fundamentally different technical architectures optimized for distinct use cases. **Ethereum** leverages Proof of Stake consensus to maintain full decentralization while supporting complex smart contracts in Solidity/Vyper. Its main limitation is throughput at 15 TPS on mainnet, though Layer 2 solutions achieve up to 100,000 TPS with maintained security.

**Hyperledger Fabric** prioritizes enterprise performance through pluggable consensus (PBFT/Raft), delivering 1,000-20,000 TPS with modular architecture. Its permissioned model enables private channels and custom chaincode in multiple languages (Go, Node.js, Java), providing data isolation crucial for business networks.

**R3 Corda**

Implements unique notary-based consensus for point-to-point transactions, achieving 170-1,700 TPS while ensuring only transaction participants access data. Its Kotlin/Java-based CorDapps integrate legal contracts directly, making it ideal for regulated industries.

**Platform Recommendations**

**Decentralized App: Ethereum** - Its permissionless architecture, extensive EVM ecosystem, and native tokenization provide maximum decentralization and developer tooling essential for public dApps.

**Supply Chain Network: Hyperledger Fabric** - Private channels enable confidential partner relationships while high throughput and modular consensus accommodate varying trust levels among known participants efficiently.

**Inter-bank Financial Application: R3 Corda** - Purpose-built for financial services with regulatory compliance, point-to-point privacy, and legal contract integration that banking institutions require while maintaining necessary auditability.