

Introduction

Blockchain platforms vary in architecture and functionality, catering to diverse applications. This report compares three platforms—Ethereum (public), Hyperledger Fabric (private), and R3 Corda (consortium)—focusing on their technical capabilities, consensus mechanisms, and suitability for specific use cases.

Technical Analysis

Ethereum

- **Type:** Public
- **Consensus:** Proof of Stake (PoS)
- **Throughput:** ~15–30 TPS (scalable with Layer 2 solutions like Optimism)
- **Smart Contracts:** Yes (Solidity, Vyper)
- **Tokens:** Native (ETH, ERC-20, ERC-721)
- **Use Case:** Decentralized apps (DApps), DeFi, NFTs
- **Feature:** Ethereum Virtual Machine (EVM) for robust smart contract execution

Ethereum's open ecosystem supports global, trustless applications, with EVM enabling complex DApps. Its moderate TPS is offset by Layer 2 scaling.

Hyperledger Fabric

- **Type:** Private
- **Consensus:** Pluggable (e.g., Raft, Kafka)
- **Throughput:** ~3,500 TPS
- **Smart Contracts:** Yes (Chaincode: Go, JavaScript, Java)
- **Tokens:** Not native (custom tokens possible)
- **Use Case:** Supply chain, enterprise solutions
- **Feature:** Modular architecture with pluggable consensus

Fabric's high throughput and permissioned model suit enterprise needs, ensuring privacy and scalability for trusted networks.

R3 Corda

- **Type:** Consortium
- **Consensus:** Notary-based (e.g., Raft)
- **Throughput:** ~100–1,000 TPS
- **Smart Contracts:** Yes (CorDapps: Kotlin, Java)
- **Tokens:** Not native (custom tokens possible)
- **Use Case:** Financial services, trade finance

- **Feature:** Privacy via notary-based consensus

Corda's privacy-focused design is ideal for confidential transactions among known parties, like inter-bank systems.

Recommendations

- **Decentralized App:** Choose **Ethereum** for its open access, EVM, and native token support, powering DApps like Uniswap.
- **Supply Chain Network:** Select **Hyperledger Fabric** for its high TPS, permissioned access, and modular design, ensuring efficiency among partners.
- **Inter-bank Application:** Opt for **R3 Corda** due to its privacy features and notary-based consensus, tailored for secure financial transactions.

Conclusion

Ethereum excels in open ecosystems, Fabric in enterprise efficiency, and Corda in financial privacy. The choice depends on accessibility, throughput, and confidentiality needs.