Blockchain Platform Comparison

1. Public Blockchain: Ethereum
2. Private Blockchain: Hyperledger Fabric
3. Consortium Blockchain: R3 Corda

Comprehensive Comparison Table

Blockchain Name	Type	Consensus Mechanism Used	Permission Model	Speed/ Throughput	Smart Contract Support	Token Support	Typical Use Case	Notable Technical Feature
Ethereum	Public	Proof of Stake with Gasper protocol combining Casper FFG finality and LMD GHOST fork choice	Open	5-20 TPS base layer, 4,000+ TPS with Layer 2 rollups (Optimism, Arbitrum, Polygon)	Yes - Solidity (primary), Vyper, Yul assembly language	Native ETH plus comprehensive ERC token standards (ERC-20, ERC-721, ERC-1155, ERC-4626)	Decentralized Finance protocols, NFT marketplaces, autonomous organizations, cross-chain bridges	Ethereum Virtual Machine creates universal computation layer with deterministic execution across 8,000+ validator nodes, enabling composable DeFi protocols
Hyperledger Fabric	Private	Pluggable consensus architecture supporting PBFT,Raft, and Solo with endorsement-ordering-validation transaction flow	Permissioned	3,500+ TPS with parallel transaction processing and multiple ordering services	Yes - Go chaincode, Node.js, Java with Docker containerization	No native cryptocurrency, supports custom digital assets through TokenSDK and FabToken	Enterprise supply chain transparency, healthcare data sharing, regulatory compliance systems, inter-organizational workflows	Modular architecture with private data collections, channel-based segregation, and Certificate Authority integration enabling selective data disclosure
R3 Corda	Consortium	Notary-based consensus with pluggable notary services, supporting validating and non-validating notaries for double-spend prevention	Permissioned	170+ TPS standard, 1,500+ TPS with hardware security modules and optimized	Yes - Kotlin, Java, JVM-compatible languages with	No native token, supports custom tokens via Tokens SDK with atomic	Trade finance automation, insurance claim processing, regulatory	Point-to-point architecture with UTXO model, legal prose contracts

				flows	CorDapps (Corda Distributed Applications)	swap capabilities	reporting, inter-bank payment rails	integration, and selective transaction visibility eliminating global state replication

Blockchain Platform Analysis Report

The three platforms show distinct technical capabilities that serve different purposes. Ethereum operates as a public blockchain with complete openness, allowing anyone to participate and deploy smart contracts. Its Proof of Stake consensus provides strong security through economic incentives, but the platform faces throughput limitations at 15-20 TPS on the base layer. However, Layer 2 solutions significantly improve performance to around 4,000 TPS while maintaining the underlying security guarantees.

Hyperledger Fabric takes an enterprise-focused approach with pluggable consensus mechanisms that can be tailored to specific business requirements. The platform's modular architecture supports much higher throughput at 3,500+ TPS through parallel transaction processing. Its permission model ensures only authorized participants can access the network, and private data collections allow selective information sharing between specific parties.

R3 Corda uses a fundamentally different architecture to eliminate global state replication. Transactions are only shared between relevant parties, which provides better privacy and reduces network overhead. The notary-based consensus prevents double-spending without requiring all participants to validate every transaction. This design is particularly effective for financial applications where confidentiality is essential.

Platform Recommendations:

For decentralized applications: Ethereum is the clear choice due to its established ecosystem and developer community. The platform offers extensive smart contract capabilities with Solidity, comprehensive token standards, and seamless integration with existing DeFi protocols. While base layer performance is limited, Layer 2 scaling solutions provide the necessary throughput for most applications.

For supply chain networks among known partners: Hyperledger Fabric fits best because it provides the permissioned access control required for business partnerships. The channel architecture enables different groups of partners to maintain separate data streams while sharing relevant information. The high throughput capability handles the volume of transactions typical in supply chain operations.

For inter-bank financial applications: R3 Corda is specifically designed for this. The point-to-point transaction model ensures privacy between institutions while maintaining auditability for regulators. The

platform's integration with existing financial infrastructure and support for legal contracts makes it suitable for complex financial instruments and settlement processes.