

1. Public Blockchain:

A public blockchain is a completely open network that *anyone in the world* can join. Anyone can read data, write data, and participate in the consensus process (validating transactions and blocks).

Permissionless — no approval required to join.

Data is fully transparent and visible to everyone.

Decentralized — no single organization controls it.

Uses cryptocurrencies as incentives for securing the network (like Bitcoin or Ether).

Typically uses **Proof of Work** or **Proof of Stake** consensus mechanisms.

Examples:

- Bitcoin
- Ethereum
- Solana

Public Blockchain → Ethereum

Ethereum is a public, permissionless blockchain, meaning anyone can join the network, read and write data, and participate in validating transactions. It was launched in 2015 by Vitalik Buterin and others.

Smart Contracts: Ethereum introduced programmable smart contracts self-executing code that runs on the blockchain.

Decentralization: The network is run by thousands of nodes globally.

Cryptocurrency: Uses Ether (ETH) as its native token to pay for computation (gas fees).

Security: Very high security through large-scale distributed consensus (Proof of Stake as of Ethereum 2.0).

Pros:

- No central control — fully decentralized.
- Highly secure and censorship-resistant.
- Massive ecosystem of developers and decentralized apps (dApps).

2. Private Blockchain:

A **private blockchain** is a **closed network** where only specific participants are allowed. It is usually controlled by a single organization or a trusted group of organizations.

Permissioned — participants must be invited or approved.

Data access is restricted — only authorized users can read/write.

Centralized or semi-centralized governance.

Often used within a single organization or for internal collaboration.

No need for cryptocurrency to operate.

- **Examples:**

Hyperledger Fabric

R3 Corda (in private mode)

Private Blockchain → Hyperledger Fabric

Hyperledger Fabric is an **open-source private (permissioned) blockchain platform** under the Linux Foundation.

Primarily designed for enterprise use cases requiring privacy, scalability, and modularity.

Permissioned: Only approved entities can participate in the network.

Modular Architecture: Components like consensus, membership services, and ledger storage can be customized.

Private Channels: Participants can create private sub-networks (channels) for selective visibility of data.

Chaincode: Hyperledger Fabric's version of smart contracts.

Pros:

- Highly customizable for enterprise needs.
- Privacy: Data is visible only to authorized participants.
- High throughput and scalability.

3. Consortium Blockchain

A **consortium blockchain** (also called a federated blockchain) is **shared by a group of organizations** (the consortium), rather than a single entity.

Only selected participants from the consortium can participate in the blockchain.

Permissioned — only consortium members can participate.

Partially decentralized — controlled by a group instead of one entity.

Provides more privacy than public blockchains, but shared trust between members.

Often used between companies that need to collaborate but not fully trust each other.

Examples:

- R3 Corda (consortium mode)
- Quorum
- IBM Food Trust

Consortium Blockchain → Quorum

- Quorum is an **enterprise-focused version of Ethereum**, designed for use by consortiums (groups of known, trusted organizations collaborating on a shared blockchain network). Initially developed by JPMorgan Chase, now an open-source project.

Permissioned: Only known participants can join and validate transactions.

Private Transactions: Allows private data sharing between selected members while maintaining an overall shared ledger.

Ethereum Compatibility: Runs Ethereum smart contracts with modifications to support enterprise needs.

Pros:

- Better privacy and control than public blockchains.
- Familiar Ethereum development tools and smart contract support.
- Suitable for regulatory and compliance-heavy industries.

Consortium blockchains like Quorum combine decentralization among known participants with configurable privacy. They allow private transactions and fast performance, balancing openness with trust among consortium members.

Platform Recommendations:

For a decentralized app, I would choose Ethereum for its mature ecosystem, global reach, and robust smart contract support.

For a supply chain network among known partners, Hyperledger Fabric is ideal due to its modular architecture and private channels for selective data sharing.

For an inter-bank financial application, Quorum offers the right mix of privacy, compliance, and shared governance among trusted banks.