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BLOCKCHAIN · BEGINNER · LESSON 12 OF 13

Public, Private and Consortium Blockchains

Not every blockchain is open to everyone. Who is allowed in changes what the chain is good for

5 min read 6 quiz questions with answer key

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Public, Private and Consortium Blockchains

IN ONE SENTENCE

Public blockchains let anyone read, send and help validate. Private ones are run by a single organization that decides who takes part. Consortium chains sit in between, shared by a group of organizations. Each trades openness for control in a different way.

One question sorts them: who is allowed in?

Every blockchain answers three questions about access, and the answers decide which type it is:

- **Who can read** the ledger?
- **Who can send** transactions to it?
- **Who can validate**, meaning help decide which blocks are added?

If the answer to all three is "anyone, without asking", the chain is **permissionless**. If someone has to approve you first, it is **permissioned**. That one difference shapes almost everything else: how much you have to trust the people running it, how fast it can be, and who can change the rules.

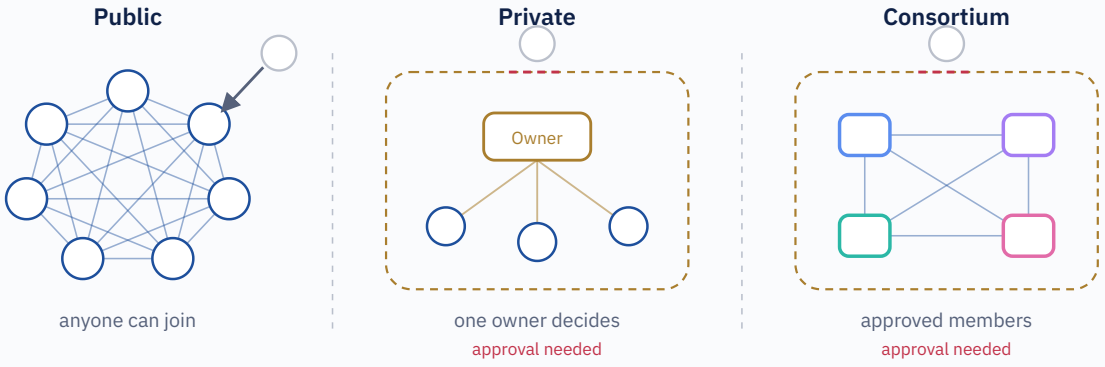


Figure 1. On a public chain anyone can join and validate. A private chain is run by one owner who approves every participant. A consortium chain is run by a group of member organizations behind a shared gate.

ANALOGY: THREE KINDS OF ROAD

A public highway is open to every driver, with rules everyone follows and nobody at the entrance checking names. A company's private car park has a barrier, and only staff badges open it. A road shared by the businesses on an industrial estate is somewhere in between: the tenants agree the rules together, and only their vehicles get through the gate.

Public blockchains

Bitcoin and Ethereum are public. Anyone can download the full history, send a transaction, and run a node. On Bitcoin anyone with the hardware can mine, and on Ethereum anyone who stakes ETH can become a validator. No company can block a person from joining.

The openness is the point. Because strangers who do not trust each other run the network, the rules have to be enforced by the software and by the cost of cheating, as Lessons 6 and 7 showed. The price is speed and privacy: thousands of copies must agree, and anyone can see every transaction.

Private blockchains

A private blockchain is run by one organization. It chooses who may run a node, who may write, and often who may read. Companies use them for internal records where several departments need the same tamper-evident history, often built with tools such as Hyperledger Fabric.

Because the operator knows every participant, there is no need for mining or staking, so transactions can be fast and cheap. But the operator can also change the rules, reverse entries, or switch the system off. Critics point out that this is close to a shared database with blockchain features. It can be useful, but it does not remove the need to trust the owner, which was the problem Bitcoin set out to solve.

Consortium blockchains

A consortium chain is shared by a group of organizations, often in the same industry, such as banks or shipping firms. Each member runs nodes and helps validate, so no single company is in charge, but outsiders cannot join without the group's approval.

The idea is appealing: competitors share one record without handing control to any one of them. Making it work is harder. TradeLens, a shipping platform built by Maersk and IBM, launched in 2018 to share supply chain data between carriers, ports and customs. In November 2022 the two companies announced they would shut it down, saying it had not reached the full industry collaboration it needed. The technology worked, but rivals were reluctant to join a system started by one of their competitors.

Side by side

Type	How it works
Public	Anyone can join, validate and see the data. Slower, with fees that vary. You trust the rules, not a company. Usually has its own coin, such as BTC or ETH.
Private	One owner approves every participant and runs the nodes. Fast and cheap. You trust the owner. Usually no public coin.
Consortium	A group of approved members validates and sees the data. Fast and cheap. You trust the group. Usually no public coin.

The lines also blur. In March 2024, BlackRock launched a tokenized fund called BUIDL on public Ethereum, but only pre-approved investors can hold its tokens. The chain is public, while the asset on it is permissioned.

Why this matters for traders

- **Most private chains have no coin to trade.** Headlines like "Big Bank Launches Blockchain" usually describe a permissioned system with no public token, so they rarely change demand for BTC or ETH directly.
- **Check what runs on public chains.** When large firms put assets such as funds or bonds on a public network, they use its block space and pay its fees. That kind of adoption touches the public chain itself and is worth following.
- **Ask who controls a coin's network.** Some tokens trade on exchanges but run on chains with a handful of approved validators. That makes them closer to a company product than to Bitcoin, and the risks are different.

Key terms

Permissionless	Open to anyone: no approval is needed to read, send transactions or take part in validation.
Permissioned	Access is controlled: participants must be approved before they can join or validate.
Public blockchain	A permissionless chain such as Bitcoin or Ethereum that anyone can use and help run.

Private blockchain	A permissioned chain run by a single organization that decides who takes part.
Consortium blockchain	A permissioned chain shared and validated by a group of organizations.
Validator	A participant that checks transactions and helps decide which blocks are added to the chain.

Key takeaways

1. Blockchains differ in who can read, who can send and who can validate.
2. Public chains like Bitcoin and Ethereum are open to anyone and rely on rules and incentives, not trusted operators.
3. Private chains are run by one organization, so they are fast but require trusting that owner.
4. Consortium chains are shared by a group of organizations, which spreads control but needs rivals to cooperate, as the end of TradeLens showed.
5. For traders, news about permissioned chains rarely affects public coins directly, while activity on public chains does.

Test yourself

Circle one answer for each question. The answer key with explanations is on the next page. You can also take this quiz online at markettalks.info and see your score instantly.

1. What makes a blockchain permissionless?

- A It has no transaction fees
- B Anyone can read, send and help validate without approval
- C It is owned by a government
- D Its data is kept secret from outsiders

2. Which is an example of a public blockchain?

A. A bank's internal settlement ledger
B. A Hyperledger Fabric network inside one company
C. TradeLens
D. Ethereum

3. What is the main trade-off of a private blockchain?

A. It is fast and cheap, but you must trust the organization that runs it
B. It is fully open, but very slow
C. It needs mining, so it uses more energy
D. It cannot record any transactions

4. Who validates blocks on a consortium blockchain?

A. Anyone who downloads the software
B. A single company
C. A group of approved member organizations
D. Nobody, blocks are added automatically

5. Why did Maersk and IBM shut down TradeLens?

A. The blockchain was hacked
B. Regulators banned it
C. It did not get enough of the industry to take part
D. Its coin lost all its value

6. A bank announces a new private blockchain with no public token. What is the most likely direct effect on bitcoin demand?

A. Little or none, because nothing on the public chain changes
B. A large rise, because all blockchains share demand
C. A large fall, because the bank competes with Bitcoin
D. Bitcoin's fees will go to zero

Answer key

1 B

Anyone can read, send and help validate without approval

Permissionless means nobody needs to approve you. Bitcoin and Ethereum are open in all three ways.

2 D

Ethereum

Ethereum is open to anyone. The others are permissioned systems run by one company or a group of companies.

3 A

It is fast and cheap, but you must trust the organization that runs it

One owner controls who joins and can change the rules. That makes it efficient but brings back the need to trust a central party.

4 C

A group of approved member organizations

Members such as banks or shipping firms share validation, so no single company is in charge, but outsiders cannot join freely.

5 C

It did not get enough of the industry to take part

The companies said it had not reached the full industry collaboration it needed. Rivals were reluctant to join a platform started by a competitor.

6 A

Little or none, because nothing on the public chain changes

A permissioned system with no public coin does not use Bitcoin's block space or require BTC, so the direct effect is usually small.

SOURCES

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- ethereum.org, Proof-of-stake: https://ethereum.org/en/developers/docs/consensus-mechanisms/pos/

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