

CRYPTOCURRENCY

>

BLOCKCHAIN

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Public, Private, Permissioned Blockchains Compared

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SETH**

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Reviewed by

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RASURE**

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Blockchains
are based on
distributed
ledgers,
which have
existed at
the
enterprise

level for
many years
to manage
data.
However,
they have
only
recently
become
popular and
interesting
because
cryptocurrency
introduced
the concept
to the
public.

The content
stored on
the blocks of
the
blockchain
—and the
activities
performed
by the
various
participants
—can be
controlled
depending
on how the
blockchain

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is configured. Generally, blockchains are designed for specific purposes, with users receiving multiple types of access or tasks.

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Public blockchains allow anyone to access them; private blockchains are closed to only selected users; permissioned blockchains are a hybrid of public and private blockchains where anyone can

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access them
as long as
they have
permission
from the
administrators
to do so.

Here's a
look at the
key
differences
between
public,
private, and
permissioned
blockchains.

KEY TAKEAWAYS

- In a
public
blockchain,
anyone
is
free
to
join
and
participate
in
the
core

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activities
of
the
blockchain
network.

- A private blockchain allows only selected and verified participants; the operator has the rights to override, edit, or delete entries on the blockchain.

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- A permissioned blockchain has properties of

both
private
and
public
blockchains.

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- Permissioned blockchains have seen an increase in popularity thanks to their ability to allocate specific permissions to various users on the network.

Public Blockchain

A public
[blockchain](#)

is one where anyone is free to join and participate in the core activities of the blockchain network. Anyone can read, write, and audit the ongoing activities on a public blockchain network, which helps achieve the self-governed, decentralized nature often touted when blockchain is discussed.

Advantages

A public network operates on

an incentivizing scheme that encourages new participants to join and keep the network agile. Public blockchains offer a particularly valuable solution from the point of view of a truly decentralized, democratized, and authority-free operation.



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Public
blockchains
are
extraordinarily
valuable
because
they can
serve as a
backbone
for nearly
any
[decentralized](#)
[solution](#). Additionally,
the vast
number of
network
participants
joining a
secured
public
blockchain

keeps it safe from data breaches, hacking attempts, or other cybersecurity issues. The more participants, the safer a blockchain is.

FAST FACT

Public blockchains can be secured with [automatic validation methods](#) and encryption that keep single entities from changing information

*in the
chain
(like
cryptocurrency
blockchains),
or they
can
allow
anyone
to
make
changes.*

Disadvantages

The primary disadvantage to secured public blockchains is the heavy energy consumption required to maintain them. The concern is a consensus mechanism that requires participants to compete to validate the

information
and receive
a reward for
letting the
network use
their
processing
power. Not
all
blockchain
networks
use an
[energy-
intensive
validation](#)
process, so
[not all](#) use
enormous
amounts of
electricity.

Other issues
include the
lack of
complete
privacy and
anonymity.
Public
blockchains
allow
anyone to
view
transaction
amounts

and the addresses involved. If the address owners become known, the user loses their anonymity.

Public blockchains also attract participants who may not be honest in their intentions. Most public blockchains are designed for cryptocurrencies, which by nature of their value are a prime target for hackers and thieves.

Private

Blockchain

Participants
can join a
private
blockchain
network
only
through an
invitation
where their
identity or
other
required
information
is authentic
and verified.
The
validation is
done by the
network
operator(s)
or by a
clearly
defined set
protocol
implemented
by the
network
through
smart
contracts or
other
automated

approval
methods.

Private
blockchains
control who
is allowed to
participate
in the
network. If
the network
is capable of
mining, its
private
nature could
control
which users
can execute
the consensus protocol
that decides
the [mining](#)
rights and
rewards.
Additionally,
only select
users might
maintain the
shared
ledger. The
owner or
operator has
the right to
override,
edit, or

delete the necessary entries on the blockchain as required or as they see fit.

Advantages

A private blockchain is not decentralized. It is a [distributed ledger](#) that operates as a closed database secured with cryptographic concepts and the organization's needs. Only those with permission can run a full node, make transactions, or

validate/authenticate
the
blockchain
changes.

By reducing
the focus on
protecting
user
identities
and
promoting
transparency,
private
blockchains
prioritize
efficiency
and
immutability
—the state
of not being
able to be
changed.

These are
important
features in
supply,
logistics,
payroll,
finances,
accounting,
and many
other

enterprise
and
business
areas.

Disadvantages

While
purposefully
designed for
enterprise
applications,
private
blockchains
lose out on
many of the
valuable
attributes of
permissionless
systems
simply
because
they are not
widely
applicable.
They are
instead built
to
accomplish
specific
tasks and
functions.

In this

respect,
private
blockchains
are
susceptible
to data
breaches
and other
security
threats. This
is because
there is
generally a
limited
number of
validators
used to
reach a
consensus
about
transactions
and data if
there is a
consensus
mechanism.

In a private
blockchain,
there may
not be
consensus
but only the
immutability
of entered

data unless
an operator
or
administrator
can make
changes.

Permissioned Blockchain

Permissioned
blockchains
are a mix
between the
public and
private
blockchains
and support
many
options for
customization.

Advantages

Permissioned
blockchain
advantages
include
allowing
anyone to
join the
permissioned
network
after a
suitable

identity
verification
process.
Some give
special and
designated
permissions
to perform
only specific
activities on
a network.
This allows
participants
to perform
particular
functions such
as reading,
accessing, or
entering
information
on the
blockchain.

Permissioned
blockchains
allow for
many
functions,
but one
most
interesting
to
businesses
is

[Blockchain-as-a-Service \(BaaS\)](#)—a blockchain designed to be scalable for the needs of many companies or tasks that the providers rent out to other businesses.

**FAST
FACT**

Blockchain-as-a-Service reduces costs for many businesses that can benefit from using blockchain

*technology
in their
business
processes.*

For example, say a business wants to improve transparency and accuracy in its accounting processes and financial reporting. It could rent blockchain accounting services from a BaaS provider. The blockchain would provide an interface where entries are made by

end users
and then
automates
the rest of
the
accounting
processes.

In this way,
there are
fewer errors
and no way
for other
parties to
alter
financial
data after it
is entered.
As a result,
financial
reports to
management
and
executives
become
more
accurate,
and the
blockchain
is accessible
for viewing
and
generating
real-time

financial
reports.

The
business
might
choose to
have its
invoicing,
payments,
book-
keeping,
and tax
reporting
automated.
Additionally,
blockchain
can prevent
anyone with
dishonest
intentions
from
altering
financial
data or
taking
advantage
of
weaknesses
in
accounting
processes.

Disadvantages

The disadvantages of permissioned blockchains mirror those of public and private blockchains, depending on how they are configured. One key disadvantage is that because permissioned blockchains require internet connections, they are vulnerable to hacking. By design, some might use immutability techniques such as cryptographic security measures

and
validation
through
consensus
mechanisms.

While most
blockchains
are thought
to be
unhackable,
there are
weaknesses.
Cryptocurrency
theft occurs
when a
network is
hacked into,
and private
keys are
stolen.

Permissioned
blockchains
also suffer
this
weakness
because the
networks
that connect
the users to
the service
depend on
security
measures

that can be bypassed. User information can be stolen and accounts hacked into, similar to enterprise-level data breaches like the one Target suffered in 2013 when a third-party with access to the network was hacked. [\[1\]](#)

What Are Private Blockchains?

Private blockchains are distributed ledgers only available to those given

express
permission
to have
specific
access levels
or abilities
on a
blockchain.

Are There Any Permissioned Blockchains?

Many
companies
have found
utility and
value in
permissioned
blockchains.

For
example,
Walmart
uses a
custom
version of
Hyperledger
Fabric,
which was
created as
an open
source

project by
IBM and the
Linux
Foundation
for
enterprise
use, to track
food origins
much faster
than it
previously
could. ^[2]

What Is the Difference Between and Permissioned and Private Blockchain?

A private
blockchain
is one in
which only
specific
users have
access and
abilities and
is generally
used only by

the entity it
belongs to.

A
permissioned
blockchain
is a hybrid of
public and
private
blockchains
where
multiple
users are
given
permissions
and
abilities.

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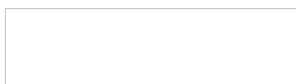
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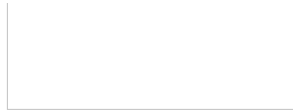


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Definition



ALTCOINS
10



10

Important
Cryptocurrencies
Other
Than
Bitcoin

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Related Terms

What Is a Permissioned Blockchain?

Permissioned
blockchains
require
participants
to identify
themselves
and assign
defined roles
to perform
only
permitted
activities.

[more](#)

Blockchain

Facts:

What Is It, How It Works, and How It Can Be Used

A blockchain is a digitally distributed, decentralized, public ledger that exists across a network. It is most noteworthy in its use with cryptocurrencies and NFTs.

[more](#)

Hyperledger Fabric

Hyperledger Fabric is a platform for building various blockchain-based products, solutions, and applications for business use. [more](#)

Proof of Elapsed Time

(PoET)

Proof of
elapsed time
(PoET)
consensus
algorithm
follows a true
lottery system
and allows for
more efficient
use of the
blockchain
network's
resources.

[more](#)

What is Hyperledger Iroha?

Hyperledger
Iroha is a
business
blockchain
framework
designed for
infrastructure
projects that
need
distributed
ledger
technology.

[more](#)

What are on-chain transactions?

On-chain
transactions
occur on the
cryptocurrency
blockchain

Blockchain,
and their
occurrence
changes the
state of the
blockchain.
[more](#)



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