

Distributed Immutable Data Object (DIDO)

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Discussion

A Distributed Immutable Data Object (DIDO) distributes an [Immutable Data Object](#) across multiple networked [Nodes](#).

The participating Nodes use a shared state-agreement mechanism to determine which proposed state changes become committed states. The mechanism preserves the integrity and consistency of the DIDO without requiring one Node to maintain exclusive control over the authoritative state.

A DIDO can preserve change without modifying a committed state. A permitted change creates a successor state and preserves the relationship between the successor state and its preceding state. The committed predecessor remains identifiable and verifiable.

A DIDO can distribute:

- Data
- State
- State transitions
- Computation
- Validation
- Replication
- Persistence
- Authority
- Evidence

The term DIDO describes a technology-independent architectural concept. It does not prescribe a specific implementation technology.

Technologies and architectural approaches capable of realizing DIDOs include:

- Blockchains
- Distributed ledgers
- Directed acyclic graphs
- Distributed journals
- Content-addressed distributed storage
- Replicated state machines
- Other distributed architectures that preserve committed state integrity

The DIDO concept is broader than any one realization.

Definition

immutable data object whose committed states are maintained across multiple networked Nodes

through a shared state-agreement mechanism

Source

Adapted from:

- [DIDO Reference Architecture, Distributed Immutable Data Objects](#)
- [DIDO Reference Architecture](#)
- [DIDO CLI, What is DIDO?](#)
- United States Patent Application Publication US 2022/0237111 A1, Distributed Immutable Data Object Testing

The definition preserves the DIDO-RA concepts of distributed data, distributed computation, networked peers, state agreement, integrity, and consistency while expressing DIDO as a data-object concept rather than as a collection of underlying technologies.

Note

DIDO is the acronym for **Distributed Immutable Data Object**.

The plural form is **Distributed Immutable Data Objects** or **DIDOs**.

A DIDO does not require every participating Node to contain an identical physical representation. The governing architecture determines the distribution, replication, partitioning, validation, and persistence rules.

Immutability does not prohibit change to the subject represented by a DIDO. Immutability prevents alteration of an already committed state. A permitted change produces a new committed state while preserving the prior committed state and the relationship between them.

A DIDO is not limited to:

- Cryptocurrency
- Blockchain
- Distributed Ledger Technology
- Financial information
- A particular consensus algorithm
- A particular data representation
- A particular programming language
- A particular communication protocol
- A particular deployment platform

A DIDO differs from a mutable distributed object whose participants can overwrite an existing committed state without preserving a detectable record of the alteration.

Example

A distributed network maintains an asset record across multiple Nodes. The participating Nodes accept a state transition through the network's state-agreement mechanism.

The accepted transition creates a successor state. The successor identifies its predecessor, and the predecessor remains independently identifiable and verifiable.

The asset record and its preserved sequence of committed states constitute a DIDO.

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