

Recoverability

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Discussion

Recoverability is a [Quality Characteristic](#) concerning the degree to which a subject can restore an affected state and required information after an interruption or failure.

Recoverability can apply to:

- A [Candidate Solution](#)
- A [Distributed System](#)
- A [Node](#)
- A [Node Set](#)
- A service
- A software component
- A hardware component
- A data store
- An [Execution Facility](#)
- An [Operational Resource](#)
- Another subject requiring restoration after an interruption or failure

Recovery can concern restoration of:

- Operational state
- Processing state
- Transaction state
- Stored information
- Configuration
- Communication
- Service availability
- Node participation
- Node Set membership
- Evidence
- Provenance
- Traceability
- Another required state or information set

Recoverability can identify:

- The evaluated subject
- The interruption or failure condition
- The state preceding the interruption or failure
- The affected state
- The required restored state
- The affected information
- The required restored information

- The recovery starting event
- The recovery completion event
- The recovery method
- The permitted recovery duration
- The permitted information loss
- The permitted state loss
- The permitted service interruption
- The required recovery verification
- The applicable [Test Environment](#)
- The applicable [Configuration](#)
- The applicable DIDO [Baseline](#)
- The applicable [Validation Criteria](#)
- The applicable [Acceptance Criteria](#)
- Its [Evidence](#)
- Its [Provenance](#)
- Its [Traceability](#)

Recoverability can be evaluated using measures such as:

- Recovery success rate
- Recovery duration
- Amount of information lost
- Amount of state lost
- Number of operations requiring repetition
- Percentage of Evidence preserved
- Percentage of transactions restored
- Time required to restore service
- Time required to restore Node Set participation
- Another measure established by the Acceptance Criteria

Definition

[Quality Characteristic](#) concerning the degree to which a subject can restore an affected state and required information after an interruption or failure

Source

Adapted from:

- [ISO/IEC 25010:2023, Systems and software Quality Requirements and Evaluation \(SQuaRE\) — Product quality model](#)
- [ISO/IEC 25023:2016, Systems and software Quality Requirements and Evaluation \(SQuaRE\) — Measurement of system and software product quality](#)
- [Quality Characteristic](#)
- [Reliability](#)
- DIDO Reference Implementation Conceptual Model
- DIDO-TE draft Requirements Register

ISO/IEC 25010 identifies Recoverability as a Reliability-related product-quality subcharacteristic concerning restoration of affected information and state following interruption or failure.

This definition adapts Recoverability for DIDO-TE evaluation of Candidate Solutions, Distributed Systems, Nodes, Node Sets, services, data stores, Execution Facilities, and Operational Resources.

Note

Recoverability differs from [Reliability](#):

- Reliability concerns performance of specified functions under specified conditions for a specified period
- Recoverability concerns restoration after an interruption or failure

Recoverability contributes to Reliability but does not replace Reliability.

Recoverability differs from availability:

- Availability concerns whether a subject is operational and accessible when required
- Recoverability concerns restoration of affected state and information after interruption or failure

Recoverability differs from fault tolerance:

- Fault tolerance concerns continued operation despite a fault
- Recoverability concerns restoration after operation has been affected

Recoverability does not necessarily require restoration to the exact state immediately preceding the interruption or failure.

The applicable Acceptance Criteria can permit restoration to:

- The immediately preceding state
- The most recent verified state
- A defined checkpoint
- A controlling Baseline
- A safe state
- Another approved state

A restart does not by itself demonstrate Recoverability. Verification must determine whether the required state, information, service, Evidence, Provenance, and Traceability were restored.

The applicable Acceptance Criteria should distinguish:

- Recovery of the evaluated subject
- Recovery of the Test Environment
- Recovery of DIDO-TE
- Recovery of an Execution Facility
- Recovery of a supporting Operational Resource

Example

DIDO-TE interrupts a Candidate Solution while it processes a controlled set of transactions.

The Acceptance Criteria establish:

- The interruption event
- The state required before interruption
- The permitted recovery method
- The maximum recovery duration
- The maximum permitted transaction loss
- The required restored Configuration
- The required Evidence and Traceability

After the interruption, the Candidate Solution restores its state and resumes processing.

DIDO-TE compares the restored state, retained transactions, recovery duration, and preserved Evidence with the Acceptance Criteria.

The resulting Test Results support evaluation of Candidate Solution Recoverability.

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