

ENV-005h — Emulate Network Partitions

[Go to ENV-005 — Emulate Distributed Systems](#)

Statement

The [DIDO-TE](#) SHALL emulate the network partitions specified by the applicable [Test Definition](#).

Derived From

- [ENV-005 — Emulate Distributed Systems](#)
- [ENV-005a — Emulate Distributed Topology](#)
- [ENV-005c — Emulate Communication Behaviour](#)
- [ENV-005g — Emulate Communication Failures](#)
- [\[DTE5\] DIDO-TE Requirements Register](#), source requirement identifier and obligation to be assigned
- [\[DTE6\] Structured Information Processing Reference Architecture \(SIP-RA\)](#)
- [\[DTE7\] Federated Data Interpretation Systems Reference Architecture \(FDIS-RA\)](#)

Rationale

A network partition divides a distributed topology into two or more groups whose members retain communication within their group but lose or restrict communication across partition boundaries.

A partition may be complete, partial, asymmetric, intermittent, or selective. It may affect designated Nodes, communication paths, directions, protocols, message classes, or services.

Network partitions affect coordination, consensus, discovery, consistency, availability, leadership, quorum, transaction processing, and recovery. Controlled partition emulation supports assessment of system behaviour during isolation and following restoration of communication.

Applies To

- [Test Environment](#)
- [Test Definition](#)
- [Test Execution](#)
- [Test Object](#)
- [Node](#)
- [Test Resource](#)
- [Configuration](#)
- [Constraint](#)
- [Evidence](#)

Verification

Verification confirms that:

- The applicable Test Definition identifies each network partition subject to emulation.
- Each specified network partition has a unique identity.
- The Test Definition identifies each partition group and its participating Nodes and Test Resources.
- The Test Definition identifies each communication path crossing a partition boundary.
- The Test Definition specifies whether the partition is complete, partial, asymmetric, intermittent, or selective.
- The Test Definition specifies the affected directions, protocols, message classes, services, and communication operations.
- The Test Definition specifies the activation condition, activation time, duration, scope, and termination condition.
- The Test Definition specifies communication permitted within each partition group and communication restricted across partition boundaries.
- The Test Definition specifies the expected behaviour during the partition and after restoration of communication.
- The DIDO-TE confirms the required pre-partition topology and communication state before activating the partition.
- The DIDO-TE activates each partition under its specified conditions.
- The DIDO-TE preserves permitted communication within each partition group.
- The DIDO-TE restricts communication across partition boundaries according to the Test Definition.
- The DIDO-TE records the planned and actual partition activation and termination times.
- The DIDO-TE observes the behaviour of each partition group during isolation and following restoration.
- The DIDO-TE detects unintended communication across a partition boundary or unintended loss of permitted communication within a partition group.
- The DIDO-TE distinguishes an emulated network partition from an unintended communication failure.
- The DIDO-TE records partition identities, groups, boundaries, affected paths, activation conditions, actual conditions, observed interactions, restoration events, and detected deviations as [Evidence](#).
- The DIDO-TE maintains [Traceability](#) among each partition, affected Nodes and paths, Test Definition, Test Execution, Evidence, and [Test Results](#).
- A missing, incorrectly activated, incorrectly bounded, uncontrolled, unobserved, unsupported, or untraceable mandatory network partition constitutes nonconformance with this requirement.

Verification includes:

- Inspection of the network partitions specified by the Test Definition
- Inspection of partition identities, groups, Nodes, boundaries, affected paths, activation conditions, durations, and expected behaviour
- Comparison of the pre-partition and partitioned topologies
- Observation of communication within and across partition groups
- Testing of a complete partition
- Testing of a partial, asymmetric, intermittent, or selective partition, as applicable
- Confirmation that permitted communication continues within each partition group

- Confirmation that prohibited communication does not cross partition boundaries
- Observation of system behaviour following restoration of communication
- Confirmation that the DIDO-TE detects unintended communication or isolation
- Inspection of network-partition Evidence and Traceability records
- Confirmation that each mandatory network-partition deviation produces a nonconformance result

Referenced By

- [ENV-005i — Emulate Membership and Topology Changes](#)
- [ENV-005j — Emulate Recovery Behaviour](#)
- [ENV-005k — Observe Distributed Interactions](#)
- [ENV-005l — Record Distributed-System Emulation](#)
- [ENV-005m — Validate Emulation Fidelity](#)

Related Architecture Sections

- Add links to the architecture sections governing distributed topology, communication paths, network isolation, consistency, availability, reconciliation, recovery, Evidence, and Traceability.

Delivery Phase

Assign the applicable delivery phase.

Requirement Status

Draft

Statement Reference

Use the following syntax to reference this requirement's Statement section from another DokuWiki page:

```
{{section>dido:03-dido-te:99-annexes:annex-c-requirements:02-test-environment-requirements:env-005-emulate-distributed-systems:env-005h-emulate-network-partitions#Statement&noheader&nofooter&noeditbtn}}
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