

ENV-005b — Emulate Participating Nodes

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

Statement

The [DIDO-TE](#) SHALL emulate each participating [Node](#) specified by the applicable [Test Definition](#).

Derived From

- [ENV-005 — Emulate Distributed Systems](#)
- [ENV-005a — Emulate Distributed Topology](#)
- [\[DTE5\] 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 distributed system depends on the identities, roles, interfaces, states, capabilities, and behaviours of its participating Nodes.

A participating Node may comprise the actual implementation, a virtualised instance, a simulator, a stub, a service double, or another controlled representation. The selected representation must exhibit the behaviour required by the Test Definition for the applicable Test Execution.

An incorrectly represented Node may alter communication, coordination, failure handling, recovery, security, or resulting system behaviour. The Test Definition therefore specifies the required representation and fidelity criteria for each participating Node.

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 participating Node.
- Each participating Node has a unique identity.
- The Test Definition specifies the role, interfaces, initial state, configuration, capabilities, dependencies, and required behaviour of each participating Node.
- The Test Definition identifies the representation used for each participating Node.
- The Test Definition specifies the applicable fidelity criteria for each Node representation.
- The DIDO-TE instantiates each participating Node using its specified representation.
- Each participating Node occupies the location and relationships specified by the distributed topology.
- Each participating Node exposes the specified interfaces.
- Each participating Node assumes the specified initial state before Test Execution.
- Each participating Node exhibits the specified behaviour during Test Execution.
- The DIDO-TE distinguishes an actual implementation from an emulated representation in the resulting records.
- The DIDO-TE detects a missing, additional, substituted, incorrectly configured, incorrectly located, or unresponsive participating Node.
- The DIDO-TE records Node identities, representations, configurations, states, interactions, and detected deviations as [Evidence](#).
- The DIDO-TE maintains [Traceability](#) among each participating Node, its representation, the Test Definition, Test Execution, Evidence, and [Test Results](#).
- A missing, additional, incorrectly represented, incorrectly configured, unsupported, or untraceable mandatory participating Node constitutes nonconformance with this requirement.

Verification includes:

- Inspection of the participating Nodes identified by the Test Definition
- Inspection of Node identities, roles, representations, interfaces, configurations, states, capabilities, and dependencies
- Comparison of specified and instantiated participating Nodes
- Observation of participating Node behaviour during Test Execution
- A negative assessment with a missing or substituted participating Node
- A negative assessment with an incorrect Node configuration, state, interface, or behaviour
- Confirmation that the DIDO-TE detects and records each Node deviation
- Inspection of participating-Node Evidence and Traceability records
- Confirmation that each mandatory Node deviation produces a nonconformance result

Referenced By

- [ENV-005c — Emulate Communication Behaviour](#)
- [ENV-005d — Emulate Time and Clock Conditions](#)
- [ENV-005e — Emulate Resource Conditions](#)
- [ENV-005f — Emulate Node Failures](#)
- [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 Nodes, Node representations, distributed topology, interfaces, Node lifecycle, 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-005b-emulate-participating-nodes#Statement&noheader&nofooter&noeditbtn}}
```

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