ENV-005a — Emulate Distributed Topology

Go to ENV-005 — Emulate Distributed Systems

Statement

The DIDO-TE SHALL emulate the distributed topology specified by the applicable Test Definition.

Derived From

- ENV-005 — Emulate Distributed Systems
- [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 topology defines the participating Nodes, their communication paths, their logical and physical relationships, and the boundaries across which they interact.

Topology influences reachability, routing, communication latency, fault propagation, dependency relationships, trust boundaries, and system behaviour. A difference between the specified topology and the emulated topology may change the behaviour observed during Test Execution.

The applicable Test Definition identifies the required topology, relationships, boundaries, connection states, and permitted variation. Topology emulation establishes those conditions without requiring every element to use its production implementation.

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 the distributed topology subject to emulation.
- The specified topology identifies each participating Node and Test Resource.
- The specified topology identifies each communication path.
- The specified topology identifies the endpoints of each communication path.
- The specified topology identifies applicable logical, physical, administrative, security, jurisdictional, and network boundaries.
- The specified topology identifies required connection states and permitted topology variation.
- Each emulated topology element has a unique identity.
- The DIDO-TE establishes each required topology element and relationship before Test Execution.
- The DIDO-TE verifies the reachability and connection state of each applicable topology element.
- The DIDO-TE detects a missing, additional, substituted, misplaced, incorrectly connected, or unreachable topology element.
- The DIDO-TE records the specified and emulated topologies as Evidence.
- The DIDO-TE maintains Traceability among the topology, participating Nodes, communication paths, Test Definition, Test Execution, Evidence, and Test Results.
- A missing, additional, incorrectly connected, unsupported, or untraceable mandatory topology element constitutes nonconformance with this requirement.

Verification includes:

- Inspection of the distributed topology specified by the Test Definition
- Inspection of participating Nodes, Test Resources, communication paths, endpoints, and boundaries
- Comparison of the specified and emulated topologies
- Observation of reachability and connection-state checks
- A negative assessment with a missing or additional topology element
- A negative assessment with an incorrectly connected or unreachable topology element
- Confirmation that the DIDO-TE detects and records each topology deviation
- Inspection of topology Evidence and Traceability records
- Confirmation that each mandatory topology deviation produces a nonconformance result

Referenced By

- ENV-005b — Emulate Participating Nodes
- ENV-005c — Emulate Communication Behaviour
- ENV-005g — Emulate Communication Failures
- ENV-005h — Emulate Network Partitions
- ENV-005i — Emulate Membership and Topology Changes
- ENV-005l — Record Distributed-System Emulation
- ENV-005m — Validate Emulation Fidelity

Related Architecture Sections

- Add links to the architecture sections governing distributed topology, Nodes, communication paths, boundaries, 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:

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