

ENV-005c — Emulate Communication Behaviour

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

Statement

The [DIDO-TE](#) SHALL emulate communication behaviour in accordance with the applicable [Test Definition](#).

Derived From

- [ENV-005 — Emulate Distributed Systems](#)
- [ENV-005a — Emulate Distributed Topology](#)
- [ENV-005b — Emulate Participating Nodes](#)
- [\[DTE5\] 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

Communication behaviour affects the interactions among participating [Nodes](#) in a distributed system.

Relevant behaviour includes connection establishment, discovery, addressing, routing, message exchange, delivery guarantees, ordering, duplication handling, retry behaviour, acknowledgement, flow control, congestion response, and connection termination.

Communication behaviour differs from communication failure. This requirement governs the nominal and bounded communication behaviour expected during [Test Execution](#). ENV-005g governs the deliberate emulation of communication failures.

The applicable Test Definition identifies each communication path and specifies the behaviour required for that path.

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 communication path subject to emulation.
- Each communication path has a unique identity.
- Each communication path identifies its source, destination, direction, interface, and protocol.
- The Test Definition specifies the required discovery, connection, addressing, routing, and termination behaviour.
- The Test Definition specifies the required message-delivery, ordering, acknowledgement, retry, and flow-control behaviour.
- Each specified communication behaviour identifies its required value, state, sequence, range, or tolerance.
- The DIDO-TE applies the specified communication behaviour to each applicable communication path.
- The DIDO-TE observes actual communication behaviour during Test Execution.
- The DIDO-TE detects communication behaviour outside the specified criteria or tolerances.
- The DIDO-TE records communication-path identities, configurations, message interactions, applied conditions, measurements, and detected deviations as [Evidence](#).
- The DIDO-TE maintains [Traceability](#) among each communication behaviour, communication path, participating Node, Test Definition, Test Execution, Evidence, and [Test Results](#).
- Missing, incorrect, unsupported, unobserved, or untraceable mandatory communication behaviour constitutes nonconformance with this requirement.

Verification includes:

- Inspection of the communication paths identified by the Test Definition
- Inspection of endpoints, directions, interfaces, protocols, and applicable communication criteria
- Comparison of specified and applied communication behaviour
- Observation of discovery, connection, message exchange, acknowledgement, retry, flow-control, and termination behaviour, as applicable
- A negative assessment using incorrect message ordering or delivery behaviour
- A negative assessment using incorrect acknowledgement, retry, or flow-control behaviour
- Confirmation that the DIDO-TE detects and records each communication deviation
- Inspection of communication Evidence and Traceability records
- Confirmation that each mandatory communication deviation produces a nonconformance result

Referenced By

- [ENV-005d — Emulate Time and Clock Conditions](#)
- [ENV-005e — Emulate Resource Conditions](#)
- [ENV-005g — Emulate Communication Failures](#)
- [ENV-005h — Emulate Network Partitions](#)

- [ENV-005i — Emulate Membership and Topology Changes](#)
- [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 communication paths, protocols, message exchange, communication quality, 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-005c-emulate-communication-behaviour#Statement&noheader&nofooter&noeditbtn}}
```

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