ENV-004d — Control Time Sources

Go to ENV-004 — Provide Deterministic Test Environment

Statement

For each Test Execution, the DIDO-TE SHALL control or measure and record each time source identified by the applicable Test Definition.

Derived From

- ENV-004 — Provide Deterministic Test Environment
- [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

Time affects event ordering, scheduling, timeout behaviour, expiration, retries, message processing, transaction processing, security controls, and the interpretation of Test Results.

A distributed Test Environment may contain multiple physical, virtual, simulated, monotonic, or externally supplied time sources. Differences among these sources include offset, drift, precision, resolution, synchronisation status, adjustment behaviour, and leap-second handling.

Where the Test Definition requires a fixed, simulated, or otherwise controlled time source, the DIDO-TE supplies and maintains that source. Where controlling a time source would distort the behaviour under test, the DIDO-TE measures and records its characteristics and variation.

Explicit control or observation of time sources permits investigators to distinguish time-related environmental variation from the behaviour of the Test Object.

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 time source capable of influencing the Test Execution or Test Results.
- The controlled descriptive information specifies whether the DIDO-TE controls or measures and records each identified time source.
- Each identified time source has a unique identity and specified provider.
- Each identified time source specifies its clock type, reference, time zone, offset, precision, resolution, synchronisation method, drift tolerance, and adjustment behaviour, where applicable.
- The DIDO-TE supplies each controlled time source with the specified characteristics.
- The DIDO-TE measures each uncontrolled time source and records its applicable characteristics and variation.
- The DIDO-TE detects loss of synchronisation, excessive offset, excessive drift, unexpected adjustment, unavailable time, and substitution of an unauthorised time source.
- The DIDO-TE records time-source identity, configuration, synchronisation status, offset, drift, adjustments, detected deviations, and relevant timestamps as Evidence.
- Timestamps used for correlation identify their applicable time source and provide sufficient precision and resolution for the Test Definition.
- The DIDO-TE maintains Traceability among each time source, its controlled descriptive information, affected Test Environment elements, Test Definition, Test Execution, and Test Results.
- An unidentified, unavailable, unsynchronised, incorrectly configured, insufficiently precise, unmeasured, unrecorded, or untraceable time source constitutes nonconformance with this requirement when it falls outside the conditions permitted by the Test Definition.

Verification includes:

- Inspection of the time sources identified by the Test Definition
- Inspection of time-source identities, providers, types, references, time zones, offsets, precision, resolution, synchronisation methods, drift tolerances, and adjustment behaviour
- Observation of controlled time-source provisioning
- Observation of time-source measurement and recording
- Comparison of timestamps produced by participating Nodes and Test Resources
- Testing with loss of synchronisation, excessive offset, excessive drift, unexpected adjustment, unavailable time, or an unauthorised time source
- Confirmation that the DIDO-TE detects and records each applicable deviation
- Inspection of time-source status, measurement, adjustment, deviation, and timestamp Evidence
- Inspection of Traceability records connecting each time source to its controlled descriptive information, affected elements, Test Definition, Test Execution, and Test Results
- Confirmation that a time-source condition outside its permitted tolerance produces a nonconformance result

Referenced By

Plugin Backlinks: Nothing was found.

Related Architecture Sections

- Add links to the architecture sections governing time-source control, clock synchronisation, timestamping, event correlation, environmental monitoring, 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-004-provide-deterministic-test-environment:env-004d-control-time-sources#Statement&noheader&nofooter&noeditbtn}}
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