

TWIN-006 — Synchronize Twin Realization State

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TWIN-006 is a non-leaf requirement group governing synchronization of the state of [Twin Realizations](#) participating in a [Twin Relationship](#).

Synchronization aligns the state of represented characteristics among participating Twin Realizations according to the configured [Synchronization Parameters](#).

Synchronization operates only on characteristics represented by the Twin Relationship and their corresponding [Twin Data Mappings](#). The availability of additional data does not extend the scope of synchronization.

Synchronization does not, by itself, establish [Data Source](#) eligibility, [Source Selection](#), semantic authority, or the [Fidelity Criteria](#) governing assessment of correspondence.

Conformance is assessed against the individual leaf requirements listed below. TWIN-006 does not establish a separate conformance obligation.

Requirements

Requirement ID	Requirement Title	Purpose
TWIN-006a	Synchronize State Between Twin Realizations	Align the state of represented characteristics among participating Twin Realizations.
TWIN-006b	Limit Synchronization to Represented Characteristics	Prevent synchronization from modifying characteristics outside the scope of the Twin Relationship.
TWIN-006c	Apply Synchronization Parameters	Perform synchronization according to the configured Synchronization Parameters.
TWIN-006d	Detect Synchronization Failure	Detect when synchronization does not satisfy the configured Synchronization Parameters.

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Source

- [\[DTE1\] U.S. Patent Application US20220237111A1](#), virtual and physical Twin Node concepts, modification of Twin Nodes, baseline test results, comparison of results, and validation
- [\[DTE2\] Non-Traditional BAA Submission](#), Digital Twin concepts, real-time monitoring, scenario testing, integration, and Twin Nodes Selection
- [\[DTE9\] Distributed Immutable Data Object Reference Architecture \(DIDO-RA\)](#), Digital Twin, distributed data, DDS publish-subscribe, and Quality of Service concepts

Rationale

A [Twin Relationship](#) may require the state of one or more [Twin Realizations](#) to remain aligned for selected represented characteristics.

TWIN-003g configures the [Synchronization Parameters](#) that define the required synchronization behavior. TWIN-006 governs execution of synchronization according to those configured parameters.

Synchronization operates on the state determined for participating Twin Realizations and the semantic correspondence established by the applicable [Twin Data Mappings](#).

Limiting synchronization to represented characteristics prevents synchronization activity from modifying unrelated characteristics that happen to be observable or technically accessible.

Explicit detection of synchronization failure prevents a Twin Relationship from being treated as synchronized when the configured synchronization conditions have not been satisfied.

Synchronization remains distinct from fidelity assessment. Synchronization governs alignment of state according to configured parameters, while [Fidelity Criteria](#) govern the acceptable degree of correspondence used during comparison or Validation.

Applies To

- [DIDO-TE](#)
- [Twin Identity](#)
- [Twin Relationship](#)
- [Twin Realization](#)
- [Twin Data Mapping](#)
- [Data Source](#)
- [Source Selection](#)
- [Synchronization Parameter](#)
- [Fidelity Criterion](#)
- [Configuration](#)
- [Quality of Service](#)
- [Test Execution](#)

Traceability

- [C.3.3 Twin Node Requirements](#)
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ConOps Relationship

This requirement group supports synchronization of represented state among Twin Realizations after the Twin Relationship, Twin Data Mappings, Data Sources, Source Selection criteria, communication characteristics, Quality of Service characteristics, and Synchronization Parameters have been configured.

Synchronization may occur before or during Test Execution according to the governing Configuration and Test Definition.

The resulting synchronized state supports simulation, comparison, Validation, monitoring, and evidence-producing activities.

Delivery Phase

TBD

Requirement Status

Draft

Notes for Editors

TWIN-006 is a non-leaf requirement group and does not contain an independent normative Statement or Verification section.

The explicit child links under Contents remain while the subordinate requirement pages are being created and reviewed. After all child pages exist, you may remove the explicit links because the indexmenu automatically discovers them.

The displayed title is *Synchronize Twin Realization State*. The existing namespace `twin-006-synchronize-twin-state` remains unchanged to preserve the stable URI.

The architecture does not define *Twin State* as a separate controlled term. State is treated as a

characteristic of a Twin Realization, consistent with how the Node requirements treat state.

TWIN-003g governs Configuration of Synchronization Parameters. TWIN-006 governs execution of synchronization according to those parameters. Do not duplicate Synchronization Parameter configuration requirements in this group.

Synchronization does not establish Data Source eligibility, Source Selection, semantic authority, or Fidelity Criteria. Those concerns are governed independently.

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