MO-006d — Lifecycle Transition Execution

Go to MO-006 — Infrastructure Lifecycle Management

Statement

Crucible SHALL execute each Operational Lifecycle transition allocated to Crucible when the applicable transition conditions are satisfied.

Derived From

This requirement derives from:

- MO-006 — Infrastructure Lifecycle Management

The Original Requirement states:

> *The system SHALL support infrastructure lifecycle management from initial deployment through retirement.*[C1]

MO-006d preserves the lifecycle-management intent of the Original Requirement by requiring Crucible to execute the Operational Lifecycle transitions allocated to it.

The separate requirements derived from MO-006 address:

- MO-006a — Operational Lifecycle Assignment
- MO-006b — Operational Lifecycle Initiation
- MO-006c — Current Lifecycle State Determination
- MO-006e — Infrastructure Environment Retirement

Assessment

The Original Requirement refers to infrastructure lifecycle management but does not identify the lifecycle-transition behavior performed by Crucible.

Without an explicit lifecycle-transition requirement, an evaluator cannot reliably determine:

- Which transitions Crucible executes
- Which transitions an external actor or system executes
- The source state applicable to a transition
- The target state applicable to a transition
- The conditions that permit transition execution
- The behavior required when transition conditions are not satisfied
- The behavior required when transition execution fails

- The Evidence required to demonstrate transition execution

The phrase **lifecycle management** does not identify:

- The transition allocated to Crucible
- The Infrastructure Environment subject to the transition
- The current lifecycle state
- The intended target lifecycle state
- The applicable transition conditions
- The transition result
- The completion criteria
- The failure criteria

MO-006d:

- Identifies Crucible as the responsible actor
- Limits the requirement to transitions allocated to Crucible
- Requires satisfaction of the applicable transition conditions before execution
- Separates transition execution from lifecycle assignment, lifecycle initiation, current-state determination, and Retirement
- Avoids the ambiguous alternative **performs or coordinates**
- Leaves transitions allocated to other actors or systems outside the scope of this requirement

Rationale

An Operational Lifecycle transition changes an Infrastructure Environment from one lifecycle state to another lifecycle state.

A lifecycle transition can include:

- Validation
- Activation
- Entry into operation
- Entry into maintenance
- Configuration change
- Upgrade
- Recovery
- Restoration
- Rollback
- Compliance reassessment
- Entry into Retirement Pending
- Retirement

The assigned Operational Lifecycle defines:

- The available lifecycle states
- The permitted transitions
- The source state for each transition
- The target state for each transition
- The transition conditions

- The transition completion criteria
- The transition failure criteria
- The actor or system responsible for each transition

Transition allocation prevents this requirement from implying that Crucible executes every transition in every Operational Lifecycle. An external operator, approval authority, orchestration service, security authority, or other system can remain responsible for transitions not allocated to Crucible.

Transition conditions can include:

- Current lifecycle state
- Approval status
- Infrastructure Environment status
- Infrastructure Baseline status
- Validation results
- Security assessment results
- Compliance assessment results
- Availability of required resources
- Completion of preceding activities
- Absence of unresolved blocking failures
- Authorization by the responsible authority

Lifecycle Transition Execution supports:

- Controlled movement between lifecycle states
- Prevention of invalid transitions
- Consistent enforcement of transition conditions
- Identification of transition completion
- Identification of transition failure
- Recovery from failed transitions
- Preservation of Provenance
- Maintenance of Traceability
- Generation of auditable Evidence

Satisfaction of the transition conditions permits Crucible to execute the transition. Satisfaction of the transition conditions does not establish successful completion of the transition. The transition result determines whether the Infrastructure Environment enters the intended target state.

A failed or incomplete transition does not establish successful entry into the intended target state. MO-006c governs determination of the current lifecycle state following transition execution.

This requirement does not assign the Operational Lifecycle. MO-006a establishes lifecycle assignment.

This requirement does not establish the first lifecycle stage. MO-006b establishes lifecycle initiation.

This requirement does not determine the current lifecycle state. MO-006c establishes current lifecycle state determination.

This requirement does not establish the specific Retirement transition. MO-006e establishes Infrastructure Environment Retirement.

Applies To

This requirement applies to:

- Crucible
- Infrastructure Environments
- Operational Lifecycles
- Operational Lifecycle states
- Operational Lifecycle transitions
- Transition allocations
- Transition conditions
- Transition completion criteria
- Transition failure criteria
- Transition requests
- Transition results
- Transition records
- Infrastructure Baselines
- Infrastructure Deployment records
- Configuration records
- Validation results
- Security assessment results
- Compliance assessment results
- Approval records
- Failure records
- Exception records
- Evidence
- Provenance
- Traceability

Verification

Verification confirms that:

1. The Infrastructure Environment is identified
2. The assigned Operational Lifecycle is identified
3. The current lifecycle state is identified
4. The requested lifecycle transition is identified
5. The requested transition belongs to the assigned Operational Lifecycle
6. The requested transition is allocated to Crucible
7. The applicable transition conditions are identified
8. The applicable transition conditions are satisfied before execution begins
9. Crucible executes the requested transition
10. The transition produces an identified result
11. The transition result supports determination of the resulting lifecycle state
12. The transition record preserves the required Evidence, Provenance, and Traceability

Verification includes:

- Infrastructure Environment inspection
- Operational Lifecycle assignment inspection
- Current lifecycle-state inspection
- Lifecycle-transition inspection
- Transition-allocation inspection
- Transition-condition inspection
- Transition-request inspection
- Valid-transition testing
- Invalid-transition testing
- Unsatisfied-condition testing
- Transition-execution testing
- Transition-completion testing
- Transition-failure testing
- Transition-result inspection
- Resulting lifecycle-state inspection
- Evidence inspection
- Provenance inspection
- Traceability inspection

The verification record identifies:

1. The Infrastructure Environment
2. The assigned Operational Lifecycle
3. The Operational Lifecycle identifier
4. The Operational Lifecycle revision
5. The current lifecycle state
6. The requested lifecycle transition
7. The source lifecycle state
8. The intended target lifecycle state
9. The transition allocation
10. The applicable transition conditions
11. The result of each transition-condition evaluation
12. The transition start date and time
13. The transition completion date and time
14. The transition result
15. The resulting lifecycle-state determination
16. Each identified failure or exception
17. The observed result
18. The generated Evidence

Requirements Realized By

This requirement is realized by:

- OR-001 — Operational Roles
- OR-002 — Deployment Environments
- OR-004 — Concurrent Environment Management
- OR-005 — Distributed Environment Management
- FR-CFG-001 through FR-CFG-005
- FR-DEP-001 through FR-DEP-007

- FR-MC-001 through FR-MC-005
- FR-COMP-001 through FR-COMP-010
- FR-DSO-001 through FR-DSO-006

Related Architecture Sections

- 5. Descriptions, Composition, and Baselines
- 7. Infrastructure and Deployment
- 9. Compliance and Security
- 10. Reproducibility, Provenance, and Traceability

Referenced By

The following pages reference this requirement:

- MO-006a — Operational Lifecycle Association
- MO-006b — Infrastructure Lifecycle Initiation
- MO-006c — Infrastructure Lifecycle State Recording
- MO-006e — Infrastructure Environment Retirement
- Annex D: Requirements Traceability

Delivery Phase

Phase 1 and subsequent phases

Implementation Status

Not Assessed

Implementation status requires verification that the current Crucible implementation executes each Operational Lifecycle transition allocated to Crucible when the applicable transition conditions are satisfied.

Requirement Status

Draft

This requirement derives from MO-006 in the Crucible System Requirements Specification, Version 1.1 Draft.

Notes for Editors

This requirement page should retain the stable requirement identifier `MO-006d`.

This page is a leaf requirement page and omits a trailing `:start` from its namespace.

Changes to the Statement should preserve execution of Operational Lifecycle transitions allocated to Crucible after satisfaction of the applicable transition conditions.

The transition definition should identify:

- The Operational Lifecycle identifier
- The Operational Lifecycle revision
- The transition identifier
- The source lifecycle state
- The intended target lifecycle state
- The actor or system allocated responsibility for the transition
- The applicable transition conditions
- The transition completion criteria
- The transition failure criteria
- The applicable recovery or rollback behavior
- The associated Provenance
- The associated Traceability
- The supporting Evidence

Material changes should receive review and should update the related verification criteria, requirements realization, related architecture sections, and source records.

To reference this requirement Statement from another wiki page, insert:

```
{{section>dido:02-crusible:99-annexes:annex-c-requirements:01-mission-objectives:mo-006:mo-006d#Statement&noheader&nofooter&noeditbtn}}
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