Runtime Endurance Test v1.0

Cyber-Physics Enterprise Trial Edition

Runtime Endurance and Resilience Validation Protocol

Version: 1.0

Classification: Evaluation Documentation

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1. Purpose

This document defines the official endurance-testing methodology for the Cyber-Physics Enterprise Trial Edition.

The objective is to evaluate runtime stability, operational continuity, governance integrity, and recovery capability under sustained enterprise operation.

The objective is not to measure threat detection performance.

The objective is to validate runtime survivability.

2. Test Philosophy

The Cyber-Physics Enterprise Trial Edition is intended to operate as a continuously running governance runtime.

Accordingly, the primary engineering question becomes:

“Can the runtime remain stable and predictable under prolonged enterprise operation?”

This protocol is designed to answer that question.

3. Validation Categories

The endurance program consists of:

- Startup Validation
- Restart Validation
- Continuous Runtime Validation
- Recovery Validation
- Kubernetes Resilience Validation
- Governance Integrity Validation

4. Test A — Cold Start Validation

Objective

Verify deterministic startup behavior.

Procedure

1. Deploy runtime.
2. Execute startup validation sequence.
3. Verify runtime initialization.
4. Verify DGEC initialization.

Expected Result

- Runtime starts successfully.
- No initialization failures occur.
- Governance engine becomes operational.

5. Test B — Restart Endurance Validation

Objective

Validate runtime survivability across repeated restart cycles.

Procedure

Execute:

Start Runtime → Stop Runtime → Restart Runtime

Repeated fifty (50) times.

Verification

After each cycle:

- Runtime startup successful.
- Runtime enters operational state.
- Governance engine operational.
- DGEC accessible.

Success Criteria

50 successful restart cycles.

Zero unrecoverable failures.

6. Test C — Continuous 24-Hour Runtime

Objective

Validate short-term operational stability.

Duration

24 Hours

Monitoring

Record:

- CPU utilization
- Memory utilization
- Container status
- Runtime status
- DGEC status

at regular intervals.

Success Criteria

- No crash.
- No deadlock.
- No governance interruption.

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7. Test D — Continuous 7-Day Runtime

Objective

Validate medium-duration runtime stability.

Duration

7 Days

Monitoring

Every six hours:

- Runtime health
- Resource utilization
- Governance continuity
- DGEC status

Success Criteria

- Continuous operation maintained.
- No critical failures detected.
- Governance continuity preserved.

8. Test E — DGEC Integrity Validation

Objective

Verify governance evidence integrity after prolonged operation.

Procedure

1. Stop runtime.
2. Execute ledger verification process.
3. Validate hash-chain continuity.

Success Criteria

- No chain corruption.
- No hash mismatch.
- Full evidence continuity preserved.

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9. Test F — Crash Recovery Validation

Objective

Evaluate runtime recovery following unexpected termination.

Procedure

1. Generate governance activity.
2. Force runtime termination.
3. Restart runtime.

Verification

Verify:

- Runtime recovery.
- Governance continuity.
- DGEC accessibility.

Success Criteria

Recovery completed without manual reconstruction.

10. Test G — Kubernetes Pod Recreation Validation

Objective

Validate resilience within Kubernetes environments.

Procedure

1. Delete active pod.
2. Allow Kubernetes to recreate pod automatically.

Verification

- Successful image retrieval.
- Successful startup.
- Successful readiness validation.

Success Criteria

Runtime returns to operational state without manual intervention.

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11. Test H — OCI Distribution Validation

Objective

Validate enterprise deployment path.

Procedure

Deploy directly from:

GHCR Registry

using the official Helm package.

Success Criteria

- Successful image pull.
- Successful deployment.
- Successful runtime startup.

12. Operational Metrics

The following metrics shall be recorded:

Metric	Target
Runtime Availability	>99.9%
Startup Success Rate	100%
Restart Recovery Rate	100%
DGEC Integrity	100%
Recovery Success Rate	100%
Manual Intervention Events	0

13. Acceptance Criteria

The endurance program shall be considered successful when:

- All validation phases pass.
- Runtime continuity is maintained.
- Governance continuity is preserved.
- DGEC integrity remains verifiable.
- Recovery capability is demonstrated.

14. Final Objective

The objective of the endurance program is to establish confidence that Cyber-Physics can operate continuously as a deterministic operational governance runtime within enterprise environments.