

Technical Progress Addendum v1.0

Cyber-Physics Enterprise Trial Edition

Technical Progress Update Following Initial Executive Submission

Version: 1.0

Classification: Evaluation Documentation

1. Purpose

This document provides a technical progress update following the initial submission of the Cyber-Physics Executive Summary.

Its purpose is to summarize major engineering, packaging, deployment, and operational developments achieved during the maturation of the Cyber-Physics Enterprise Trial Edition.

This document should be read as a supplement to previously provided executive and architectural materials.

2. Executive Summary

Since the original executive submission, Cyber-Physics has evolved from a conceptual research initiative into a structured Enterprise Trial Architecture designed for controlled evaluation within modern enterprise environments.

The primary focus of development has been:

- Runtime operationalization
- Enterprise packaging
- Kubernetes compatibility
- Governance persistence
- Evaluation readiness

The objective remains unchanged:

To evaluate deterministic operational governance as a complementary architectural layer operating alongside existing cybersecurity infrastructures.

3. Major Architectural Milestones

The following milestones have been completed.

Governance State Machine

Completed.

The Cyber-Physics Governance State Machine has been formalized into a deterministic operational model supporting explicit governance transitions.

Operational States:

OBSERVE

ALERT

GOVERNANCE

STABILIZED

The state model now serves as the primary operational framework for runtime governance activities.

Deterministic Governance Evidence Chain (DGEC)

Completed.

DGEC has been formalized as the governance evidence layer of the runtime.

Key capabilities include:

- Governance traceability
- Hash-chain verification
- Governance continuity
- Evidence preservation

DGEC provides a deterministic record of governance actions and runtime transitions.

Replay Architecture

Completed.

A replay-oriented architecture has been established to support:

- Governance reconstruction
- Runtime validation
- Post-event analysis
- Evaluation transparency

The replay model complements DGEC by enabling deterministic review of governance activity.

4. Runtime Packaging Progress

One of the most significant developments since the initial submission has been the transition from architecture design to runtime packaging.

OCI Runtime Packaging

Completed.

Cyber-Physics is now packaged as a containerized runtime suitable for enterprise deployment workflows.

Key objectives achieved:

- Runtime encapsulation
- Portable deployment model
- Kubernetes compatibility
- Operational isolation

Compiled Runtime Protection

Completed.

Core governance components have been transitioned into protected compiled runtime modules.

This model enables:

- Technical evaluation
- Operational validation
- Intellectual property protection

while preserving deployment flexibility.

5. Build Factory Implementation

Completed.

A dedicated build pipeline has been established using:

- GitHub Actions
- Private Source Repository
- Automated Runtime Packaging

The build system now supports repeatable generation of evaluation-ready runtime packages.

Runtime Validation Pipeline

Completed.

The build process now includes automated validation procedures.

Capabilities include:

- Runtime packaging verification
- Build integrity checks
- Runtime smoke testing
- Artifact generation

This ensures that generated runtime packages satisfy minimum operational requirements before distribution.

6. Enterprise Distribution Architecture

Completed.

A secure distribution workflow has been established.

Components include:

- Private Repository Management
- OCI Image Generation
- GitHub Container Registry (GHCR)
- Evaluation Artifact Packaging

This enables controlled distribution of evaluation assets while preserving runtime integrity.

7. Kubernetes Deployment Assets

Completed.

The Enterprise Trial Edition now includes:

- Helm Charts
- Deployment Templates
- Network Policies
- Runtime Configuration Assets

These assets support deployment into Kubernetes-based environments while maintaining runtime isolation principles.

8. Security and Runtime Isolation

Completed.

The runtime architecture now incorporates:

- Container isolation
- Non-root execution
- Runtime separation
- Governance boundary enforcement

The deployment model is designed to minimize interaction with host infrastructure while preserving evaluation visibility.

9. Documentation Expansion

Completed.

The documentation portfolio has expanded significantly since the original executive submission.

Documentation now includes:

- Governance State Model
- DGEC Specification
- API Specification
- Security Architecture Documentation
- Deployment Documentation
- Runtime Validation Documentation
- Enterprise Trial Documentation
- Compliance-Oriented Documentation

10. Current Engineering Status

Current status:

Completed:

- ✓ Governance State Machine
- ✓ DGEC Architecture
- ✓ Replay Architecture
- ✓ OCI Runtime Packaging
- ✓ Compiled Runtime Protection
- ✓ GitHub Build Factory
- ✓ Runtime Smoke Testing
- ✓ GHCR Distribution
- ✓ Helm Packaging
- ✓ Kubernetes Deployment Assets
- ✓ Evaluation Documentation Package

11. Current Validation Position

The project has now entered the validation preparation phase.

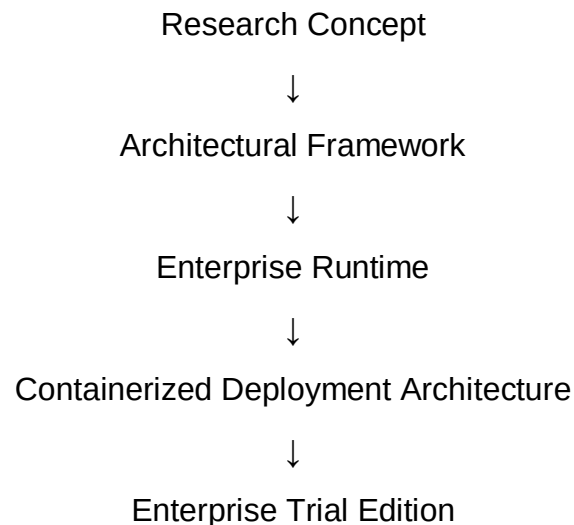
Future validation activities include:

- Runtime endurance testing
- Operational stability assessment
- Restart recovery validation
- Kubernetes resilience validation
- Governance continuity verification

These activities are intended to establish confidence in long-duration runtime behavior under enterprise deployment conditions.

12. Strategic Outcome

Cyber-Physics has progressed from:



The current focus is no longer on architectural construction but on operational validation and runtime stability assessment.

13. Closing Statement

The Cyber-Physics Enterprise Trial Edition now represents a structured and deployable evaluation environment intended to support technical assessment of deterministic operational governance within enterprise infrastructures.

The architecture remains focused on complementing existing cybersecurity ecosystems while maintaining operational independence, governance traceability, and evidence continuity.

Cyber-Physics Research Initiative

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