

The AI OSI Stack: Version 4 (Expanded)

A Governance Blueprint for Scalable and Trusted AI

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- **Version:** 4.0 (Blueprint Integration Release)
- **Date:** November 2025

Overview

The AI OSI Stack v4 (Expanded) restores the canonical governance architecture developed by Daniel P. Madden to unite technical controls, ethical guardrails, and institutional accountability across the lifecycle of intelligent systems. The stack is the anchor of the **AI Governance Trinity** the synthesis of the AI OSI Stack, Persona Architecture, Epistemology by Design, and the AI Epistemic Infrastructure Protocol (AEIP) ensuring that reasoning integrity, role accountability, and evidence generation advance together. Version 4 reasserts the seven-layer architecture as a living bridge between compute substrates, socio-technical oversight, and public legitimacy, explicitly binding operational proof to normative commitments.

The historical progression from v1 through v3 culminates here. **Version 1** established the layered metaphor and introduced integrity ledgers for AI services. **Version 2** expanded into Persona Architecture and affective constraint design, embedding role-specific accountability. **Version 3** incorporated Epistemology by Design and AEIP alignment, demonstrating how reasoning provenance could be transported as a protocol. **Version 4 (Expanded)** consolidates these trajectories into a unified, jurisdiction-neutral standard proposal that harmonizes global regulatory requirements with executable governance.

Purpose and Scope

This repository serves simultaneously as a conceptual reference and an executable demonstration environment. The v4 release integrates the prior frameworks AI OSI, Persona Architecture, Epistemology by Design, and AEIP into one authoritative standard proposal. It provides policy architects, regulators, and technical stewards with a coherent blueprint for designing, validating, and disclosing accountable AI systems. All materials are delivered for offline study, conformance testing, and future adoption by public institutions, private sector alliances, and multilateral governance bodies.

Canonical Documents

The following artifacts remain the **normative sources of truth** for AI OSI Stack v4 (Expanded):

- `source/AI_OSI_Stack_v4_Test_Integrated.md`
- `source/AI_OSI_Stack_v4-TEST.pdf`
- `docs/Persona_Architecture.md`
- `docs/Epistemology_by_Design.md`
- `docs/AEIP_Artifact_Schema_Templates.md`

Derived materials, including this README and executable assets, SHALL reference these

canonical documents for interpretive authority.

Blueprint Implementation AI OSI Protocol Stack v4

AI OSI Protocol Stack v4 Blueprint Implementation

The **Blueprint Integration Release** introduces a structured codebase generated by the master prompt build to illustrate how the AI OSI Stack can operate as a self-contained governance engine. Key directories include:

- `/protocol/` AEIP transport engine, governance ledger node, registry services, and deterministic test vectors.
- `/schemas/` machine-readable artifact definitions for Interpretive Trace Packages (ITP), Decision Rationale Records (DRR), Governance Disclosure Statements (GDS), Oversight Action Memoranda (OAM), and Integrity Ledger Entries (ILE).
- `/src/layer18/` layer-aligned modules, validators, and persona integration hooks spanning the full seven-layer stack plus the optional civic mandate layer.
- `/tools/` command-line utilities for artifact generation, signature rehearsal, and schema validation.
- `/tests/` conformance and handshake verification suites covering AEIP flows, ledger provenance, and schema contracts.
- `/examples/` Jupyter notebooks demonstrating single-node and multi-node reasoning handshakes, ledger replay, and governance council exercises.

This blueprint is an **offline-first reference implementation**. It demonstrates how governance can be instantiated as executable code, enabling reproducible testing without active networks. The implementation SHALL NOT be interpreted as a production network or a live compliance service.

Key Features

- **AEIP v1 Handshake:** Implements the five-step reasoning exchange (`Intent Justify CounterSign Commit Update`) with deterministic fixtures.
- **Governance Ledger and Temporal Integrity:** Provides a local append-only ledger with temporal validity windows and replayable provenance.
- **Conformance Assurance:** Ships schema validators, artifact provenance checks, and handshake integrity tests to verify adherence to the canonical specifications.
- **Offline Execution:** Operates without external dependencies, emphasizing audit reproducibility and jurisdiction-neutral deployment.

Purpose

> This blueprint exists to demonstrate that governance itself can be executable that reasoning, provenance, and accountability can move through a stack with the same rigor as data.

Project Status and Contribution Policy

The AI OSI Stack is maintained by a single independent researcher and released for reference, study, and future standardization. No active APIs, databases, or live network services are deployed. Forks, translations, and policy adaptations are welcome under the

CC BY-SA 4.0 license provided attribution and non-derivative requirements are preserved. This integration is tagged ```v4-protocol-blueprint``` to signal continuity with prior canonical releases and the addition of the executable reference build.

Repository Structure

```text

docs/      Specifications, persona briefs, and protocol interface guides  
schemas/   JSON/YAML schema definitions for governance artifacts  
protocol/   AEIP handshake engine, ledger node, and registry configuration  
src/       Layer modules (L1L8), validators, and shared utilities  
tests/      Conformance suite for schemas, ledger flows, and layer contracts  
tools/      CLI utilities for artifact generation and validation  
examples/   Offline notebooks demonstrating reasoning handshakes  
versions/   Historical tags and integrity manifests

```

Citation

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This repository consolidates years of independent research on accountable AI design. It is released as an open blueprint for collective stewardship and future standardization.

> ## Normative Language Notice

> This specification uses normative language consistent with ISO/IEC 42010 and NIST conventions.

> SHALL denotes mandatory requirements, SHOULD denotes strong recommendations, and MAY denotes optional practices.

> Interpretations of this document must preserve authorial intent fidelity to layered accountability, epistemic integrity, and human dignity as design constraints.