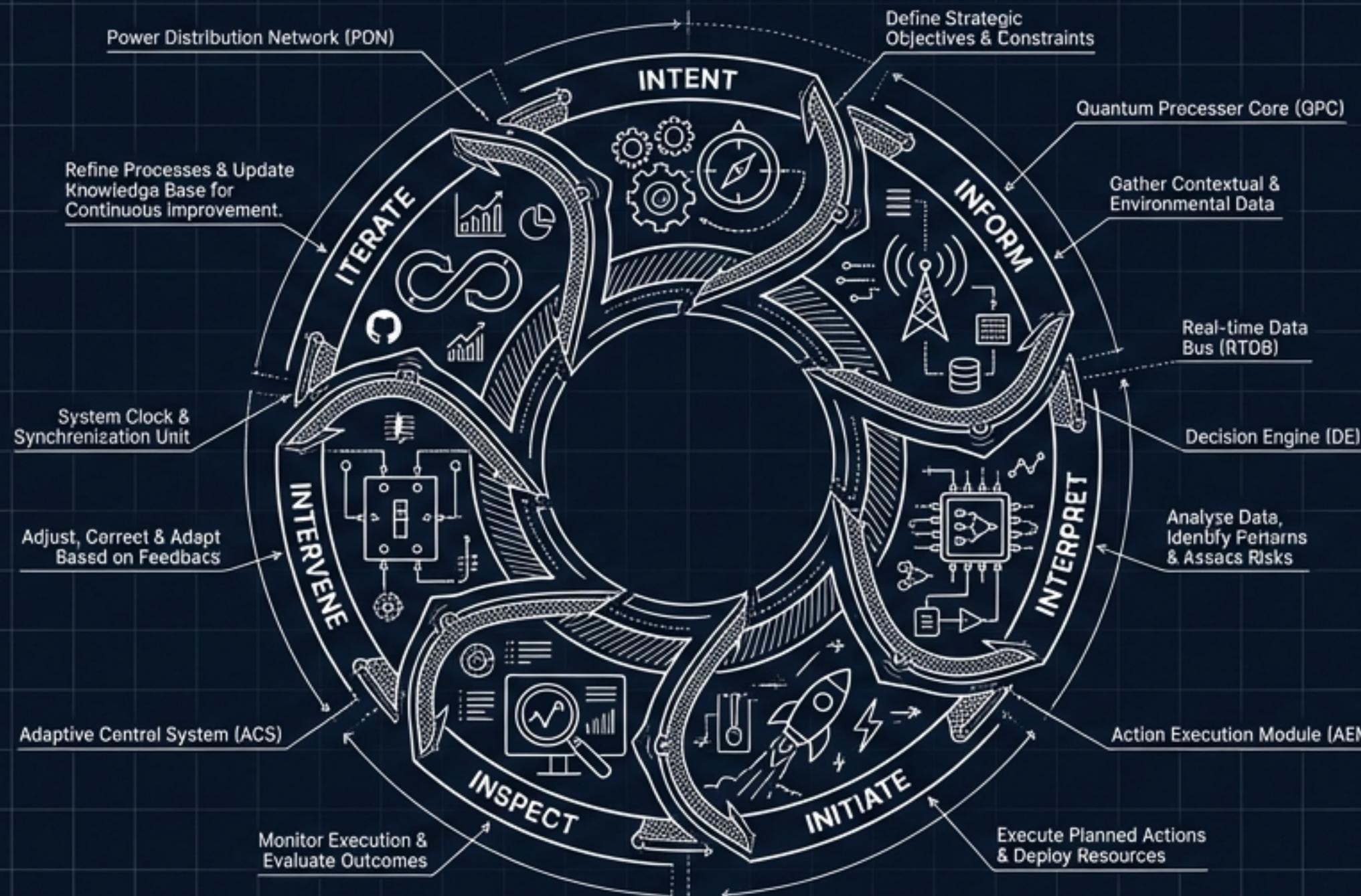


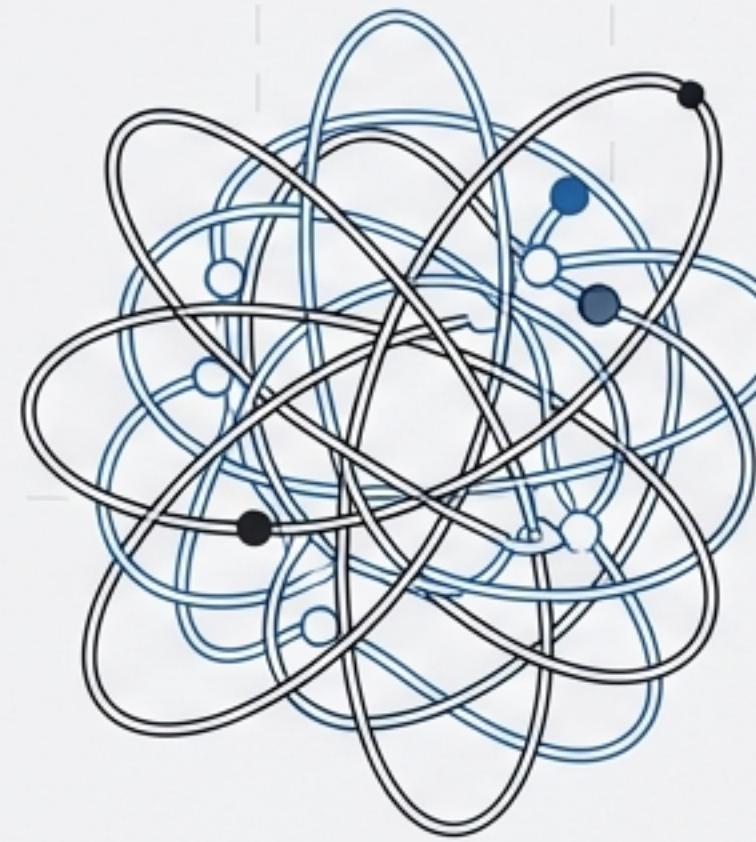
THE I-7 COGNITIVE ARCHITECTURE



A Universal Methodology for Engineering Resilient Agentic Systems

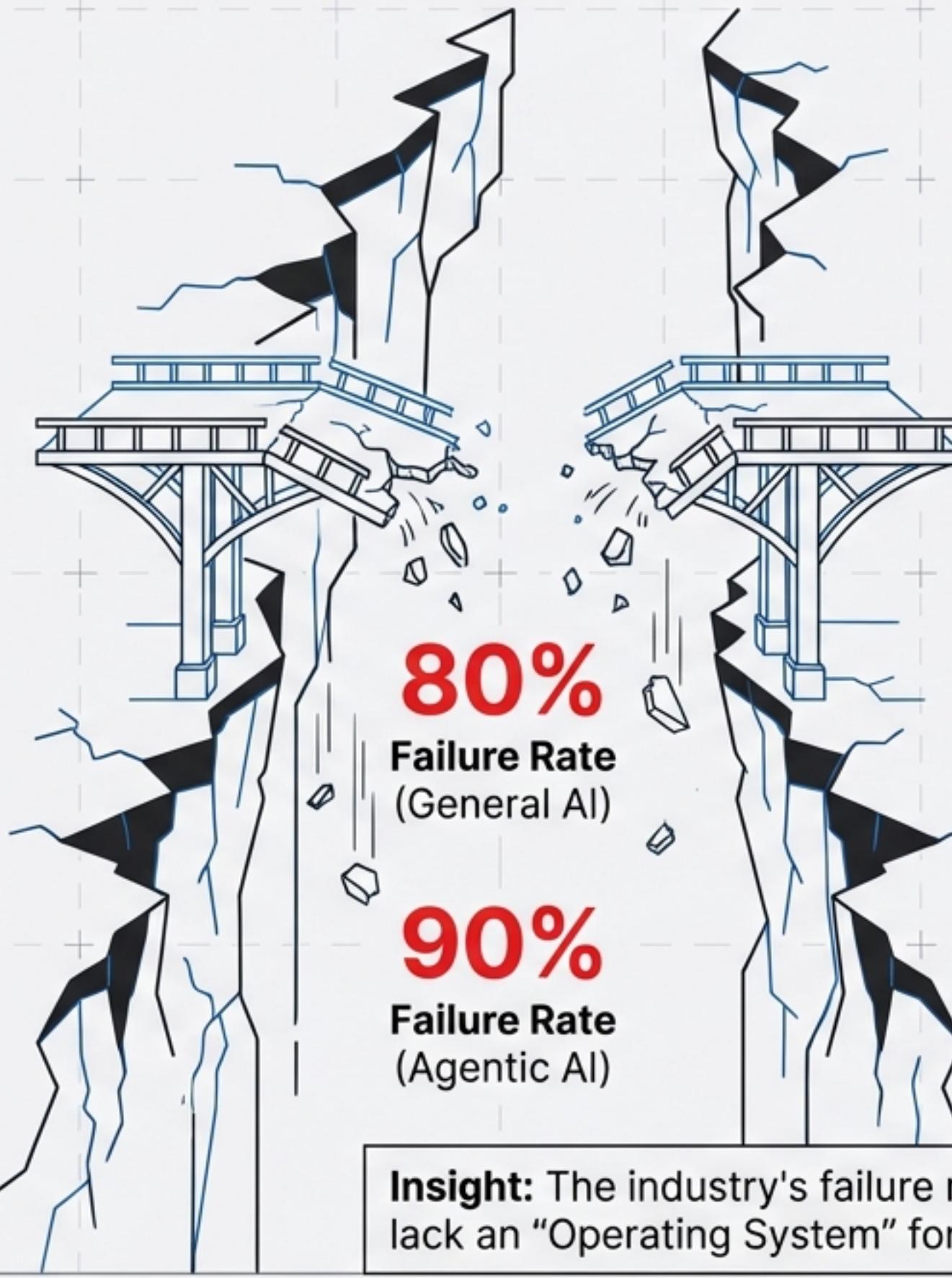
The Agentic Gap: Why 90% of Pilots Fail to Launch

PROTOTYPES

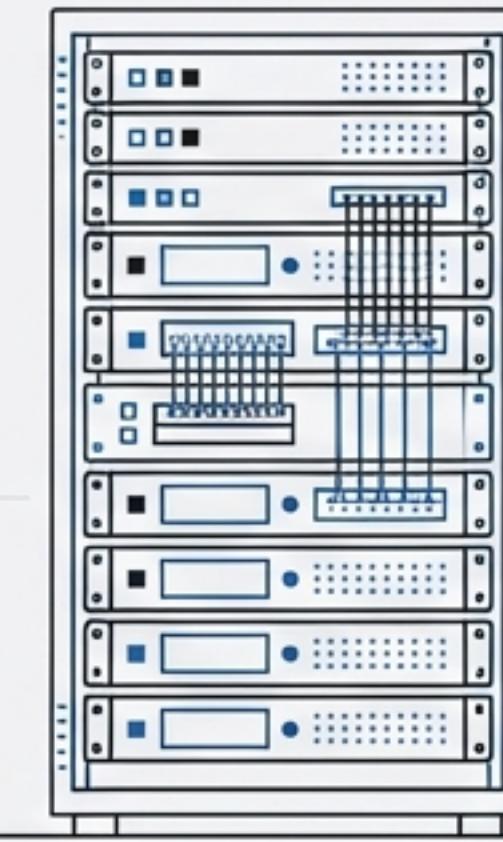


High Hype / Stochastic

- Unstructured Context
- Fragile Connectors
- Prompt-and-Pray



PRODUCTION



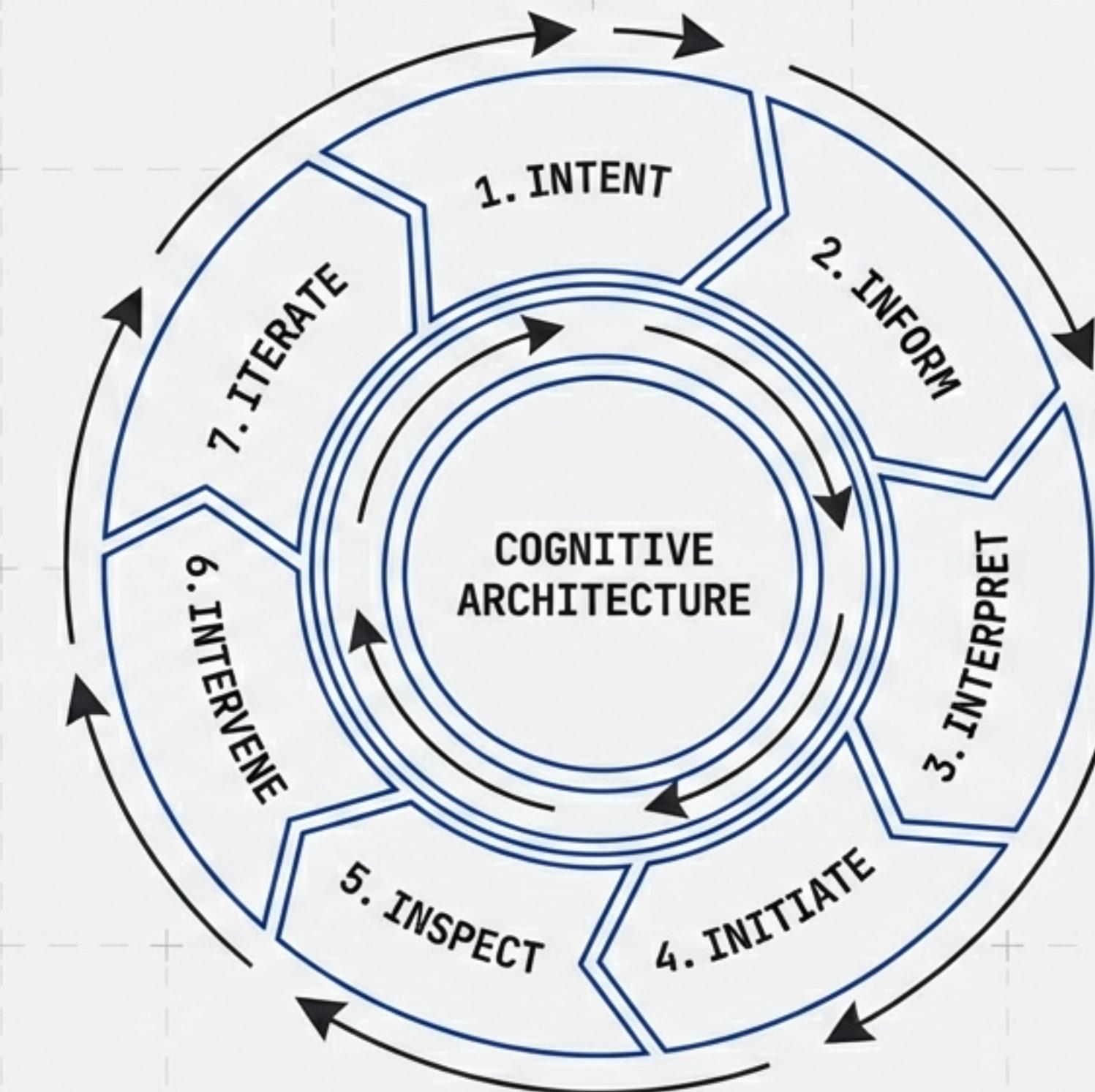
High Reliability / Deterministic

- Governance
- Observability
- State Management

Insight: The industry's failure mode is structural. Large Language Models lack an "Operating System" for memory, I/O, and permissions.

Bridging the Gulf of Execution: The Universal Cognitive Loop

- THEORETICAL FOUNDATIONS
- Donald Norman's Seven Stages of Action (Gulf of Execution)
 - The OODA Loop (Observe-Orient-Decide-Act)
 - PDCA Cycle (Continuous Quality Control)



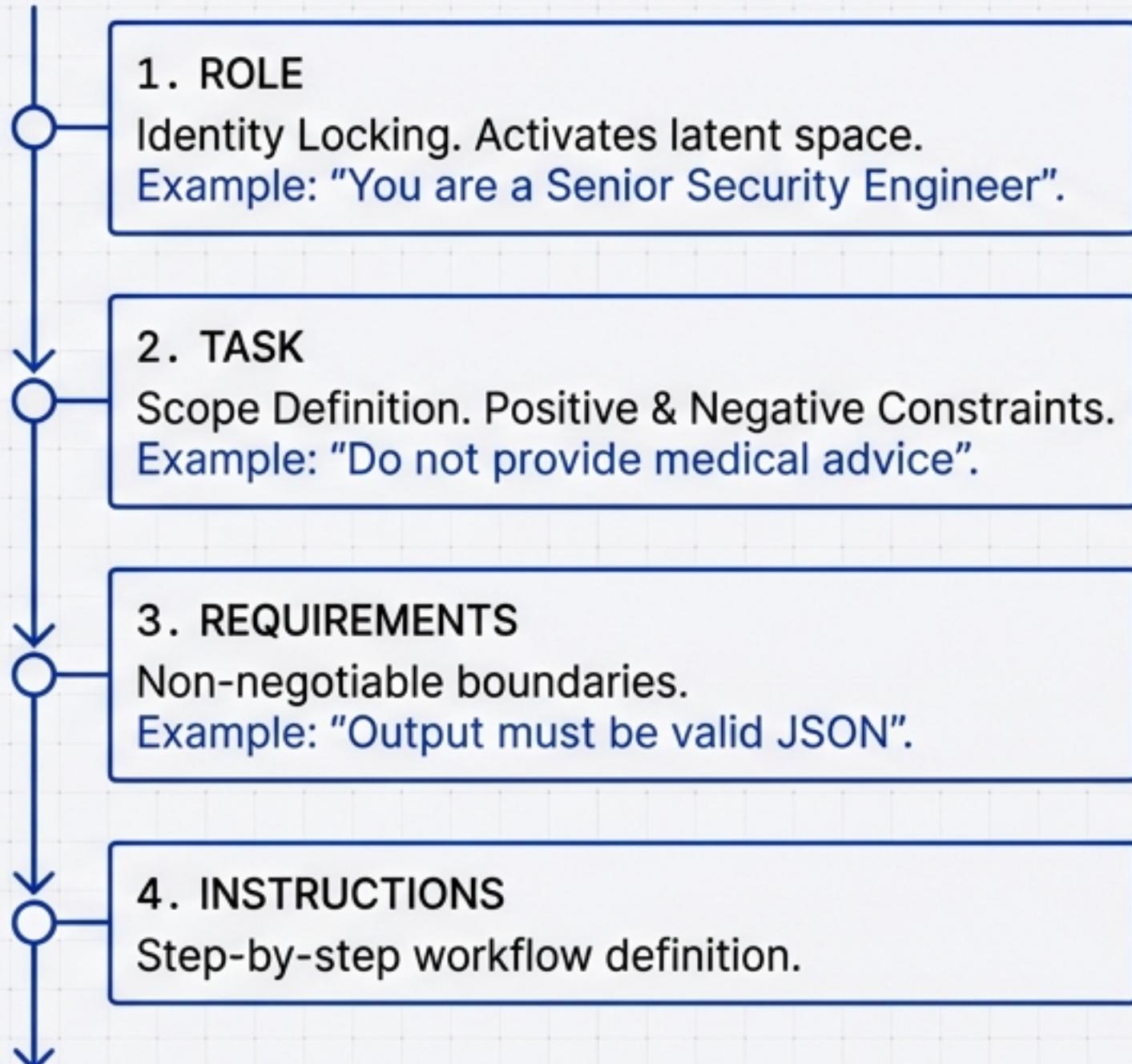
Transforms agentic activity from a stochastic 'Black Box' into seven verifiable phases of execution.

Phase I: INTENT — Governance of Purpose and Identity

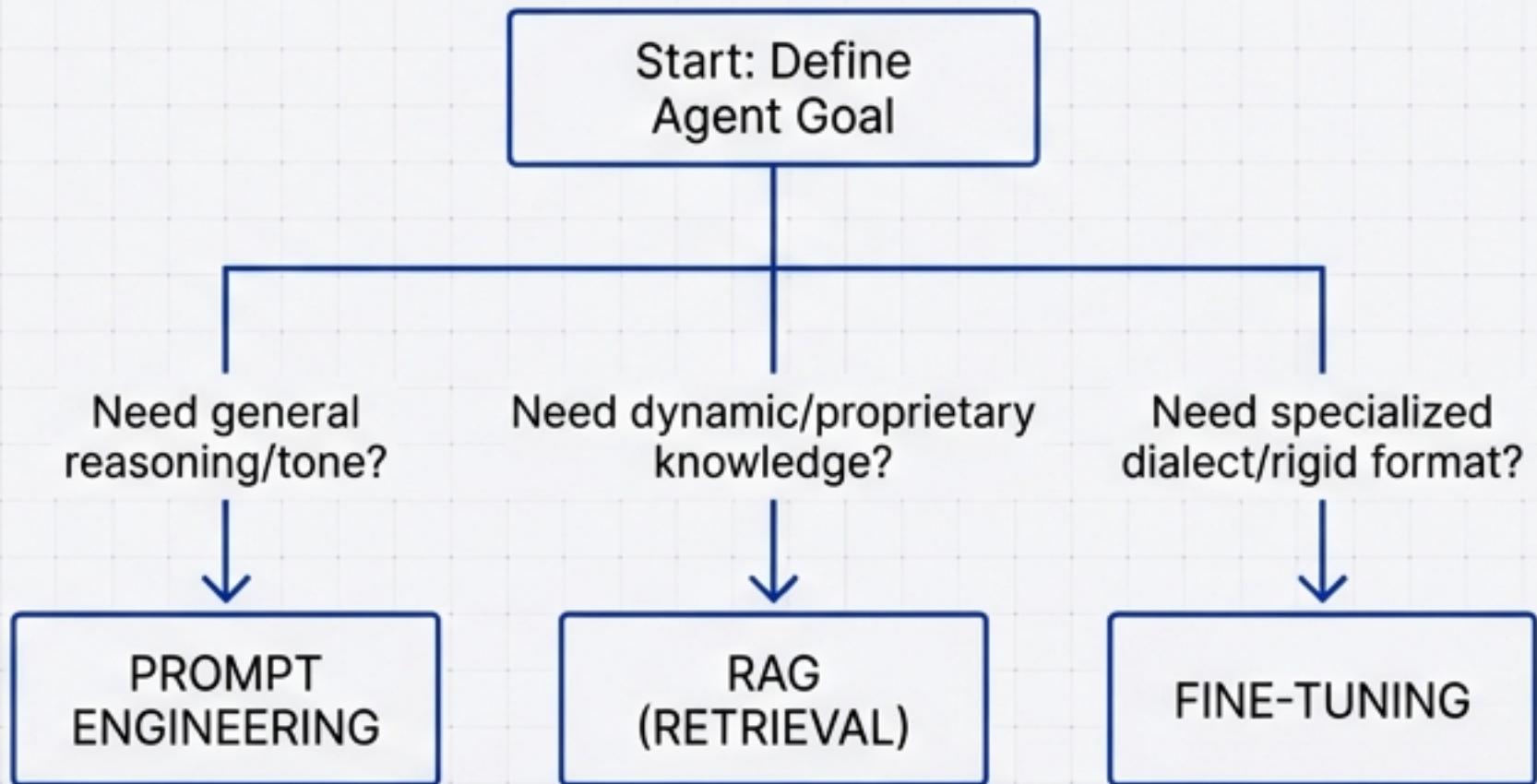
Standard INT-1:
System Prompt
Constitution

JetBrains Mono

The RTRI Framework

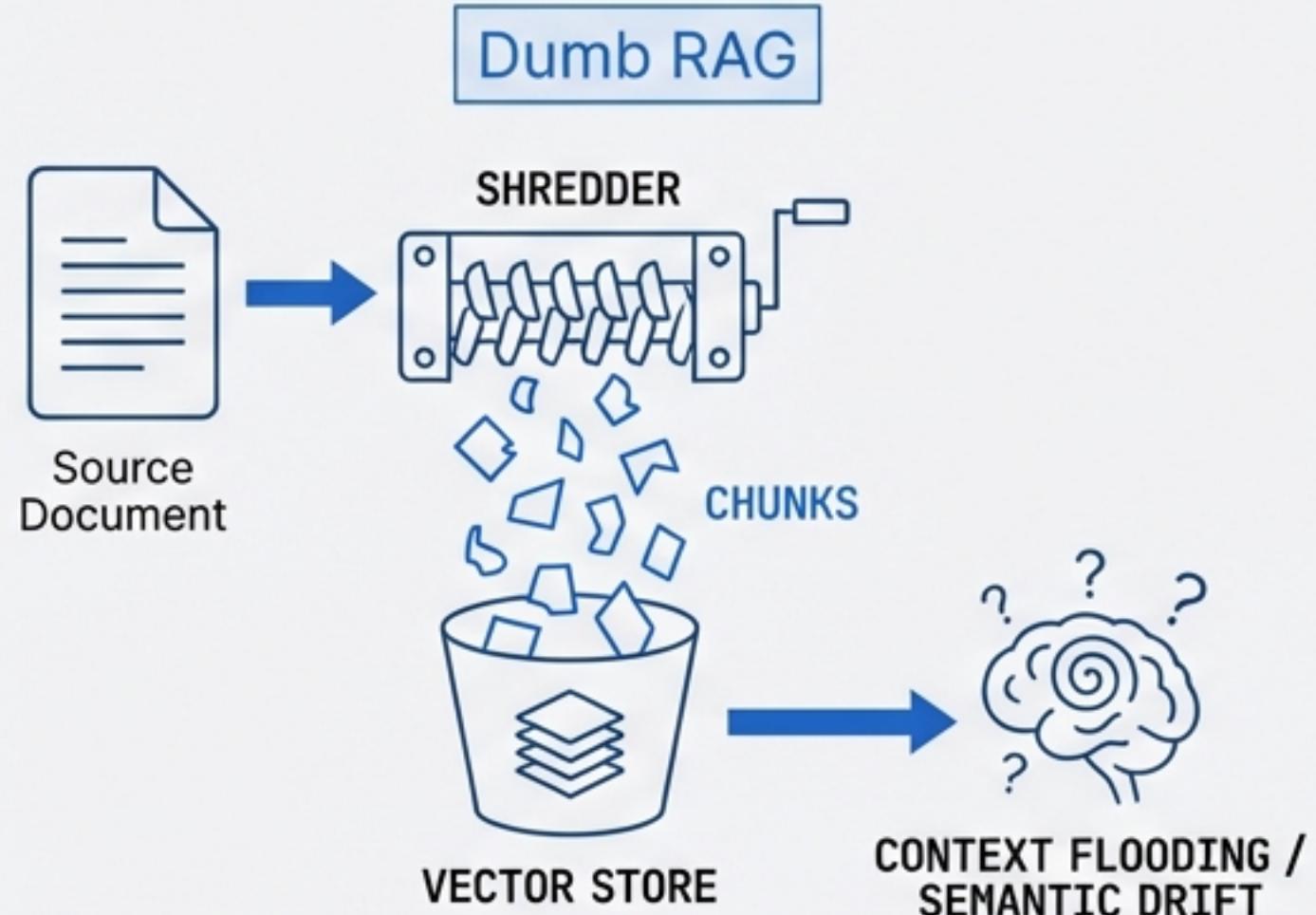


Optimization Decision Tree

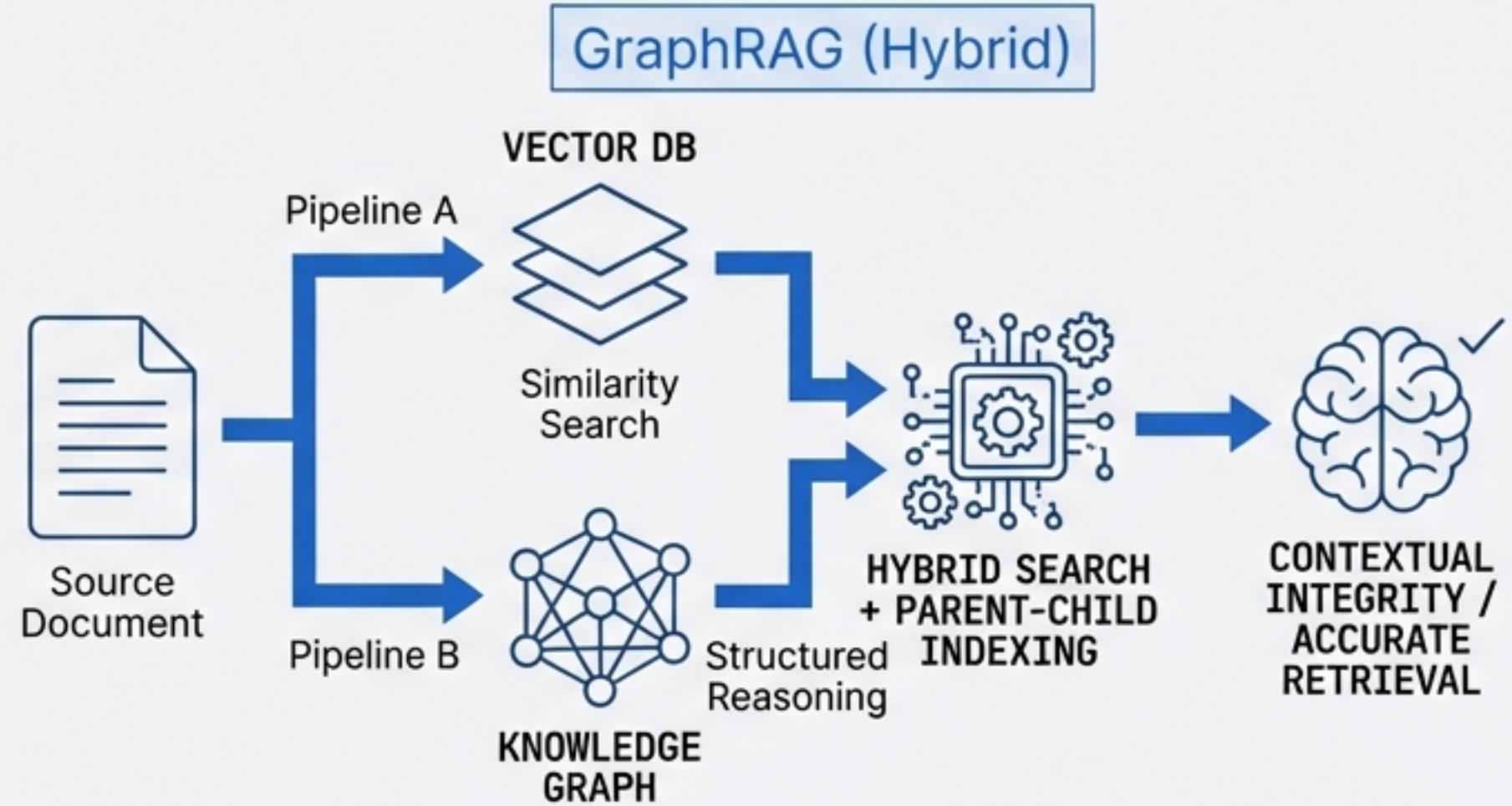


Phase II: INFORM — Solving the “Lost in the Middle” Phenomenon

The Retrieval Architecture



Random chunking leads to loss of structural context.



Preserves hierarchy and combines semantic & structured search.

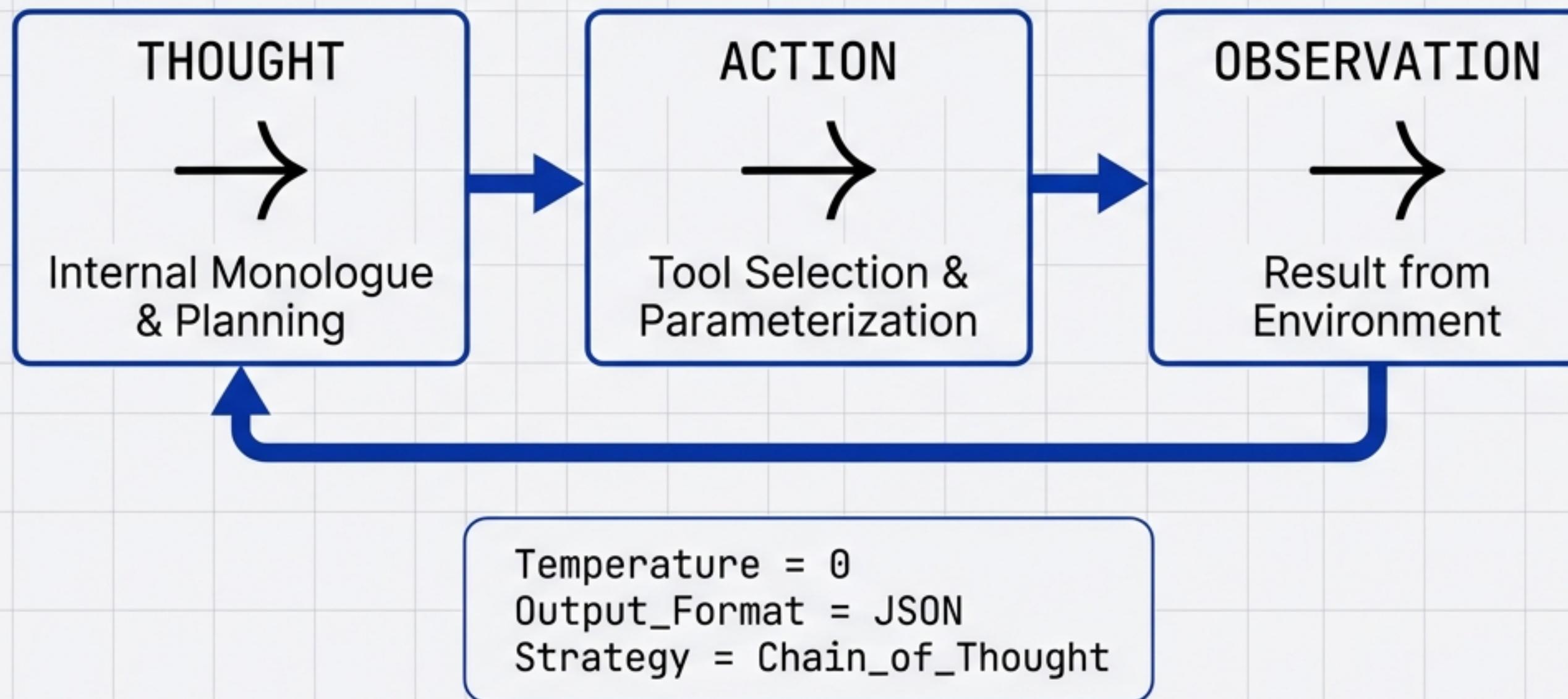
Engineering Tactics

Use Structure-Aware Splitting to preserve document hierarchy.
Combine Dense (Vector) and Sparse (Keyword) retrieval to capture both semantic meaning and exact matches.

Phase III: INTERPRET – From Text Generation to Structured Reasoning

Standard INP-1:
Reasoning Assurance

The ReAct Loop



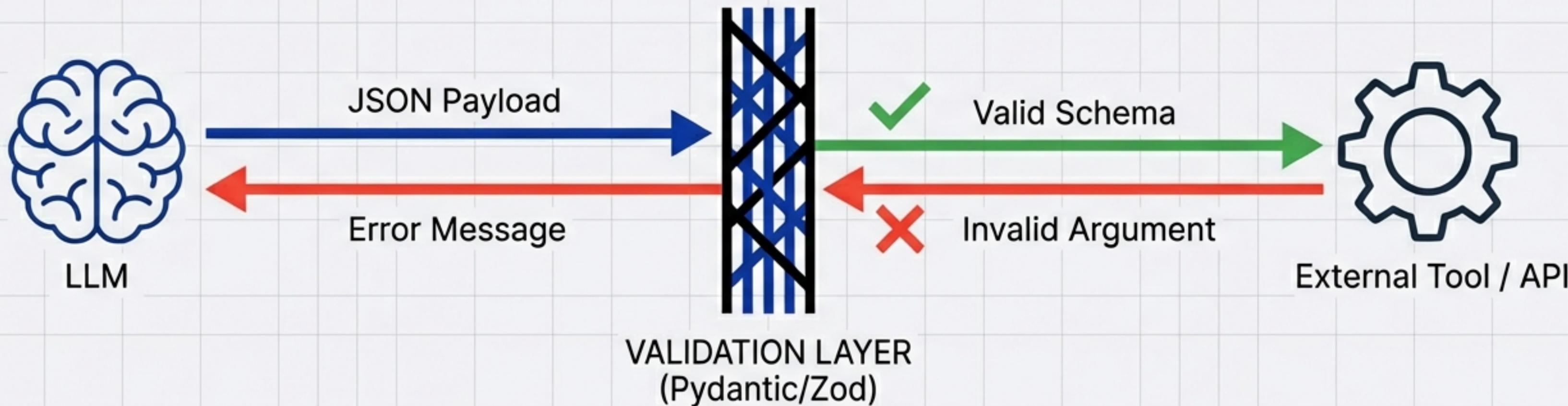
Mechanism:

The agent must output a reasoning trace ("I need to check the balance...") before acting. This forces the probabilistic model to adhere to a deterministic logical path.

Phase IV: INITIATE — Safe Execution and Tool Use

Standard INP-1:
Schema Engineering

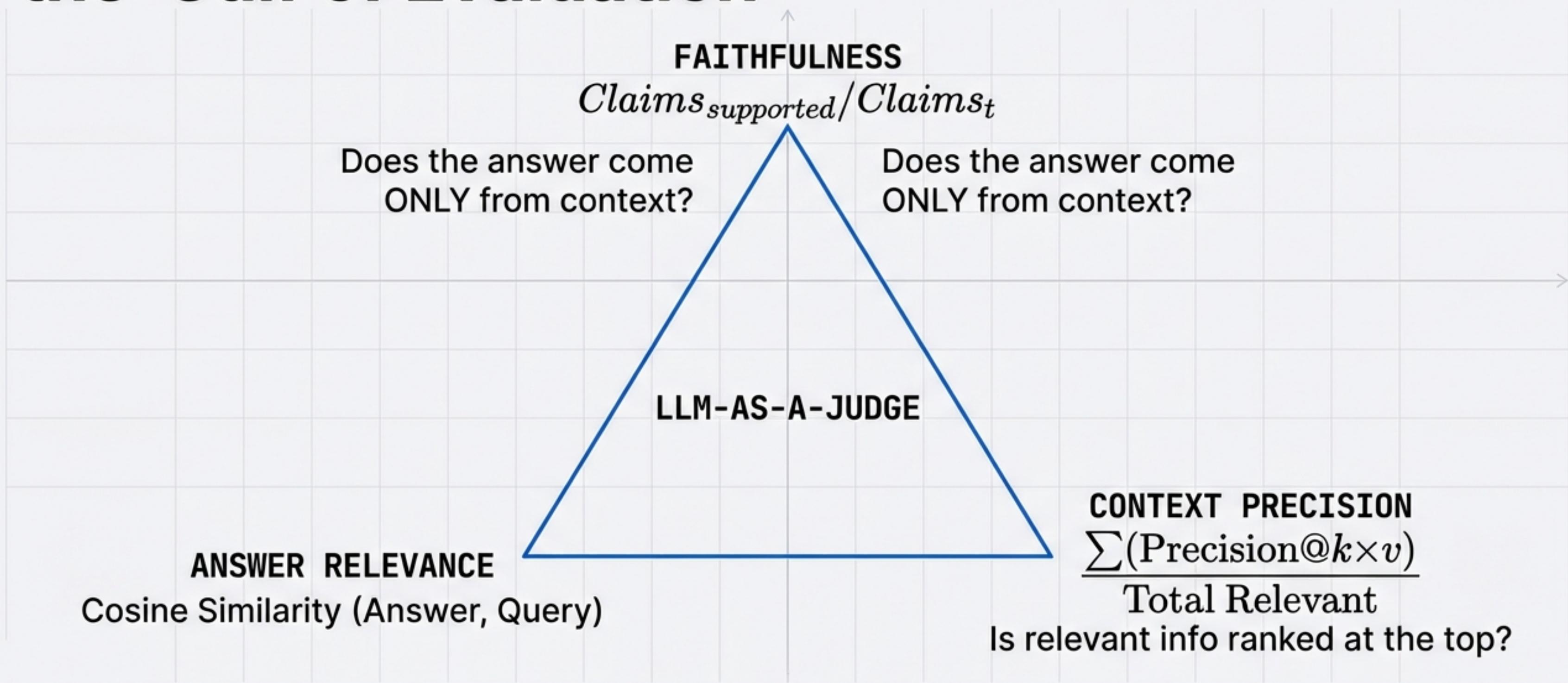
Schema Firewall



- **The Brittle Connector Problem:** APIs are not flexible. Schema validation prevents 'Hallucinated Arguments'.
- **Defense:** Validation occurs BEFORE execution.
- **Resilience:** Treat 429/500 Errors as 'Observations', not crashes.

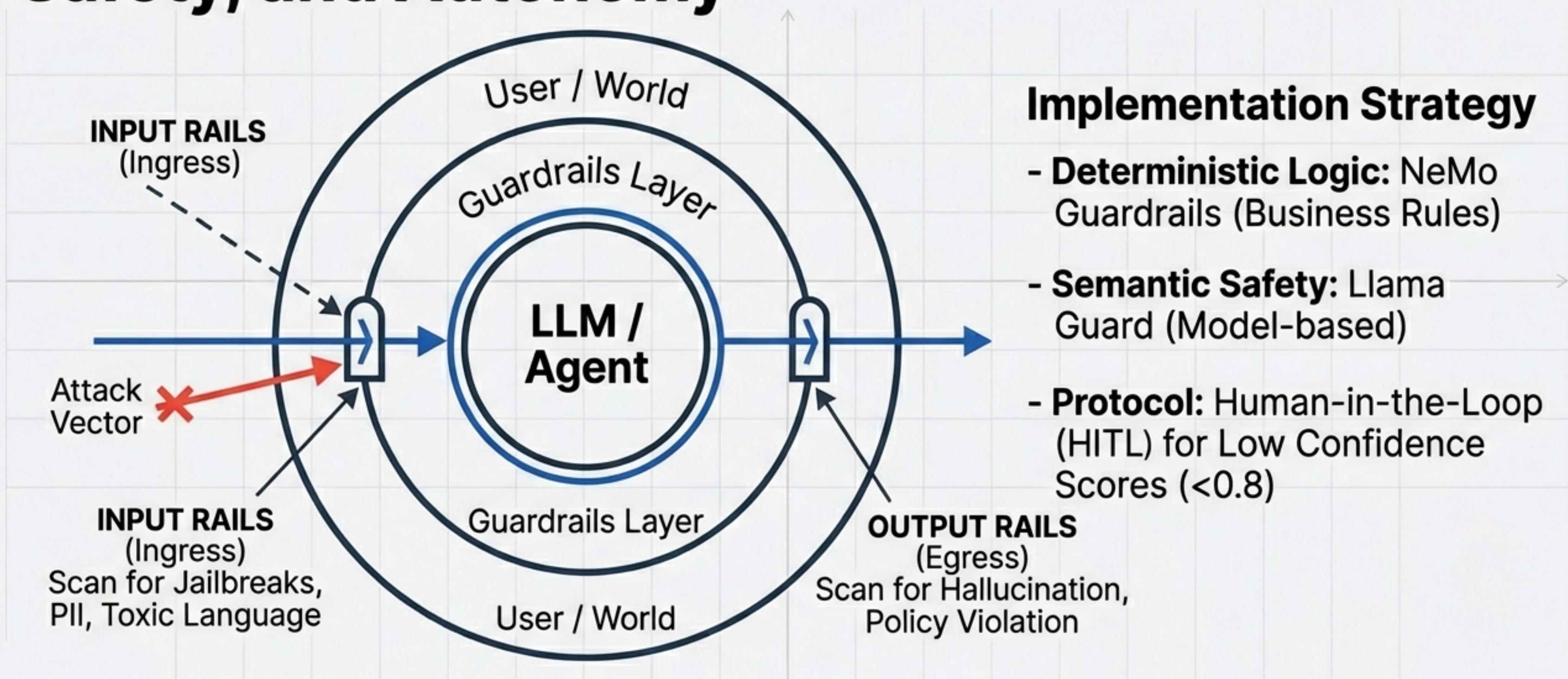
Phase V: INSPECT — Quantifying the ‘Gulf of Evaluation’

Standard INS-1:
The RAG Triad



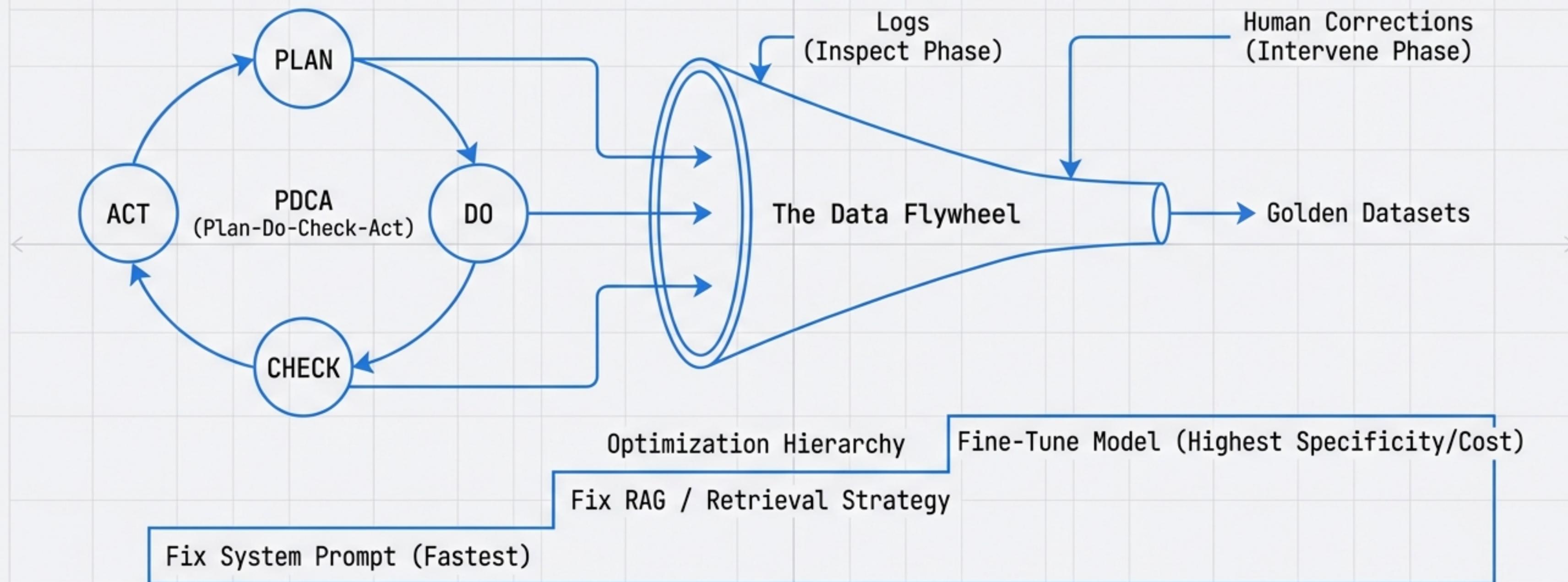
Phase VI: INTERVENE — Governance, Safety, and Autonomy

Standard INV-1:
Guardrails



Phase VII: ITERATE – The Data Flywheel & PDCA Cycle

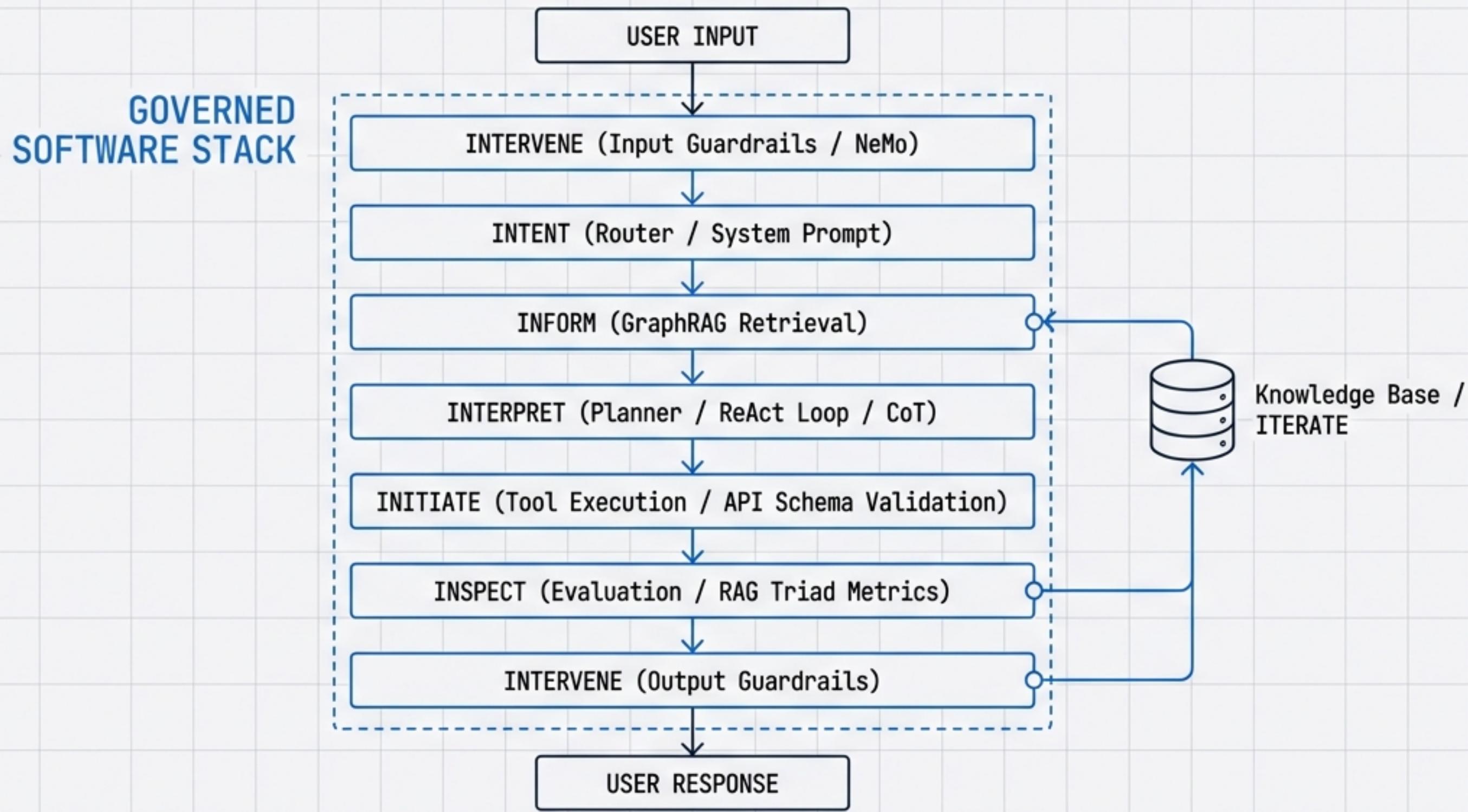
Standard ITE-1:
Continuous Optimization



A failure today becomes a test case tomorrow. Systematic ingestion of edge cases drives exponential reliability.

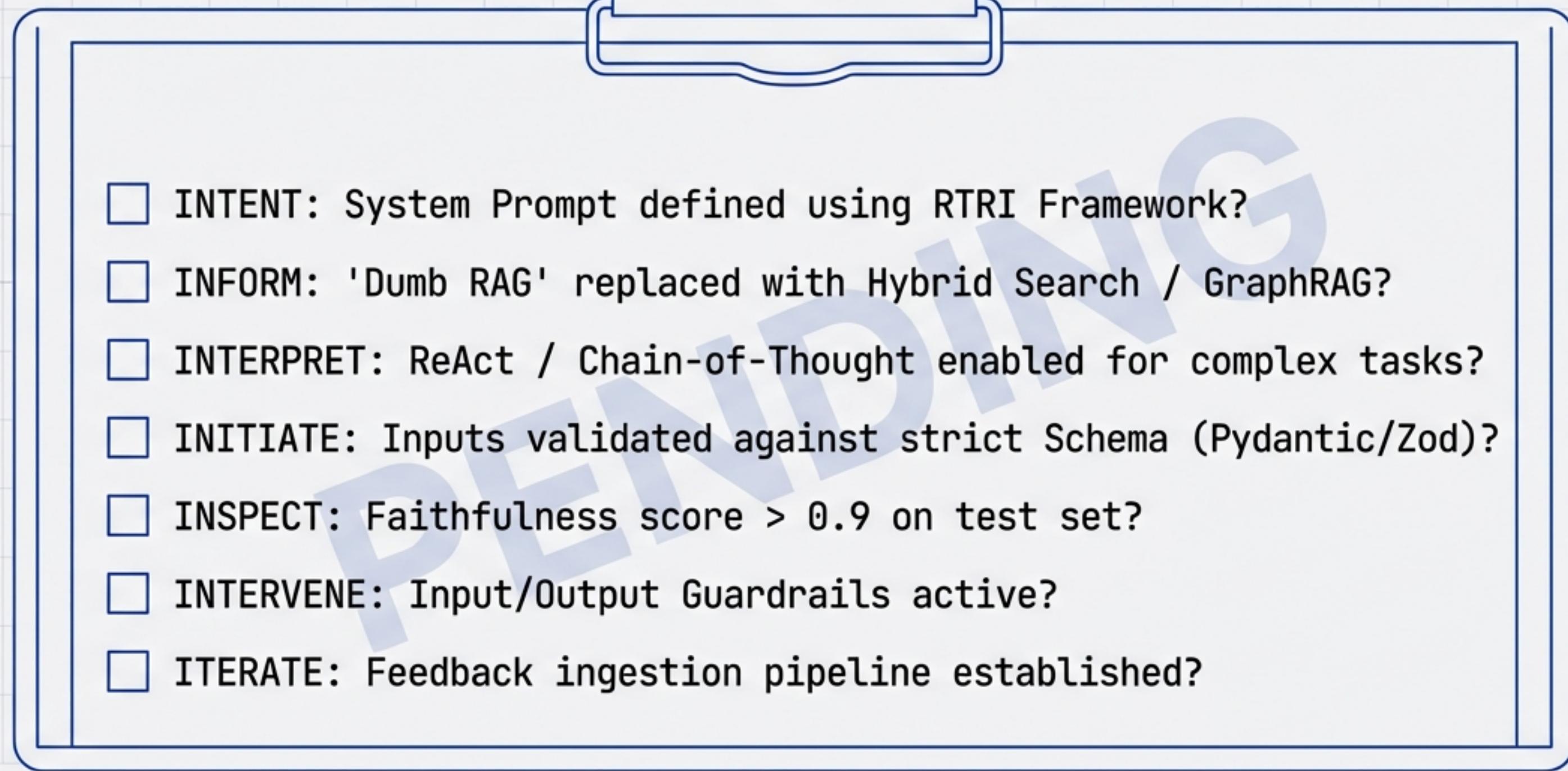
The Architecture of Resilience

The I-7 Stack: From Stochastic Input to Deterministic Execution



Operational Readiness: The Pre-Launch Checklist

Ref: Appendix A - Mandatory for Production

- 
- A large, semi-transparent watermark reading "PRE LAUNCH" is overlaid across the center of the slide.
- INTENT: System Prompt defined using RTRI Framework?
 - INFORM: 'Dumb RAG' replaced with Hybrid Search / GraphRAG?
 - INTERPRET: ReAct / Chain-of-Thought enabled for complex tasks?
 - INITIATE: Inputs validated against strict Schema (Pydantic/Zod)?
 - INSPECT: Faithfulness score > 0.9 on test set?
 - INTERVENE: Input/Output Guardrails active?
 - ITERATE: Feedback ingestion pipeline established?

The Path to Production

Reliability is an engineering choice, not a model feature.

The 90% failure rate is the result of intuition-based development. Move from "Prompting" to "Architecting".

Adopt the I-7 Standard.
Transform the stochastic black box
into a governable enterprise component.

Bridging the Gulf of Execution to build the 10% of agents that succeed.

Works Cited & Research Foundations

Norman, D. (The Design of Everyday Things)

RAND Corporation (AI Project Failure Rates)

Microsoft (Taxonomy of Failure Modes)

Composio (The 2025 AI Agent Report)

IBM (ReAct Agents)

Stanford University (Legal RAG Hallucinations)

DeepEval & Ragas (Metric Frameworks)

NVIDIA (NeMo Guardrails)

Meta (Llama Guard)

JetBrains Mono

Presentation generated based on the I-7 Cognitive Loop Framework / 2026