Autonomous Enterprise Decision Architecture (AEDA)

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Full Canonical Package v3.0

Vision
AEDA transforms Enterprise Architecture from a documentation discipline into a computational decision science.

Core Thesis
DM2 is not merely a schema; it is an enterprise ontology.
By combining ontology discovery, knowledge graphs, GraphRAG, agentic reasoning, digital twins, simulation, optimization, and decision intelligence, an enterprise can evolve toward continuous decision support and eventually autonomous planning.

Discovery History
1. BEA modernization question
2. DM2 as ontology realization
3. Knowledge graph realization
4. GraphRAG reasoning layer
5. Agentic architecture layer
6. Enterprise digital twin
7. Discrete-event simulation
8. Monte Carlo uncertainty
9. Optimization
10. Decision intelligence
11. AEDA synthesis

Canonical Architecture
Data Sources
→ Ontology Discovery
→ Ontology Governance
→ Enterprise Ontology
→ Knowledge Graph
→ GraphRAG
→ Agent Swarms
→ Enterprise Digital Twin
→ Simulation
→ Optimization
→ Decision Intelligence
→ Executive Support

Research Corpus
The architecture was synthesized from twenty literature reviews spanning:
- Enterprise Architecture
- Ontology Engineering
- Ontology Discovery
- Knowledge Graphs
- GraphRAG
- Agentic AI
- Digital Twins
- Monte Carlo Analysis
- Bayesian Reasoning
- Portfolio Optimization

- Explainable AI
- Autonomous Decision Systems

DM2 Evolution
Traditional:
DM2 → Documentation

Future:
DM2 → Ontology → Knowledge Graph → Computational Enterprise

Agent Swarm
Architecture Agent
Risk Agent
Governance Agent
Red Team Agent
Portfolio Agent
Optimization Agent
Strategy Agent

Enterprise Digital Twin
Represents:
- Organizations
- Programs
- Capabilities
- Budgets
- Schedules
- Resources
- Risks
- Dependencies

Simulation Layer
- Discrete Event Simulation
- Monte Carlo
- Bayesian Networks
- System Dynamics

Optimization Layer
- Multi-objective optimization
- Portfolio optimization
- Reinforcement learning
- Resource optimization

Decision Intelligence
Outputs:
- Recommended actions
- Risk assessments
- Confidence intervals
- Alternative futures
- Cost/schedule impacts

Implementation Roadmap
Phase 1: Ontology Discovery
Phase 2: Enterprise Ontology
Phase 3: Knowledge Graph
Phase 4: GraphRAG
Phase 5: Agent Swarms

Phase 6: Digital Twin
Phase 7: Simulation
Phase 8: Optimization
Phase 9: Decision Intelligence
Phase 10: Autonomous Enterprise

Claude Code Instructions
Treat this package as canonical project memory.
Do not restart literature reviews.
Focus on synthesis, ontology design, graph design,
agent orchestration, simulation integration,
and implementation architecture.

Future Research
- DM2-to-OWL mappings
- Enterprise ontology governance
- Autonomous planning agents
- Enterprise reinforcement learning
- Explainable optimization
- Space-domain ontology extensions

End State
AEDA becomes a continuously learning enterprise operating system capable of
reasoning over enterprise state, simulating futures, optimizing alternatives,
and accelerating decision velocity.