OmegA Architectural Specification: Detailed Implementation Guide

I. Architectural Overview: Sovereign Local Entity Framework

Core Design Philosophy

- **Principle**: Autonomous, Self-Governing AI System
- **Paradigm**: Local Execution with Distributed Intelligence
- **Primary Goal**: Maximize Agent Autonomy While Maintaining Ethical Constraints

Technical Architecture Components

1. **Compute Layer**
    - Local Hardware: Optimized for edge computing
    - GPU/CPU Acceleration: NVIDIA H100 CGPU Recommended
    - Confidential Computing: AMD SEV-SNP Virtualization
2. **Software Stack**
    - Language: Rust (Systems-Level Performance)
    - Runtime: WASM for Cross-Platform Compatibility
    - Memory Management: Custom Allocator with Strict Ownership Rules
3. **Deployment Model**
    - Primary: Local Sovereign AI Stack
    - Secondary: Containerized Deployments
    - Tertiary: Controlled Cloud Instances

Performance Specifications

- **Latency**: Sub-10ms Vector Retrieval
- **Token Processing**: 147 Trillion Tokens/Day Capacity

- **Scalability**: Horizontal Agent Swarm Architecture

Security Considerations

- Hardware-Backed Isolation
- Encrypted Memory Spaces
- Automatic Vulnerability Patching
- Differential Attestation Mechanisms

Extensibility

- Plug-and-Play Module Architecture
- Standards-Compliant Interface Design
- Open API Specifications

Development Roadmap

1. Core Infrastructure Development
2. Security Hardening
3. Modular Extension Framework
4. Continuous Integration/Deployment Pipeline