Elasticsearch Vector Database Design Document

# Document Information

Project: Elasticsearch Vector Database on OpenShift

Version: 1.0

Date: September 2025

Owner: Platform Engineering Team

Status: Design Review

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1. Executive Summary  
This document outlines the design for deploying Elasticsearch as a vector database on OpenShift cluster SILO-06. The system will support hybrid search capabilities combining traditional text search (BM25) with semantic vector search using dense embeddings.  
Key Objectives  
  
Enable semantic search across enterprise documents and logs  
Provide scalable vector storage and retrieval capabilities  
Integrate with existing data sources (NetApp S3, NAS, databases)  
Support real-time and batch data ingestion workflows  
Maintain high availability and disaster recovery capabilities  
  
2. System Overview  
Architecture Principles  
  
Cloud-native: Kubernetes-native deployment using operators  
Scalable: Horizontal scaling of compute and storage  
Resilient: Multi-node clustering with automated failover  
Observable: Comprehensive monitoring and logging  
Secure: RBAC, network policies, and encryption at rest/transit  
  
High-Level Components  
...  
Document Control  
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