



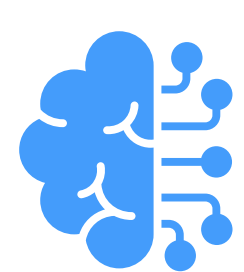
AI-Native Payment Integrity Platform

Find, prove, and prevent leakage - faster

Neuro-Symbolic Architecture Compound AI Solution

Combine artificial intelligence with rule-based logic to
ensure healthcare policy compliance
with full auditability and explainability

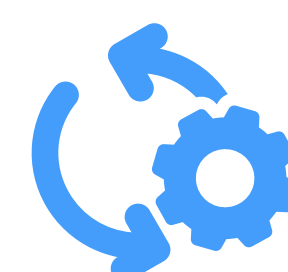
TL;DR



Neural Engine

Deep learning extracts insights
from unstructured data

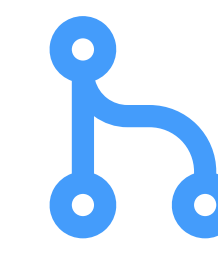
- Clinical entity extraction
- Context understanding
- Pattern recognition



Symbolic Reasoning

Executable rules ensure
consistent decisions

- Auditable reasoning
- Structured validation
- Compliance-ready



Graph-RAG

Knowledge graphs
connect everything

- Citation tracking
- Relationship mapping
- Context retrieval



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Core Architecture Components

1. Neural Engine (AI Processing Layer)

Multi-Model DLA & Extraction: Deep Learning Architecture that uses multiple specialized AI models working together to analyze documents and extract information with higher accuracy than single-model approaches

Clinical Entity and Metadata Extraction: Automatically identifies and extracts medical terms, patient information, provider details, and document metadata from healthcare documents.

Context-based Clause Extraction: Identifies policy-related clauses such as age, gender, clinical criteria, treatment protocols, drugs/dosages, billing codes, service units, and time conditions. Uses ontology and reasoning to determine data relationships.

2. Symbolic Component (Rules & Logic Layer)

Clauses as Logical Rules: Converts extracted policy language into executable logical statements that can be evaluated programmatically. Example: "Patients over 65 require prior authorization" becomes a testable logical rule

Structured Entities: Organizes extracted information into standardized data structures (patient records, claims, policies) for consistent processing

Entities Relation Graph: Creates a network showing how different elements relate to each other (e.g., which treatments are covered for which diagnoses under specific conditions)

3. Integration Layer

Sparse and Dense retrieval: Quickly finds relevant policy sections for any claim

Indexing, Comparison, Construction: Builds a comprehensive policy knowledge base

Audit Trails and Citations: Every decision is documented with sources, enabling full compliance auditing

Processing Pipeline

Stage 1: Ingestion

- **Automated triggers:** System automatically detects new documents requiring processing
- **Scraping and download:** Retrieves documents from various sources
- **Hashing and version control:** Tracks document changes and versions
- **Storage:** Maintains an organized document repository

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Stage 2: Parse, Normalize, Segmentation

- **Document layout extraction:** Identifies sections, tables, and headers using parsers and vision models
- **Table Extractor Models:** Specialized AI for extracting structured data from tables
- **UMLS Text normalization and Chunking:** Breaks documents into manageable pieces while standardizing medical terms, leveraging Unified Medical Language System.

Stage 3: Extraction (Hybrid)

- **Entity Extraction:** Identifies key data points (names, dates, codes, amounts)
- **Clause Extraction:** Pulls out policy rules and requirements
- **Entities Relation Graph construction:** Maps relationships using rules, patterns, and BERT embeddings
- **Zero-Shot Entity Extraction:** Can identify entity types without specific training examples
- **UMLS:** Ensures medical terminology consistency
- **Clinical BERT + MedSpacy + Gliner-BioMed:** Specialized medical AI models for healthcare text understanding

Stage 4: Indexing & Storage

- **Vector Database:** Stores AI-generated semantic representations for similarity search
- **Relational Database:** Traditional structured database (PostgreSQL, pgvector for vector storage)
- **Graph Database:** Stores relationship networks (BM25 for ranking, tables for structured data, Neo4j-style edges for connections)

Stage 5: Query & Retrieval

- **Dense + Sparse fusion:** Combines AI semantic search with traditional keyword search for optimal results
- **Reasoning and citation:** Provides explanations and sources for retrieved information

Stage 6: Compliance & Policy Creation

- **Agentic:** AI agents work autonomously to apply rules and make decisions
- **Template-guided + Human-in-loop:** Combines automation with human oversight for critical decisions

Key Differentiators

1. **Transparency:** Unlike pure AI systems, every decision can be explained with logical proof
2. **Reliability:** Logic rules ensure consistent, repeatable decisions required for regulatory compliance
3. **Auditability:** Complete citation and reasoning trails for compliance officers and auditors
4. **Adaptability:** Human-in-loop allows experts to guide and validate automated decisions
5. **Scalability:** Handles thousands of policies and millions of claims with consistent accuracy

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Architecture Value Proposition

Neuro-symbolic > Vanilla AI

- AI reads documents and identifies patterns; logic rules prove decisions are repeatable
- Traditional AI alone acts as a "black box"; this system provides transparent, traceable decisions

Logic Programmable Engine

- **Rules + Facts:** Combines policy rules with case facts
- **Backtracking proof:** Can trace logic backwards to show why a decision was made
- **Deterministic:** Same inputs always produce the same outputs (critical for compliance)

Validation

- **Compile, run, trace:** Rules are tested in a sandbox environment
- Rules must pass all tests before being applied to actual claims, ensuring accuracy and preventing errors

Schema-constrained Prompting for Logic Code Generation

- **Controlled outputs:** AI generates code using only approved predicates and fields
- Ensures all generated logic is executable and complies with system constraints

Use Case: Agentic Claims Policy Compliance

Automated policy compliance checking for healthcare claims

Goal: Reduce manual review time, ensure consistent application of complex rules, and provide regulatory defensibility through complete audit trails.

Key Features:

Goal: Reduce manual review time, ensure consistent application of complex rules, and provide regulatory defensibility through complete audit trails.

- Quickly finds relevant policy sections for any claim
[Sparse + Dense Retrieval]
- Builds a comprehensive policy
[Indexing + Comparison + Construction]
- Every decision is documented with sources, full compliance auditing
[Lineage + Citations]
- Subject matter experts intervene and override for complex cases.
[Human in the loop]