GAIA Investigation System - Product Overview

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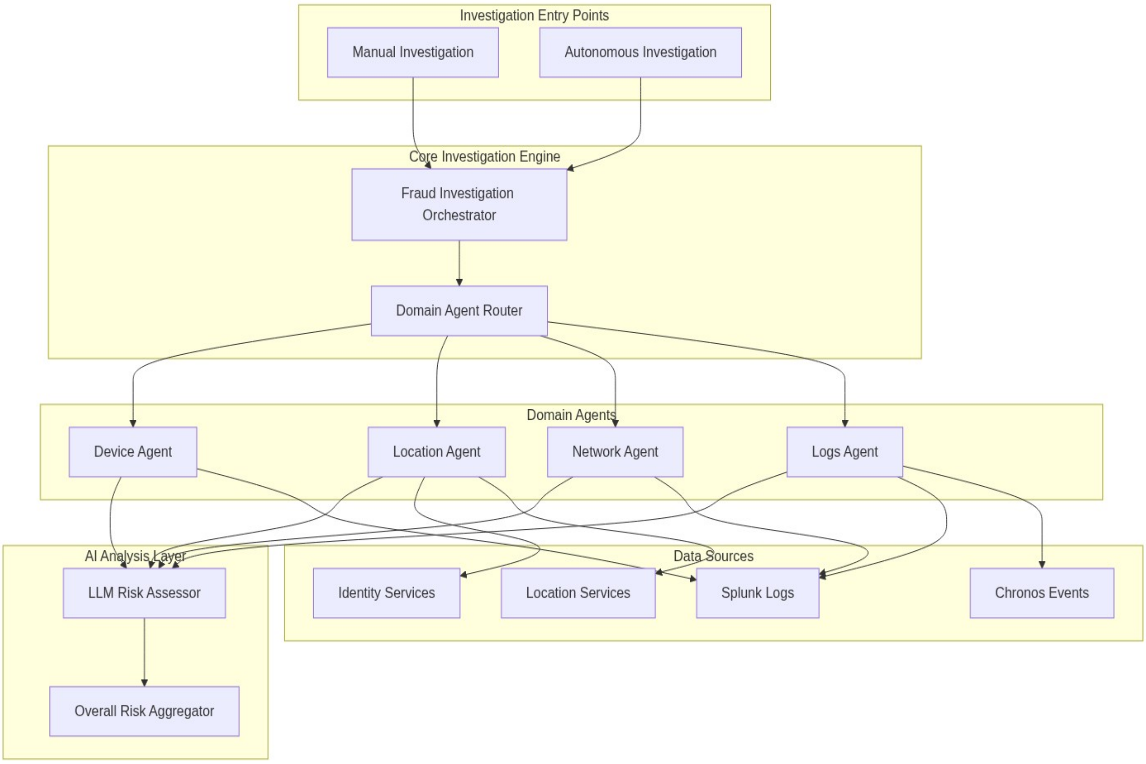
Executive Summary

The GAIA (Generative AI Investigation Agents) system is an intelligent fraud investigation platform that automates risk assessment across multiple data domains. It combines specialized domain agents with AI-powered analysis to provide comprehensive security insights for user accounts and devices.

System Architecture Overview



Domain Agents Overview

1. Device Agent

Purpose: Analyzes device fingerprinting and behavioral patterns

Focus Areas:

- Device identification and consistency
- Browser and OS fingerprinting
- Device reputation scoring
- Cross-device correlation

Key Tools:

- Splunk query engine for device telemetry
- Vector search for behavioral pattern matching
- Device fingerprinting algorithms

Data Sources:

- RSS (Risk Scoring Service) logs
- ThreatMetrix device data
- Browser fingerprinting data

Independent Usage: ■ Yes - Can be called standalone via `/api/device/{entity_id}`

Migration Potential: High - Self-contained with well-defined APIs

2. Location Agent

Purpose: Detects geographic anomalies and impossible travel patterns

Focus Areas:

- Geographic risk assessment
- Impossible travel detection
- Location consistency analysis
- VPN/proxy detection

Key Tools:

- Online Identity Information (OII) services
- Splunk geographic data analysis
- Vector search for location patterns

Data Sources:

- Business location data
- Phone location services
- IP geolocation data
- Historical location patterns

Independent Usage: ■ Yes - Can be called standalone via `/api/location/{entity_id}`

Migration Potential: High - Modular design with external service integrations

3. Network Agent

Purpose: Analyzes network-based risk indicators and ISP patterns

Focus Areas:

- ISP reputation analysis
- Network volatility detection
- Proxy/VPN identification
- IP address risk scoring

Key Tools:

- Splunk network data queries
- ISP analysis algorithms
- Geographic network mapping

Data Sources:

- Network telemetry logs
- ISP databases
- IP reputation services
- Proxy detection services

Independent Usage: ■ Yes - Can be called standalone via `/api/network/{entity_id}`

Migration Potential: High - Standard network analysis patterns

4. Logs Agent

Purpose: Examines authentication patterns and user behavior

Focus Areas:

- Authentication failure analysis
- Login pattern detection
- Session behavior analysis
- Account takeover indicators

Key Tools:

- Splunk log analysis
- Chronos event processing
- Pattern recognition algorithms

Data Sources:

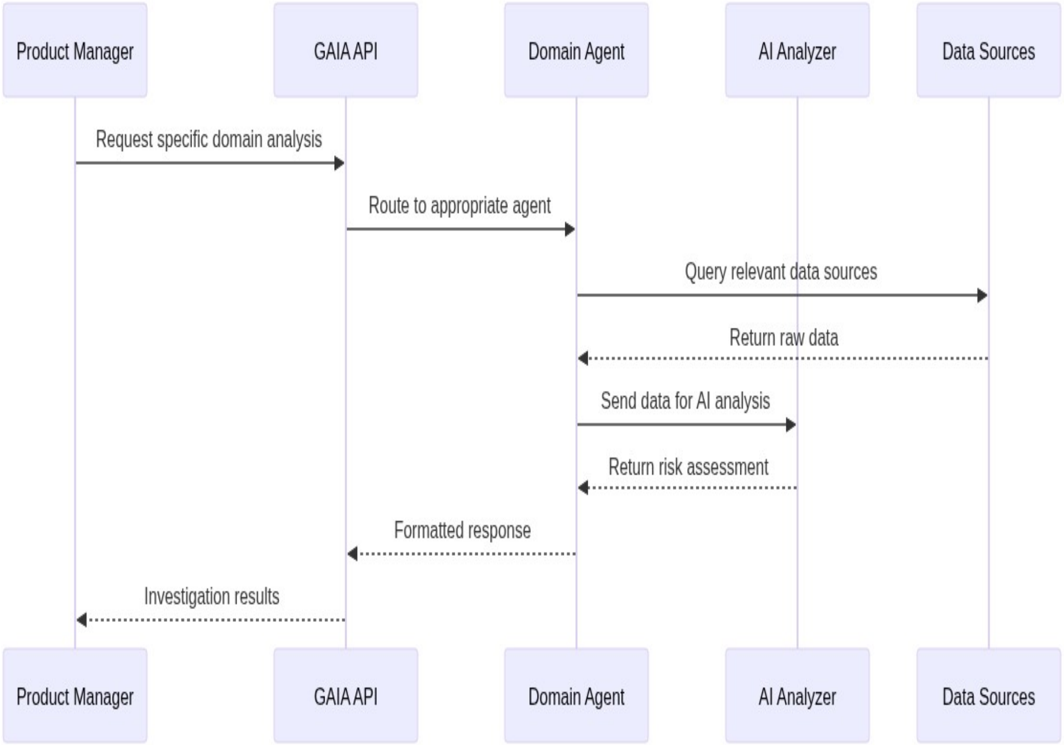
- Authentication logs
- Session management data
- User activity logs
- Security event streams

Independent Usage: ■ Yes - Can be called standalone via `/api/logs/{entity_id}`

Migration Potential: Medium - Depends on log format standardization

Investigation Modes

Manual Investigation Mode



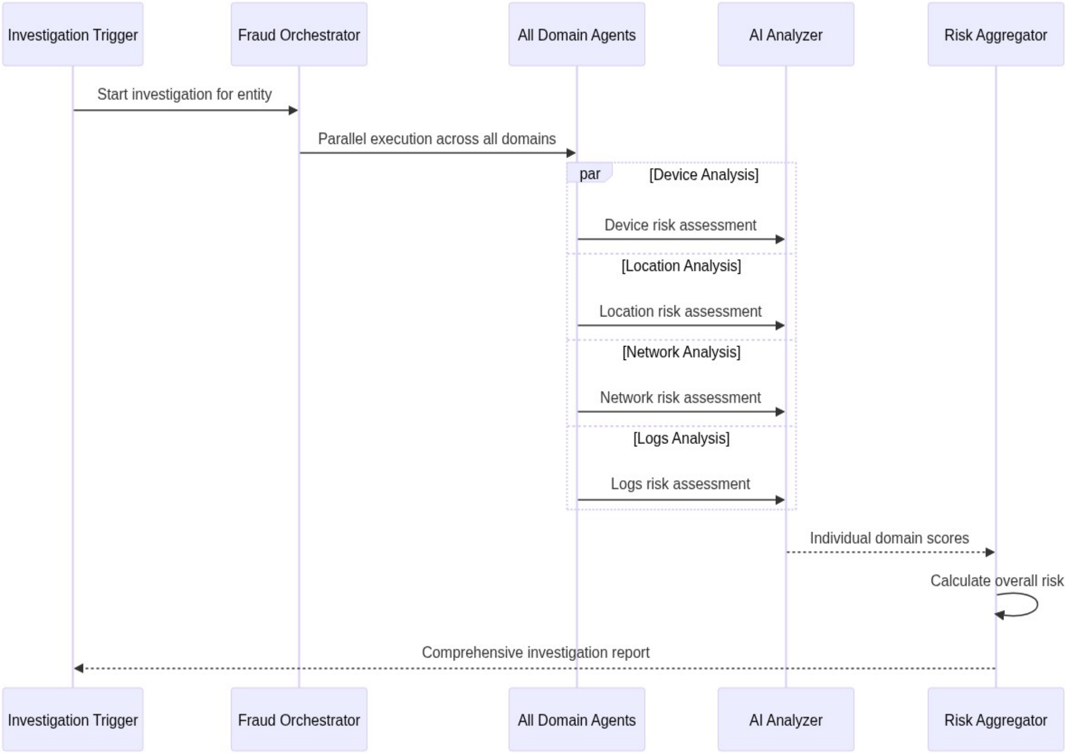
Use Cases:

- Targeted investigation of specific risk domains
- Deep-dive analysis for escalated cases
- Integration with existing security workflows
- Custom investigation scenarios

Benefits:

- Precise control over investigation scope
- Faster response times for specific queries
- Easy integration with existing tools
- Granular risk assessment

Autonomous Investigation Mode



Use Cases:

- Automated fraud detection workflows
- Real-time risk scoring
- Bulk account analysis
- Proactive threat hunting

Benefits:

- Comprehensive 360-degree view
- Automated decision making
- Consistent investigation methodology
- Scalable fraud detection

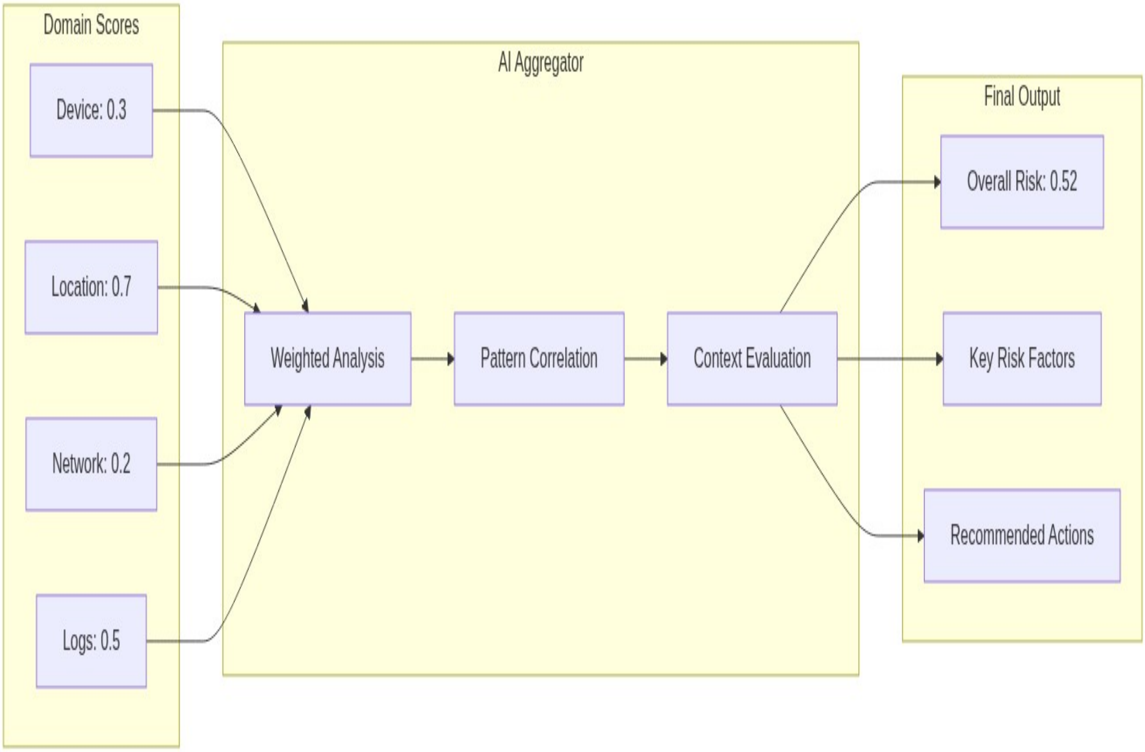
AI Integration Strategy

LLM Risk Assessment Layer

The system leverages Large Language Models (LLMs) to:

Pattern Recognition: Identify subtle fraud indicators across complex data sets
Contextual Analysis: Understand relationships between different risk factors
Natural Language Insights: Generate human-readable explanations for risk decisions
Adaptive Learning: Improve detection accuracy based on new fraud patterns

Risk Aggregation Intelligence



Business Value Proposition

For Security Teams

- **Reduced Investigation Time**: Automated analysis across multiple domains
- **Improved Accuracy**: AI-powered pattern recognition reduces false positives
- **Comprehensive Coverage**: No blind spots in fraud detection
- **Scalable Operations**: Handle high-volume investigations efficiently

For Product Teams

- **Modular Architecture**: Easy to extend with new domain agents
- **API-First Design**: Simple integration with existing products
- **Real-time Capabilities**: Support for both batch and streaming analysis
- **Flexible Deployment**: Can be deployed as microservices or monolith

For Business Operations

- **Cost Reduction**: Automated fraud detection reduces manual review costs
- **Risk Mitigation**: Proactive identification of account takeover attempts
- **Compliance Support**: Detailed audit trails and risk documentation
- **Customer Protection**: Faster response to potential security threats

Technical Capabilities

Data Processing

- **Multi-source Integration**: Connects to Splunk, Chronos, and identity services
- **Real-time Analysis**: Sub-second response times for individual domain queries
- **Batch Processing**: Support for bulk investigation workflows
- **Data Privacy**: Secure handling of sensitive user information

Scalability Features

- **Horizontal Scaling**: Each domain agent can scale independently
- **Load Balancing**: Intelligent routing of investigation requests
- **Caching Strategy**: Optimized data retrieval and response times
- **Fault Tolerance**: Graceful degradation when services are unavailable

Integration Options

- **REST APIs**: Standard HTTP endpoints for all functionality
- **Webhook Support**: Real-time notifications for investigation results
- **SDK Availability**: Client libraries for common programming languages
- **Documentation**: Comprehensive API documentation and examples

Migration and Deployment Considerations

System Requirements

- **Infrastructure**: Kubernetes-ready containerized deployment
- **Dependencies**: Splunk, LLM services, identity providers
- **Security**: OAuth 2.0, API key management, encrypted communications
- **Monitoring**: Health checks, metrics, and alerting capabilities

Migration Strategy

Phase 1: Deploy individual domain agents for manual investigations
Phase 2: Implement autonomous investigation workflows
Phase 3: Integrate with existing fraud detection systems
Phase 4: Enable real-time streaming analysis

Success Metrics

- **Investigation Speed**: Time from trigger to final risk assessment
- **Accuracy Rates**: False positive and false negative percentages
- **System Utilization**: API call volumes and response times
- **Business Impact**: Fraud detection rates and cost savings

Future Roadmap

Additional Tool Integrations

• **ATHENA DB Integration**: Direct connectivity to Amazon Athena for advanced data lake queries and analytics
• **NELI Integration**: Enhanced natural language processing capabilities for log analysis and pattern recognition

CRM and Case Management Integration

• **PEGA CRM Integration**: Seamless case management workflow integration for fraud investigation tracking

Enhanced Data Source Connectivity

• **Real-time Streaming Data**: Integration with Kafka and other streaming platforms for live data analysis
• **Third-party Intelligence Feeds**: Connection to external threat intelligence and fraud databases
• **Cloud Storage Integration**: Direct access to AWS S3, Azure Blob, and Google Cloud Storage for historical data analysis
• **API Gateway Expansion**: Additional REST and GraphQL API integrations for extended data access