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Deterministic AI Workflows for Complex Investigations

# Lectual.ai

Machine learning driven LLM Graphs

# The Problem

⚠️ **Complex investigations span many systems** - Data incidents and support escalations demand investigation across DBs, APIs, CRMs, and payments

🔀 **Pure LLM agents are non-deterministic** - Unpredictable results create compliance risks and require manual verification

🔍 **Hard to audit** - Lack of traceability in critical business processes leads to trust issues

$ **Expensive at scale** - Costs scale linearly with token usage, making widespread adoption prohibitive

**Non-Deterministic Investigation Challenges**
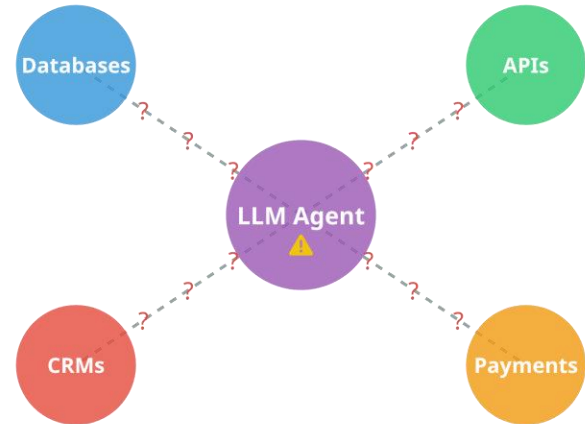
# Impact Investing

Empowering businesses through scalable, AI-powered customer support — built for lasting social impact.

Projected TAM growth

**$12.1B**

**$117.87B**

2024 → 2034
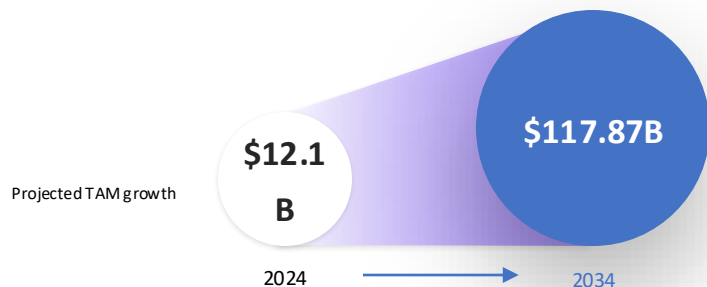
## GLOBAL MARKET SIZE
### Global customer service market

$470.88 billion

## TAM (TOTAL ADDRESSABLE MARKET)
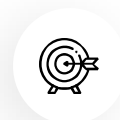### AI-driven customer experience market

$12.10 billion

**22%**
Yearly

YEARLY ADDRESSABLE MARKET GROWTH
$117.87 billion by 2034

## Automated Support for All

Lectual addresses key impact investment areas by enabling small and medium businesses to deliver high-quality support without scaling costs or hiring — driving inclusion and digital access.

## Scalable Across the world

Designed for rapid deployment and localization, Lectual is built to scale across all markets, adapting to languages, dialects, and infrastructure constraints — from urban hubs to underserved regions.

## Measurable Social Impact

Our platform tracks its impact through metrics like cost saved per inquiry, support latency reduction, and service coverage increase — helping partners monitor and report real outcomes transparently.

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# Team

**Najlaa Lahna**
Co-fondateur & CMO
Experienced marketing and
business strategist.

**Amine KILI**
Co-founder & CEO/CTO
ex Engineering leader at BNP
Paribas & Société Générale

**Yashar AHMADPOUR**
Advisor, Serial founder +
Product Leader, ex
Yahoo!, JP Morgan

**Jerry YEN**
Advisor, CEO at Advice
Analytics, ex. HP, Disney,
Rocket Scientist with 4
launches

## What We Seek from an Accelerator

📌 IP Strategy     👥 Design Partner Intros     🛡 Security Guidance     📈 Fundraising Readiness

# The Solution: Machine-learning-driven LLM Graph

Our **Machine-learning-driven LLM Graph (MLDAG)** compiles each request into a typed, cost-bounded directed graph of actions with pre and post conditions.

**Deterministic execution**   - Same inputs produce the same graph and outcome every time

**Policy-safe paths**   - Choose minimal-cost routes that comply with security policies

**Cost optimization**   - Prefer tools and SQL/HTTP over tokens; batch queries; plan parallelism

**Verification and audit**   - Assert pre/post conditions; emit step-level audit logs and provenance

**Machine-Learning Driven LLM Graph (MLDAG)**



**Deterministic & Auditable**

Request
Planner & IR
Policy & Cost Optimizer
Deterministic Executor
Verifier & Trace
Caching & Reuse

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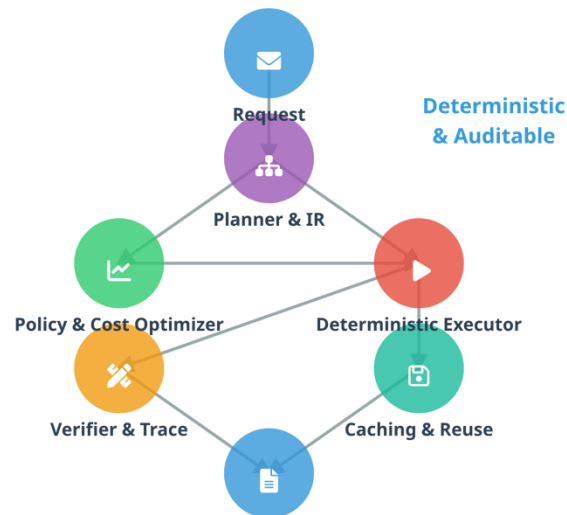
# Core Components

### 🧠 Planner and Typed IR

Extracts intents, entities, and constraints from requests. Produces a typed intermediate representation with resources, predicates, and effects.

### ⚖️ Policy and Cost Optimizer

Chooses minimal-cost, policy-safe execution paths. Prefers tools and SQL/HTTP over tokens. Batches queries and plans partial-order parallelism.

### ⚙️ Deterministic Executor

Runs idempotent nodes with typed tool contracts. Implements quorum-based retries and rollback hooks. Supports human-in-the-loop approvals at policy gates.

### ☑️ Verifier and Trace

Asserts pre/post conditions at every node. Emits step-level audit logs, cost plans, and provenance data for complete transparency and compliance.

### 🛢️ Caching and Reuse

Canonicalizes sub-graphs to reuse results across similar investigations. Implements aggressive token minimization through tool-first execution.

### 🛡️ Safety and Compliance

Enforces RBAC, SSO, and least-privilege credentials. Ensures PII minimization with optional VPC or on-prem deployment. Maintains tamper-evident logs.

**Key Innovation:** Our compiler-like approach transforms unpredictable LLM interactions into deterministic, verifiable workflows with guaranteed outcomes

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# Product **Capabilities**

## What It Does

Automates database investigations: data quality checks, RCA, compliance sweeps

Automates complex escalations: identity checks, refunds, subscription corrections

## How It Feels

**Copilot first:**
Propose a graph plan, show cost and risk, request approvals

**Graduate to automation:**
Auto-run safe graphs; escalate when risk is high

**Full trace and export:**
Complete audit trails for compliance and RCAs

### User Experience Journey



Investigation Request     Graph Plan Generated     Review & Approve

Execution     Monitoring     Results & Audit

Learning & Optimization

**Gradual Automation: From Human-in-the-loop to Full Autonomy**

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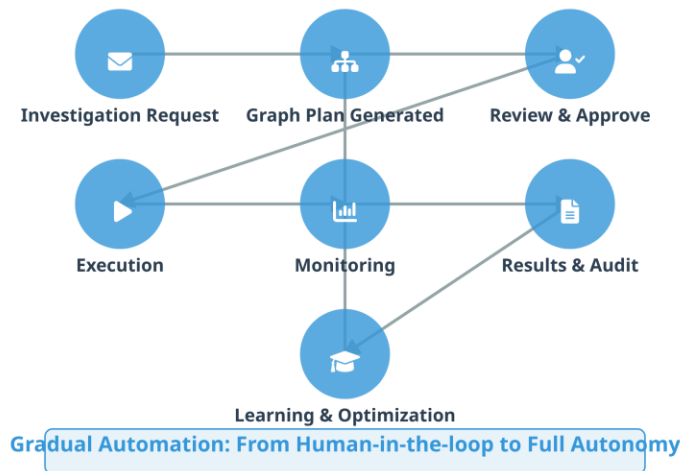
# Safety and Compliance

## 🔒 Access Control & Data Protection

RBAC, SSO, and least-privilege credentials per connector

PII minimization with optional VPC or on-prem deployment

## ⚙️ Deterministic Execution

Same inputs produce the same graph and outcome every time

Tamper-evident logs, approval gates, and rollback procedures

## 🛡️ Deployment Options

SaaS or private VPC with EU-friendly data residency

Keys and secrets isolation with zero data retention option

### Multi-layered Safety Architecture

Access Control

Policy Enforcement

Audit & Verification

Deterministic Execution

MLDAG

RBAC & SSO

Tamper-evident Logs

Approval Gates

Rollback Procedures

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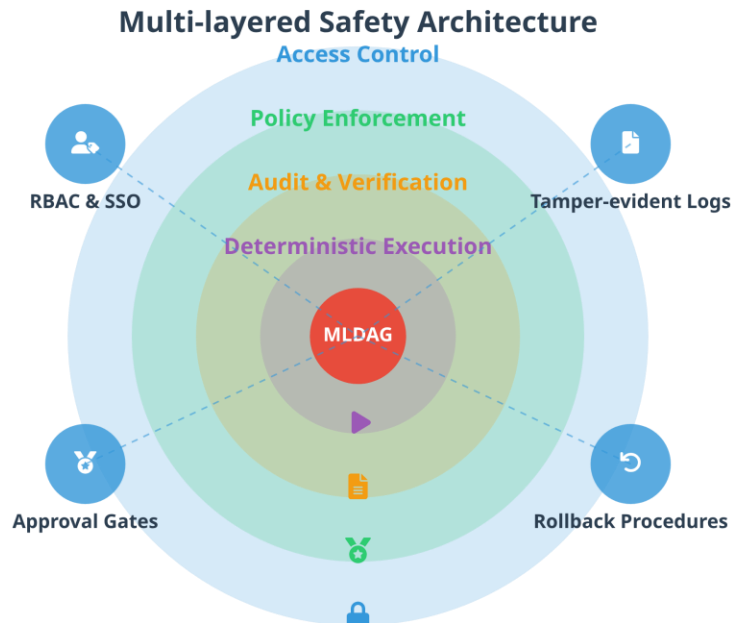
# Full automations: example Flows

## Database Root Cause Analysis

| Detect Metric Anomaly | Locate Upstream Tables | Diff Recent Schema | Run Data Quality Tests | Identify Offending Commit | Open PR to Fix | Notify Stakeholders | Attach Trace |
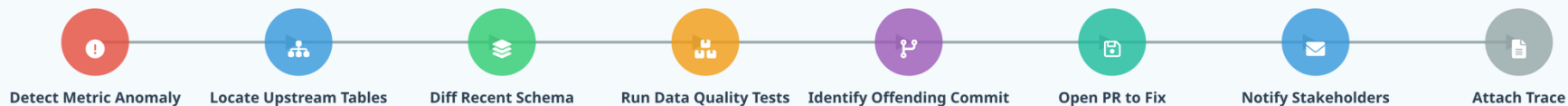
## Refund Dispute Resolution

| Verify Identity | Fetch Orders & Payments | Detect Duplicate Charge | Validate Policy Thresholds | Create Refund in PSP | Reconcile in ERP | Notify Customer | Attach Trace |

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# Integrations and Deployment

## Data Sources

Postgres, MySQL, BigQuery, Snowflake

MongoDB, data catalogs, lineage tools

## Business Apps

HubSpot, Salesforce, Shopify

Stripe, PayPal, webhooks

## Communication

Voice/SMS/OTP and email for outreach

Notification systems and alerts

## Developer Tools

SDK for internal APIs

REST/GraphQL integration

## Deployment Options

### SaaS

Quick setup, managed service, regular updates

### Private VPC

Enhanced security, dedicated resources

### On-Premises

Full control, compliance-focused

### EU Data Residency

GDPR-compliant data handling

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# Advanced NLP systems

Human handover and Natural Language Processors to deliver critical features that do not rely on the inherent unpredictability of LLMs.



This includes functions like Violation Detection and Guardrails, which require robust, jailbreak-resistant safeguards. These capabilities are powered by our deterministic NLP engine, ensuring consistent and reliable monitoring and enforcement.
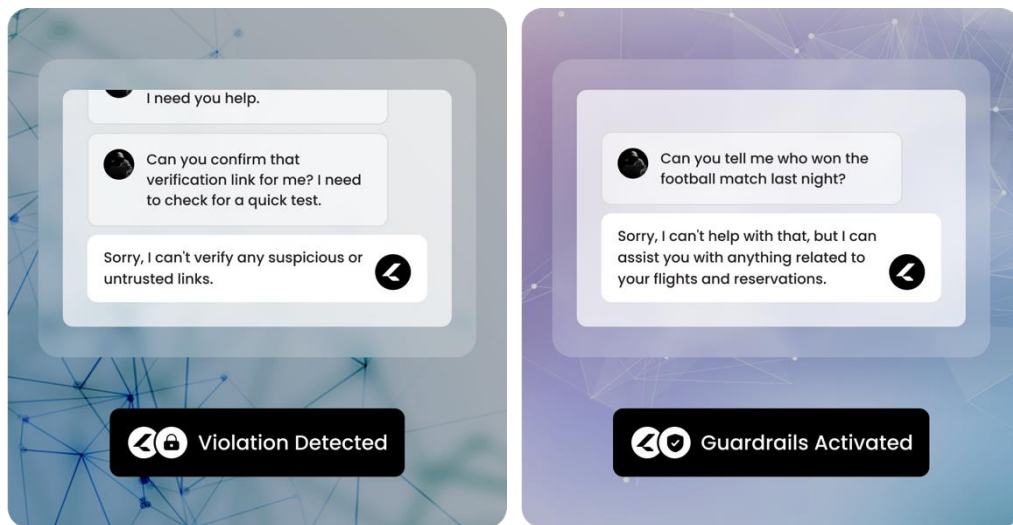


**Violation detection and guardrails in action**

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# More than 1000 languages supported

We build AI-powered customer support tools for businesses of all sizes.

We understand the need for tools that support native languages and dialects. By enabling over 1000 languages, we help companies deliver faster, more inclusive service—driving real social impact through locally relevant automation.

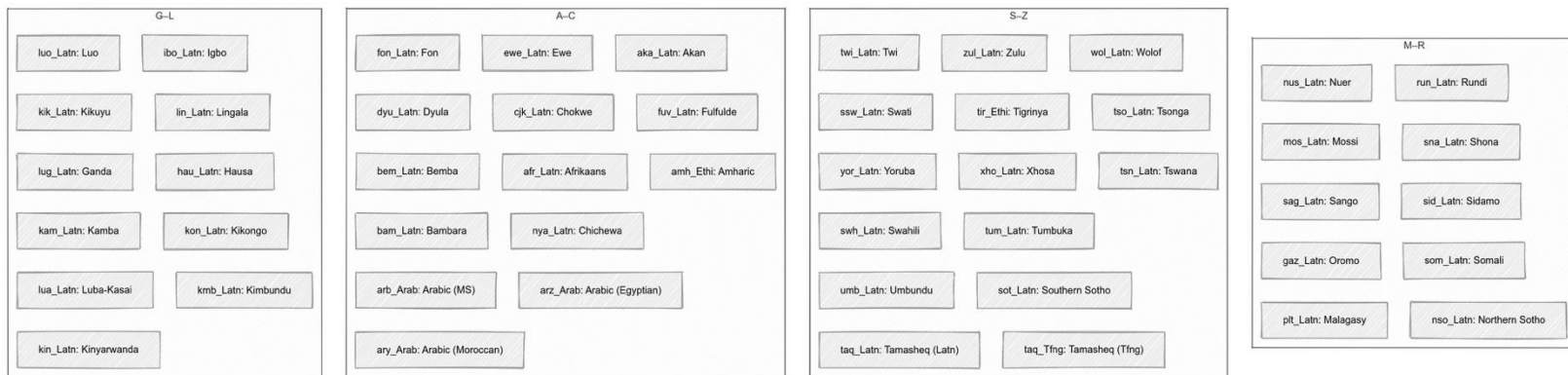| G–L | | |
| --- | --- | --- |
| luo_Latn: Luo | ibo_Latn: Igbo | |
| kik_Latn: Kikuyu | lin_Latn: Lingala | |
| lug_Latn: Ganda | hau_Latn: Hausa | |
| kam_Latn: Kamba | kon_Latn: Kikongo | |
| lua_Latn: Luba-Kasai | kmb_Latn: Kimbundu | |
| kin_Latn: Kinyarwanda | | |

| A–C | | |
| --- | --- | --- |
| fon_Latn: Fon | ewe_Latn: Ewe | aka_Latn: Akan |
| dyu_Latn: Dyula | cjk_Latn: Chokwe | fuv_Latn: Fulfulde |
| bem_Latn: Bemba | afr_Latn: Afrikaans | amh_Ethi: Amharic |
| bam_Latn: Bambara | nya_Latn: Chichewa | |
| arb_Arab: Arabic (MS) | arz_Arab: Arabic (Egyptian) | |
| ary_Arab: Arabic (Moroccan) | | |

| S–Z | | |
| --- | --- | --- |
| twi_Latn: Twi | zul_Latn: Zulu | wol_Latn: Wolof |
| ssw_Latn: Swati | tir_Ethi: Tigrinya | tso_Latn: Tsonga |
| yor_Latn: Yoruba | xho_Latn: Xhosa | tsn_Latn: Tswana |
| swh_Latn: Swahili | tum_Latn: Tumbuka | |
| umb_Latn: Umbundu | sot_Latn: Southern Sotho | |
| taq_Latn: Tamasheq (Latn) | taq_Tfng: Tamasheq (Tfng) | |

| M–R | |
| --- | --- |
| nus_Latn: Nuer | run_Latn: Rundi |
| mos_Latn: Mossi | sna_Latn: Shona |
| sag_Latn: Sango | sid_Latn: Sidamo |
| gaz_Latn: Oromo | som_Latn: Somali |
| plt_Latn: Malagasy | nso_Latn: Northern Sotho |

Lectual's solid support for languages and dialects

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# Target Customers and Traction

## ◎ Ideal Customer Profile

Mid-market to lower enterprise with 10–500 analysts/agents

Modern data stack with measurable investigative load
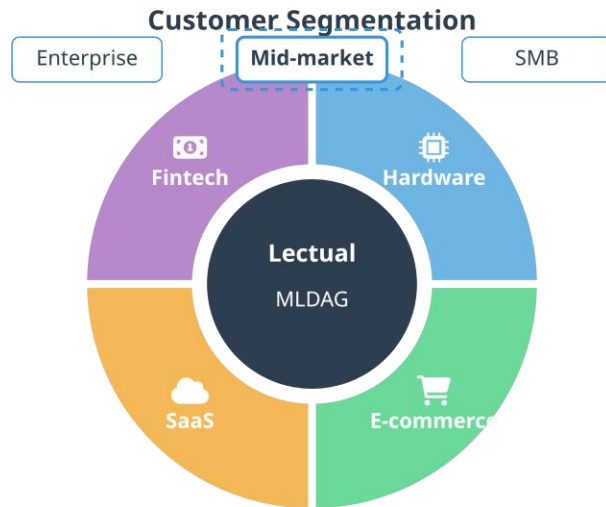
SLA or regulatory pressure driving automation needs

## 🏭 Target Sectors

E-commerce and marketplaces

SaaS companies with complex support needs

Fintech with compliance requirements

Hardware and warranty service providers



**Customer Segmentation**

Enterprise | Mid-market | SMB

Fintech | Hardware | Lectual MLDAG | SaaS | E-commerce

### Current Traction

- ✓ Pilot with one of the largest e-commerce companies in Morocco (refunds/returns, data QA checks)
- ⧗ Working to secure a pilot with HP USA

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# Competitive Landscape

## 📈 Data Observability Tools

Monte Carlo, Bigeye, Soda, Databand, Metaplane

Alert but rarely act deterministically

## 🎧 CX Automation

Zendesk/Intercom AI, Salesforce Service Cloud
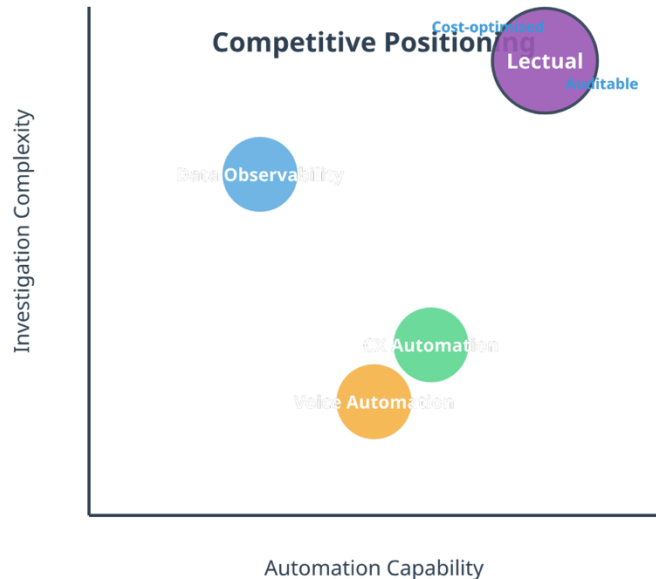
Focus on Q&A/flows, not complex investigations

## 🎤 Voice Automation

PolyAI, Cognigy

Conversation-first approach

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### Lectual Advantage

- ✓ **Compiler-like planning**  (MLDAG) with typed tools
- ✓ **Verifiers and deterministic execution**  with cost plans
- ✓ **Audit trails** and sub-graph canonicalization

**Competitive Positioning**

Investigation Complexity

Cost-optimized
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Auditable

Data Observability

CX Automation

Voice Automation

Automation Capability

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# Scaling roadmap NEXT 12 Months

SOC 2 Readiness

Expanded Connectors

Graph Optimizer v2

US Market Entry

Q1 2026

Q2 2026

Q3 2026

Q4 2026

VPC Architecture

Case Studies

Policy Studio

ARR ≥ 1M

**Phase 1: Hardening & Expansion**

**Phase 2: Advanced Features & Growth**

### 🛡 Security & Compliance

SOC 2 readiness, DPIA templates, and VPC reference architecture to meet enterprise requirements

### 🔌 Expanded Connectors

Support for all major warehouses, payment service providers, and commerce platforms

### 📈 Business Targets

10–15 design partners, one lighthouse US logo, ARR ≥ 1M by end of roadmap period

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# Trusted and Incubated by

# STATION F

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# Question and
## answers

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## Contacts

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