



PRECISION SOURCING FOR PRECISION ENGINEERING

AI-powered BOM optimization with real-time DigiKey inventory data.

Find parts, compare prices, and source with confidence.

4

AI AGENTS

3

SUPPLIER APIs

30h

BUILD TIME

Ojas Patkar | Jacob Valdez | Mark Lubin | Kyle Smith

LIVE SUPPLIER DATA

Direct API integration with DigiKey means you're always seeing live data. No cached results from yesterday. No stale pricing.

- Live stock levels updated every request
- Price breaks at every quantity tier
- Lead time visibility for backordered items
- Factory stock vs distributor stock breakdown

API_RESPONSE // DigiKey Live

```
{  
  "mpn": "STM32F405RGT6",  
  "manufacturer": "STMicroelectronics",  
  "stock": {  
    "digikey": 4847,  
    "factory": 12000  
  },  
  "pricing": [  
    { "qty": 1, "unit": 11.42 },  
    { "qty": 10, "unit": 10.28 },  
    { "qty": 100, "unit": 8.85 }  
  ],  
  "leadTime": "In Stock"  
}
```

INTELLIGENT ANALYSIS

Our AI doesn't just find exact matches. It analyzes your BOM and suggests alternatives based on availability, pricing tiers, and specifications.

- Alternate parts with equivalent specs
- Quantity optimization for price breaks
- Vendor consolidation recommendations
- Risk flags for sole-source or EOL parts
- Transparent reasoning for every suggestion

AI_REASONING // Claude Analysis

[COST_OPTIMIZATION]

Increasing order quantity from 50 to 100 units drops unit price from \$2.34 to \$1.87 — 20% savings for 2x volume.

[RISK_ALERT]

Single-source part with 6-week lead time. Consider TI equivalent TPS63020DSJR available from 3 distributors.

REAL-WORLD DATA

Real-world supply chain data that APIs don't capture. Our Market Intel agent scrapes news, manufacturer announcements, and trade publications via Apify.

- Component shortage alerts from industry news
- Manufacturer EOL and PCN announcements
- Price trend analysis from trade publications
- Supply chain risk signals in real-time
- Powered by Apify web scraping platform

MARKET_INTEL // Apify Scraping

[SHORTAGE_ALERT]

STM32F4 series experiencing 18-week lead times due to fab capacity constraints.

[EOL_WARNING]

TI announces LM317 EOL Q3 2026. Last-time-buy deadline: March 2026.

[PRICE_TREND]

MLCC prices down 12% QoQ. Good time to stock up on 0402/0603 caps.

SMART PARSING

Every team exports BOMs differently. Different column names, different formats. We handle it. Upload your CSV or Excel and we'll figure out what's what.

- Automatic column detection (MPN, quantity, etc.)
- Handles multiple MPN formats and conventions
- Fuzzy matching for partial part numbers
- Description-based search when MPN fails
- CSV, XLSX, and ODS support

COLUMN_DETECT // Auto-mapping

INPUT:

Part #	Desc	Qty	Ref Des

Part # → MPN ✓
Desc → DESCRIPTION
Qty → QUANTITY ✓
Ref Des → REFERENCE

[✓] Detected 47 line items
[✓] 45 parts matched
[!] 2 parts need review

SEAMLESS WORKFLOW

Once you've optimized your BOM, get it out of the tool and into your workflow. Export to CSV or use our direct DigiKey cart integration.

- Export to CSV with full decision audit trail
- Direct add-to-cart for DigiKey
- Include AI reasoning in exports
- Custom export templates (coming soon)
- API access for automation (coming soon)

[1] EXPORT CSV

Full BOM with pricing

[2] ADD TO DIGIKEY

Direct cart integration



DIRECT API CONNECTIONS

Direct API connections to the distributors you use.

DIGIKEY
[ACTIVE]

MOUSER
[SOON]

ARROW
[SOON]

NEWARK
[SOON]

LCSC
[SOON]

DATA SOURCES

APIFY
[MARKET INTEL]

SOURCING MANAGEMENT

Tools to manage your sourcing workflow.

SAVED BOMS

Store and version your bills of materials. Quick access to recent projects.

- AVAILABLE

HISTORY

Track every search, every decision. Full audit trail for compliance.

- AVAILABLE

TEAM COLLAB

Share BOMs with team members. Comment on part selections.

- COMING SOON

FOUR SPECIALIZED AGENTS

Each with a unique perspective, running in parallel.

[00] MARKET INTEL

APIFY

Scrapes news, manufacturer sites, and trade publications.

- Shortage alerts
- EOL announcements
- Price trends

[01] ENGINEERING

Validates parts against compliance requirements.

- RoHS/REACH
- Lifecycle (EOL?)
- Counterfeit risk

[02] Sourcing

Evaluates supply chain risk, checks stock levels.

- Lead time analysis
- Multi-source options
- Supplier trust scores

[03] FINANCE

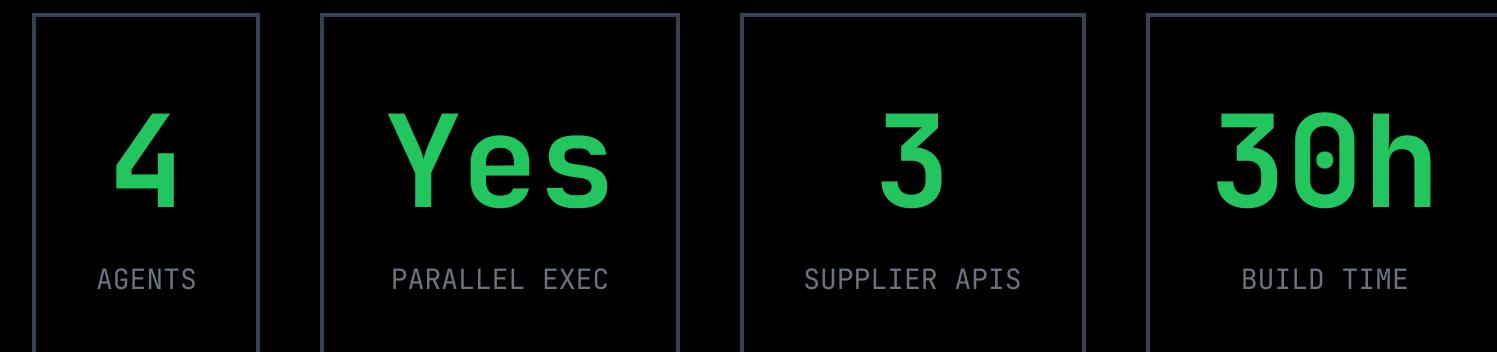
Optimizes for budget constraints and cost savings.

- Price break analysis
- MOQ optimization
- Volume discounts

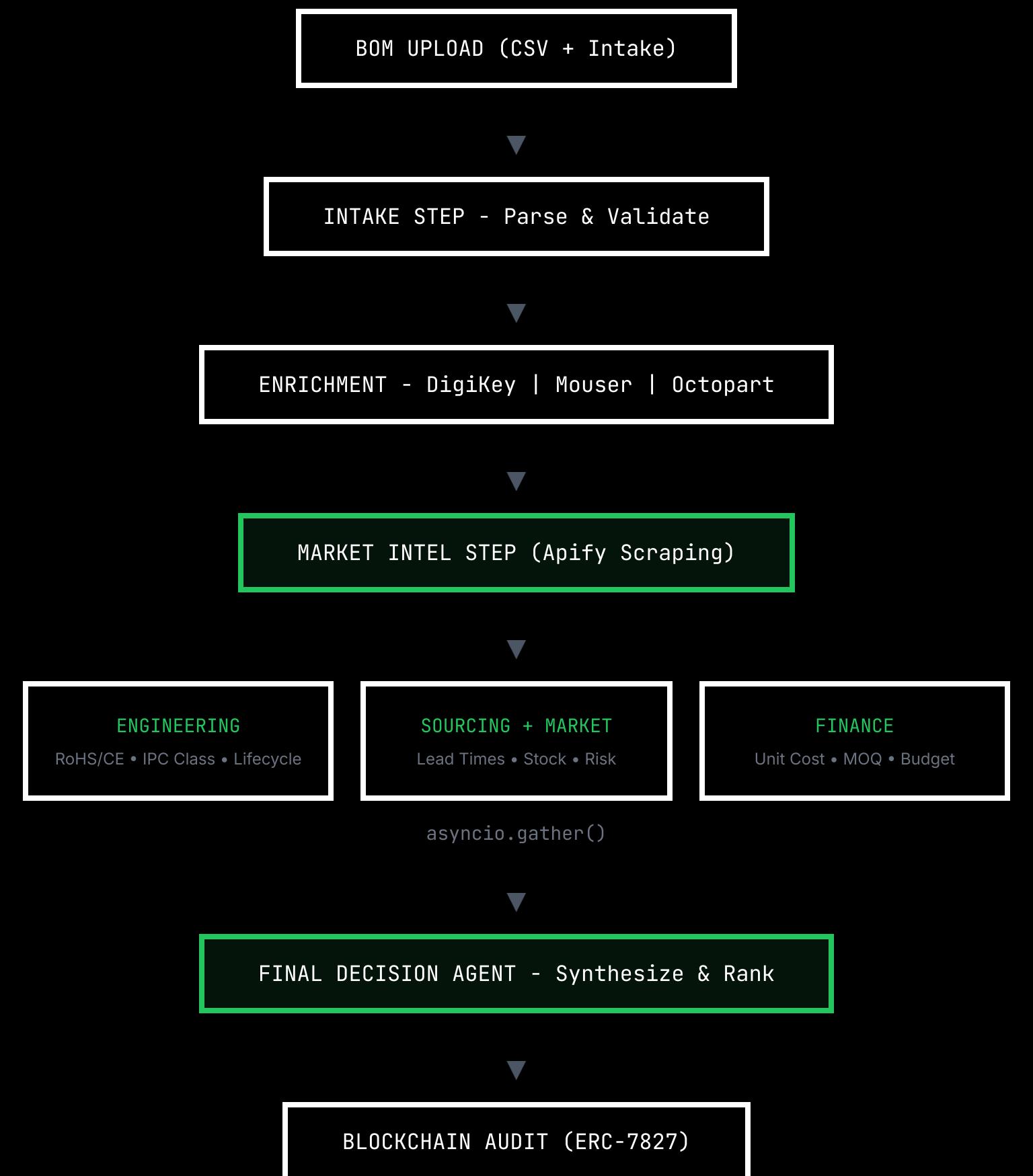
All 4 agents run in parallel using `asyncio.gather()` → Final Decision Agent synthesizes results

UNDER THE HOOD MULTI-AGENT ARCHITECTURE

Four specialized AI agents working in parallel. Real-time supplier APIs.
Live market intelligence via Apify. Blockchain audit trails.







[00] MARKET INTEL

APIFY

REAL-WORLD DATA

- ✓ Shortage Alerts
- ✓ Price Trends
- ✓ Mfr News
- ✓ EOL Announce
- ✓ Supply Signals
- ✓ Trade News

Scrapes news via Apify for real-world intel.

[01] ENGINEERING

COMPLIANCE CHECK

- ✓ RoHS 3 Status
- ✓ REACH SVHC
- ✓ IEC 60601-1
- ✓ IPC Class (1-3)
- ✓ Lifecycle (EOL?)
- ✓ Counterfeit Risk

Validates against compliance databases.

[02] SOURCING

SUPPLY CHAIN RISK

- ✓ Lead Time Check
- ✓ Stock Levels
- ✓ Supplier Trust
- ✓ Multi-Source OK?
- ✓ Market Intel
- ✓ Alt Parts Avail

Evaluates risk with market intel.

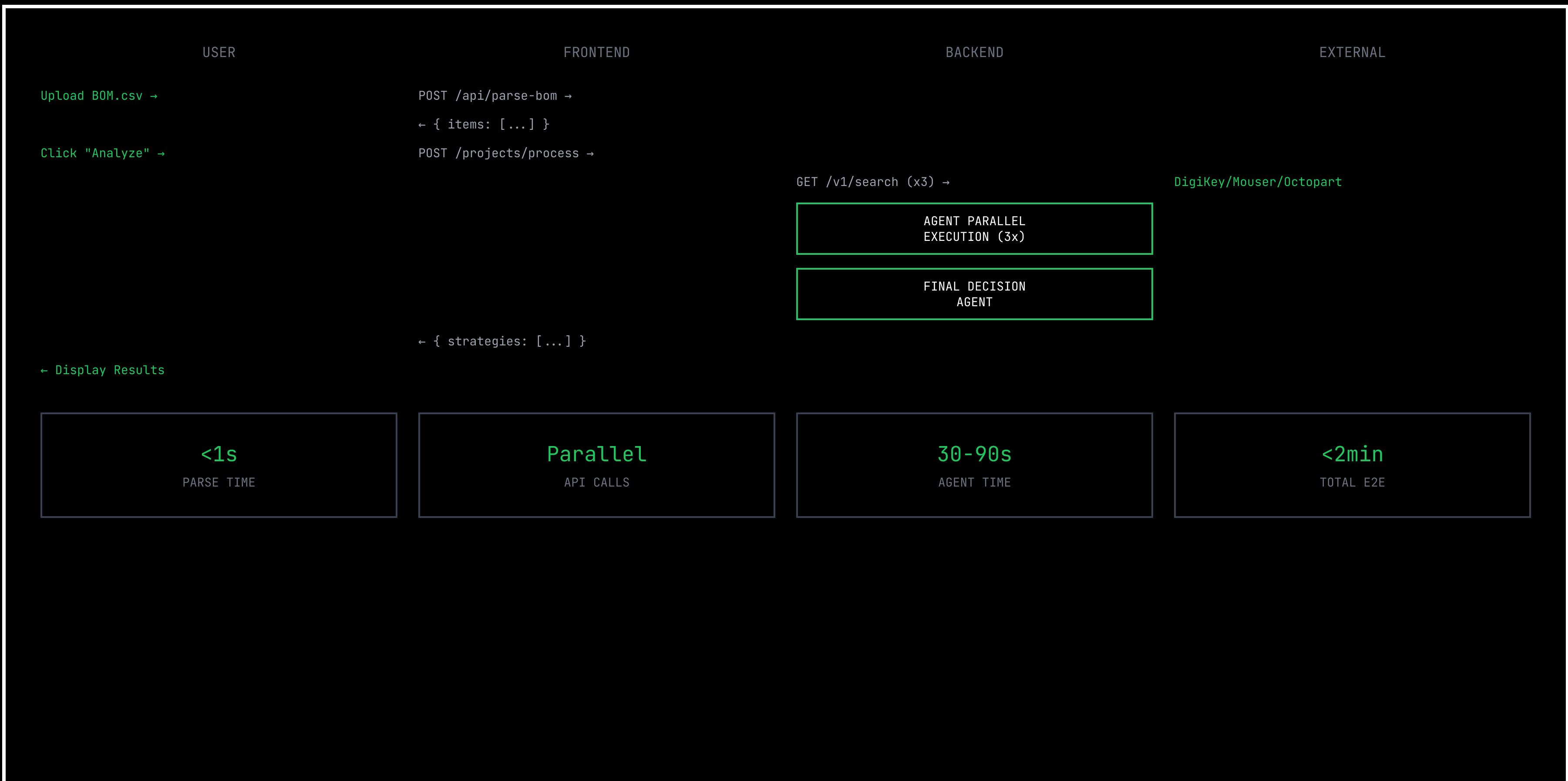
[03] FINANCE

BUDGET ANALYSIS

- ✓ Unit Cost
- ✓ Extended Cost
- ✓ MOQ Requirements
- ✓ Price Breaks
- ✓ Budget Remaining
- ✓ Volume Discounts

Optimizes for budget constraints.

REQUEST LIFECYCLE // DATA FLOW



IMMUTABLE JSON STATE



WHY BLOCKCHAIN?

- Medical devices need FDA-auditable trails
- Aerospace needs AS9100 compliance records
- Can't modify or delete historical decisions
- Timestamp proof of when decisions were made



TECH STACK // THE FULL PICTURE

Next.js 16
Frontend

React 18
UI Library

Tailwind
Styling

TypeScript
Language

FastAPI
Backend

Python 3.12
Runtime

CrewAI
Agents

OpenAI GPT
LLM

Apify
Web Scraping

Pydantic
Validation

Neon
Database

Ethereum
Blockchain

BUILD STATS // HACKATHON EDITION

30

HOURS TO BUILD

45

TESTS PASSING

3

SUPPLIER APIs

5

AI AGENTS

• CLINE

AI-POWERED CODE GENERATION

Cline helped us write production-quality TypeScript, Python, and Solidity across 4 separate deployments. Full-stack in a weekend.

- Next.js Frontend
- Python Agent Service
- Neon Postgres
- Ethereum Contracts

17,149

LINES OF CODE

4 Deployments
Built in 30 Hours

- OPENAI + CREWAI
AGENT FRAMEWORK

CrewAI provides excellent agent orchestration, but swapping to OpenAI GPT-5.2 for inference gave us 3.75x speed improvement.

- CrewAI for orchestration
- OpenAI GPT-5.2 for inference
- Best of both worlds

SPEED COMPARISON

CrewAI Default:



GPT-5.2:

**3.75X**

FASTER

- **Rilo**

LEAD ACQUISITION AUTOMATION

We used Rilo to generate LinkedIn and Reddit content for PrecisionBOM.

getrilo.ai

- Email signup workflows
- LinkedIn outreach automation
- Lead enrichment pipeline
- Plain English → Workflows

"Get me signups from hardware engineers interested in BOM optimization"



AUTOMATED IN MINUTES

• AI NATIVE STUDIO

NEXT-GEN DEV ENVIRONMENT

AI Native Studio helped with rapid prototyping and code quality checks during our speed-focused hackathon development.

ainative.studio

- Code quality analysis
- AI-assisted debugging
- Architecture exploration

RAPID
PROTOTYPING
&
QUALITY

• APIFY

LIVE: MARKET INTELLIGENCE AGENT

apify.com - Web Scraping at Scale

APIFY ACTORS

- Web Scraper
- News Scraper
- Site Crawler

MARKET INTEL AGENT

- Component shortage alerts
- Manufacturer news & updates
- Price trend analysis
- EOL/lifecycle announcements
- Supply chain risk signals

INTEGRATION: BOM Upload → Extract MPNs → Apify scrapes news/manufacturer pages → MarketIntelAgent analyzes → Risk alerts

13,000+ pre-built scrapers Real-time data Proxy rotation

THE FLEX SUMMARY // WHAT WE SHIPPED

17,149

LINES OF CODE

30

HOURS TO BUILD

4

DEPLOYMENTS

5

AI AGENTS

6

SPONSOR TOOLS

ESI x Korea Investments AI Agent Hackathon 2026

WANT TO SEE IT IN ACTION?

Upload a BOM and watch the agents work.

TRY IT NOW →

VIEW FEATURES

precisionbom.com

Built for the ESI x Korea Investments AI Agent Hackathon 2026
Team: Ojas Patkar • Jacob Valdez • Mark Lubin • Kyle Smith