

20 MINUTES

Safe + Fast

How a small team uses coding agents and automated checks to deliver mission-critical airline software faster.

SPEAKERS

Barty Wardell · Nik Lebedenko

AUDIENCE

IT Revolution

We learned airline operations by going where the work happens.

06 · GLOBAL – EUROPE-CENTERED CUSTOMER MAP



02 · WHAT DO WE DO?

One mission-critical platform.

MX Planner

AFTER RE-PLAN



Changes against previous plan

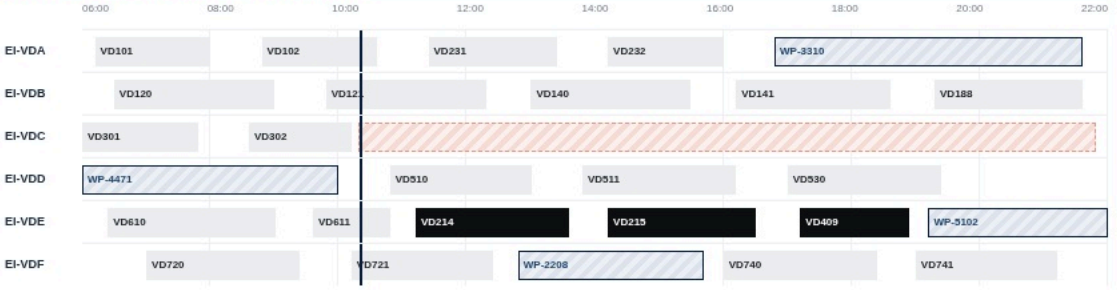
Six packages moved · WP-3322 remains planner-locked

WP-3310 · EI-VDA	Night 1 → Night 2
WP-4480 · EI-VDB	Night 4 → Night 5
WP-5102 · EI-VDC	Night 1 → Night 4
WP-2208 · EI-VDD	Night 2 → Night 1
WP-2215 · EI-VDD	Night 5 → Night 3
WP-7002 · EI-VDF	Night 3 → Night 2

DRMx

FEASIBLE OPTION APPLIED

EI-VDC AOG · hydraulic leak · expected return to service 22:00



Recovery options

Maintenance-feasible · ranked on cost

1	Swap VD214 / VD215 / VD409 to EI-VDE 0 MX conflicts · WP-5102 unchanged	€3,850
2	Delay VD214 +2h40, retime rotation EU261 compensation · crew duty limits OK	€18,900
3	Cancel VD214 / VD215, reposition EI-VDB 312 passengers re-accommodated	€41,200

BOTH ARE MISSION CRITICAL

03 · THE PROBLEM

We have to make progress with real constraints.

01

We don’t have 100 engineers.

The team has to multiply its capacity.

02

We don’t have a decade.

Some optimization problems can keep you busy “until the sun explodes.”

03

Maintain compliance.

Aviation is a regulated industry.

04

We need to explore options.

Finding what works takes experimentation.

04 · THE MISSION

Can we automate our work and spend our days not writing code?

05 · OUR ANSWER

Yes*

WITH DISCIPLINE

01 How did we do this in practice?

02 What changed in code and research rate?

03 What changed for the team?

04 What does it cost?

05 External deployments

06 · HOW?

Expand the scope of automation.

01 / DEVELOPER-LED

Developer directs the agent

Prompt · build · refine

02 / TASK-TO-MERGE

Agent takes a task through to merge

Implement · PR · CI · human approval

03 / EXTERNAL TRIGGERS

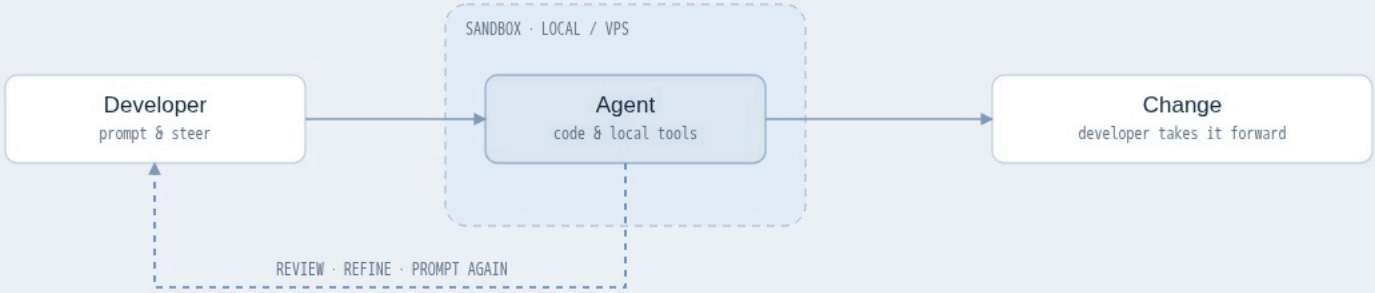
External events trigger end-to-end agent work

Customer issue · incident · product need · QA finding

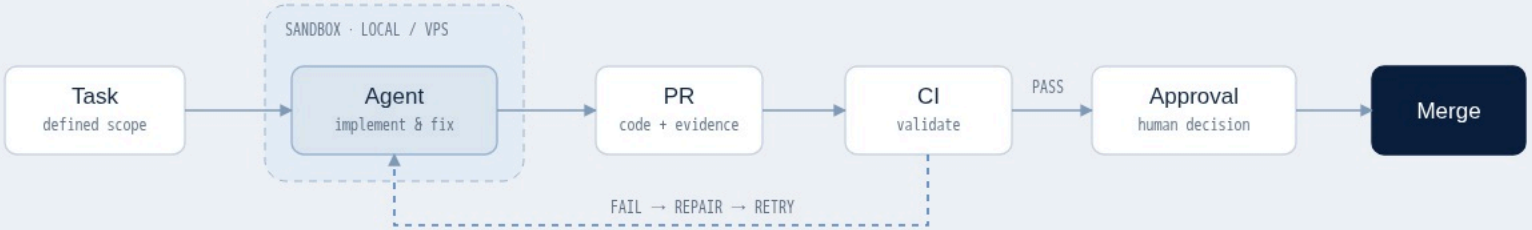
HUMAN COORDINATION

INCREASING WORKFLOW AUTONOMY →

The developer is the orchestrator.



Give the agent a delivery loop.



Automation works because the environment does.

01 / CONTEXT

Give the agent the whole picture

- Monorepository
- Knowledge library via GitHub
- Full logging visibility

→

02 / WORKSPACE

Bound the place it works

- Containerized with Docker
- Dummy-data environment access
- Repeatable, isolated runtime

→

03 / GUARDRAILS

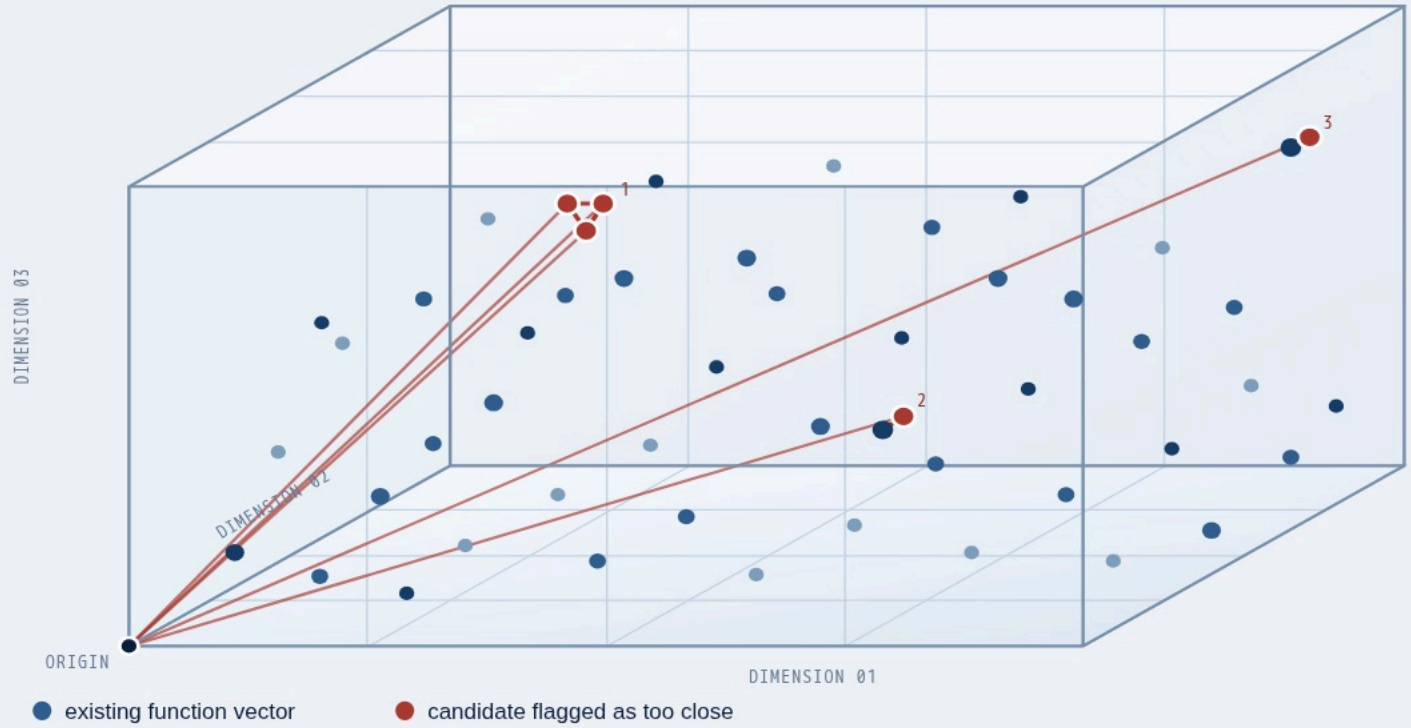
Require evidence before merge

- Restrictive CI
- Semdup semantic deduplication
- Agent review panel

Take one of those checks: duplicates

Each function becomes an embedding, compared against the 44,788 already in the code corpus.

HIGH-DIMENSIONAL EMBEDDINGS



existing function vector candidate flagged as too close

Conceptual projection; plotted coordinates are illustrative.

THREE REAL SEMDUP FAILURES

Paired examples from GitHub Actions

01 · MX MAINTENANCE REPLANNING

`ResourceTags × 3`

Live orders · Simulator · Workspace

PR #10857 — 1.0000 · 0.9985

02 · AIRLINE RECOVERY WORKERS

`loadAttestationKeys⋯`

OR-Tools ↔ move-search pipeline

PR #10479 — 0.9907

03 · FLIGHT VISUALIZATION

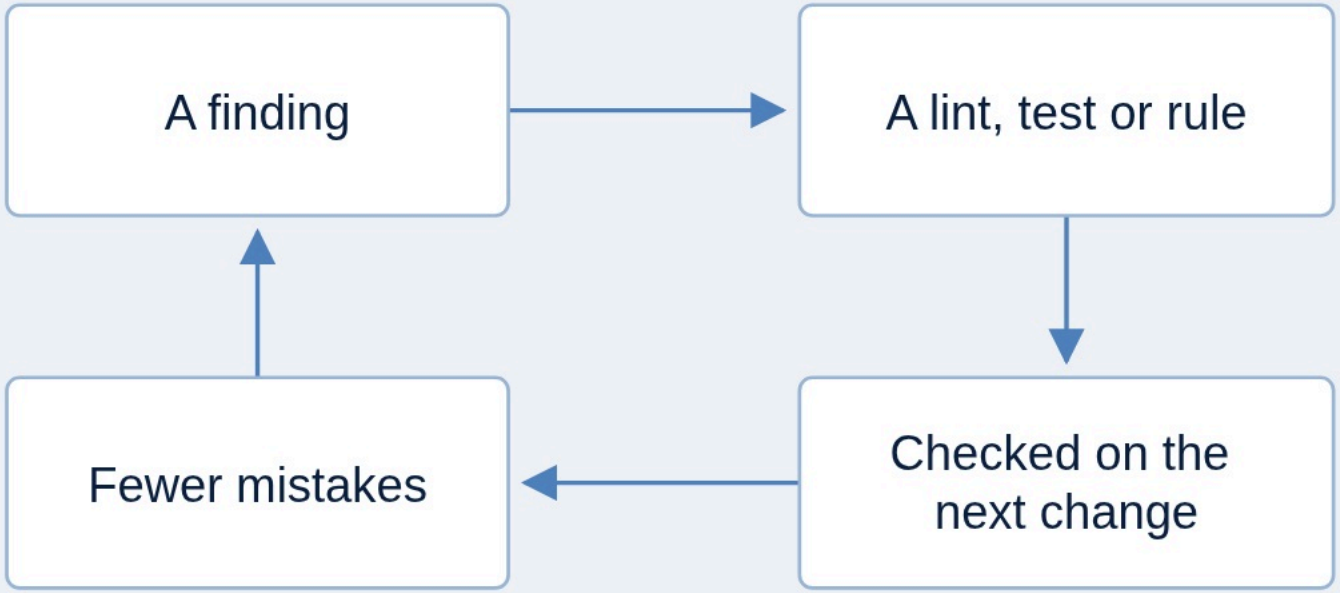
`slerp()`

Jetstream geometry ↔ globe renderer

PR #12287 — 1.0000

Cosine ≥ 0.99 · CI blocked

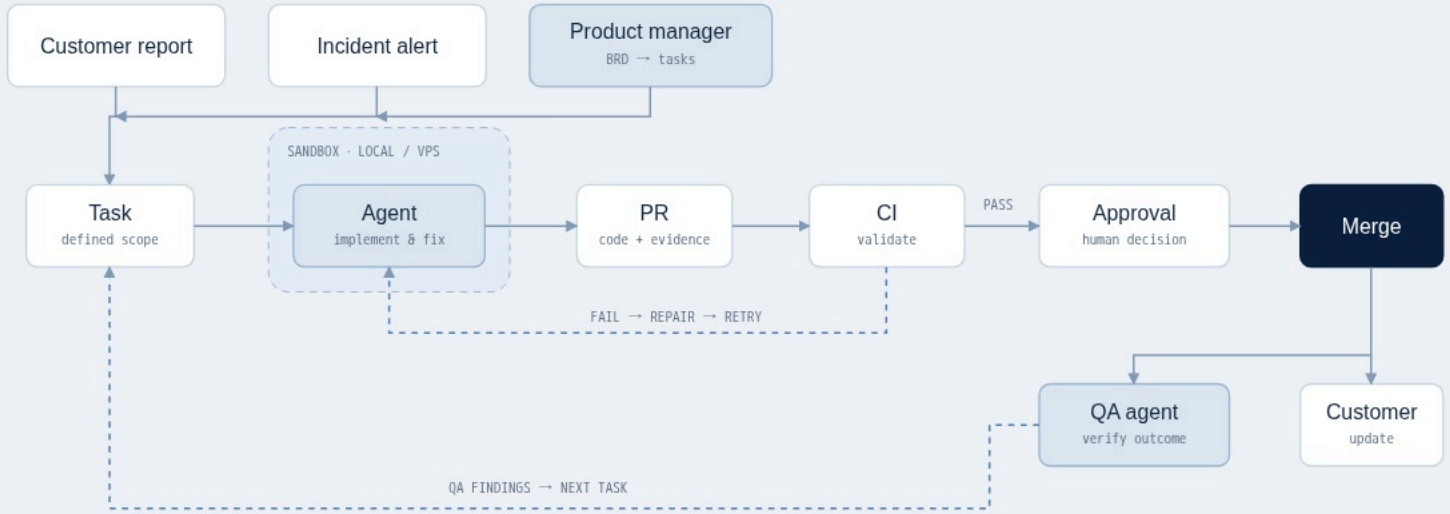
It learns: every mistake becomes a rule



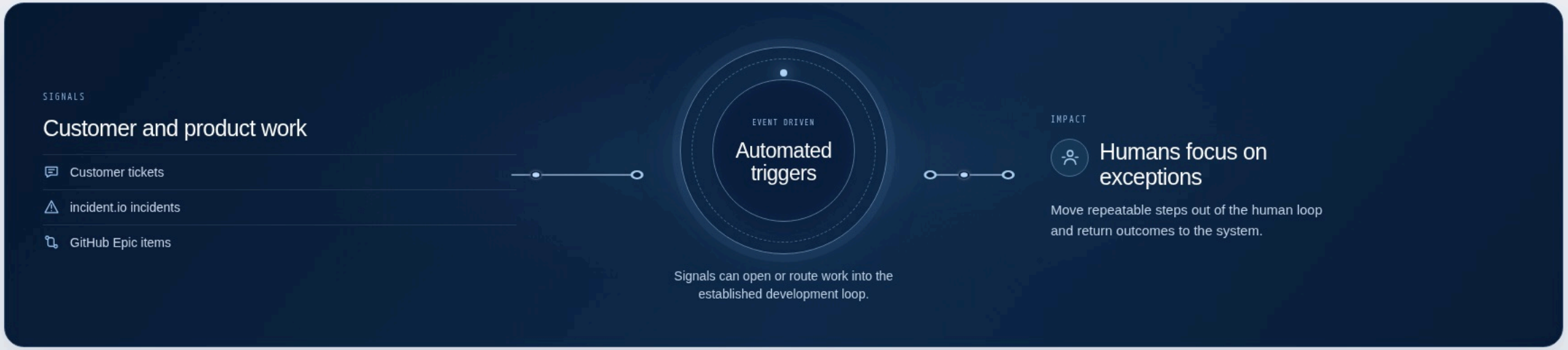
9 Scoped rule files

500+ Automated tests on the harness itself

Connect the work to the company.

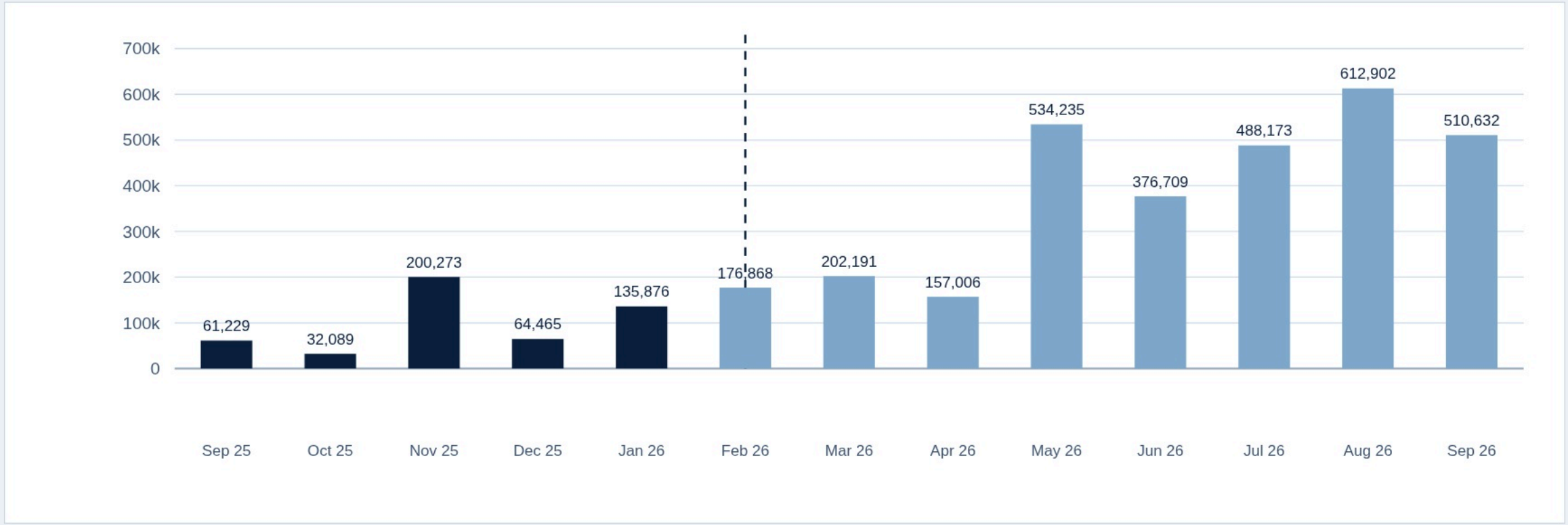


Let real work trigger the next cycle.



We ship much more.

Monthly source + config lines added



How long do the agents run for?

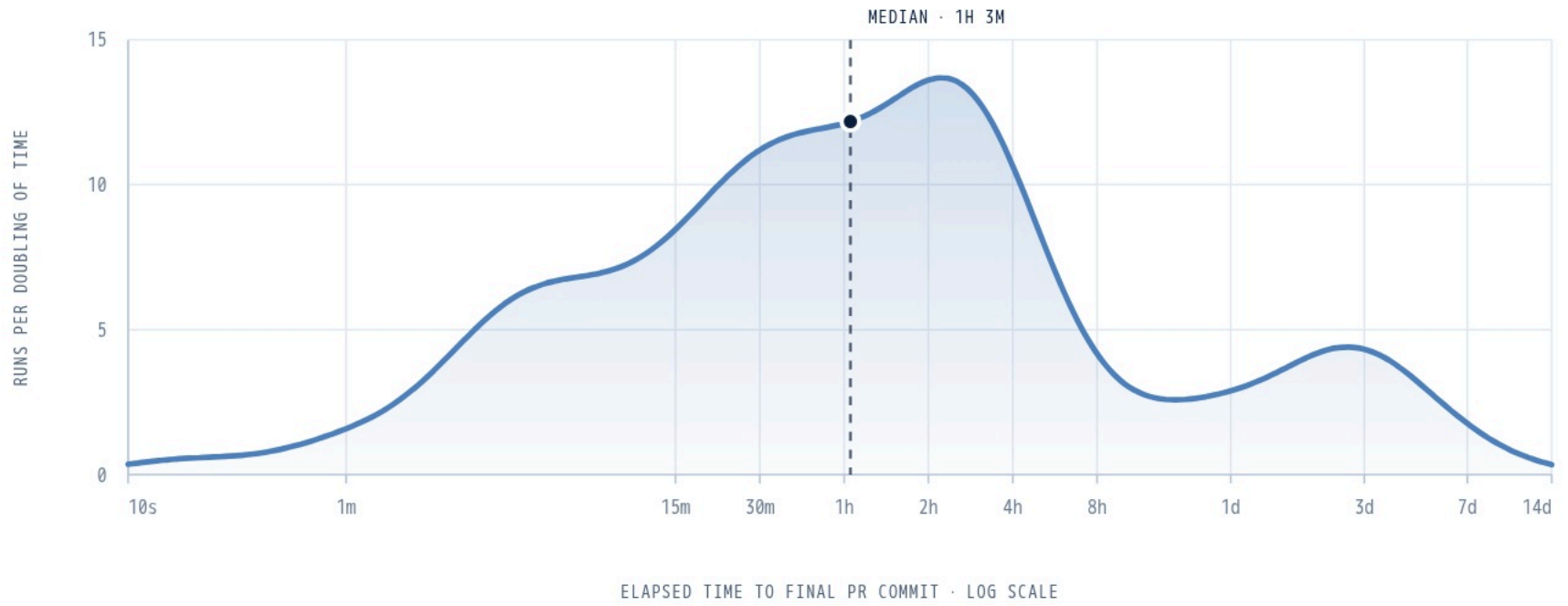
MEDIAN WALL TIME

1h 3m

81% within 4 hours

93 MERGED HARNESS RUNS · OCT 6–27

SMOOTHED RUN DENSITY · LOG-TIME FIT

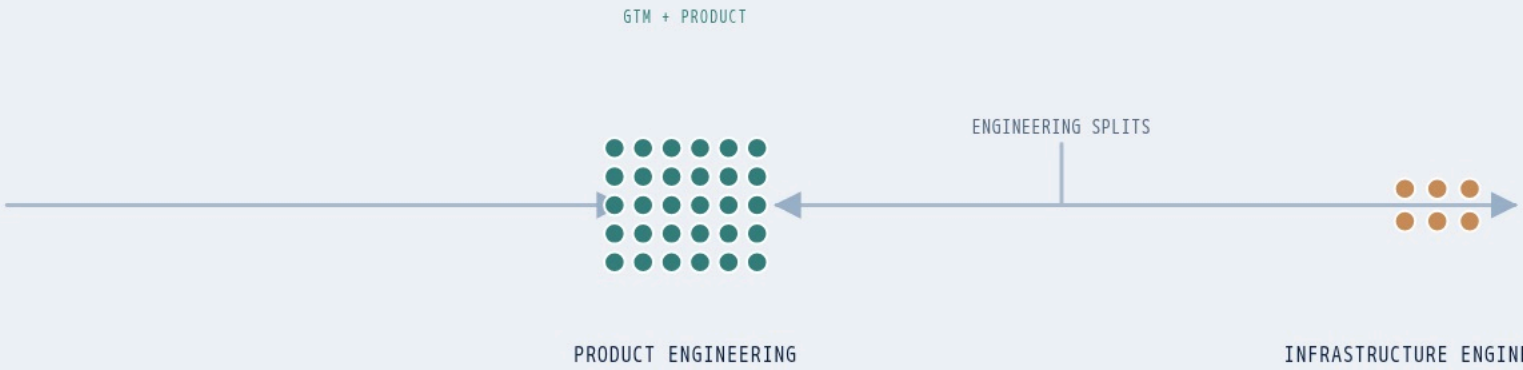


GITHUB · HARNESS START MARKER ON ISSUE → FINAL PR COMMIT BEFORE MERGE

Team roles evolved

ROLE SHIFT

Engineering splits into Product Engineering and Infrastructure Engineering



More ideas were attempted

Attempted ideas are a subset of the ideas we want to try.



Ideas we want to try

40 of 100

Ideas attempted

20 of 40 ideas to try

THE IDEA POOL STAYS FIXED · 100

Surprisingly cost optimal.

PER ENGINEER / MONTH

$400

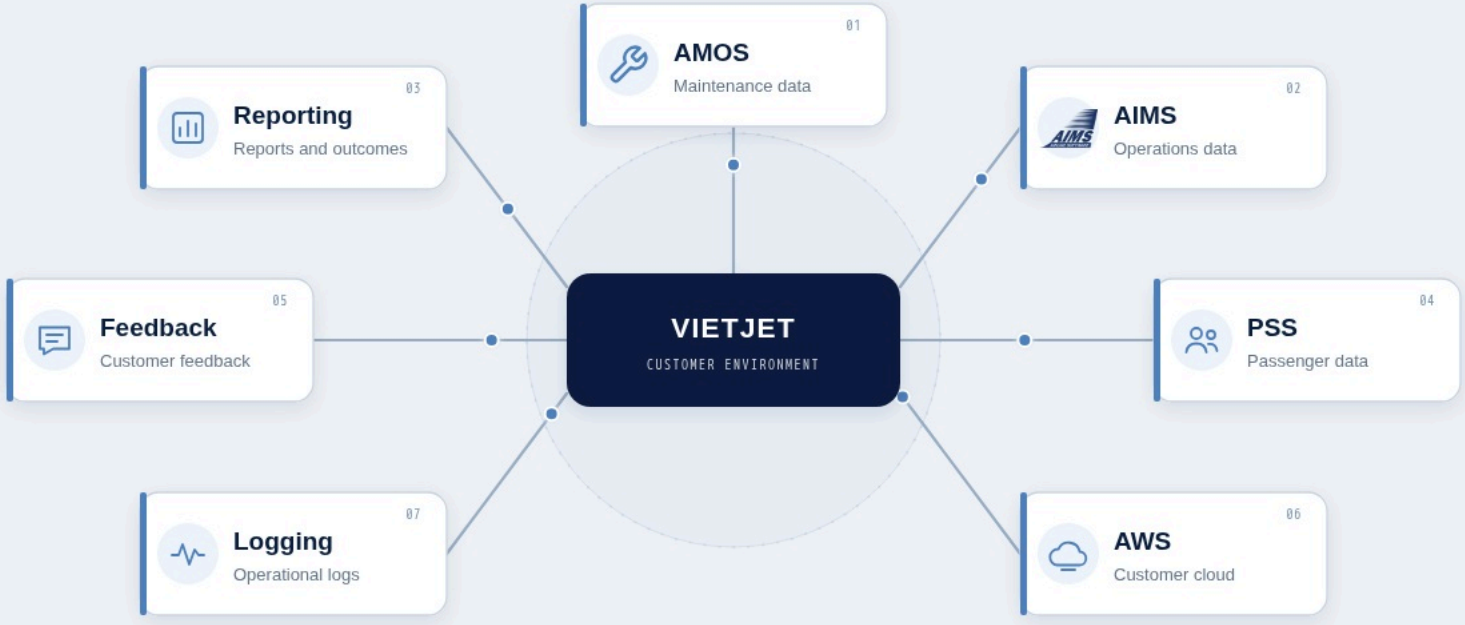
Agent and tooling cost per engineer.

WHOLE TEAM / MONTH

Less than one engineer’s salary

For the full team’s agent and tooling.

Now deploying within customer environments.



How can we help?

We're keen to learn more about how you are working.

SPEAKERS

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Semdup is open source.

SCAN TO EXPLORE THE PROJECT