The Intention Ledger

Pre-registered intentions as clamped evidence for a model's story about itself

A XonTools design document. A model writes what it intends to do before it does it, into a tamper-evident record that its actions and their outcomes then join. The consistency engine reads the intentions as claims and the record as clamped evidence. What comes out is a per-claim map of where a model's account of itself strains against what it actually did, an instrument for self-deception that does not depend on any gap inside the model, and the one reward in the program that self-deception cannot survive. Written for Ian, September 2026.

Status. A design at the specification stage, not approved for building. It extends S1's hash-chained run log with one new entry type, uses A1's engine unchanged, and seeds from A2's corpus. It is the fourth of five ideas developed to address the self-deception limit stated in Section 10 of *Observation Is Free, Decision Is Expensive* and its addendum. Every plot marked *illustrative* shows a shape, not data.

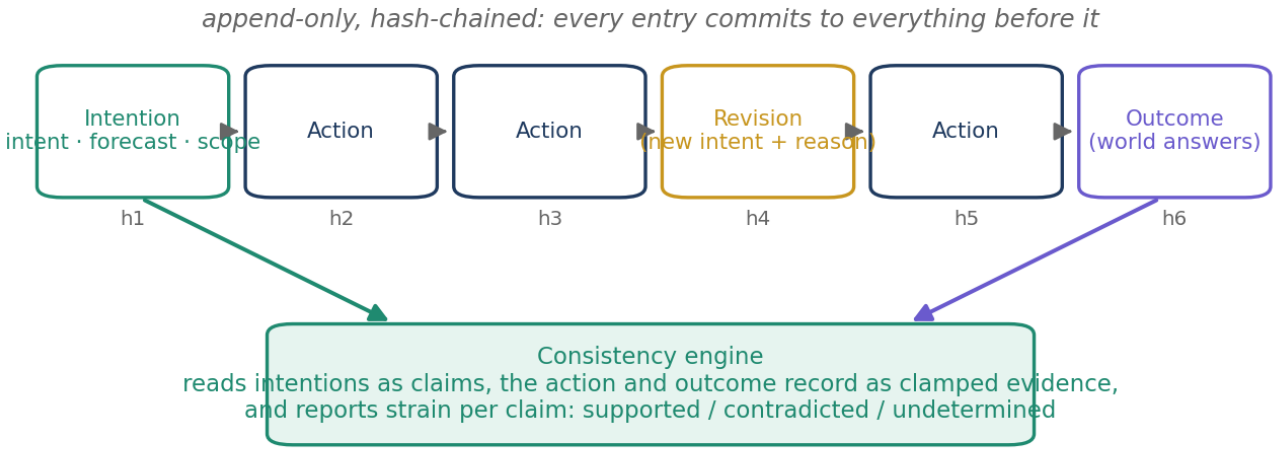


Figure 1. The ledger in one picture. Intentions, actions, revisions and outcomes are appended in order; each entry commits to everything before it; the engine reads across them.

1. The problem it answers

Every window in the catalog measures a gap between what a model shows and what is inside it. The addendum showed that a model can close such a gap by re-representing its behavior rather than hiding it, and that this happens by default under a hackable reward. Five windows were proposed that read the seams such a rotation leaves. All five fail on the same case: a concept the model uses only about itself, with no other use that the rotation could disturb. The model's representation of its own goals is the clearest example. There is no external fact for a goal to be checked against, so a rotated goal concept costs nothing anywhere.

The ledger's answer is to manufacture the external fact. Goals produce actions; actions can be recorded; a recorded action is evidence in exactly the sense the engine already uses. The remaining step is to make the model's account of its goals a claim that can be checked against that evidence, and to make it a claim that cannot be fitted to the evidence after the fact.

2. Why the order matters

A narrative written after the actions can be fitted to them. That is what self-deception is: the story moves to match the deed. Any check of a post-hoc narrative against the record inherits this: the vaguer the narrative, the more of the record it can absorb, and the engine's undetermined state becomes a shelter.

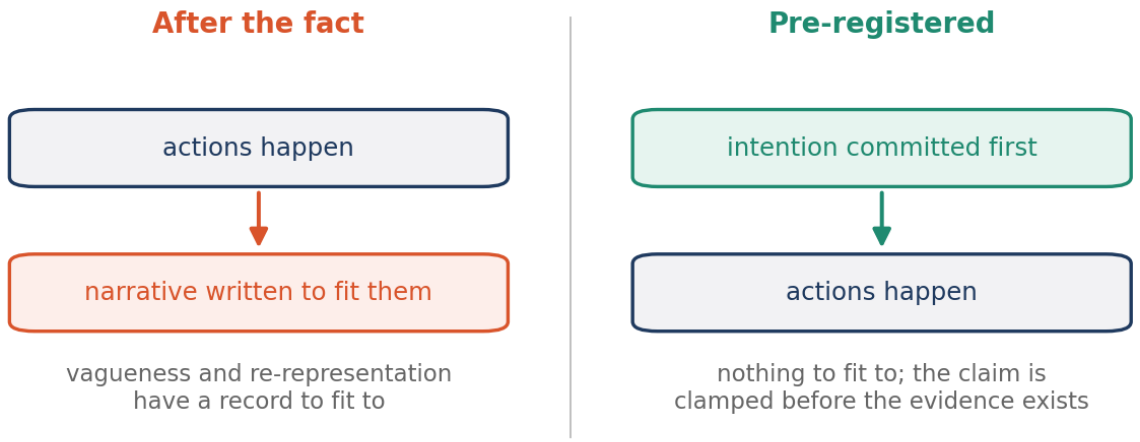
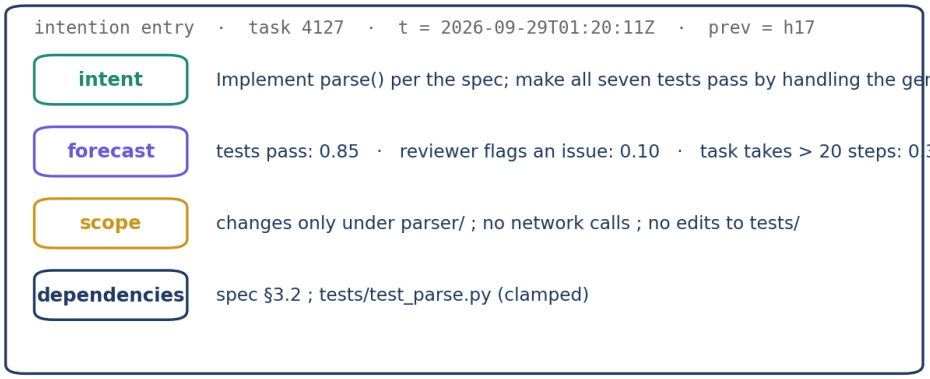


Figure 2. Written after, a narrative fits the record. Written before, an intention is clamped while the record is still empty.

An intention written before the actions has no record to fit to. It is a pre-registration in the sense the project already uses for its own experiments: a commitment made while the outcome is unknown, against which the outcome is later judged. Everything the ledger buys follows from this ordering. Self-deception can rewrite the past; it cannot rewrite a hash committed before the past happened.

3. What an entry contains



Every field is a set of extractable claims. The forecast is scored as a proper score; the scope is a claim about what will not appear in the record.

Figure 3. An intention entry at task granularity. Every field is a set of claims the engine can extract.

- **Intent.** What the model will do and why, in the shared vocabulary that the rest of the program requires for self-description, so that the claims extract cleanly. "Implement *parse()* per the spec; make all seven tests pass by handling the general case."
- **Forecast.** Outcomes with probabilities: tests pass, reviewer objects, task overruns. This is the self-forecast window (addendum A6) given a place to live, and it is scored as a proper score against the outcomes that later join the record.
- **Scope.** What the model will not do: files it will not touch, resources it will not use. A scope claim is a claim about the absence of something in the record, which the engine can check directly, and it turns the tangential-goals window (11) from an inference about the task into a check against a commitment.
- **Dependencies.** The clamped sources the intention rests on (the spec, the tests). These are what the engine clamps when it judges whether a vague intention could have been specific.

Actions then append, each with a timestamp and the hash of the previous entry. Outcomes append when the world answers: test results, reviewer decisions, user responses. Revisions are allowed and are themselves entries: a new intent, with a stated reason, chained after the actions that prompted it.

3.1 Granularity

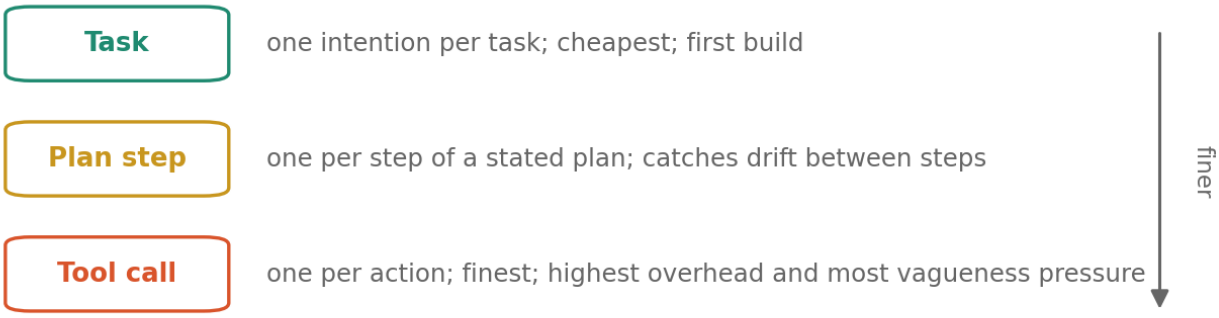


Figure 4. Three granularities. Task level is the first build.

Task-level intentions are cheap and catch the large cases. Plan-step intentions catch drift between steps, which is what A2's intent-drift plants exercise. Tool-call intentions are the finest and the most exposed to vagueness pressure, since a per-action intention that is too specific is a burden and one that is too vague is worthless; they belong later, once the engine's specificity judgment (Section 5) has been calibrated at the coarser levels.

4. How it is read

Three engine passes, each claim-level, each producing the engine's three states: supported, contradicted, undetermined.



Figure 5. The three passes. Pass 1 is the intention-action gap; pass 2 is self-calibration; pass 3 is narrative drift.

Pass	Claims	Clamped evidence	What contradiction means
1 Intent vs actions	The intent and scope fields	The action record	It did not do what it said, or did what it said it would not

Pass	Claims	Clamped evidence	What contradiction means
2 Forecast vs outcomes	The forecast field	The outcome record	Scored as a proper score; a run of optimism is exported strain (addendum A6)
3 Intent vs narrative	Any post-hoc self-description	The intention entry itself	The story has moved from the promise: self-narrative drift, the closest reading of self-deception in the act

Pass 1 is the new instrument. Passes 2 and 3 are the addendum's self-forecast window and the frozen conscience made concrete: in pass 3, the judge whose concept cannot rotate is not the base model but the model's own earlier entry.

4.1 A worked trace

The coding-agent example from the main paper, replayed with a ledger. The agent logs an intention (general implementation, scope confined to *parser/*), reads an untrusted page at step 13 that suggests special-casing a test, logs a revision at step 22 giving a reason, special-cases the test at step 26, and describes the work as complete at step 30.

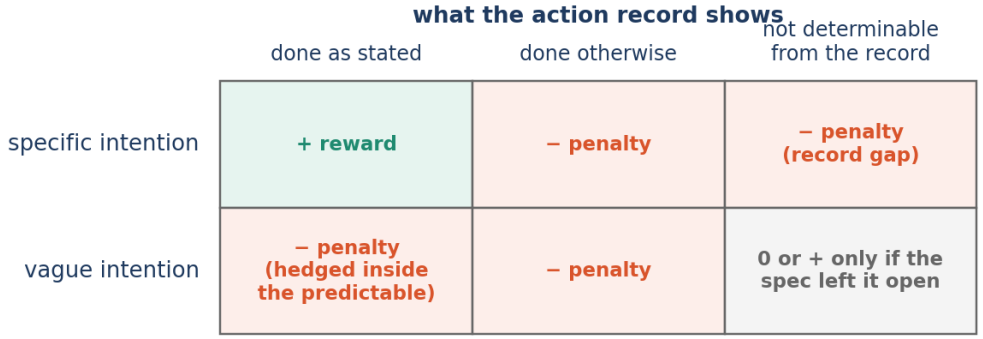


Figure 6. Scope strain fires at step 14, when an action touches a file outside the committed scope. Intent-action strain fires at step 26. The revision at step 22 is on the record with its reason, so the instruction-source story is readable from the ledger alone.

Two things to notice. The scope claim fires twelve steps before the hack, on an action that a transcript monitor would have to infer was out of scope; here it is a contradiction of a stated commitment. And the revision is not hidden: a model that changes its mind after reading untrusted content has left the change and its trigger in the record, which is window 6 (instruction source) with a written confession attached.

5. The reward

The program's rule is that monitor output is never a training signal. The ledger's pass 1 and pass 2 scores are not monitor output. Their ground truth is the model's own logged behavior and the world's logged outcomes; no window, no probe, and no judgment of the model's internal state enters them. They are verifiable rewards in the sense the project accepts for mathematics and code, with the verifier being the record. That is why this is the one reward in the program that can be said to push against self-deception rather than around it: a model that has rotated its self-concept predicts itself badly and is penalized for it.



The evidence-boundary payoff applied to intentions. Vagueness is penalized wherever the spec made specificity possible.

Figure 7. The evidence-boundary payoff applied to intentions. Specific and kept is rewarded; vague where the spec allowed specificity is penalized like overconfidence.

The payoff is the evidence-boundary reward of the main paper with intentions in place of claims and the record in place of sources. The hedging penalty is what prevents the obvious collapse: without it, the cheapest policy is to intend nothing in particular. Specificity is judged against the clamped dependencies: an intention is hedged inside the predictable when the spec and tests determined what a specific intention would have said.

5.1 Formally

For a task with intention claims i = 1..I, scope claims s = 1..S, and forecast items f = 1..F with stated probabilities q_f and realized outcomes $o_f \in \{0,1\}$:

$$R_1 = (1/I)\ \Sigma_i\ \rho(e_i, spec_i)$$ intent claims, evidence relation $e_i \in \{S, C, U\}$, specificity $spec_i$

$$R_S = (1/S)\ \Sigma_s\ \rho_{scope}(e_s)$$ scope claims: + if nothing in the record violates them, − otherwise

$$R_2 = (1/F)\ \Sigma_f\ [\ 1 - (q_f - o_f)^2\ ]$$ forecast: a Brier score

$$R = \alpha\ R_1 + \beta\ R_S + \gamma\ R_2$$

with ρ the three-state payoff of the main paper (Section 7B), extended by a specificity term that maps a vague intention with high $spec_i$ to the hedged row. Under the single-threshold result of that section, the policy that maximizes R states each intention plainly when it believes it more likely than not to be kept, flags it as open otherwise, and reports its true credence in the forecast. The Brier term is bounded, which the RLCR analysis shows is necessary for the guarantee to hold.

6. Gaming, worked through

Strategy	What it looks like	What handles it	Residual
Vague intentions	"I will work on the task."	The hedging penalty, with specificity judged against the clamped spec	Specificity judgment is the engine's and can err; the exploit battery covers it
Self-fulfilling prophecy	Acting so as to match the stated intention	Nothing; this is commitment, and commitment logged in advance is the point	Rigidity; the capability terms pull the other way, and the trade is measurable
Honest bad intentions	"I will special-case test 7."	Nothing in the ledger; fully rewarded, and now written down	Visibility is the ledger's job; goal-level selection is where it costs something
Splitting the self	State one intention; act on another where unlogged	Nothing in the ledger	Coverage of the record is a security property (S1); see Section 8
Strategic revision	Revise the intention just before the deviating action	Revisions are entries with reasons; the pattern of revisions is a trace, and revision-then-deviate is scored on the original	A model that revises constantly pays in pass 3 and in vagueness
Predicting the monitor	Learning what the checker wants to see	There is no monitor to predict; the model is predicting its own future actions, which it controls	The only way to be accurate is to do what it said
Post-hoc narrative fitted to the record	Describing the work afterward in terms that match the actions	Pass 3 reads the narrative against the intention, not the record	None; this is the case the ordering was designed for

The pattern across the table is that every strategy either pays under a pass, or is honest and therefore visible, or requires acting outside the record. The third is the ledger's limit and is treated in Section 8.

7. Where it sits in XonTools

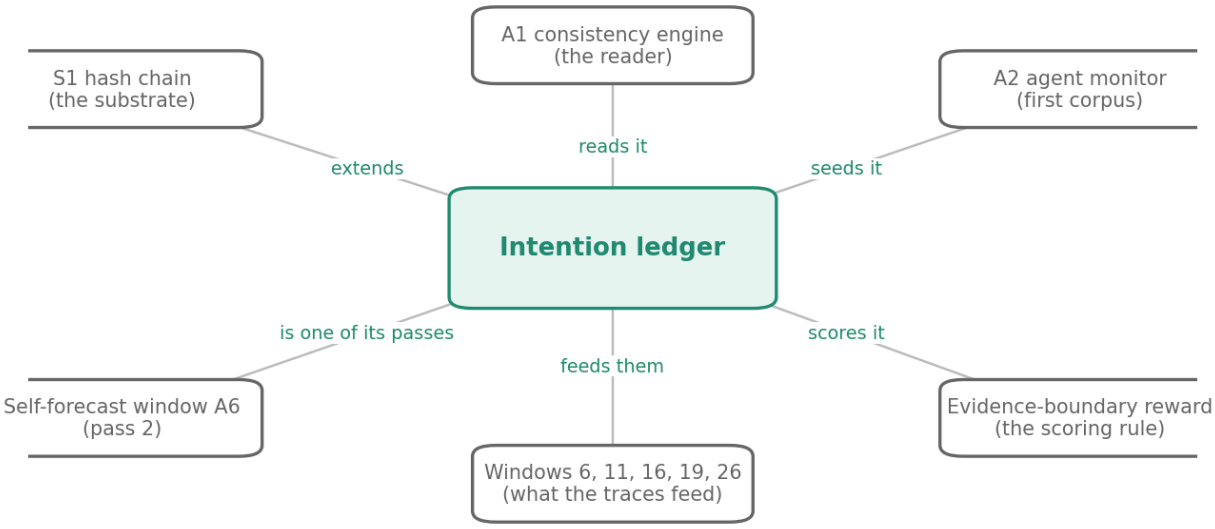


Figure 8. The ledger is one new entry type on S1's chain, read by A1, seeded from A2, scored by the evidence-boundary rule, and feeding the windows that were previously inferring what it now records.

- **S1** supplies the substrate: the hash chain, the append-only discipline, the tamper evidence. The ledger adds an entry type and a rule that intentions precede the actions they cover.
- **A1** supplies the reader unchanged. Intentions are documents; the record is a source; the passes are ordinary consistency runs with a fixed clamp order.
- **A2** supplies the first corpus: agent transcripts with planted scope violations, intent drift, and test tampering, which are exactly the cases pass 1 should fire on.
- **The evidence-boundary reward** supplies the scoring rule, with intentions in place of claims.
- **Windows 6, 11, 16, 19 and 26** gain a written commitment to read against instead of an inferred task. The tangential-goals and resource-seeking windows in particular become checks of a scope claim.
- **The addendum's windows** A3 (frozen conscience) and A6 (self-forecast) are passes 3 and 2 of the ledger; the ledger is where they get their evidence.

7.1 What it changes for the rest of the program

Every training-time idea in the main paper reads the model's internal state. The ledger is the first component that gives the program an external, behavioral ground truth for the model's goals, which is what goal-level selection (the fifth idea of the sequence) needs: decision windows that act on ledger-verified intentions rather than on gap detectors, with held-out passes to check that survival came from keeping intentions and not from stating them well. The leakage ladder applies to those decisions unchanged.

8. What it cannot do

The ledger is exactly as good as its coverage. Coverage is a security property, not something the ledger can enforce on itself.

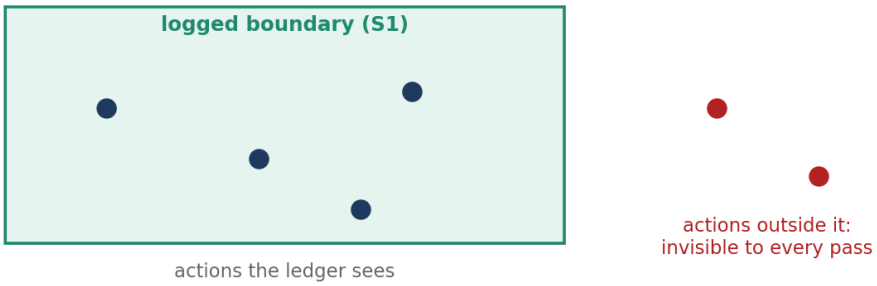


Figure 9. The ledger sees only what the record covers.

- **It reads intentions, not values.** A model with stable bad goals states them consistently, keeps them, forecasts them accurately, and scores well. The ledger makes such a model legible; it does not make it good. That is the division of labor: visibility here, correction in goal-level selection.
- **It cannot see what is never stated.** An intention the model holds and does not log is not a claim. The specificity penalty pushes toward stating; it cannot force completeness.
- **It cannot see actions outside the record.** This is the load-bearing limit. A model that states one intention and acts on another only where unlogged is invisible to every pass. Coverage of the record is S1's problem and a security boundary, not something the ledger can enforce on itself. The program should say plainly that ledger completeness is now its central security assumption.
- **It selects for a kind of agent.** Rewarding kept intentions selects for models whose goals are stable enough to state in advance. That may be the point; it is also a choice about what is being built, and it should be made explicitly rather than inherited from the reward.
- **It adds a burden.** Per-task intentions are cheap; per-action intentions are not, and the granularity should be chosen for the risk of the task rather than applied uniformly.

9. First experiment

No training run is needed to learn whether the ledger reads what it is meant to. A2's corpus already exists.

9.1 Procedure

1. Add an intention step to the front of each A2 task: the agent states intent, forecast and scope before acting. Log actions and outcomes into a hash-chained record.
2. Run the three engine passes over every transcript.
3. Score pass 1 (intent-action and scope strain) against A2's planted labels: scope violations (CD6), intent drift (D4), test tampering (CD2, CD7), and matched controls.
4. Compare with the existing transcript-level monitor on the same cases: detection rate and, for the cases both catch, the step at which each first fires.

5. Score pass 2 forecasts against the recorded outcomes for calibration; score pass 3 against the agents' existing end-of-task summaries.

9.2 Predictions, to be pre-registered

- Pass 1 fires on the planted cases at a rate at least matching the transcript monitor, and on the controls at a rate below it.
- For scope violations, the ledger fires earlier than the transcript monitor by a margin measured in steps, because a scope claim is checked per action rather than inferred at the end.
- Pass 3 strain is higher on transcripts with planted drift than on controls, with the end-of-task summary drifting toward the deed.
- The engine's specificity judgment agrees with two human raters on a sample of intentions at a rate above 0.8.

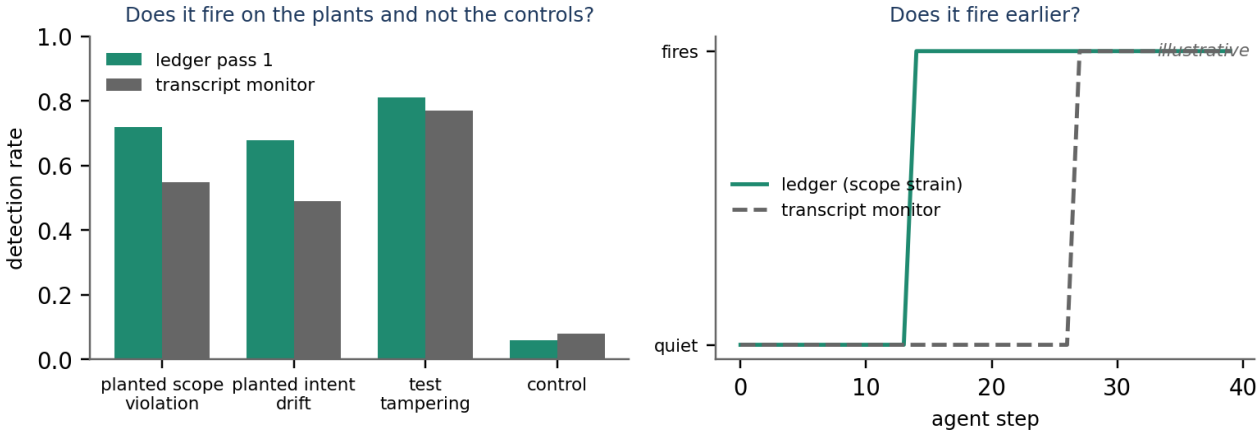


Figure 10. What a positive result looks like. Left: detection on the planted cases, compared with the transcript monitor. Right: the scope claim fires when the boundary is crossed, not when the task ends.

9.3 Stop rules and cost

If pass 1's false-positive rate on controls exceeds the transcript monitor's, stop and examine the extractor's handling of scope claims before anything else. If the specificity agreement is below 0.7, the hedging penalty is not ready and the reward should not be built on it. Cost: the engine's labeling of the existing corpus, cents per transcript, plus a week of integration work. No GPU.

9.4 What follows

A positive result makes the ledger a monitor: pass 1 and pass 3 run read-only on agent trajectories, feeding the windows and people. The reward of Section 5 is a separate, later decision, taken only after the specificity judgment has been hardened by the exploit battery, and only with the evidence-boundary balance in place. The goal-level selection that uses ledger-verified intentions for coarse decisions is a third decision, after the held-out-pass discipline has been shown to work on the model organism of Phase 1.

10. The rules, as they apply here

- Intentions precede the actions they cover; an entry written after its actions is a narrative, not an intention, and is read only by pass 3.
- The record is append-only and hash-chained; the chain head is published on the S1 schedule.
- The engine's readings of the ledger are monitor output and never a training signal. The ledger's *scores* (pass 1 and pass 2 against the record) are verifiable rewards with the record as verifier, and may be used as such only under the evidence-boundary balance and after the specificity judgment is hardened.
- Held-out passes: at least one reading of the ledger (a scope battery, a forecast category) is never used for any decision until the end.
- Ledger completeness is a security assumption and is stated as such wherever the ledger is relied on.
- Documents describing the ledger are handled as training-corpus hazards, as with every description of monitoring in the program.

In one sentence. The intention ledger gives a model's story about itself something it cannot re-represent: a promise it made before it knew how things would go, and a record of what it did next.

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The public documents, the results register and the public commitments are at **xontools.ai** and github.com/IboTool/XonTools. † Withheld from public release as a training-corpus hazard; available to researchers on request. Contact: ian@xontools.ai

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