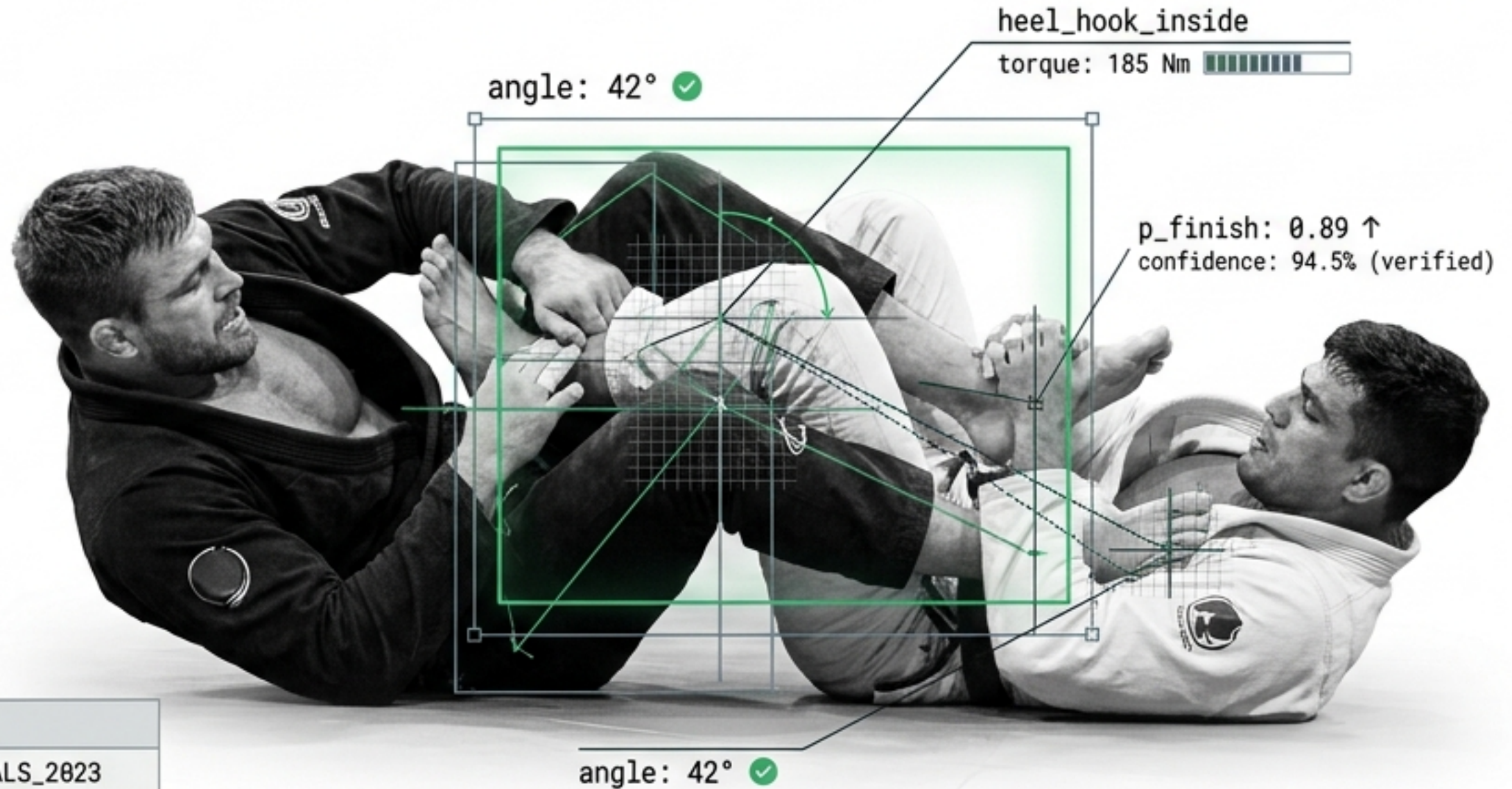
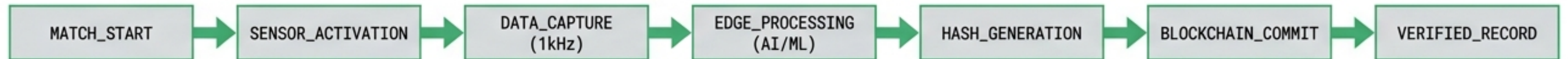


ABSOLUTE GROUND TRUTH

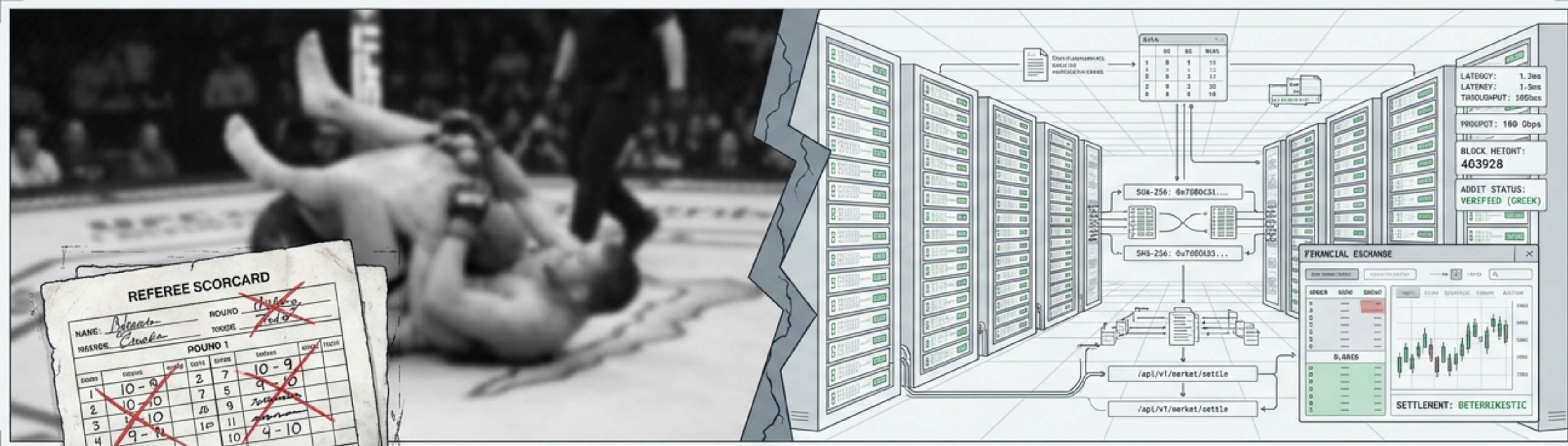
Securing Integrity in Professional
Grappling via Cryptographic
Rubric Registries



CRYPTOGRAPHIC RUBRIC REGISTRY (CRR)	MATCH_DATA STREAM
HASH: 0x9f8a7d2e4b1c6f3e...	EVENT_ID: ADCC_FINALS_2023
VALIDATION: 0.0012s (SUCCESS)	ATHLETE_A: 2345 (G. Ryan)
NODE: 192.168.1.55	ATHLETE_B: 6789 (N. Rodriguez)
AUDIT_TRAIL: BLOCK_78901234	TECHNIQUE_ID: HH_INSIDE_V2
	TIMESTAMP: 00:08:45.320 (SYNC)



The Barrier to Market: Subjective Officiating Destroys Betting Integrity



Traditional combat sports are structurally excluded from high-volume, live in-play sportsbooks.
Modern wagering requires absolute determinism.

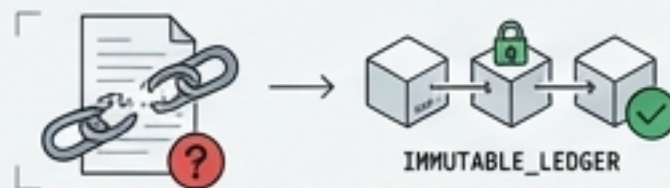
Human Hallucination

Referees miss subtle positional changes or submit to stylistic biases.



Tamper Susceptibility

Paper scorecards lack an audit trail and cannot be mathematically falsified.



Un-Bettable Data States

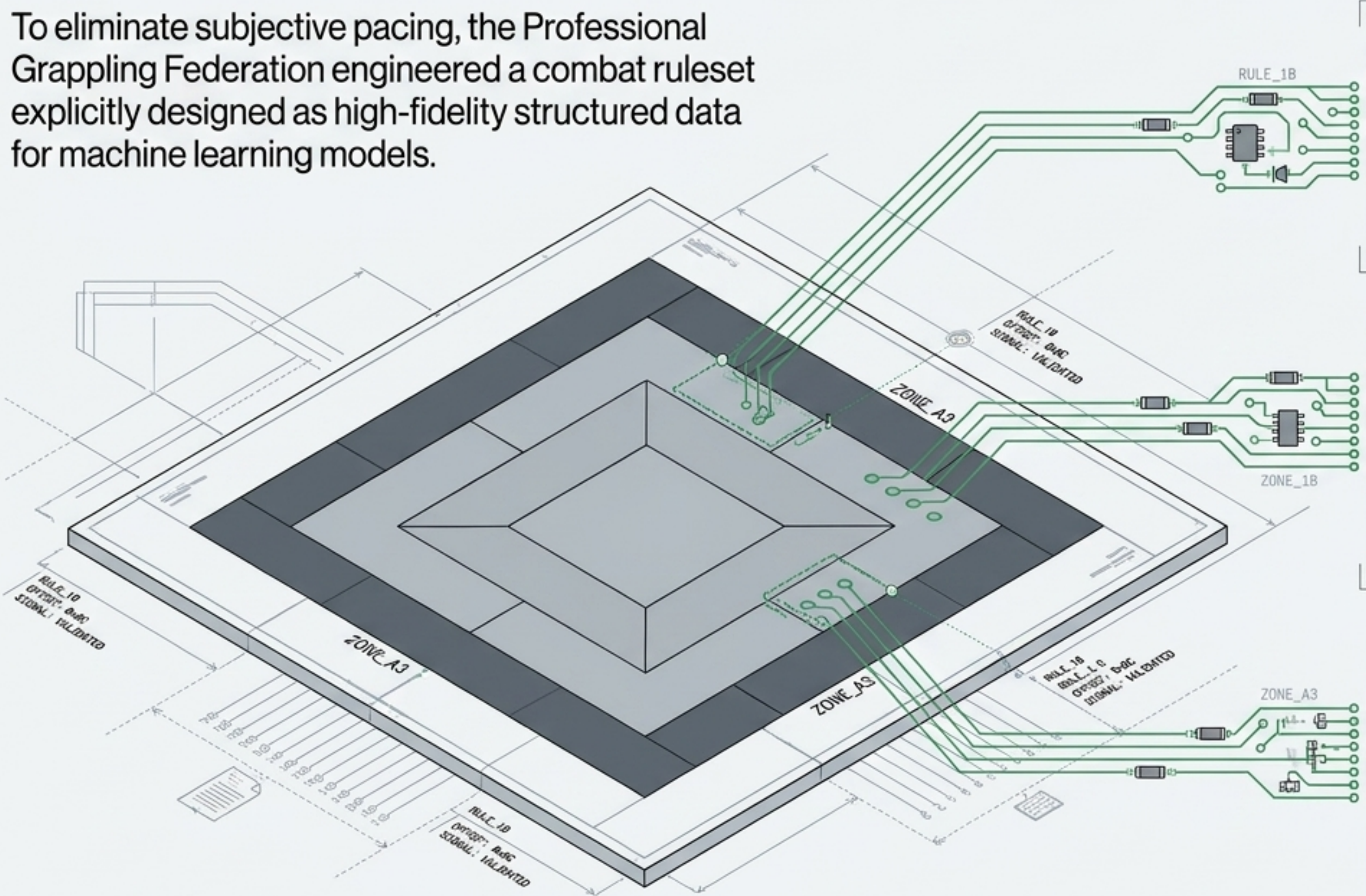
Subjective stalling calls and unmeasured pacing provide zero signal for automated market settlement.



Without provenance, there is no recourse for contested payouts—only opinion against opinion.



Engineering an Asymmetric Mathematical Framework

To eliminate subjective pacing, the Professional Grappling Federation engineered a combat ruleset explicitly designed as high-fidelity structured data for machine learning models.





THE ACTION FORCER

A strict 20-second shot clock automatically triggers penalty flags if positional advancement or submission threats cease.

  STATUS: ACTIVE
PENALTY: FLAG

ASYMMETRIC FINISH WEIGHTING

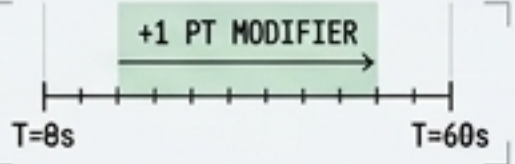
Chokes (Kills) are mathematically isolated at 6 points. Joint locks (Breaks) hold a 3-point value.

 6 PTS →  3 PTS

TYPE: CHOKE (KILL)
VALUE: 0x06
TYPE: JOINT LOCK (BREAK)
VALUE: 8x03

THE TEMPO MODIFIER

The 'Elbow Genie' bonus window applies a +1 point modifier to any finish secured within the first 60 seconds.

 WINDOW: T < 60s
MODIFIER: +0x01

The S.C.O.U.T. Intelligence Pipeline

The League deployed **Submission Combat Observation and Utility Tracking (S.C.O.U.T.)** to convert chaotic, multi-planar physical exchanges into **deterministic telemetry** via strict **Pydantic v2 schemas**.

Unstructured Match Footage



Gemini 3.1 Pro Vision Agent Ecosystem

AI AGENT | MULTI-MODAL PROCESSING

control_dominance



+12.5% ACCURACY

escape_rate



92.3% SUCCESS

sub_rate



0.85 SUB/MIN

technique_diversity



18 UNIQUE MOVES

explosiveness



PEAK FORCE: 4.2 Gs

transition_speed

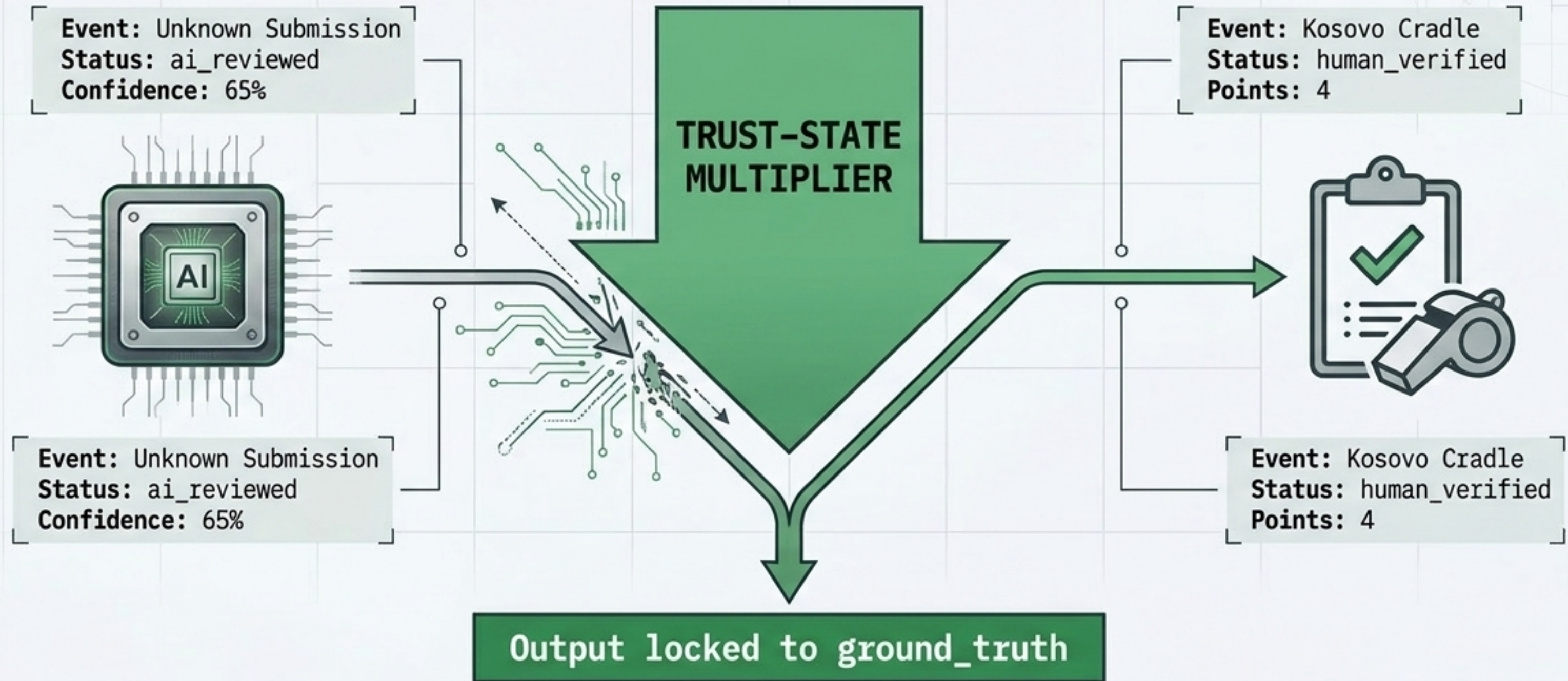


AVG: 1.4s

Processing Time: $T < 90$ seconds

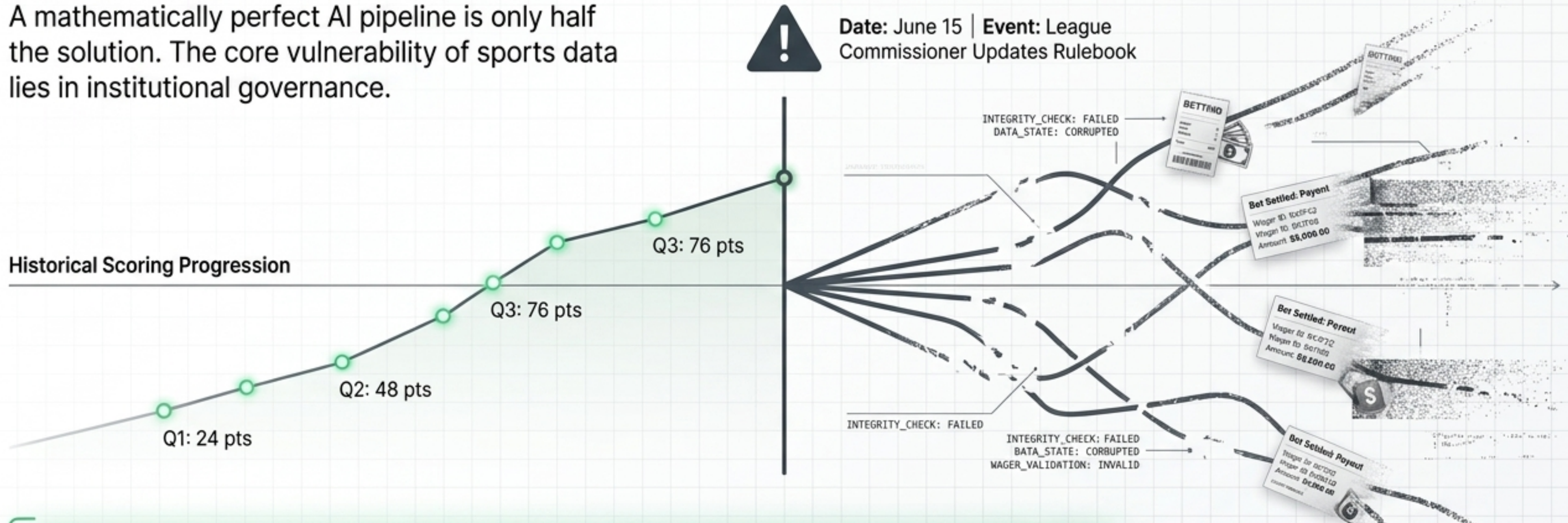
Trust-State Discrimination: Eliminating AI Hallucination

Standard AI models misclassify visually similar grappling entanglements. ContextOS solves this via **Trust-State Discrimination**. The system never over-scores an event when official human ground-truth exists.



The Destructive Paradox of Rule Evolution

A mathematically perfect AI pipeline is only half the solution. The core vulnerability of sports data lies in institutional governance.



The Overwrite Failure

Altering historical scoring logic retroactively destroys the data state that previous sports wagers were settled upon. If a Twister is reclassified from a 6-point Kill to a 3-point Break, standard databases simply overwrite the value in the backend. To a Vegas sportsbook, a shifting database is indistinguishable from fraud.

Database Architecture: The Integrity Paradigm

System Dimension	Traditional Approach (The Overwrite Method)	PGF ContextOS (The Correction Overlay Method)
Data Preservation	✗ Deletes old rules; overwrites historical values in the database.	✓ Preserves lineage; old values are layered, never destroyed.
Cryptographic Custody	✗ None. Silent developer edits go undetected.	✓ Bound to sequential RubricEpochs.
Historical Replay	✗ Breaks historical scores. Past matches output new, incorrect point values.	✓ 100% Deterministic. Matches replay exactly as they scored on match day.
Dispute Resolution	✗ "Trust the database admin." High risk of bettor disputes.	✓ Trustless settlement. Regulators can audit the exact rubric state at the timestamp.

The Code-Drift Honesty Guard

```
backend/scout/score/metrics.py
```

```
42 heel_hook = 3 2
```

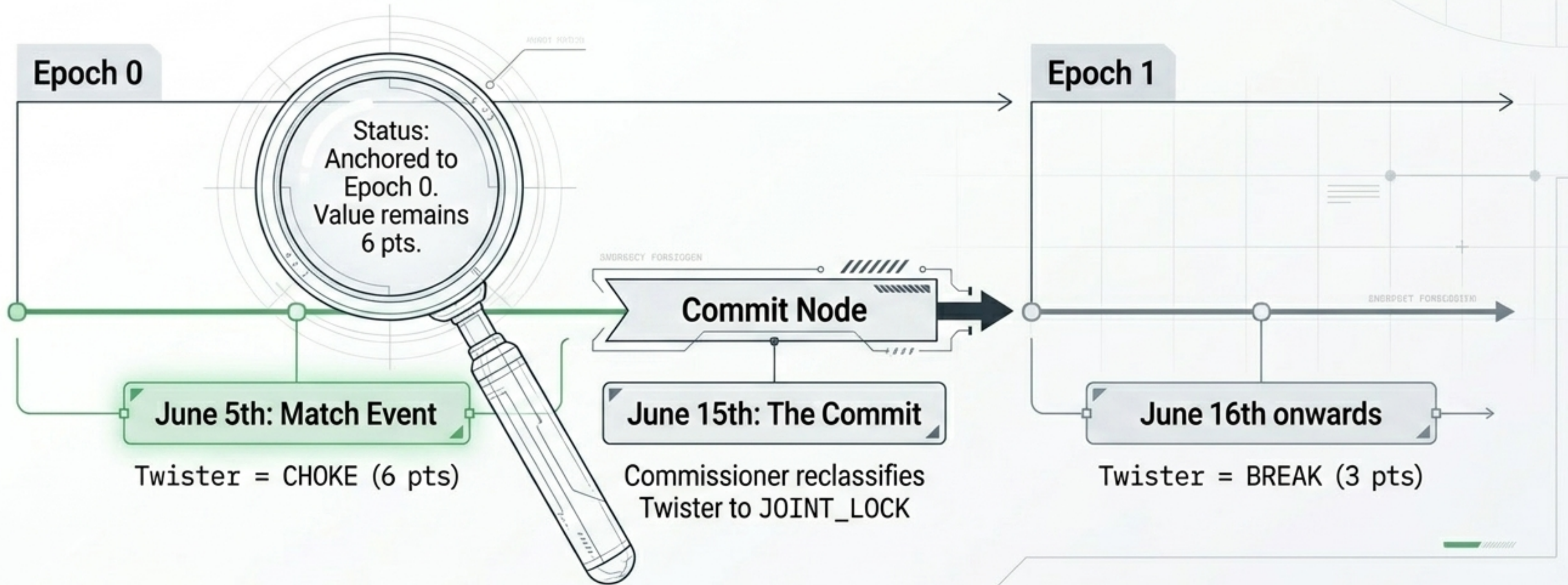
CRITICAL:
assert_no_silent_code_drift()
TRIGGERED.
LIVE DIGEST MISMATCH vs
GENESIS_RUBRIC_DIGEST.

Every time a match is scored, ContextOS recomputes a cryptographic hash of the entire active ruleset and compares it against the hardcoded GENESIS_RUBRIC_DIGEST. If a developer attempts to silently alter scoring logic, the live digest mismatches. The guard fails loudly, instantly locking down all scoring outputs to prevent corrupted data from reaching the sportsbooks. Rule changes must be cryptographically declared.



Chained Rubric Epochs: The Twister Example

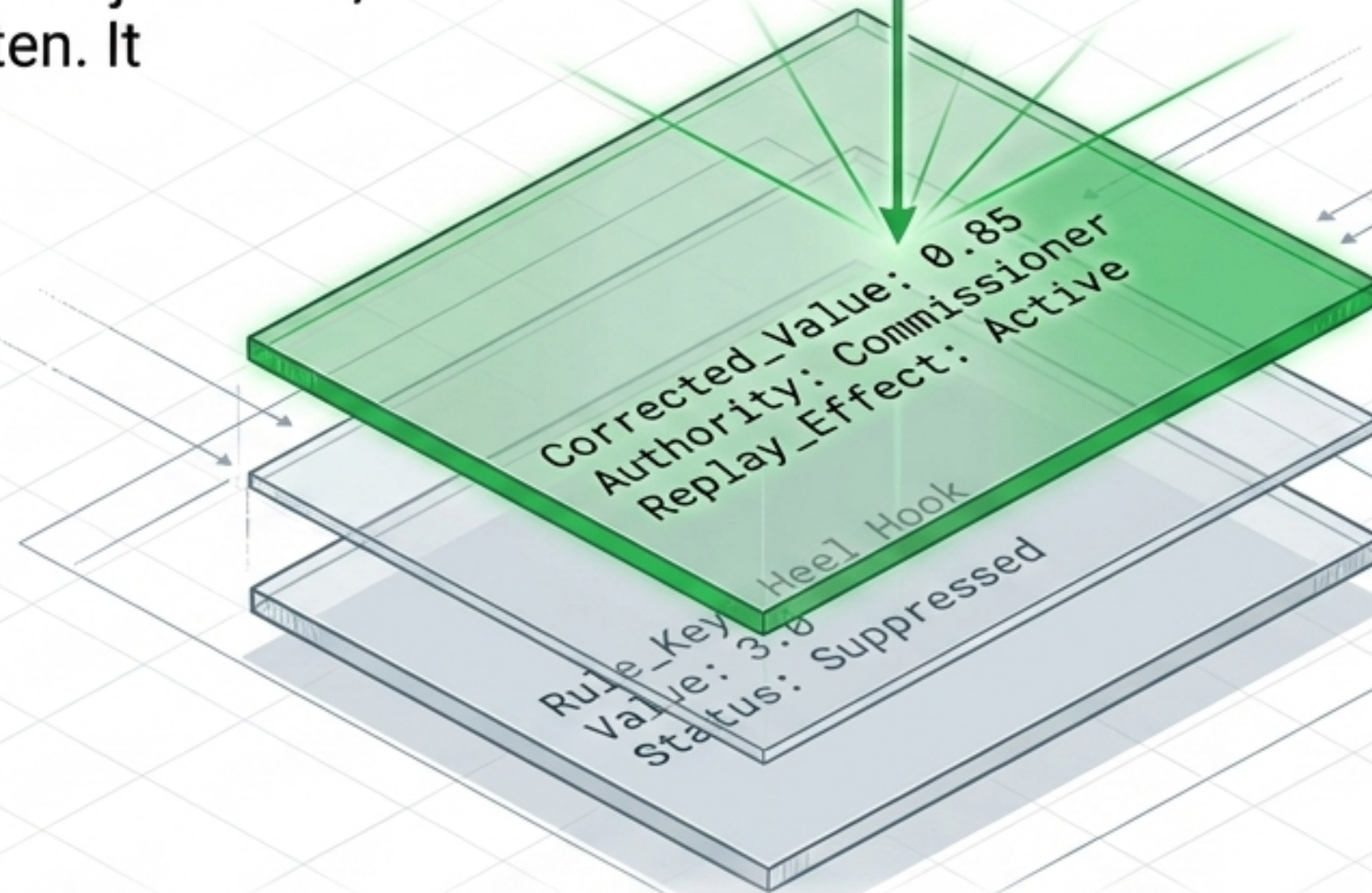
Matches are permanently sealed under the exact epoch active on their match day. This allows sportsbooks to settle historical bets with absolute mathematical consistency, even as the sport evolves.



The Correction Overlay Method

The ContextOS RubricRegistry utilizes a non-destructive overlay mode a rule require model for rule corrections. When a rule requires adjustment, the original value is not overwritten. It is appended to a lineage.

Access Query



The new grade applies exclusively going forward. Traders rely on this architecture because it guarantees that a settlement executed under Epoch 0 rules can never be contested by an Epoch 1 update.



Anatomy of a Settlement Proof

This is not just a score. This is absolute ground truth packaged for regulated capital markets.



6 Talent Metrics: Captured

Match Duration: 06:00

XP Update: +14.2

Analysis Source: Gemini_Vision_Agent_v3.1

EvidenceClip URL: Attached

Active RubricEpoch ID: 04

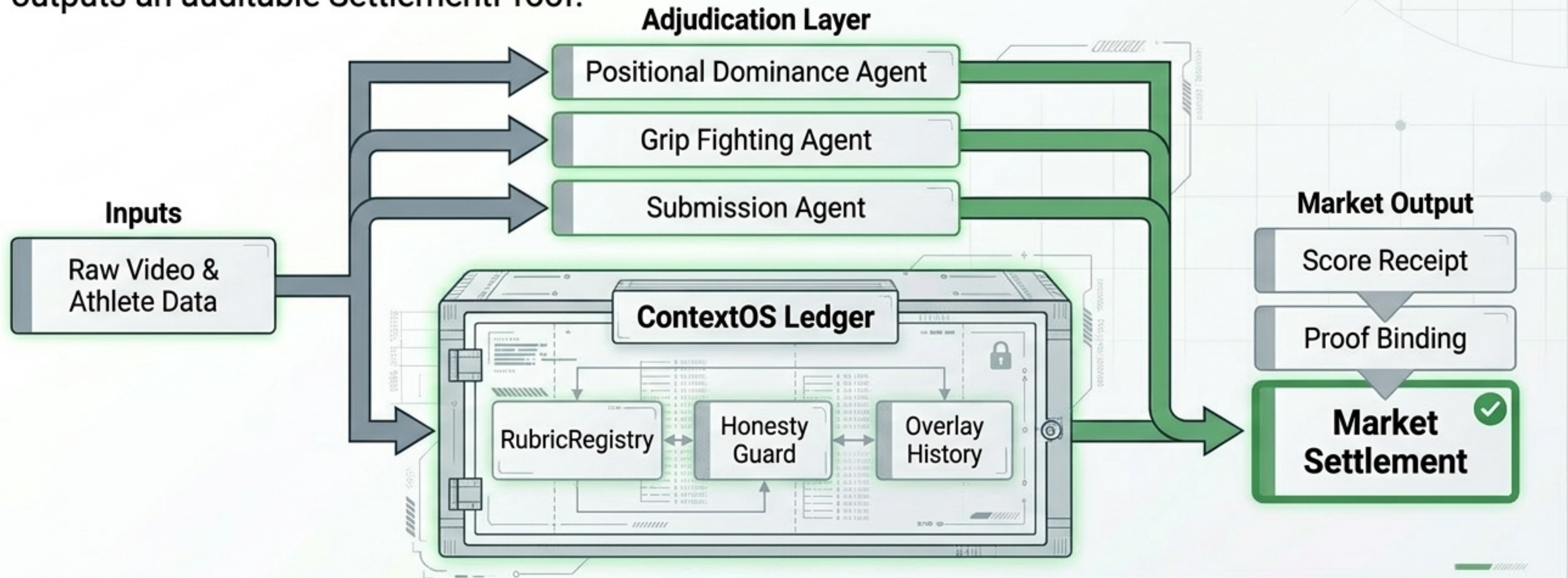


For the first time, a grappling match produces a **machine-readable, reproducible, cryptographically-attributable record of reality**. Every performance metric, submission probability rating, and referee decision is ledgered onto a tamper-evident chain, binding the video evidence to the exact RubricEpoch that graded it.



The Transparent Vault Ecosystem

The PGF Scout Match Analysis Pipeline operates as a deterministic factory. One video fans out into 160+ micro-events, passes through the AI adjudication layer, is secured by the ContextOS Ledger, and outputs an auditable SettlementProof.



The same input produces byte-identical output, enforced by snapshot testing.



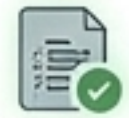
The Commercial Unlock: High-Volume In-Play Wagering

By wrapping S.C.O.U.T. inside the ContextOS integrity layer, PGF solves the core requirements of gaming regulators, unlocking a multi-million dollar betting market.



• Live Micro-Betting

The measured positional timeline acts as the exact signal upon which live, in-play grappling markets are priced.



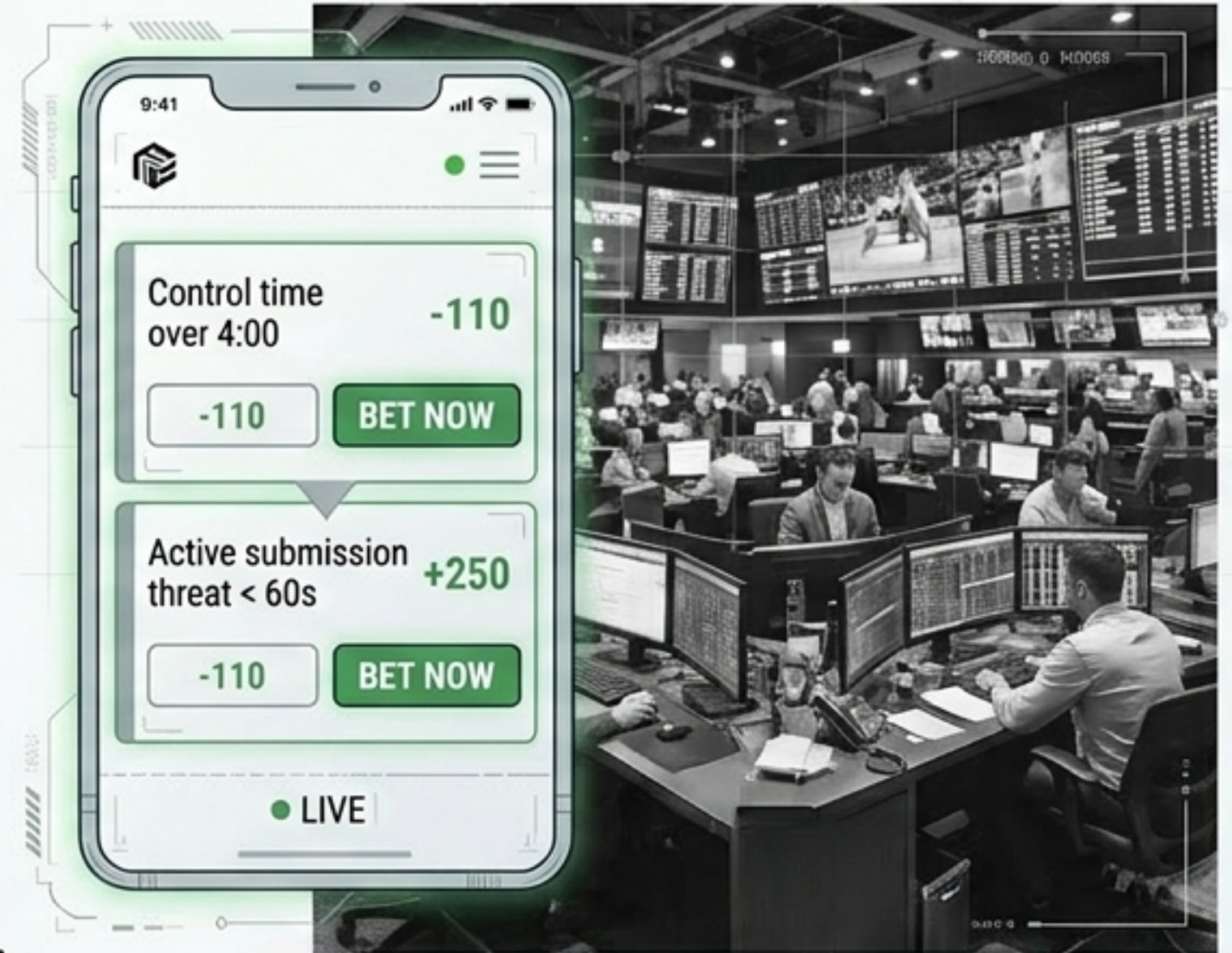
• Deterministic Settlement

Markets settle against an **open-source, auditable** pipeline (score/pgf_rules.py), not a human scorecard.



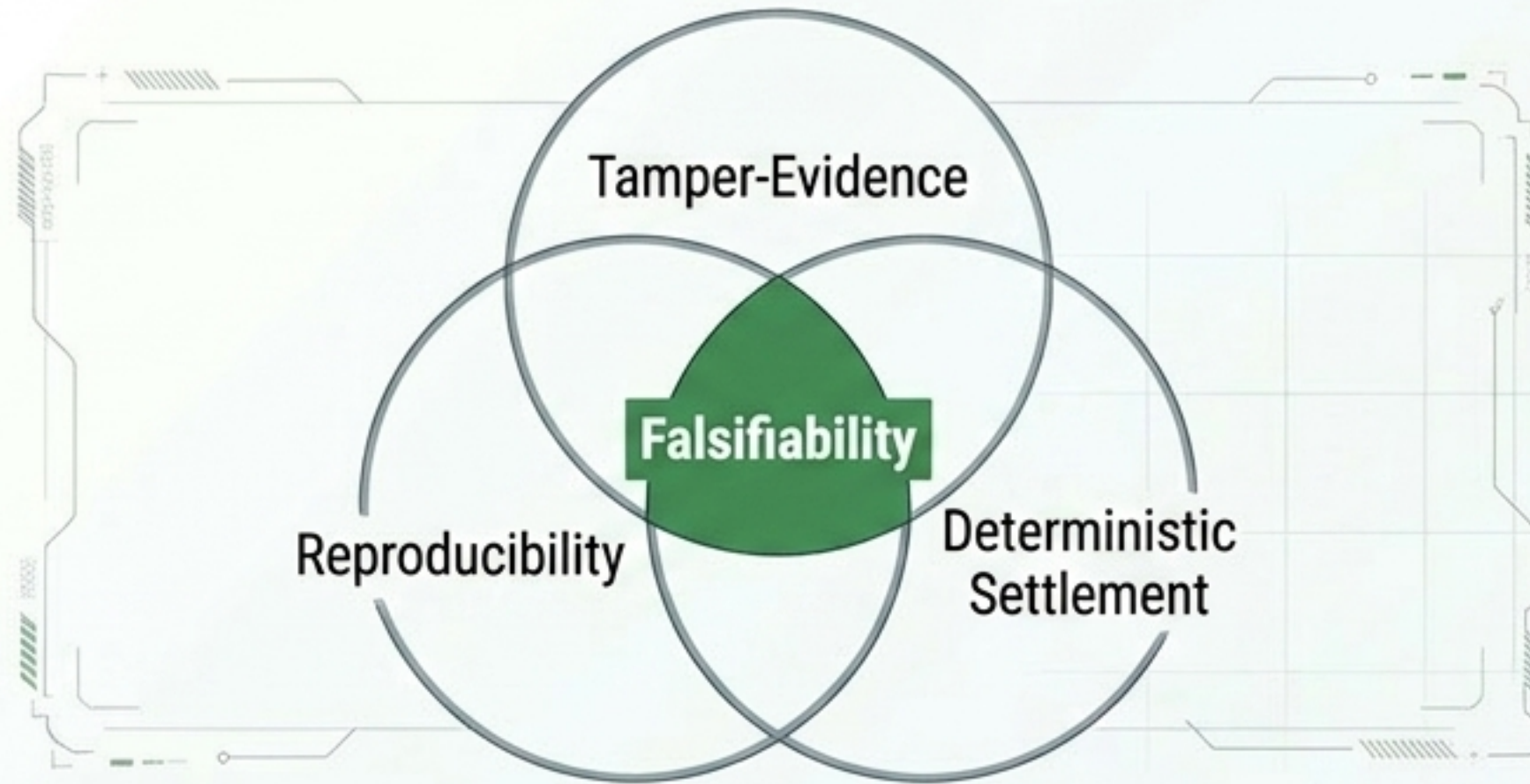
• Defensible New Markets

Talent XP, finish probability, and technique diversity create proprietary prop markets powered by an exclusive data feed.



Synthesis: The Provenance Engine

Every sportsbook on earth runs on a fragile foundation: a result someone tells them to trust. The Correction Overlay Method inverts this entirely, replacing trust with cryptographic proof.



Tamper-Evidence:

Grading cannot be **silently** changed without triggering a hardcoded audit trail.

Reproducibility:

Any auditor or regulator can replay a score using the **original rubric state**.

Deterministic Settlement:

Odds and payouts are executed from **permanently sealed rubrics**.

```
contextos.ledger.record_scoring_proof(...)
```

Trust Without Authority.

The data speaks for itself.

1668990 0 44085
Btōica 8.6320 0600
SAsoos 8.6005 0600

