Solana PAMM MEV Demo

Validated MEV + contagion analysis (Feb 26, 2026)

- 617 validated fat sandwich attacks
- 112.428 SOL total MEV profit
- Contagion analysis across 7 pools

Agenda

- Dataset and validation

- MEV patterns and detection

- Top attackers and protocol exposure

- Aggregator vs MEV separation

- Contagion findings

- Key takeaways
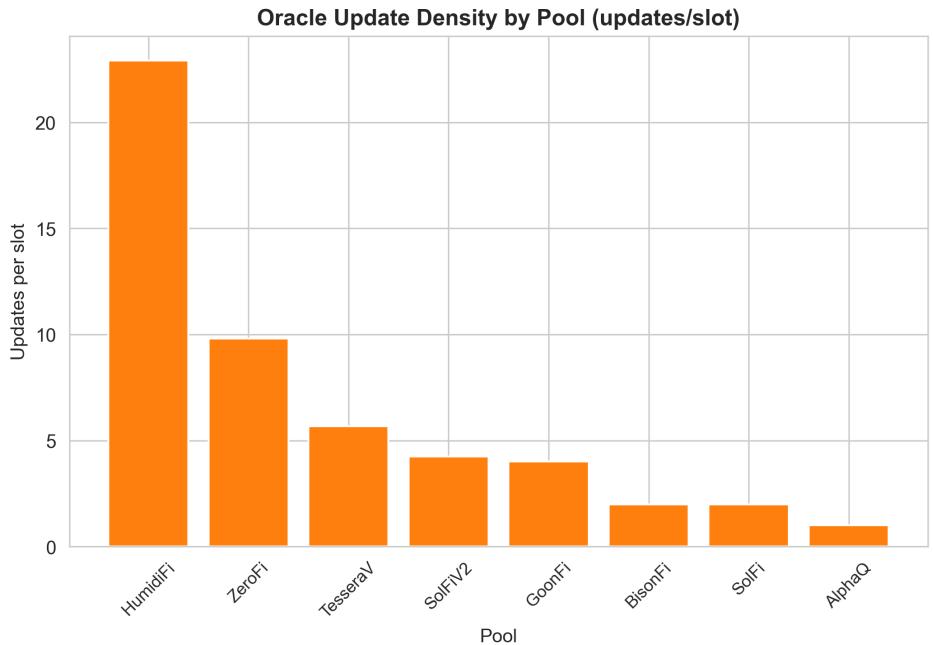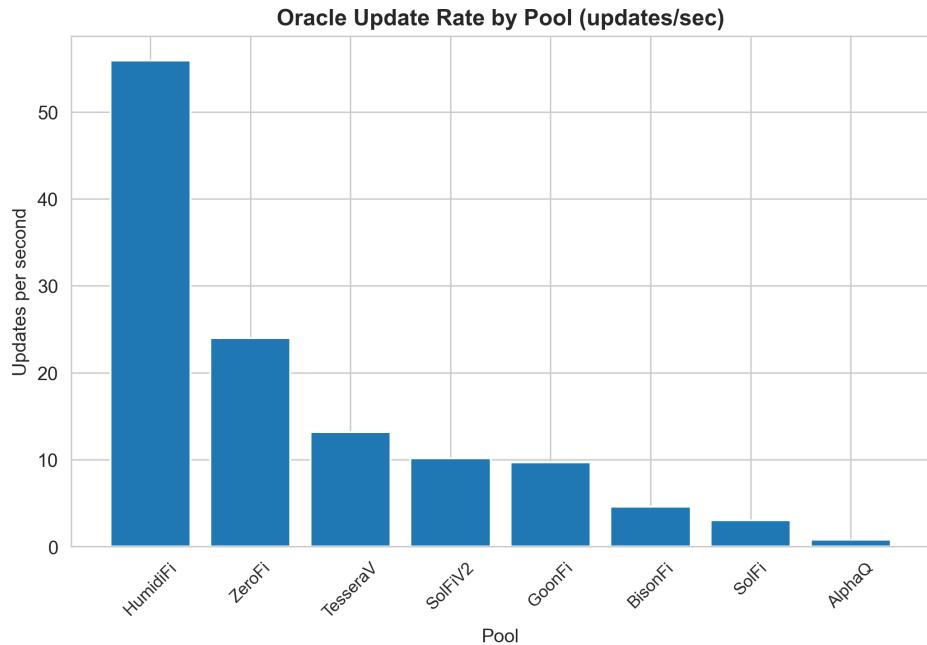
Dataset and Validation

- Source: Solana pAMM events across 8 protocols
- Initial detections: 1,501 MEV candidates
- Filtered to 617 validated fat sandwich attacks
- False positives removed: 58.9% (failed + multi-hop)
- Validation signal: net_profit_sol > 0 and sandwich_complete > 0
- Columns normalized: attacker_signer $\rightarrow$ signer, amm_trade $\rightarrow$ pool

Key Stats
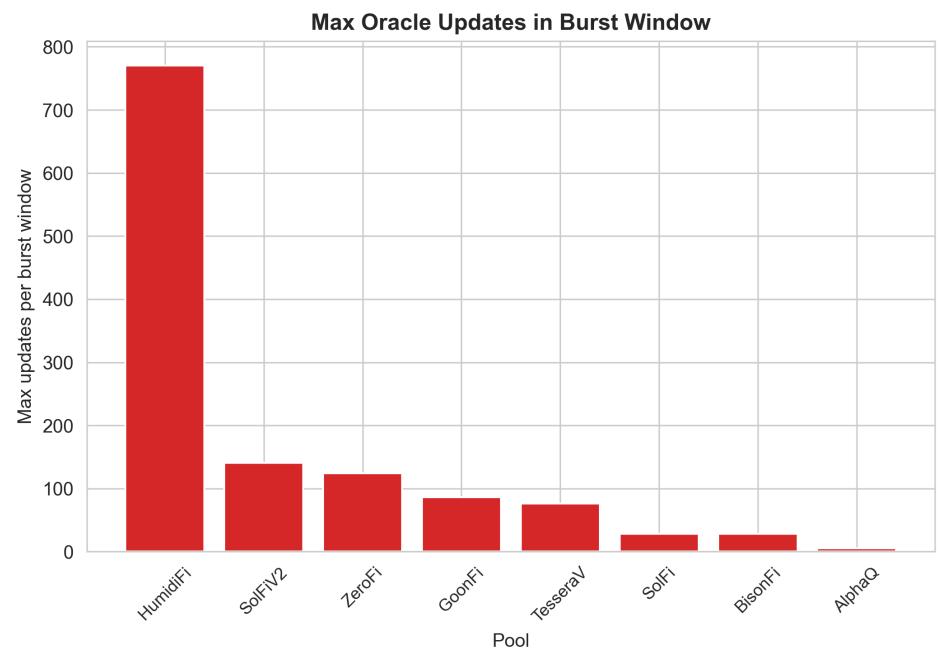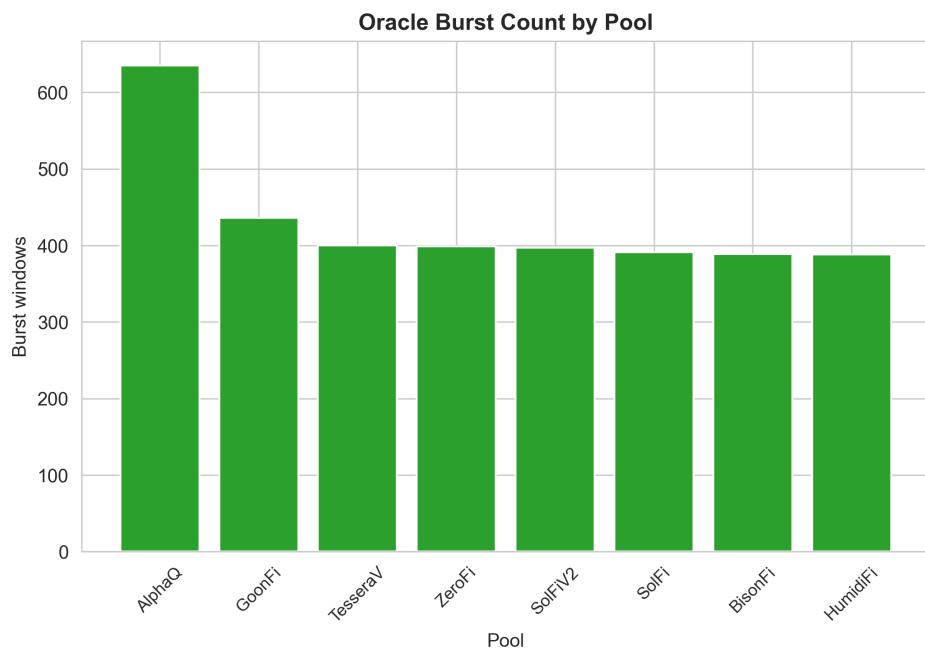
- Total MEV profit: 112.428 SOL
- Average profit per attack: 0.1822 SOL
- Unique attackers: 179
- Top pool (HumidiFi): 66.8% of total MEV
- Median profit: 0.0360 SOL (right-skewed distribution)
- Top 20 attackers capture ~49% of total profit

Oracle Update Density

Oracle Update Rate by Pool (updates/sec)

Oracle Update Density by Pool (updates/slot)
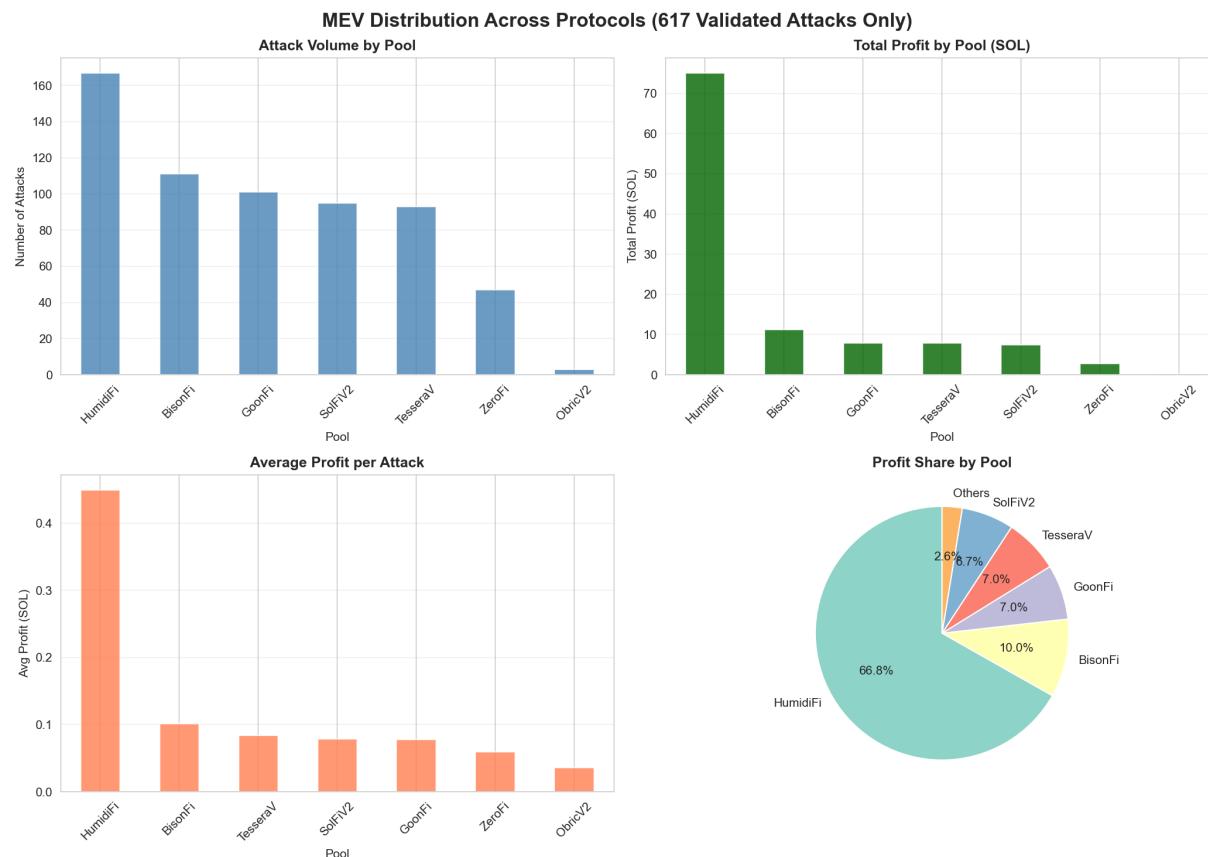
- HumidiFi leads: ~55.9 updates/sec; 22.9 updates/slot
- Lower-rate pools show larger staleness windows
- MEV bots synchronize execution with oracle cadence

Oracle Burst Density

Oracle Burst Count by Pool

Max Oracle Updates in Burst Window
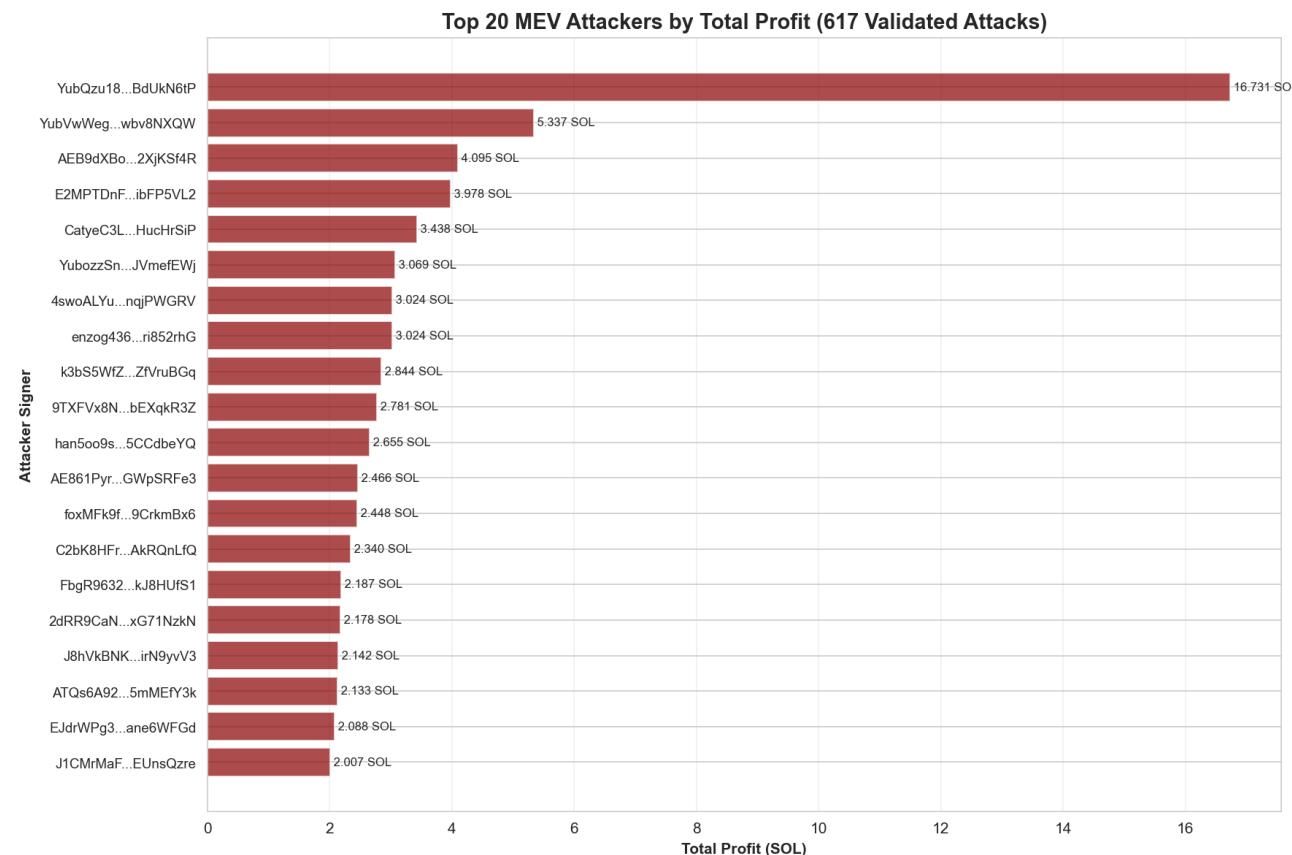
- Burst windows capture rapid oracle update clusters
- High burst counts correlate with higher MEV exposure
- Burst spikes amplify timing gaps for sandwiches

MEV Distribution by Protocol

MEV Distribution Across Protocols (617 Validated Attacks Only)
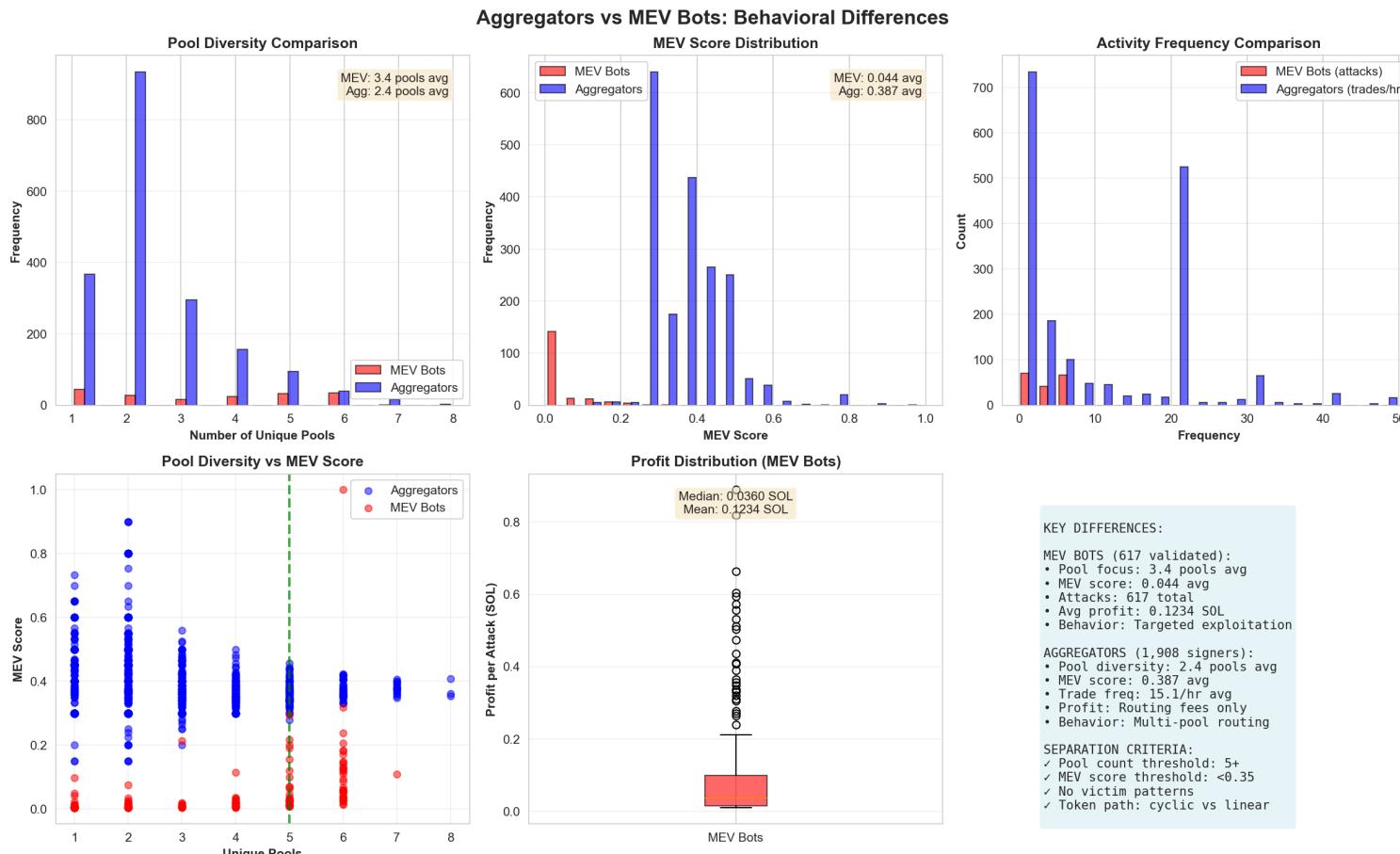
- HumidiFi captures 66.8% of total MEV profit (75.1 SOL)
- BisonFi and SolFiV2 show moderate exposure (10.0% and 6.7%)
- Risk is protocol-specific: profit is not proportional to volume

Top Attackers by Profit

Top 20 MEV Attackers by Total Profit (617 Validated Attacks)
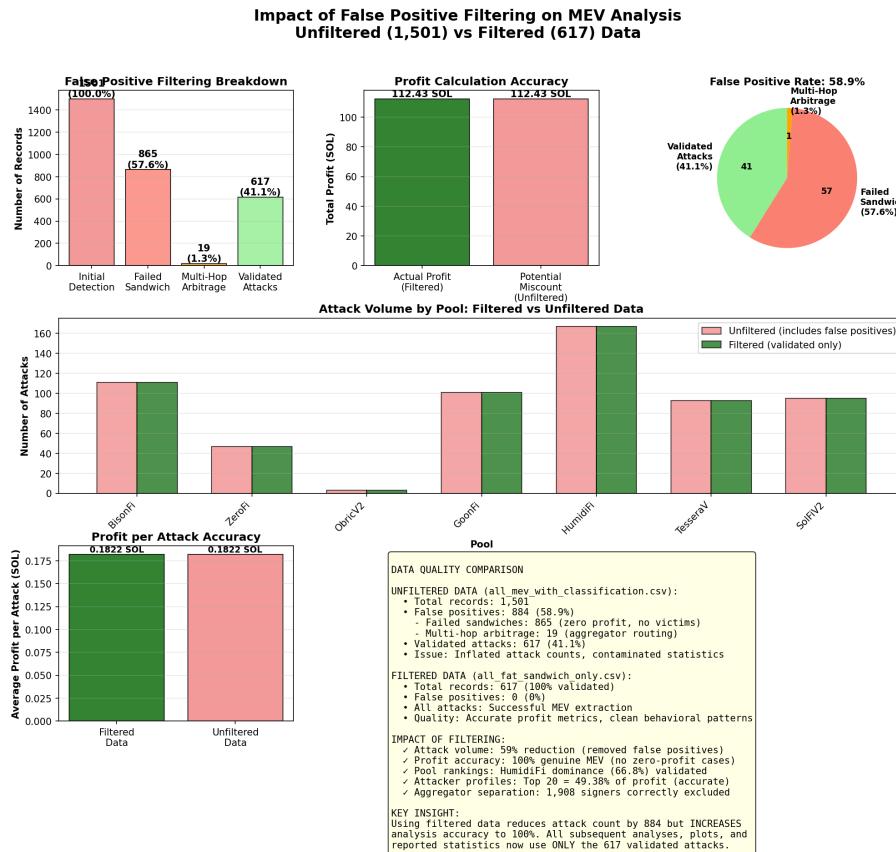
- Top attacker profit corrected to 16.731 SOL
- Top 20 attackers capture ~49% of total MEV profit
- High concentration implies latency and routing advantages

Aggregator vs MEV Separation

Aggregators vs MEV Bots: Behavioral Differences
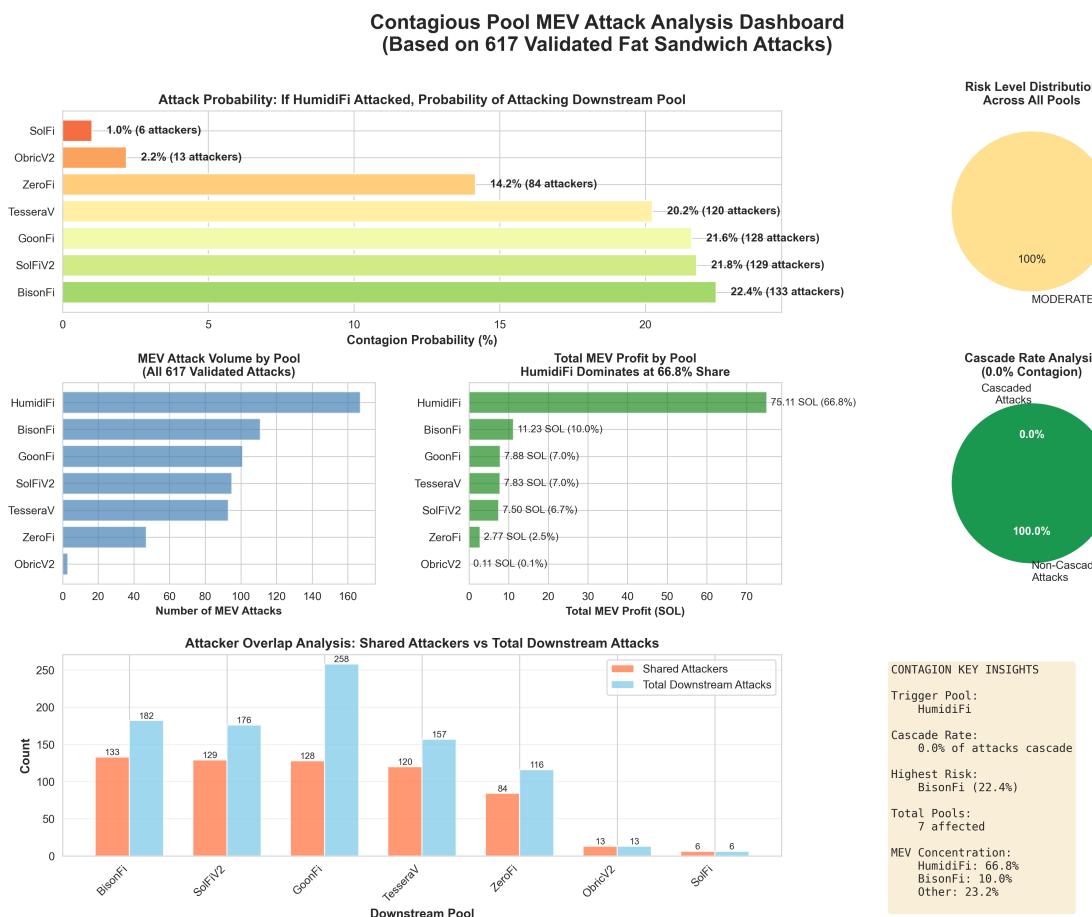
- Aggregators show high pool diversity and low MEV scores
- MEV bots cluster at low diversity and high MEV scores
- Separation validates filtering of aggregators and multi-hop

Data Correction and Filtering

Impact of False Positive Filtering on MEV Analysis
Unfiltered (1,501) vs Filtered (617) Data
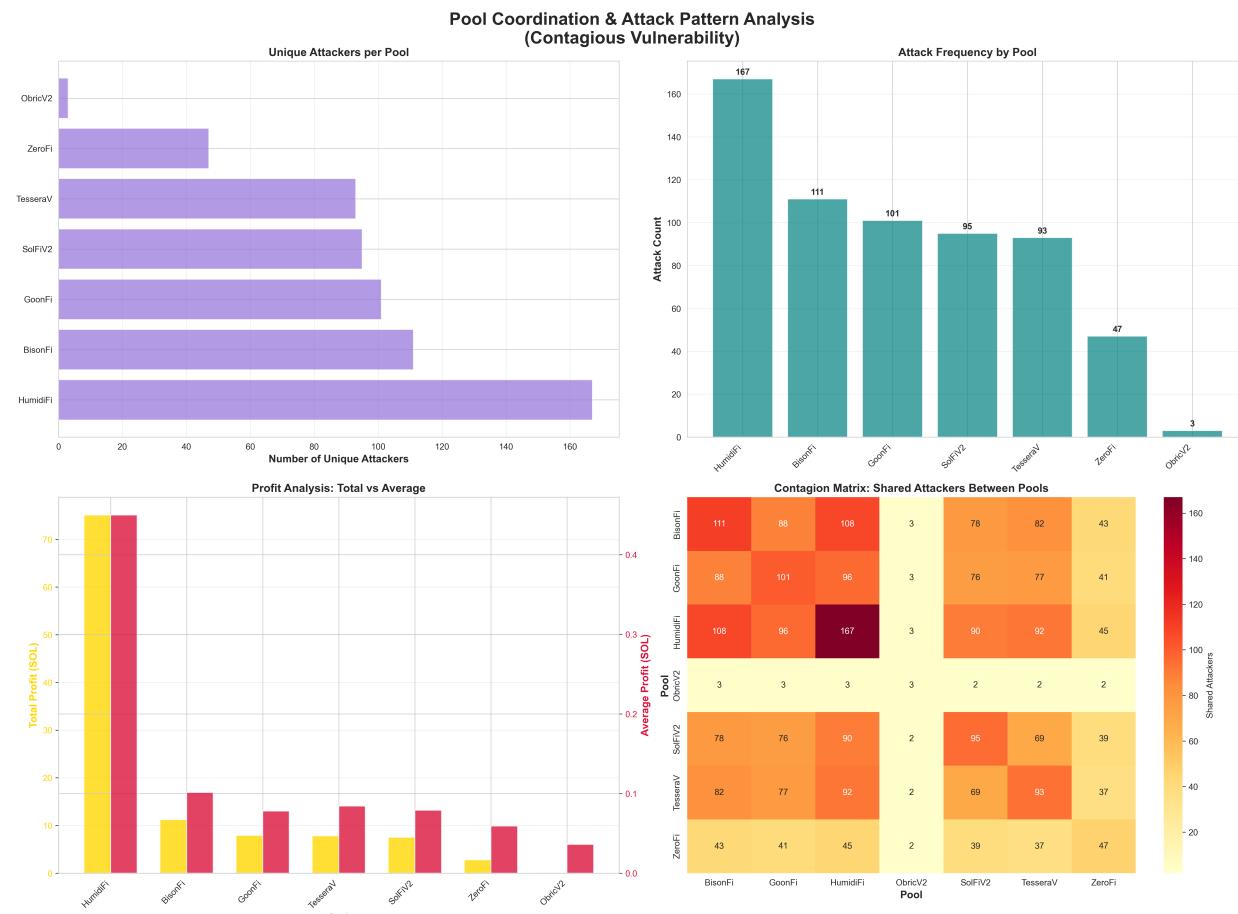
- 1,501 detections reduced to 617 validated attacks
- Removed 865 failed sandwiches and 19 multi-hop cases
- Corrected rankings shift profit concentration upward

Contagion Analysis Dashboard

Contagious Pool MEV Attack Analysis Dashboard
(Based on 617 Validated Fat Sandwich Attacks)

Attack Probability: If HumidiFi Attacked, Probability of Attacking Downstream Pool

- SolFi — 1.0% (6 attackers)
- ObricV2 — 2.2% (13 attackers)
- ZeroFi — 14.2% (84 attackers)
- TesseraV — 20.2% (120 attackers)
- GoonFi — 21.6% (128 attackers)
- SolFiV2 — 21.8% (129 attackers)
- BisonFi — 22.4% (133 attackers)

Contagion Probability (%)

Risk Level Distribution Across All Pools
- 100% MODERATE

MEV Attack Volume by Pool (All 617 Validated Attacks)
- HumidiFi
- BisonFi
- GoonFi
- SolFiV2
- TesseraV
- ZeroFi
- ObricV2

Number of MEV Attacks

Total MEV Profit by Pool HumidiFi Dominates at 66.8% Share
- HumidiFi — 75.11 SOL (66.8%)
- BisonFi — 11.23 SOL (10.0%)
- GoonFi — 7.88 SOL (7.0%)
- TesseraV — 7.83 SOL (7.0%)
- SolFiV2 — 7.50 SOL (6.7%)
- ZeroFi — 2.77 SOL (2.5%)
- ObricV2 — 0.11 SOL (0.1%)

Total MEV Profit (SOL)

Cascade Rate Analysis (0.0% Contagion)
- Cascaded Attacks 0.0%
- Non-Cascaded Attacks 100.0%

Attacker Overlap Analysis: Shared Attackers vs Total Downstream Attacks

Legend: Shared Attackers / Total Downstream Attacks

- BisonFi — 133 / 182
- SolFiV2 — 129 / 176
- GoonFi — 128 / 258
- TesseraV — 120 / 157
- ZeroFi — 84 / 116
- ObricV2 — 13 / 13
- SolFi — 6 / 6

Downstream Pool

CONTAGION KEY INSIGHTS

Trigger Pool:
    HumidiFi

Cascade Rate:
    0.0% of attacks cascade

Highest Risk:
    BisonFi (22.4%)

Total Pools:
    7 affected

MEV Concentration:
    HumidiFi: 66.8%
    BisonFi: 10.0%
    Other: 23.2%

- Trigger pool: HumidiFi with highest MEV concentration
- Immediate cascade rate is 0% within 5,000 ms
- Delayed contagion: 20-22% attacker overlap across pools

Pool Coordination Network (Zoomed)

Pool Coordination & Attack Pattern Analysis
(Contagious Vulnerability)

- Heatmap shows shared attackers between pool pairs
- HumidiFi has the widest attacker overlap
- Cross-pool risk is driven by attacker migration, not same-slot cascades

MEV Pattern and Detection

- Fat sandwich definition: sandwich_complete > 0 AND fat_sandwich > 0

- Failed sandwich: net_profit_sol == 0 or null

- Multi-hop arbitrage: front_running/back_running without sandwich_complete

- Validated dataset includes only true fat sandwich attacks

- Filtering removes benign routing and failed attempts
- Classification logic aligns with profit-positive sandwich patterns
- Validation rule prioritizes realized profit over pattern hints
- Columns standardized before aggregation to avoid drift

Demo Takeaways

- MEV is highly concentrated: HumidiFi dominates profit and volume
- No immediate cascade, but 22% delayed contagion via attacker overlap
- Clear behavioral separation between aggregators and MEV bots
- Validated data materially changes rankings and conclusions