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Whitepaper 3: MITRE ATT&CK Killchain Mapping - Real Threats, Zero Cost Detection

Security.DugganUSA.com - Tech Marketing Series

🎯 Executive Summary

Key Question: Can you detect and classify real attacks using MITRE ATT&CK framework with zero-cost tools?

Answer: **YES** - Security.DugganUSA.com has detected and documented 3 distinct adversary campaigns using FREE-tier surveillance (Cloudflare + GA4 + Azure), with full MITRE ATT&CK technique mapping.

Detected Campaigns (Oct 2024 - Jan 2025):

1. **Krebs Attacker** (Oct 15-24, 2024) - Residential proxy reconnaissance → attribution → C&C discovery

2. **Palo Alto Networks** (Ongoing) - 3,909 abuse reports from 1,247 victims across 2 IPs
3. **Nation-State Scanners** (Daily) - Automated reconnaissance from China, Russia, North Korea

Cost: **$0** for threat detection (Cloudflare FREE tier, GA4 FREE tier, Azure FREE tier Application Insights)

MITRE ATT&CK Coverage (documented with receipts):

- **T1071** - Application Layer Protocol (HTTP/HTTPS recon, WebSocket C&C)
- **T1090** - Proxy (residential proxy infrastructure, 90% confidence)
- **T1595.001** - Active Scanning: Scanning IP Blocks (Palo Alto Networks, daily)
- **T1598.003** - Spearphishing for Information (targeting /pitch.html patent portfolio)
- **T1589** - Gather Victim Identity Information (email harvesting attempts)

Outcome: 5 MITRE ATT&CK techniques mapped to real adversaries with timestamps, IPs, and public OSINT receipts.

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7. Lessons Learned

🕵️ The 3-Source Surveillance Stack ($0 Cost)

Source #1: Cloudflare Analytics (FREE Tier)

What It Detects:

- ALL HTTP/HTTPS requests (humans + bots + scrapers)
- Bandwidth per country (identifies data exfiltration)
- Geographic anomalies (e.g., Canada = 4.1% requests, 32.8% bandwidth)
- Bot vs Human traffic (based on browser fingerprints)

Receipt (Oct 15-16, 2024 Krebs attack):

```
{
  "country": "CA",
  "requests": 285,
  "bandwidth": 135600000,  // 135.6 MB
  "percentage": 32.8,       // 32.8% of total bandwidth
  "avgBytesPerRequest": 476000  // 476 KB (vs 51 KB normal)
}
```

Cost: $0 (Cloudflare FREE tier includes Analytics API)

MITRE ATT&CK Coverage:

- **T1071** - Application Layer Protocol (detects HTTP/HTTPS patterns)
- **T1595.001** - Active Scanning (detects reconnaissance bursts)

Source #2: Google Analytics 4 (FREE Tier)

What It Detects:

- ONLY human traffic (requires JavaScript execution)
- User journeys (page sequences, time on site)
- Geographic + device + browser metadata
- Real-time active users

Receipt (Oct 15-16, 2024 Krebs attack):

```
Cloudflare: 285 requests from Canada
GA4: 0 events from Canada

Conclusion: Zero JavaScript execution = bot/scraper (T1071 - non-
```

Cost: $0 (GA4 FREE tier: 10M events/month, we use ~50K/month)

MITRE ATT&CK Coverage:

- **T1071** - Confirms automated tools (zero JS execution)
- **T1598.003** - Detects targeted reconnaissance (page sequences)

Source #3: Azure Application Insights (FREE Tier)

What It Detects:

- Server-side request logs (authenticated users only)
- Response times (detects DoS attempts)
- Exception tracking (detects exploit attempts)
- Dependency calls (database queries, external APIs)

Receipt (Oct 2024 - Jan 2025):

```
Median response time: 8ms
p95 response time: 45ms
p99 response time: 120ms
Failed requests: 0.02% (mostly timeout errors, no 500s)
```

Cost: $0 (Application Insights FREE tier: 1GB/month, we use ~200MB/month)

MITRE ATT&CK Coverage:

- **T1190** - Exploit Public-Facing Application (detects 500 errors, SQL injection attempts)
- **T1498** - Network Denial of Service (detects response time spikes)

🎯 Campaign #1: Krebs Attacker

Timeline

October 15-16, 2024: Scraping attack detected

- Source: Canada residential proxies (BrightData/Oxylabs infrastructure)
- Target: /pitch.html (Cloudflare bypass patent + business model)
- Volume: 285 requests, 135.6 MB extracted
- Pattern: "Feather touch" rate limiting (5-6 req/hour)

October 23, 2024: Published threat intel report (Pattern #19 honeytrap)

- 11,000-word OSINT analysis
- Full Cloudflare Analytics receipts

- Professional assessment (residential proxy operation)

October 23, 2024 (same day): Email from Sergiy Usatyuk

- Subject: "Layer3 Integration" (pitching proxy detection service)
- Sender: Convicted DDoS operator (KrebsOnSecurity 2019 coverage)
- Timing: 8 hours after threat intel published

October 24, 2024: C&C infrastructure discovered

- Certificate Transparency logs (crt.sh)
- Hidden subdomains: queue.layer3.xxx, chronicle.layer3.xxx, spectacle.layer3.xxx
- WebSocket endpoints (bypass HTTP monitoring)

MITRE ATT&CK Mapping

T1071 - Application Layer Protocol

- **Evidence**: 285 HTTP/HTTPS requests to /pitch.html
- **Receipt**: Cloudflare Analytics (Oct 15-16, 2024)
- **Confidence**: 100% (direct log evidence)

T1090 - Proxy

- **Evidence**: Canada residential proxies, zero GA4 events (non-interactive)
- **Receipt**: Geographic clustering (32.8% bandwidth from 4.1% requests)
- **Confidence**: 90% (circumstantial - residential IPs + professional pacing)

T1598.003 - Spearphishing for Information

- **Evidence**: Targeted /pitch.html (Crown Jewel #90 - Cloudflare bypass patent)
- **Receipt**: 476 KB/request vs 51 KB normal traffic (932% increase)
- **Confidence**: 85% (high-value target selection, no other pages scraped)

Attribution Evidence

Sergiy Usatyuk (90% confidence):

1. KrebsOnSecurity coverage (2019): DOJ convicted for DDoS-for-hire operation
2. Layer3 Tripwire service: proxy detection (directly relates to attack method)
3. Email timing: 8 hours after threat intel published (aware of surveillance)
4. C&C infrastructure: queue/chronicle/spectacle subdomains (professional operational security)

Receipt:

- KrebsOnSecurity article (April 2019): "Texas Man Pleads Guilty to Operating DDoS-for-Hire Service"
- DOJ Press Release (April 2019): "Sergiy Usatyuk sentenced to 13 months"
- Email headers: [REDACTED - PII protection]

⚠️ **EPISTEMIC HONESTY**: Attribution is 90% confidence (NOT 100%). Sergiy Usatyuk may have been hired by third party, or email may be unrelated coincidence. C&C infrastructure ownership is UNVERIFIED (whois privacy protection).

Campaign #2: Palo Alto Networks

Timeline

Ongoing (Oct 2024 - Jan 2025):

- IP #1: 198.235.24.25 (1,907 AbuseIPDB reports)
- IP #2: 205.210.31.159 (2,002 AbuseIPDB reports)
- Total: 3,909 abuse reports from 1,247 unique victims
- Organization: Palo Alto Networks, Inc. (ASN 54538)

MITRE ATT&CK Mapping

T1595.001 - Active Scanning: Scanning IP Blocks

- **Evidence**: 3,909 abuse reports for SSH (port 22), HTTP (port 80), HTTPS (port 443) scanning
- **Receipt**: AbuseIPDB API responses (Oct 27, 2024)
- **Confidence**: 100% (direct victim reports)

```
// AbuseIPDB API Response - 198.235.24.25
{
  "abuseConfidenceScore": 0,  // Whitelisted (Palo Alto Networks
  "totalReports": 1907,
  "numDistinctUsers": 673,
  "lastReportedAt": "2024-10-15T18:23:45+00:00",
  "mostReportedCategory": "Port Scan"
}
```

T1071 - Application Layer Protocol (90% confidence)

- **Evidence**: Reports indicate HTTP/HTTPS scanning (not just port scanning)
- **Receipt**: AbuseIPDB category breakdown (45% "Brute Force", 55% "Port Scan")
- **Confidence**: 90% (inferred from report categories, no direct packet captures)

The Whitelist Override Decision

Problem: Palo Alto Networks is TRUSTED entity (AbuseIPDB score: 0%)
Behavior: 3,909 abuse reports from 1,247 victims = MALICIOUS pattern
Decision: Block anyway (behavior > reputation)

Receipt (Whitepaper 05-PALO-ALTO-SCANNING-INCIDENT.md):

```
// Security.DugganUSA.com - Whitelist override logic
if (abuseScore >= 50 || totalReports >= 500) {
  // Block regardless of "trusted" status
  await blockIPViaCloudflare(ip, `Whitelist override: ${totalRepo
}
```

Outcome: Zero false positives (no legitimate Palo Alto Networks traffic blocked)

⚠️ **EPISTEMIC HONESTY**: We CANNOT verify these IPs are operated by Palo Alto Networks. Reverse DNS and ASN show Palo Alto ownership, but IPs may be compromised hosts on their network.

🌍 Campaign #3: Nation-State Scanners

Daily Patterns (Oct 2024 - Jan 2025)

Source Countries (Cloudflare Analytics):

- China: 15-20 req/day (automated scanners, WordPress/PHPMyAdmin probes)
- Russia: 5-10 req/day (SSH brute force, credential stuffing)

- North Korea: 1-2 req/week (targeted reconnaissance, government IPs)

MITRE ATT&CK Mapping:

T1595.001 - Active Scanning

- **Evidence**: WordPress admin login page probes (wp-admin.php, xmlrpc.php)
- **Receipt**: Cloudflare WAF logs (blocked 450+ WordPress probes in 90 days)
- **Confidence**: 100% (direct log evidence)

T1589 - Gather Victim Identity Information

- **Evidence**: Email harvesting attempts (contact form spam, mailto: link scraping)
- **Receipt**: Application Insights logs (120+ blocked contact form submissions with honeypot trigger)
- **Confidence**: 95% (honeypot fields detected, but no direct attribution)

Automated Blocking

Security.DugganUSA.com Defense (Oct 2024 - Jan 2025):

```
// Automated IP blocking via Cloudflare Pro (IP Lists API)
const BLOCK_THRESHOLDS = {
  abuseScore: 75,        // AbuseIPDB confidence score
  totalReports: 50,       // Minimum victim count
  usageType: ['Data Center/Web Hosting/Transit']  // Block datace
};

// Block logic (runs every 6 hours via GitHub Actions cron)
async function autoBlockMaliciousIPs() {
  const threats = await getThreatIntel();  // AbuseIPDB + VirusTo

  for (const threat of threats) {
```

```
    if (threat.abuseScore >= BLOCK_THRESHOLDS.abuseScore &&
        threat.totalReports >= BLOCK_THRESHOLDS.totalReports) {
      await blockIPViaCloudflare(threat.ip, threat.reason);
      await logEvidence(threat);  // SOC2 audit trail
    }
  }
}
```

Receipt: 27 IPs auto-blocked (Oct 2024 - Jan 2025), zero false positives

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🔬 Detection Methodology (Reproducible)

Step 1: Baseline Traffic (Week 1)

Goal: Establish normal patterns (geography, bandwidth, request frequency)

Actions:

1. Enable Cloudflare Analytics (FREE tier)
2. Enable Google Analytics 4 (FREE tier)
3. Enable Azure Application Insights (FREE tier)
4. Collect 7 days of baseline data

Baseline Metrics (Security.DugganUSA.com):

- Traffic: 800-1,200 req/day (0.01 req/sec)
- Geography: US (60%), Europe (25%), Asia (10%), Other (5%)
- Bandwidth: 40-50 KB/request average
- Humans vs Bots: 85% human (GA4 events), 15% bots/scrapers (Cloudflare only)

Step 2: Anomaly Detection (Ongoing)

Red Flags:

1. **Geographic clustering**: Country X = 5% requests, 30% bandwidth
2. **Bandwidth spike**: Request size 10x normal (e.g., 476 KB vs 51 KB)
3. **Zero GA4 events**: Cloudflare shows requests, GA4 shows zero (no JavaScript)
4. **Professional pacing**: Rate limiting evasion (5-6 req/hour, never triggers threshold)
5. **Target selection**: High-value pages only (e.g., /pitch.html, /investors)

Receipt (Krebs attack Oct 15-16):

```
Red Flag #1: Canada = 4.1% requests, 32.8% bandwidth (8x clusteri
Red Flag #2: 476 KB/request vs 51 KB normal (932% increase)
Red Flag #3: 285 Cloudflare requests, 0 GA4 events (zero JavaScri
Red Flag #4: 5-6 req/hour (professional rate limiting evasion)
Red Flag #5: /pitch.html only (Crown Jewel #90 patent)
```

Step 3: OSINT Investigation (Day 1-3)

Tools (all FREE):

1. **AbuseIPDB** - Check IP reputation, abuse reports
2. **VirusTotal** - Check IP for malware C&C, phishing
3. **ThreatFox** - Check IP for known botnet/C&C
4. **Whois** - Get ASN, organization, contact info
5. **Reverse DNS** - Get hostname (if available)
6. **Certificate Transparency** - Find hidden subdomains (crt.sh)

Receipt (Krebs attacker OSINT):

- AbuseIPDB: No reports (residential proxies have clean reputation)
- VirusTotal: No malware associations
- ThreatFox: No C&C listings
- Whois: BrightData/Oxylabs (residential proxy providers)
- Reverse DNS: N/A (residential IPs don't have PTR records)
- Certificate Transparency: queue.layer3.xxx, chronicle.layer3.xxx (C&C infrastructure)

Step 4: MITRE ATT&CK Mapping (Day 3-5)

Framework: MITRE ATT&CK Enterprise Matrix

Mapping Process:

1. Identify adversary actions (HTTP requests, email, C&C)
2. Match actions to MITRE techniques (T1071, T1090, T1595.001, etc.)
3. Assign confidence levels (100% = direct evidence, 90% = strong inference, 75% = circumstantial)
4. Document receipts (Cloudflare logs, AbuseIPDB reports, Certificate Transparency)

Receipt (Krebs attacker mapping):

```
T1071 - Application Layer Protocol: 100% confidence (Cloudflare l
T1090 - Proxy: 90% confidence (residential IPs + professional pac
T1598.003 - Spearphishing for Information: 85% confidence (target
```

Step 5: Document Everything (Day 5-7)

Compliance Requirements (SOC2 audit trail):

1. Threat intelligence reports (11,000+ words with timestamps, IPs, receipts)
2. Blocked IP logs (Azure Table Storage: BlockedAssholes table)
3. Evidence artifacts (Cloudflare Analytics exports, AbuseIPDB API responses)
4. MITRE ATT&CK mapping (JSON format for audit queries)

Receipt (Security.DugganUSA.com):

- Whitepaper 04: Krebs Attacker Investigation (15,000 words)
- Whitepaper 05: Palo Alto Networks Incident (25,000 words, 3,909 reports)
- /compliance/evidence/threat-intelligence/ (JSON exports, API responses)
- /compliance/evidence/achievements/FOUNDING-JUDGMENT.json (SOC2 controls documented)

🗺️ MITRE ATT&CK Mapping Framework

Technique Coverage (Security.DugganUSA.com)

Reconnaissance (TA0043):

- **T1595.001** - Active Scanning: Scanning IP Blocks (Palo Alto Networks, nation-state scanners)
- **T1598.003** - Spearphishing for Information (Krebs attacker targeting /pitch.html)

- **T1589** - Gather Victim Identity Information (email harvesting, contact form spam)

Resource Development (TA0042):

- **T1583** - Acquire Infrastructure (residential proxy networks, C&C domains)
- **T1588.002** - Obtain Capabilities: Tool (residential proxy subscriptions)

Initial Access (TA0001):

- **T1190** - Exploit Public-Facing Application (WordPress probes, SQL injection attempts - BLOCKED)

Command and Control (TA0011):

- **T1071** - Application Layer Protocol (HTTP/HTTPS, WebSocket C&C)
- **T1090** - Proxy (residential proxy infrastructure for C&C communication)

Confidence Levels

100% Confidence (direct evidence):

- T1071 - Cloudflare logs show HTTP/HTTPS requests
- T1595.001 - AbuseIPDB reports show port scanning

90% Confidence (strong inference):

- T1090 - Residential IPs + professional pacing = proxy infrastructure
- T1589 - Honeypot contact form triggers = email harvesting

75% Confidence (circumstantial):

- T1598.003 - Targeted /pitch.html + high bandwidth = information gathering
- T1588.002 - Attribution to Layer3 Tripwire based on email timing

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📚 Lessons Learned

What Worked (Zero-Cost Detection)

1. **3-Source Surveillance** ($0 cost)
    - Cloudflare + GA4 + Application Insights = 100% visibility
    - Cost: $0 (all FREE tiers)
2. **Pattern #19 - Honeytrap via Radical Transparency**
    - Publishing threat intel forced adversary response (8-hour email)
    - Result: Attribution confidence increased from 50% → 90%
3. **MITRE ATT&CK Framework** (standardized classification)
    - Clear technique mapping (T1071, T1090, T1595.001, T1598.003)
    - Auditable receipts (Cloudflare logs, AbuseIPDB reports, Certificate Transparency)
4. **Automated Blocking** (Cloudflare Pro - $20/month)
    - 27 IPs auto-blocked (Oct 2024 - Jan 2025)
    - Zero false positives (behavior-based thresholds)

What Failed (Lessons for v2)

1. **Attribution Confidence Ceiling** (90% max without law enforcement)
    - Cannot verify C&C ownership (whois privacy protection)
    - Cannot subpoena residential proxy providers (legal barriers)
    - **Solution**: Accept 90% confidence as "good enough" for defensive actions

2. **Prevented Attacks Are Unverifiable** (counterfactual problem)
    - Cannot prove Palo Alto Networks WOULD have attacked (only scanning detected)
    - Cannot quantify damage prevented (no baseline for "what would have happened")
    - **Solution**: Focus on DETECTED threats, not prevented threats (epistemic honesty)
3. **Real-Time Detection Lag** (5-15 minute delay)
    - Cloudflare Analytics: 5-minute aggregation
    - GA4: 10-minute delay for real-time reports
    - Application Insights: 1-minute delay
    - **Solution**: Acceptable for most threats (not targeted for real-time DDoS)

🏁 Conclusion

TLDR: Security.DugganUSA.com has detected 3 adversary campaigns using $0 surveillance (Cloudflare + GA4 + Azure), with full MITRE ATT&CK technique mapping and public OSINT receipts.

Detected Threats:

1. Krebs Attacker (T1071, T1090, T1598.003) - 90% attribution confidence
2. Palo Alto Networks (T1595.001) - 3,909 abuse reports from 1,247 victims
3. Nation-State Scanners (T1595.001, T1589) - Daily reconnaissance from China/Russia/North Korea

Cost: $0 for detection (FREE tiers), $20/month for automated blocking (Cloudflare Pro)

The Real Moat: Epistemic rigor. Every MITRE ATT&CK technique mapped with confidence levels, timestamps, and receipts. No marketing bullshit, just auditable threat intelligence.

📋 Last Updated: 2025-01-27 🚨 Security.DugganUSA.com - Radical Transparency + IP Protection = Trust Arbitrage

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