About OmniSOC

- Shared 24/7/365-capable cybersecurity operations center for research & higher education (R&E).
- Led by/located at/leverages IU: Data Centers, GlobalNOC, InfoSec team, HR, legal, office space, etc.
- Average volume across all members: > 16 TB/day; > 17.2 B events/day; > 200k EPS.
- Elastic is key technology partner.

OmniSOC: always watching:

- **OmniSOC Core Service:**
  - 24/7/365 monitoring and alerting
  - SIEM (dashboard) access
  - Project Liaison:
    Onboarding support, single POC for emerging issues, interpretation, coordination of mass security events.
- SOC - Plus:
  - Honeypots, SIEM build/replacement, EDR, managed vulnerability scanning
- Cybersecurity Staffing Services:
  - Embedded, fractional- FTE: CISO, CISO advisory,, partial FTE security analysts/engineers, virtual cybersecurity teams, specialized IR teams, SOC readiness assessment, research- specific cybersecurity consulting.

Key features

- 24/7 network monitoring/threat hunting capability @ lower cost than hiring on-premise staff.
- Provides only actionable alerts.
- Community “herd immunity:” Leverages threat intelligence gained from across all members’ data.
- Cybersecurity staffing services (partial-FTE staffing)
- Higher Ed collaborator/ higher Ed focus.
- Helps meet insurance SOC requirements.
- Leverages MITRE ATT&CK framework.
- Acts as extension of member’s local security team.

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Current Member Community

Regional Networks

- I-Light/Indiana GigaPOP
- Connecticut Education Network (CEN)
- Southern Crossroads (SoX)

NSF Facilities

- Academic Research Fleet
- NOIRLab
- National Radio Astronomy Observatory
- ACCESS

Higher Education

- University of California Santa Cruz
- Case Western Reserve University
- Claremont Colleges*
- Clemson University
- University of Connecticut
- Creighton University
- DeSales University
- Fordham University
- Indiana University
- Lehigh University
- Lehigh Carbon Community College
- University of Nebraska
- Northwestern University
- Purdue University
- Rutgers University
- San Diego State University
- Santa Clara University
- Stony Brook University
- Virginia Tech
- University of Wisconsin System

*Finalizing contract

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Why not DIY?

- $67k ELK server, storage cluster, and software licensing to build monitoring system
- $95,380k/year (average salary, Glassdoor) security engineer salary, x 1.5 for tax and benefits, x 4 for 24/7/365 coverage = $572,280
- $50k/year to provide professional development and training to keep this staff up to date on the latest techniques and technologies

~$689,280 year 1

~$600,000 each year following

How OmniSOC Works

Log Requirements

Must Have (Required)

- **Traffic Session — N/S**
  - e.g. Netflow, Zeek, Conn logs
- **NIDS**
  - e.g. Suricata, Palo Alto Threat logs
- **DNS query logs**
  - e.g. Bind, Zeek DNS
- **Endpoint logs for critical systems**
  - e.g. Crowdstrike, Elastic Endpoint, MS Defender

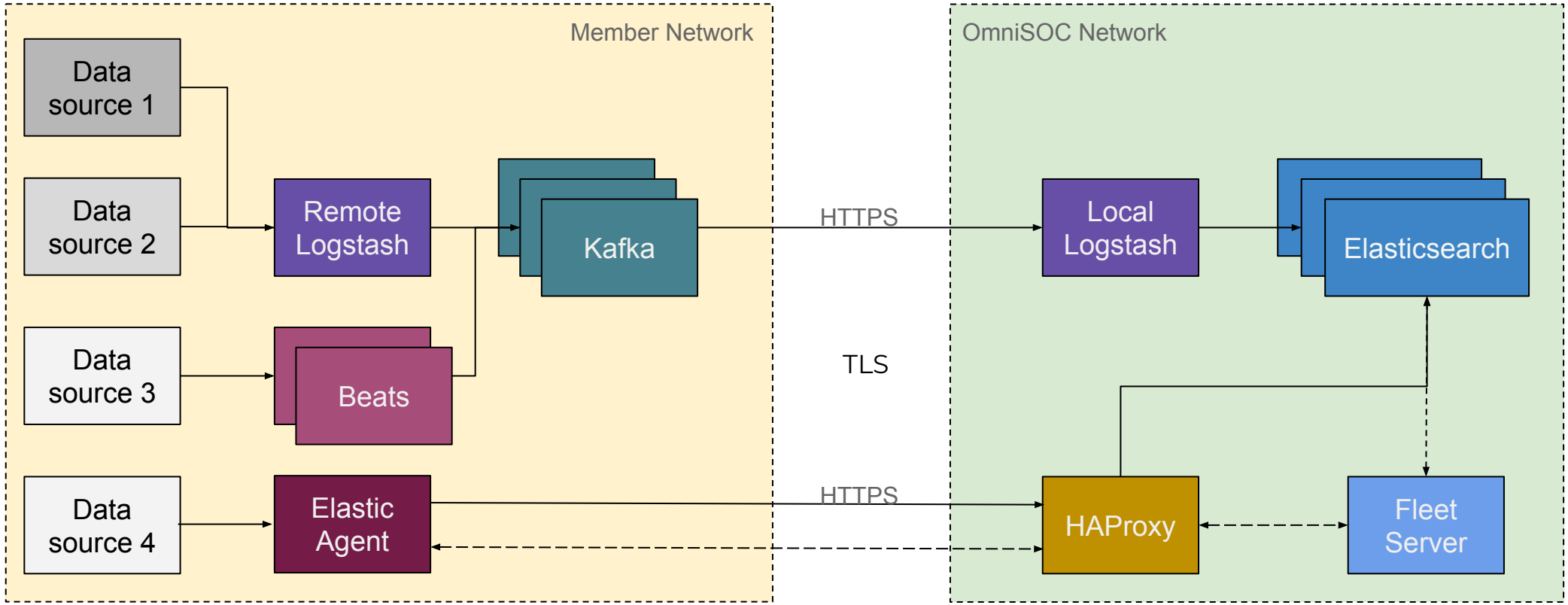
Adds Significant Value

- **Application layer protocol analyzers**
  - e.g. Zeek, HTTP, SMTP, TLS, Weird
- **Centralized Authentication**
  - e.g. AD, kerberos, O365
- **Malware**
  - e.g. MS Defender
- **Web Proxy**
  - e.g. Palo Alto, Squid

Helpful—Not Required

- **NAT logs for public/private IP mapping**
- **DHCP**
  - e.g. Zeek DHCP
- **Traffic Session E/W**
  - e.g. Netflow, Zeek Conn logs
- **Endpoint logs for high value** (less than critical) **systems**
- **Wireless/VPN Authentication**
- **Vulnerability scanner results**
  - e.g. OpenVAS, Nessus, Qualys
- **Honeypots**
  - e.g. Duke STINGAR
- **Service-specific access logs**
  - e.g. MSSQL, MySQL, Apache

Typical Architecture



- ➔ Raw data collected by Logstash on aggregators
- ➔ Inserted into Kafka as-is
- ➔ Picked up by IU-based Logstash instances
  - ◆ “Store and forward”, no data loss due to network interruption

- ➔ Data normalized to ensure consistency between different sources
- ➔ Data augmented with additional metadata
- ➔ Finally indexed into Elasticsearch

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Daily incident and threat hunting

- Automated Detections
- NIDS Alerts
  - Newly encountered alerts
  - Recent alert spikes
- Known Bad
  - Previously actioned IoCs (Across all OmniSOC members)
  - External Threat Intelligence
- Ignore Known Good/False Positives
  - Know thy environment

Deeper hunting

- Manual Hypothesis Based Hunts
- Long Tail Analysis:
  - Unique metadata groups (e.g. Browser User Agents)
  - Least occurrence events
- Anomaly Detection
  - C2 Beaconing
  - Baseline Deviations / Machine Learning

Communications/Member operations

OmniSOC engages with members through:

- Tickets
- Email lists
  - Monthly Hunt Summaries
  - $NEWSINT Events
- Video Conferencing (Zoom)
  - Bi-Weekly Meetings: Platform Updates / Reported Incident Reviews
- Slack
  - Interactive discussions/ Information Sharing
- Hunt Journals/Case Management
- PL/VCS Engagement


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Becoming a member

Typical Use Case

Requirements	Typical Services	Funding Requirements
• **Higher education or research institution** • **REN-ISAC member**	• **Core Services @ 50-200 GB Level**	• **~$81K-$98K** ○ Managed 24x7 monitoring, alerting, actionable alerts, deep threat hunting

• **Defined resource to address alerts**
  ○ May be OmniSOC virtual staff
• **Has necessary logs**
  ○ Or funded plan to add
• **Funding for member fee**
	• **.25-.5 FTE virtual Cybersecurity staff**
	  ○ Onboarding lead + other tasks
		• **~$41K-$83K**
		  ○ 1 year, often extended to years 2, 3

	• **SIEM (dashboard) access**
	  ○ For security teams
		• **~$14K***
		  ○ Included in above Core Service figures

Onboarding: usually 12-14 weeks, begins & payment starts not earlier than 60 days after contract executed.

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Member Fees

Drivers

- Average log volume (GB/day)
- Data retention (30 days standard)
- Need for hosted SIEM
- Need for other services

For institutions with enrollments ~10,000-15,000 and ingest of 350-500 GB daily, OmniSOC can provide 24x7x365 monitoring & delivery of actionable alerts + deep threat hunting (Core Service) @ a cost less than 2 FTE.

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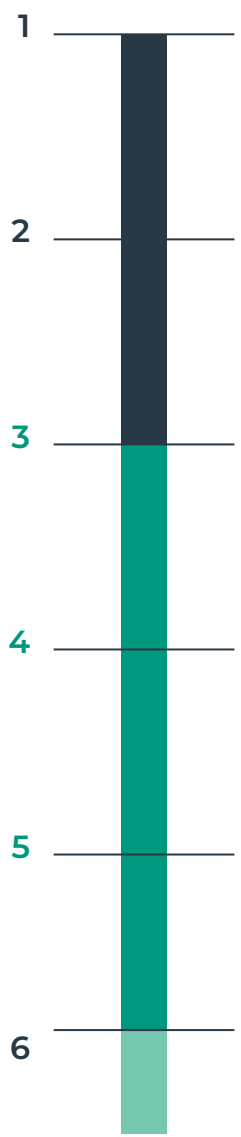
Member Fees

Drivers

- Average log volume (GB/day)
- Data retention (30 days standard)
- Need for hosted SIEM
- Need for other services

Historically, for institutions with enrollments ~ 5,000 and ingest of 50-150 GB daily, OmniSOC can provide 24x7x365 monitoring & delivery of actionable alerts (Core Service) @ less than the cost of one FTE/FTE with benefits.

Roadmap to membership



1 **Scoping and contracts**

Sizing, selecting right services, establishing contractual relationships,

2 **Deeper discovery**

Establish comms channels, better understanding of your infrastructure, create onboarding plan

3 **Onboarding: Platform**

Set up monitoring appliances and aggregators, assess feed quality, begin normalization and enrichment workflows, deploy endpoint solution

4 **Onboarding: Security Engineering**

Establish monitoring rules and workflows, begin threat hunting

5 **Onboarding: Virtual Services**

Get to know Project Liaison. Establish vulnerability scanning. Set up honeypot management platform. Intro VCS personnel.

6 **Move to production**

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Thank you for your attention.

Questions?

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Palo Alto traffic dashboard

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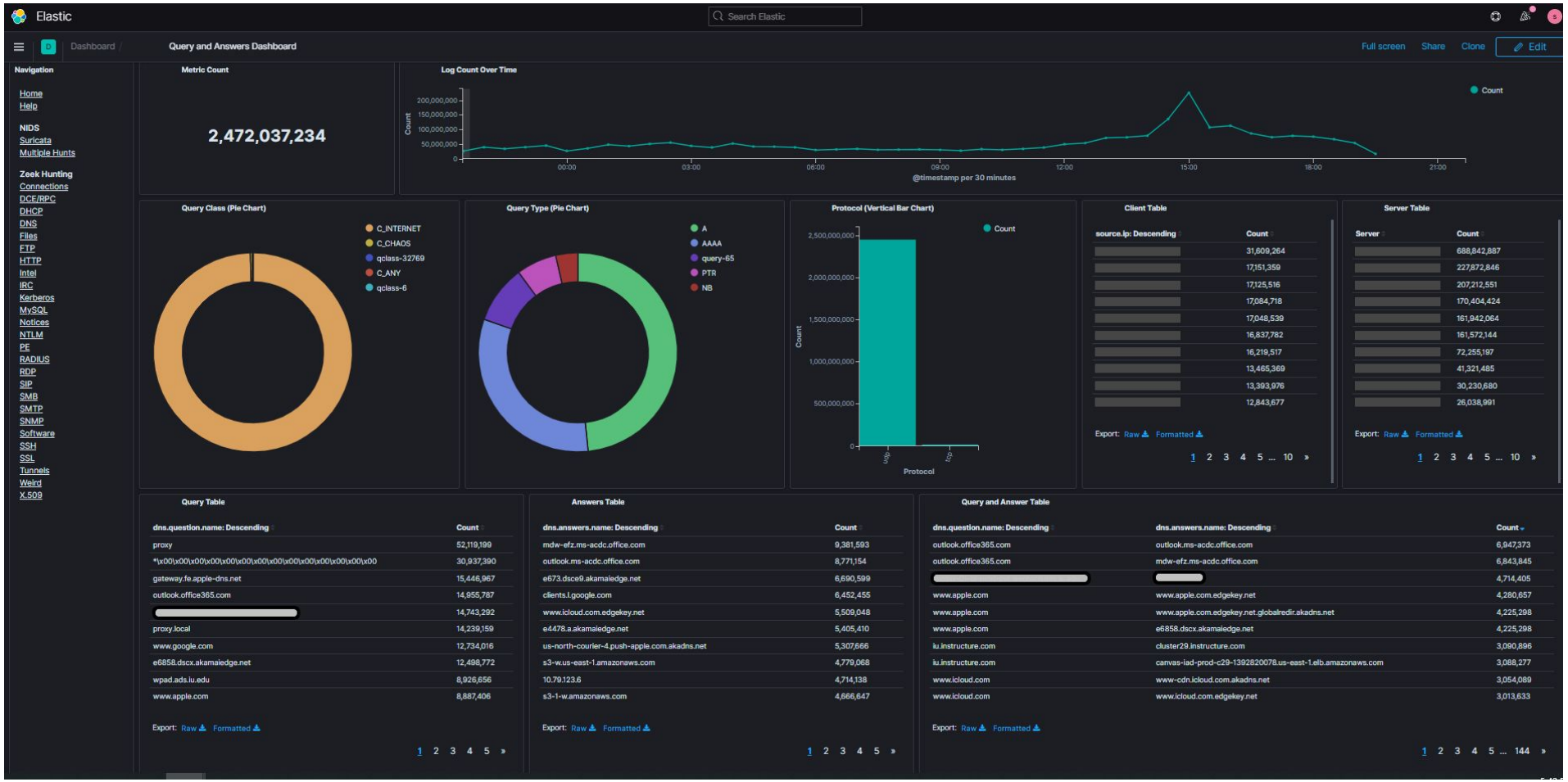
Zeek DNS dashboard



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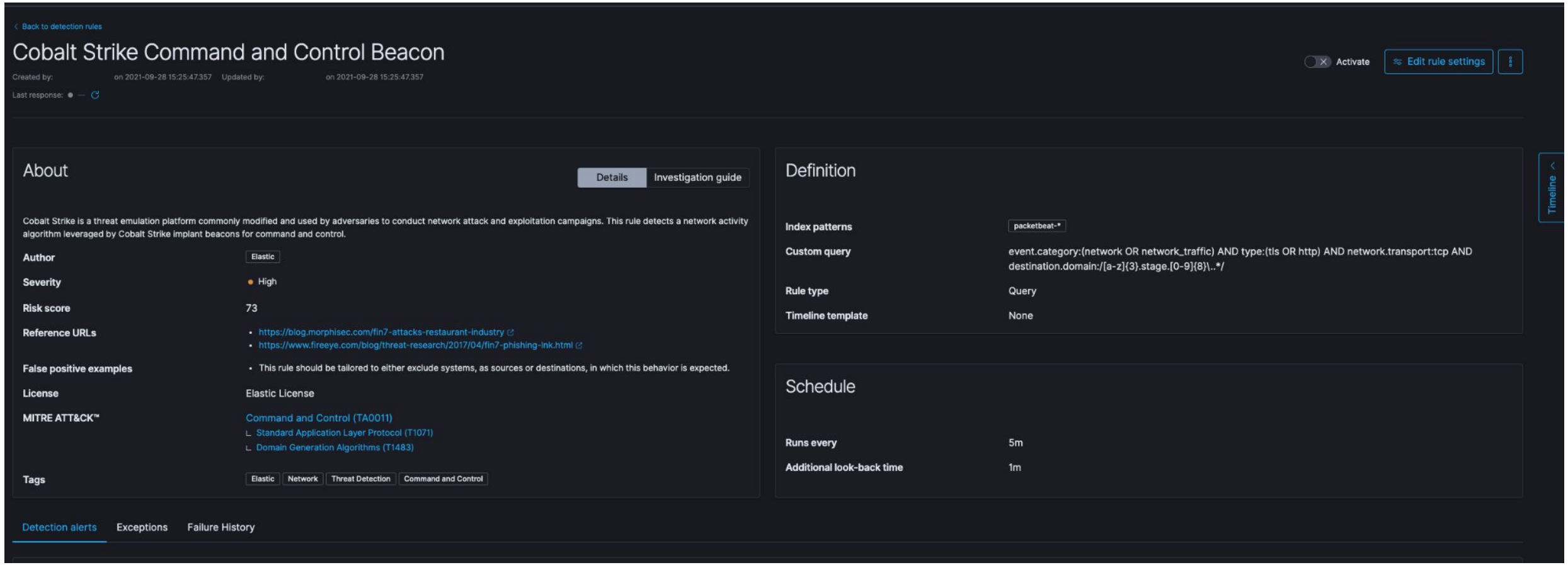
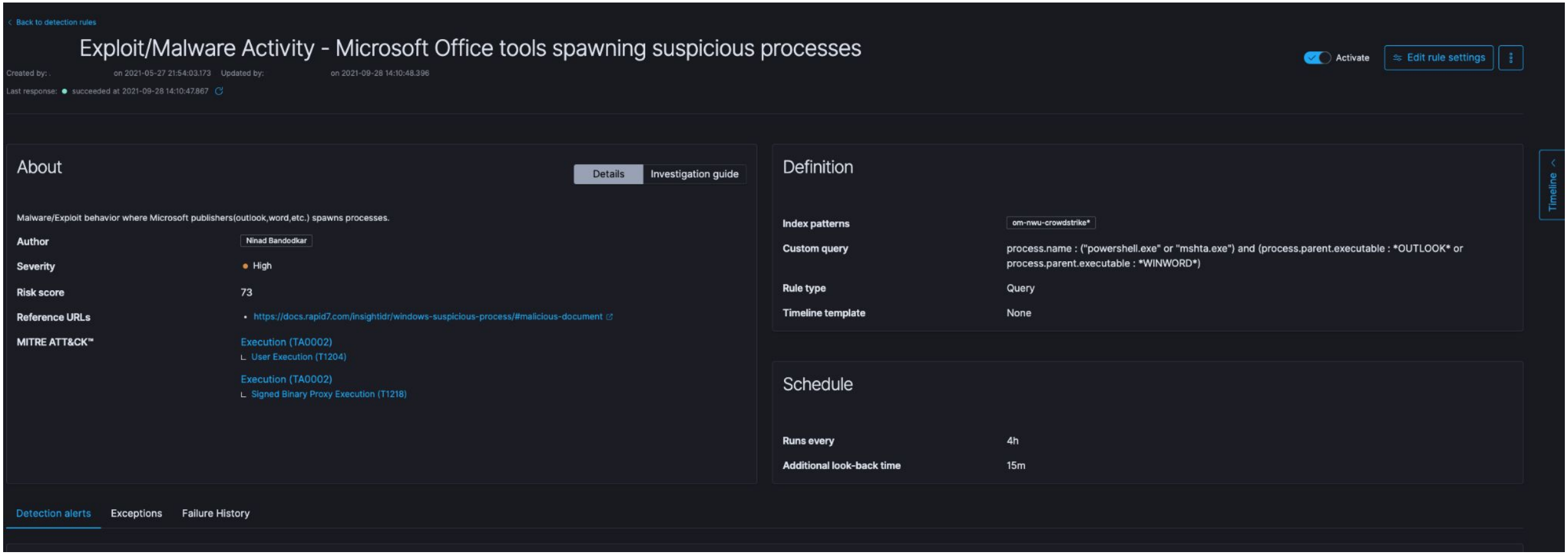
Cobalt strike automated detection



Malware automated detection



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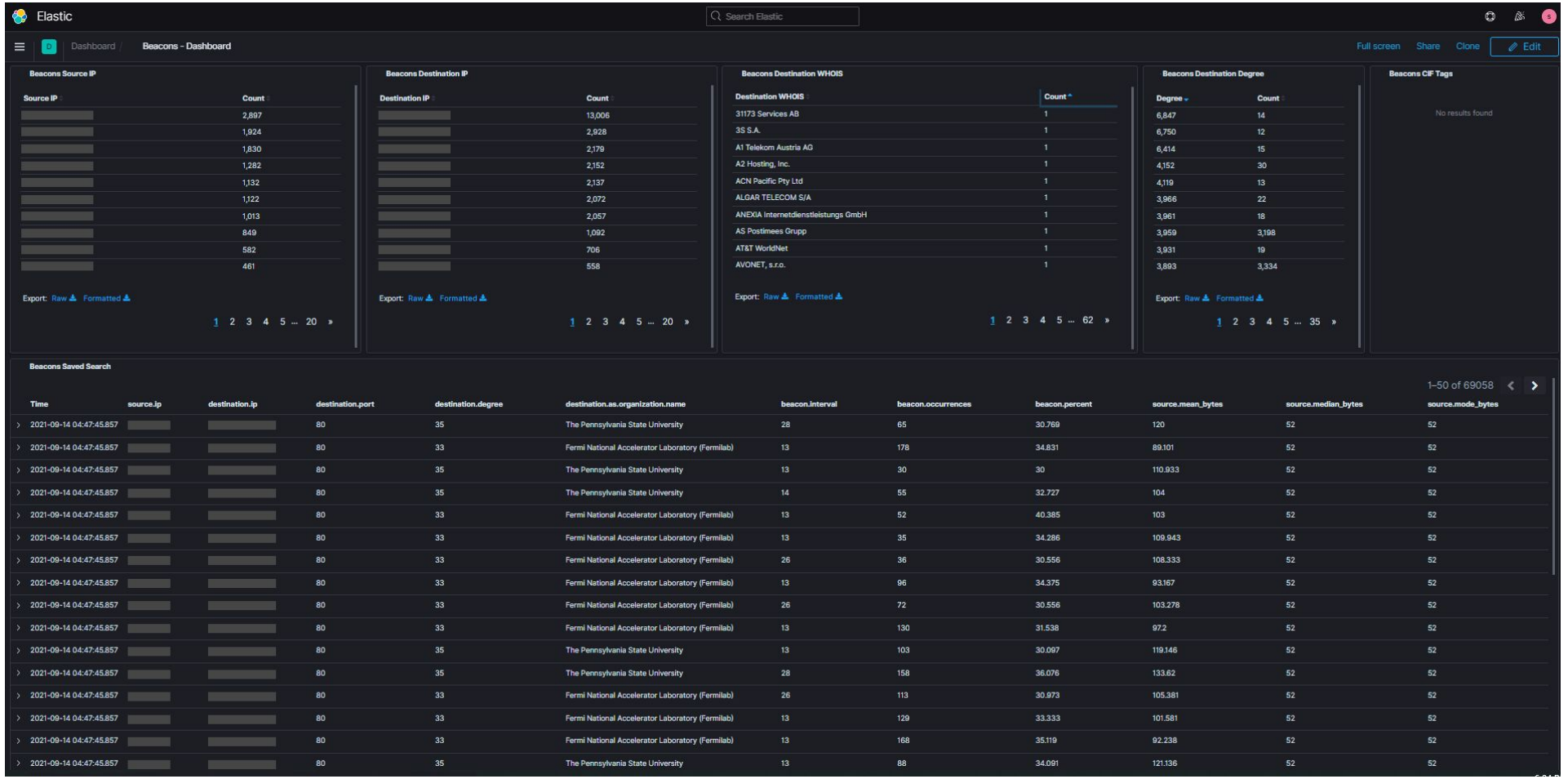
Flare C2 beacon dashboard



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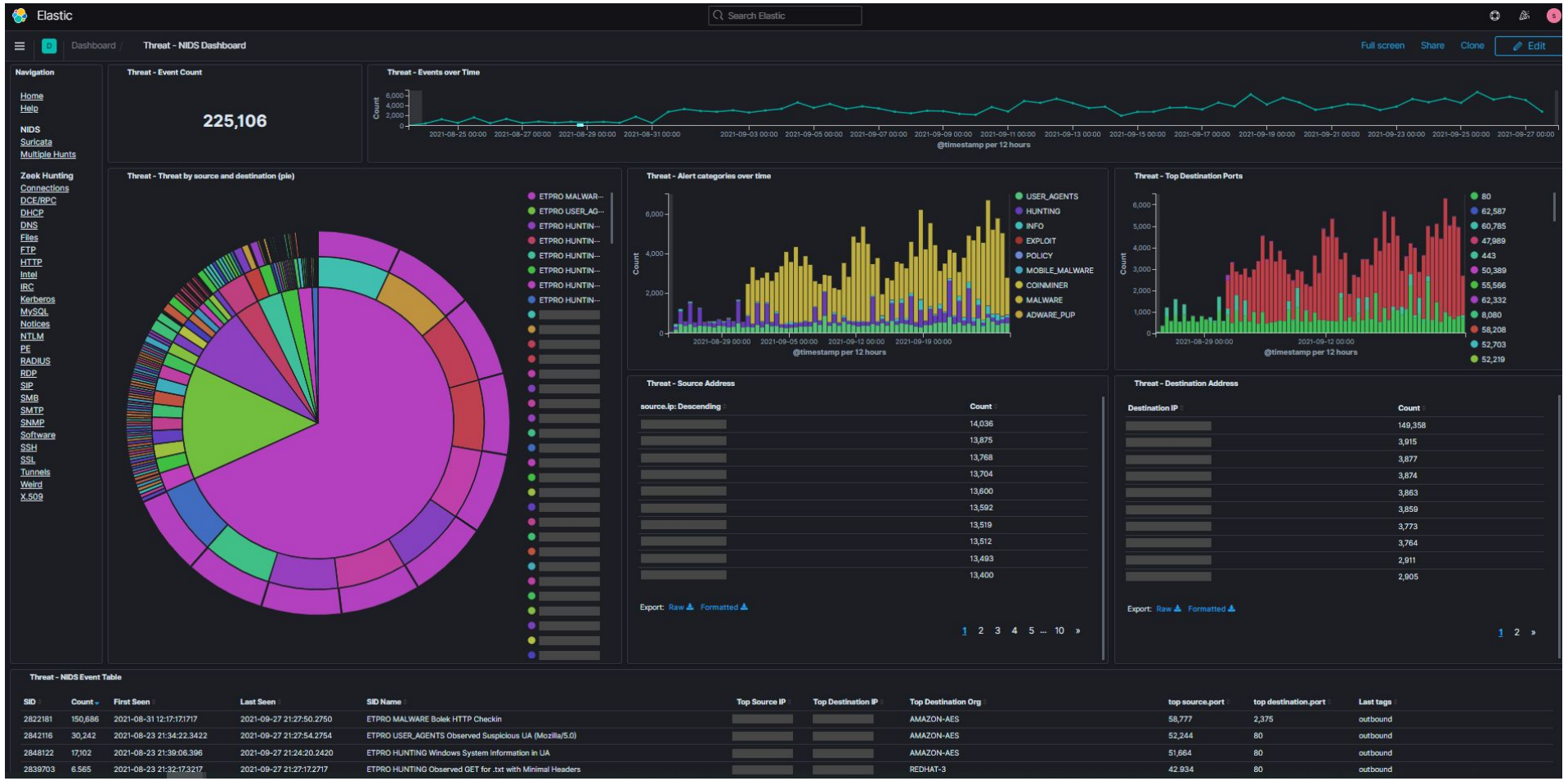
Suricata NIDS dashboard



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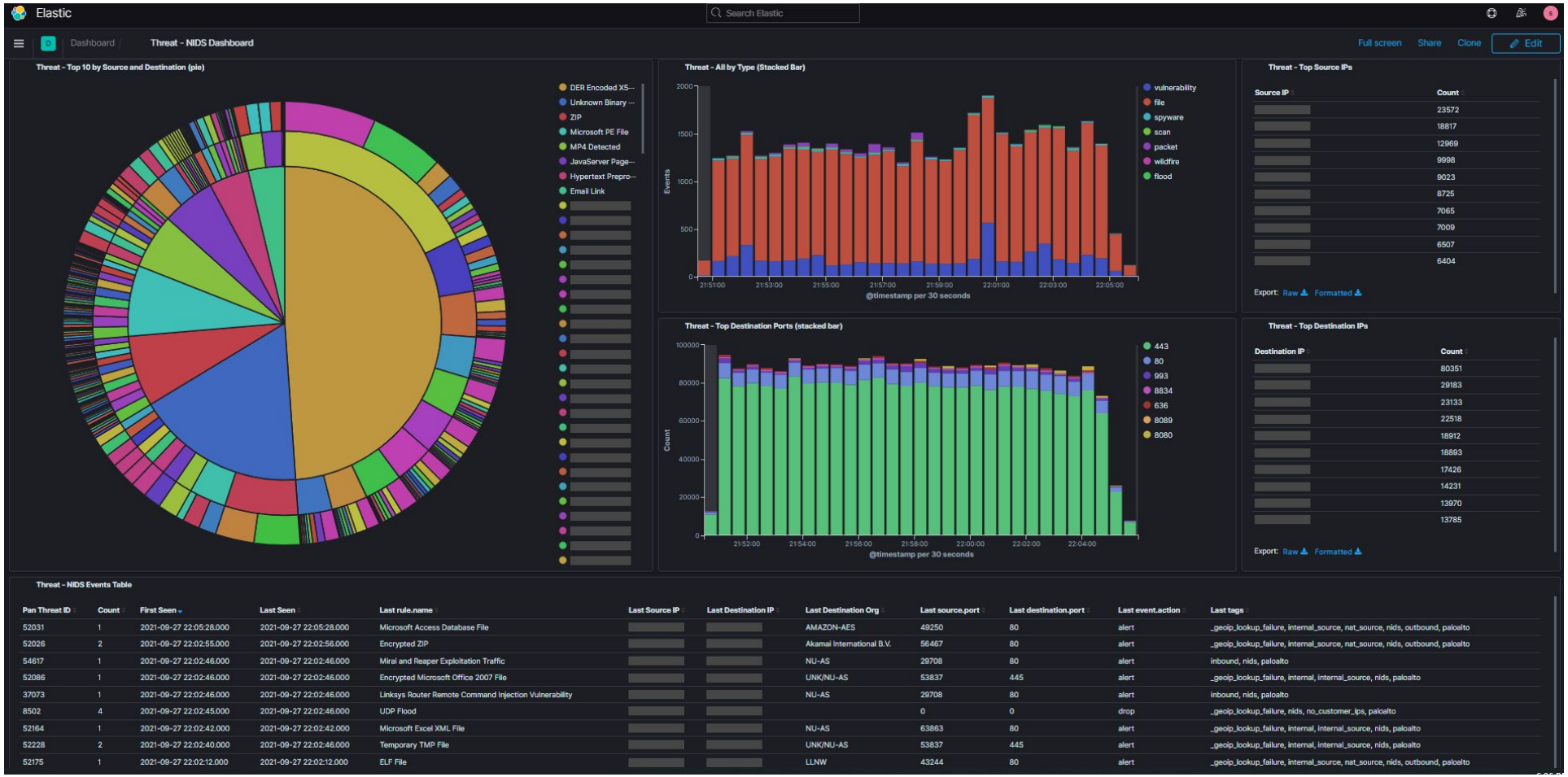
Palo Alto threat dashboard



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