Raphaël Vinot, MISP Project
Danni Co & Saâd Kadhi, TheHive Project

BOTCONF 2018 / 2018-12-04

TLP:WHITE

DETECT, INVESTIGATE & RESPOND

USING MISP, THEHIVE & CORTEX

BEFORE WE START - REQUIREMENTS

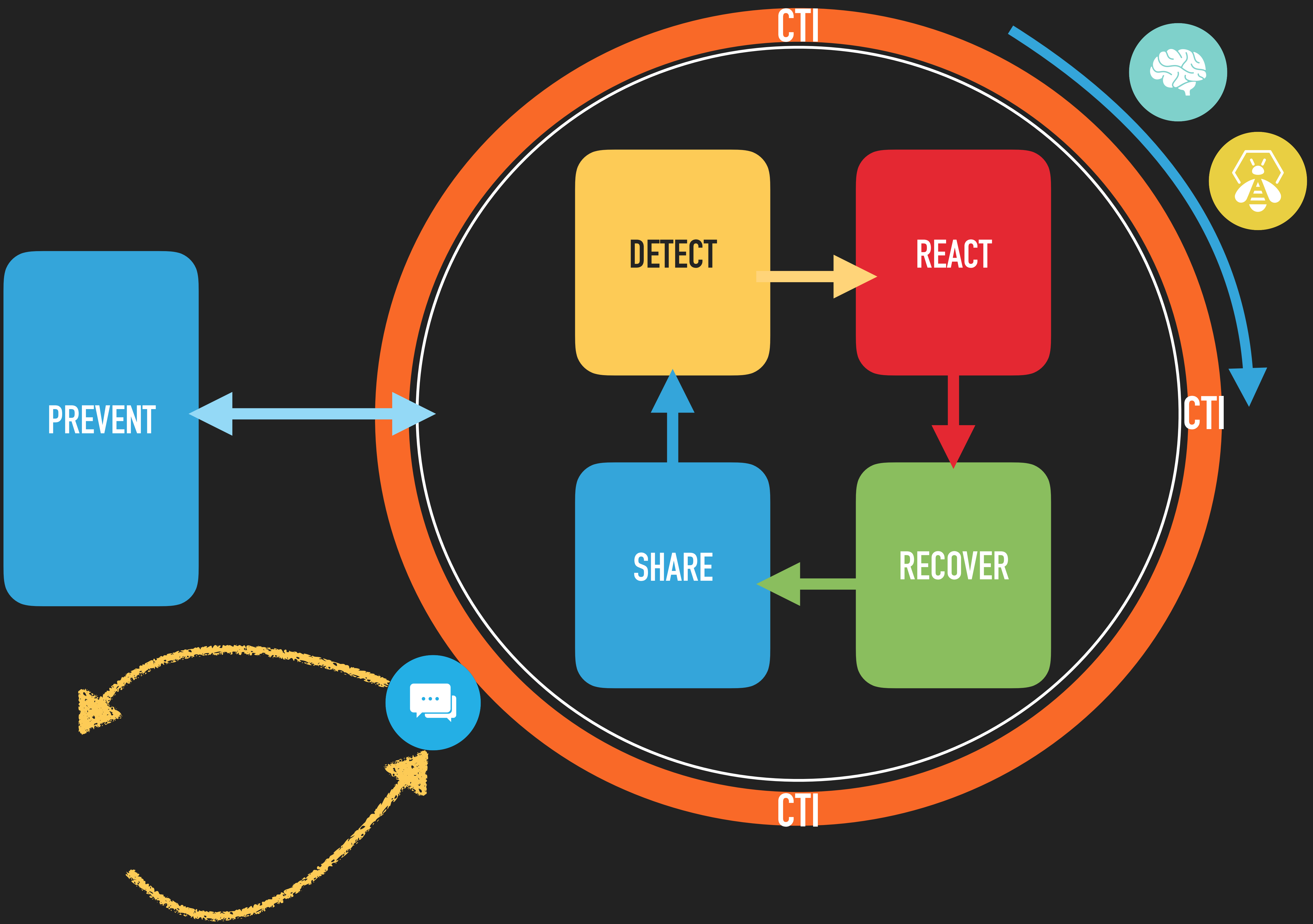
- A decent computer with enough power to run a hungry VM
- If you can give it 6GB of RAM & 2 processor cores, that would be great
- 4GB is the bare minimum
- Virtualisation software (VMware Fusion, VMware Workstation, or VirtualBox)
- An SSH client on your host OS
- Copy all the contents of the USB keys we provide to your laptops

WHAT WE ARE GOING TO COVER TODAY

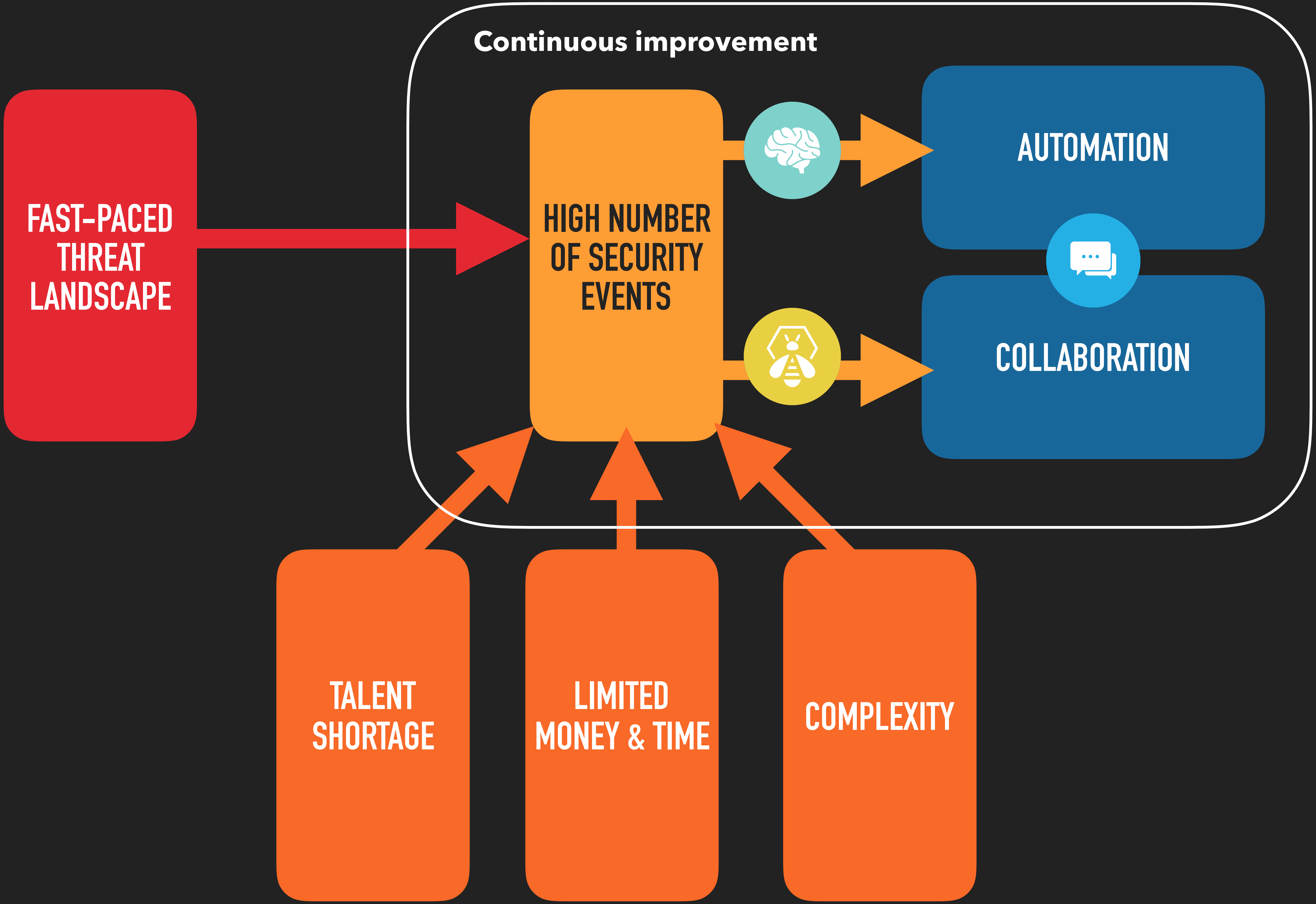
- Overview of the software stack: TheHive, Cortex & MISP
- Installation & Configuration
- Case Study 1: Your Car is Waiting
- Case Study 2: Feed me an Alert
- Case Study 3: Knock, Knock, You’ve got an Event

OVERVIEW

WHEN PREVENTION FAILS



DRIVE DOWN THE TIME TO REACT



Continuous improvement

FAST-PACED THREAT LANDSCAPE

HIGH NUMBER OF SECURITY EVENTS

AUTOMATION

COLLABORATION

TALENT SHORTAGE

LIMITED MONEY & TIME

COMPLEXITY

THEHIVE PROJECT

GOALS

- DRIVE THE TIME TO DETECT & REACT
- CONTRIBUTE TO THE COMMUNITY

HOW

- ALERT/EVENT COLLECTION
- AUTOMATION
- COLLABORATION

WHAT (TOOLS)

- CYBER THREAT INTELLIGENCE
- INCIDENT RESPONSE
- DIGITAL FORENSICS

WHAT (TAKE TWO)

- LIBRARIES
- SYNAPSE
- ‘FEEDERS’

WHO

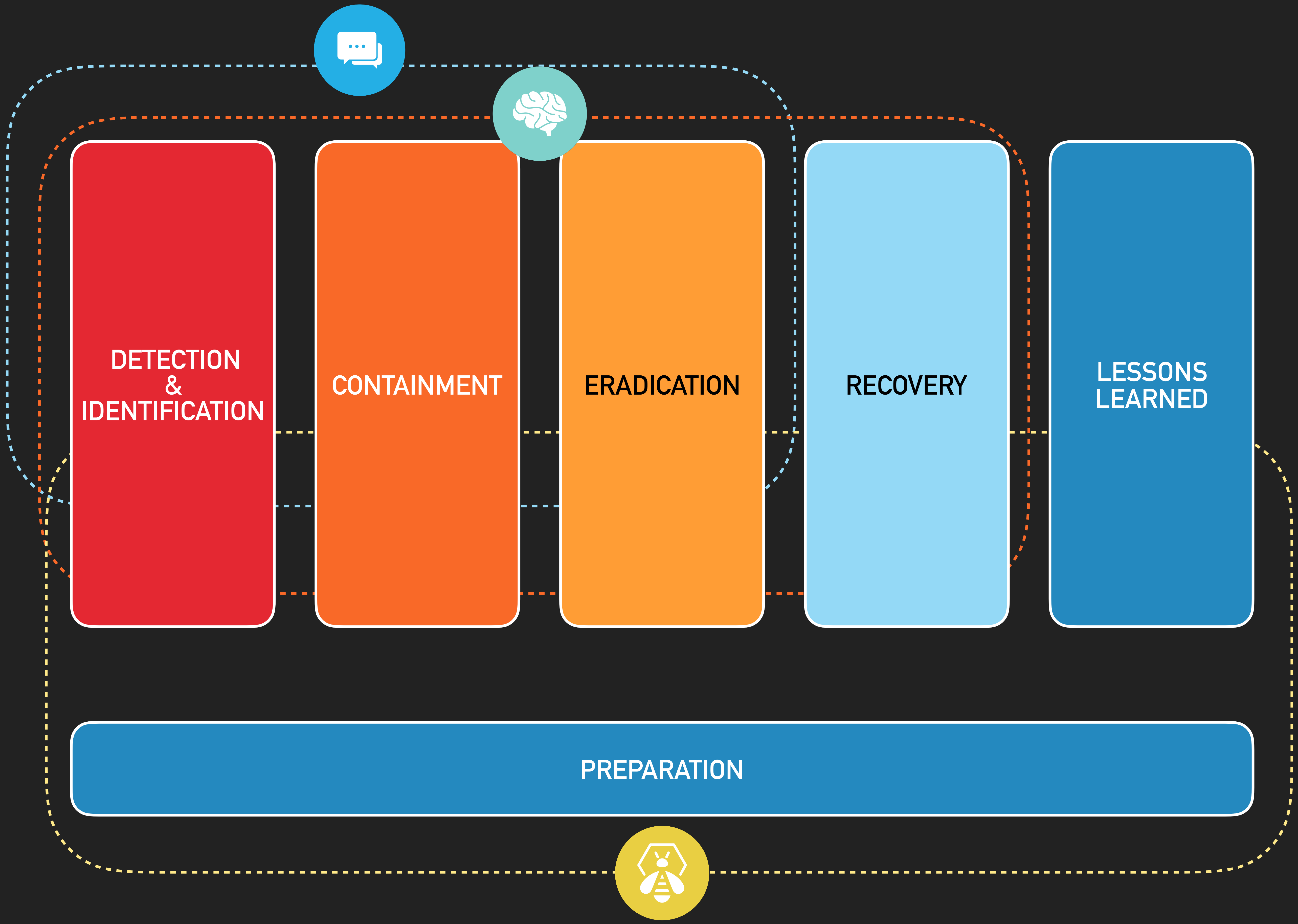
- THEHIVE CORE TEAM (6 MEMBERS)
- A LARGE COMMUNITY (SOC/CSIRT/CERT)

SINCE WHEN

- OCT 2014 (PRIVATE VERSION)
- NOV 2016 (FLOSS)
- FEB 2017 (CORTEX)

AGPL V3

WITHIN THE SANS 6 STEPS PROCESS



- SIRP / SOAR
- Collaborate in real-time
- Fully customisable dashboards : track activity, follow KPIs…
- Use Cortex for at-scale analysis & active response
- Leverage MISP for CTI functions
- Multiple auth methods (LDAP, AD, OAuth 2, API keys…)
- Webhook support

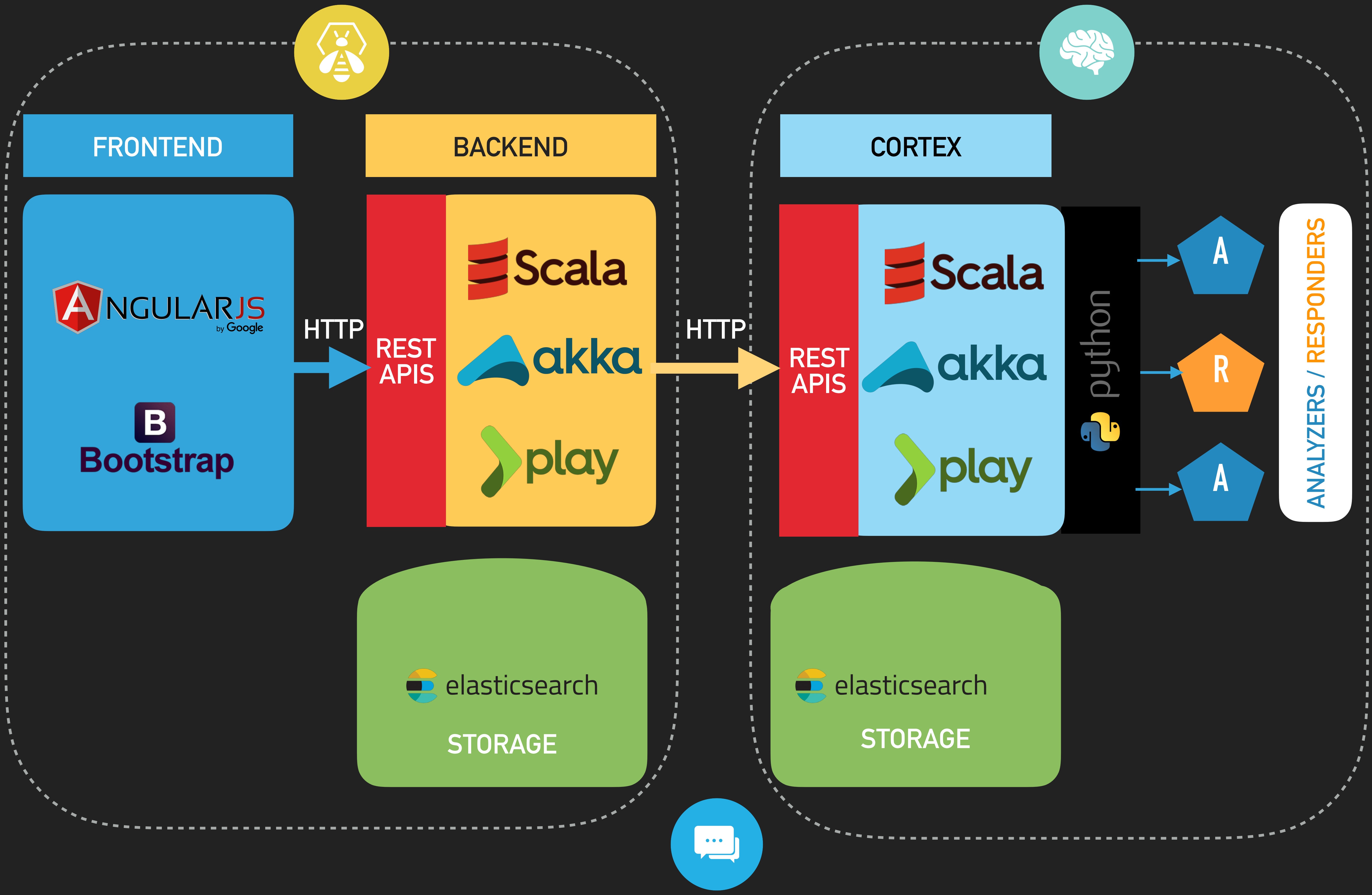
- TheHive is horizontally & vertically scalable
- You can add additional nodes to the underlying Elasticsearch cluster
- You can dynamically add TheHive nodes to your cluster to increase the performance of the platform
- TheHive API is stateless to the exclusion of the stream
- You can explore almost all the data that TheHive handles thanks to the search module

- Observable analysis & active response engine

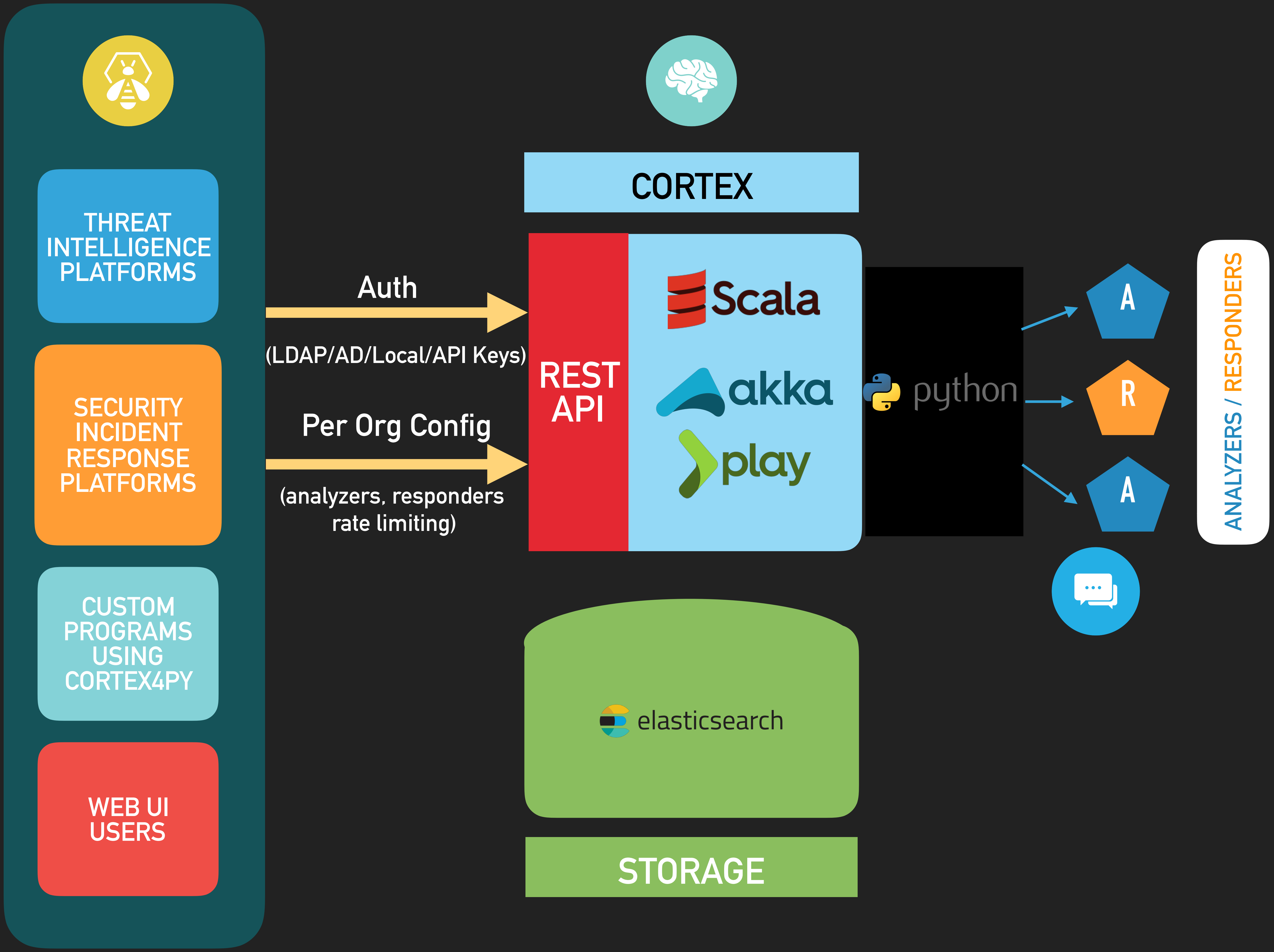
101 ANALYZERS

- Analyze using the Web UI or through the REST API
- Respond & take action
- Use Python (or other languages supported by Linux) to write your own
- TheHive can leverage multiple Cortex instances
- Use MISP for additional analysis possibilities

ARCHITECTURE



- Unlike TheHive, Cortex supports RBAC or multi-tenancy
- You can host multiple ‘organizations’ within a single instance
- Each organization can have its own set of analyzers and/or responders, corresponding quota limits and custom caching
- Analyzers and responders understand the TLP and the PAP (Permissible Actions Protocol) and will act accordingly



THREAT INTELLIGENCE PLATFORMS

SECURITY INCIDENT RESPONSE PLATFORMS

CUSTOM PROGRAMS USING CORTEX4PY

WEB UI USERS

Auth

(LDAP/AD/Local/API Keys)

Per Org Config

(analyzers, responders rate limiting)

CORTEX

REST API

Scala

akka

play

python

A

R

A

ANALYZERS / RESPONDERS

elasticsearch

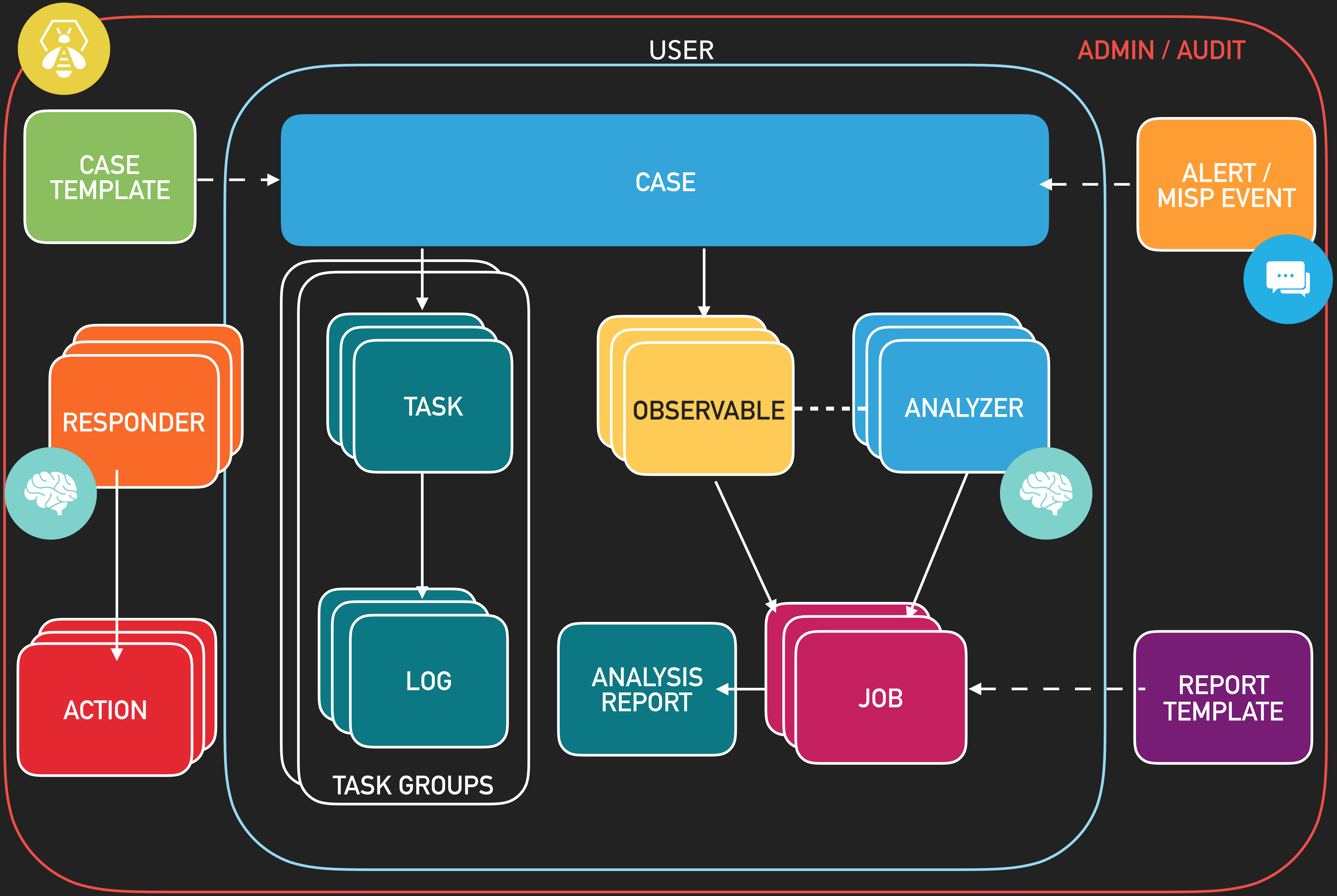
STORAGE

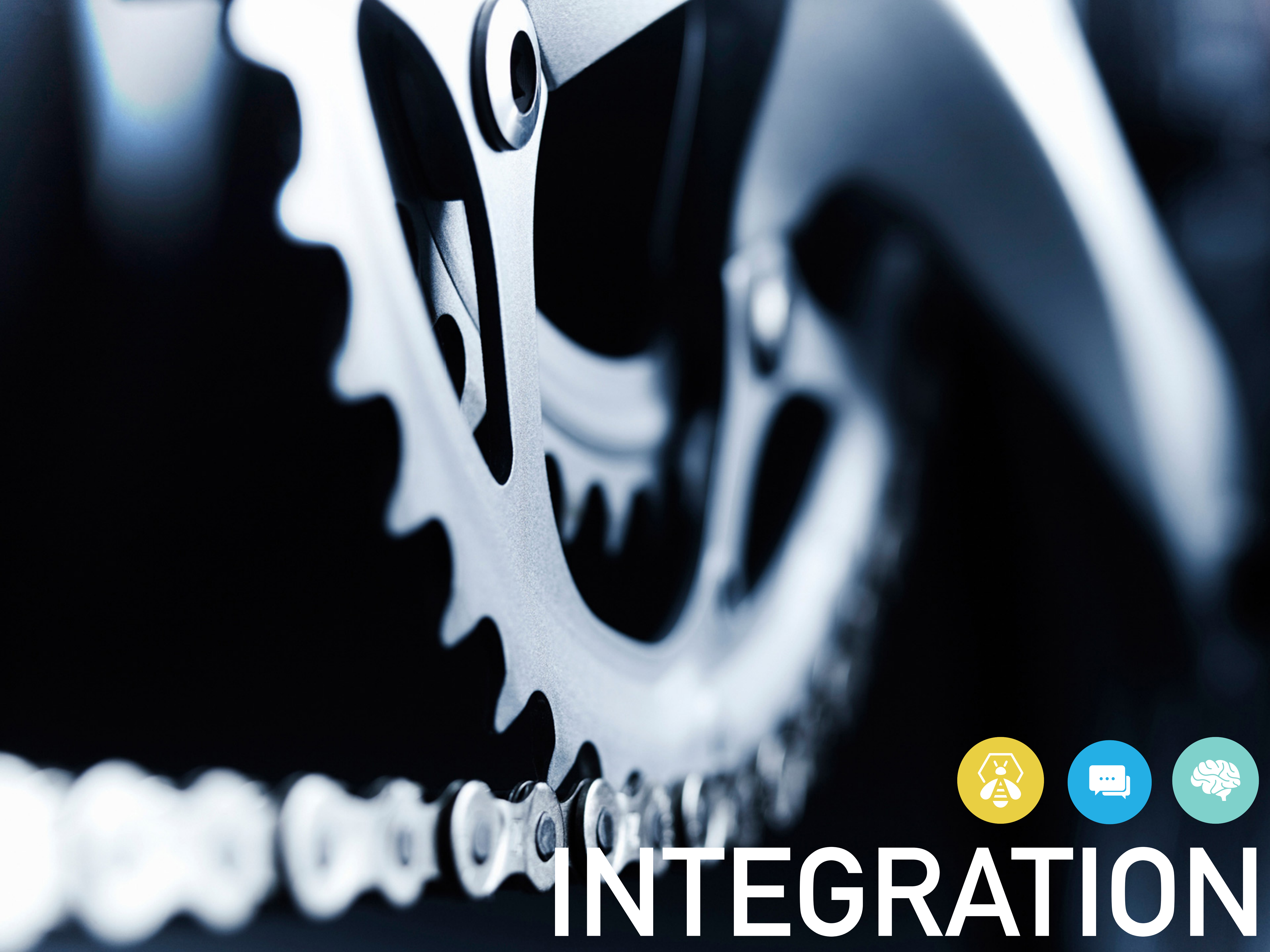
- The *de facto* standard for threat sharing
- Threat intelligence collection, sanitisation & dissemination
- Correlation & intelligence storage
- Supports tagging, galaxies, objects, taxonomies such as ATT&CK, & much more
- Can be highly automated
- TheHive can import from or export to multiple MISP instances

OR BOTH AT THE SAME TIME

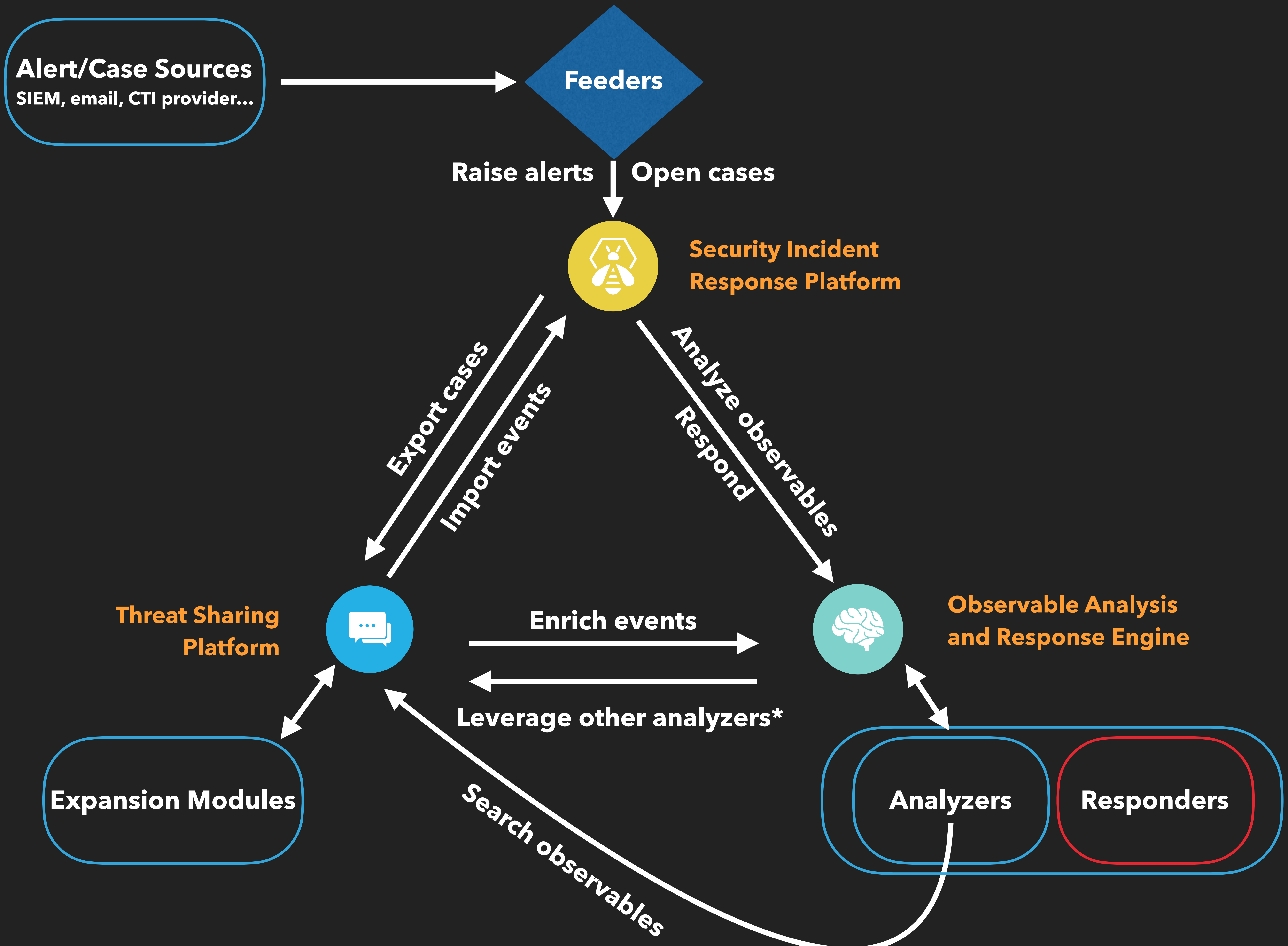
- Tightly integrated with Cortex for indicator enrichment

WORKFLOW


USER
ADMIN / AUDIT
CASE TEMPLATE
CASE
ALERT / MISP EVENT
RESPONDER
TASK
OBSERVABLE
ANALYZER
ACTION
LOG
ANALYSIS REPORT
JOB
REPORT TEMPLATE
TASK GROUPS



INTEGRATION



Alert/Case Sources

SIEM, email, CTI provider…

Feeders

Raise alerts

Open cases

Security Incident Response Platform

Export cases

Import events

Analyze observables

Respond

Threat Sharing Platform

Enrich events

Leverage other analyzers*

Observable Analysis and Response Engine

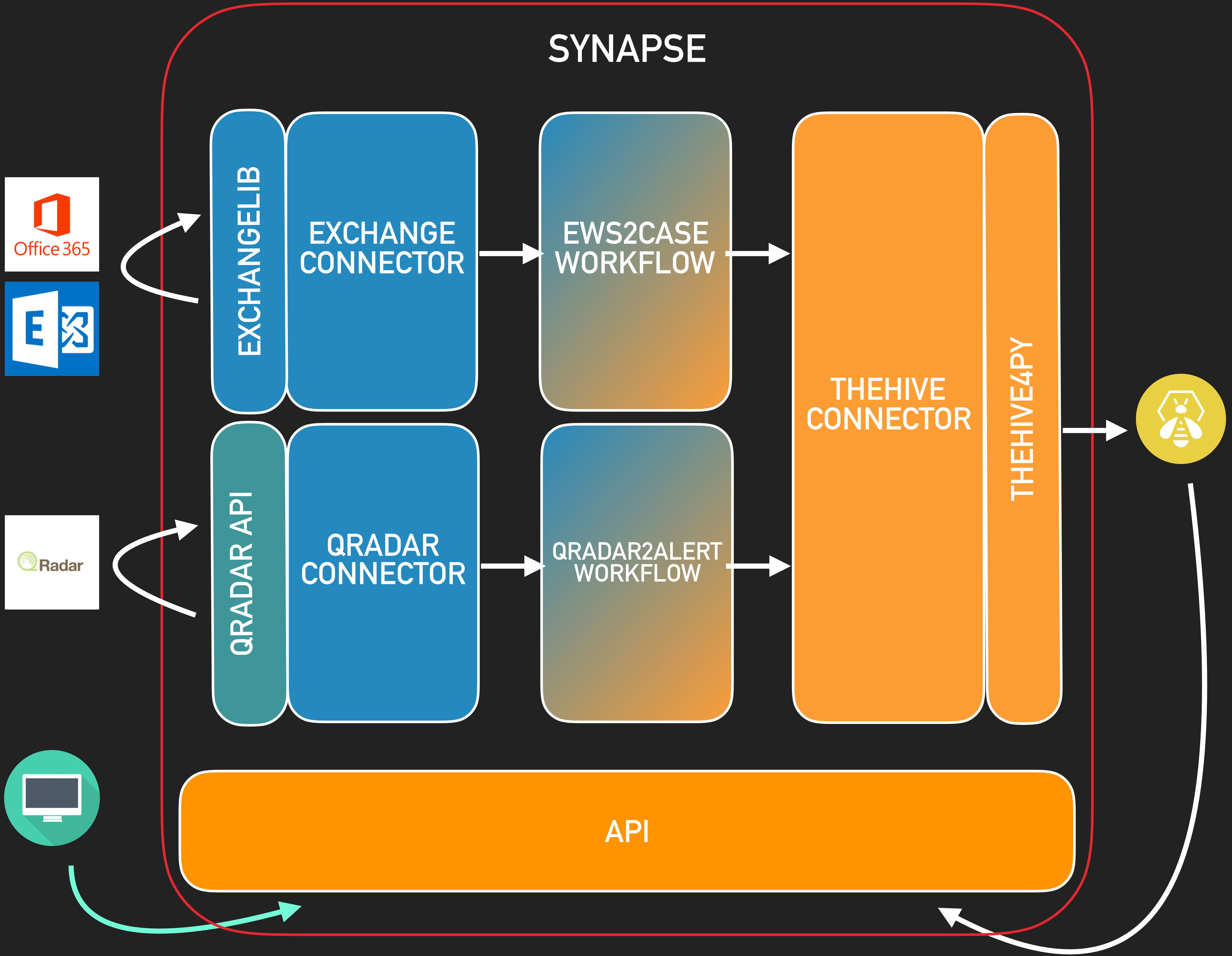
Expansion Modules

Search observables

Analyzers

Responders

* Not supported currently in Cortex 2



SYNAPSE

EXCHANGELIB

EXCHANGE CONNECTOR

EWS2CASE WORKFLOW

QRADAR API

QRADAR CONNECTOR

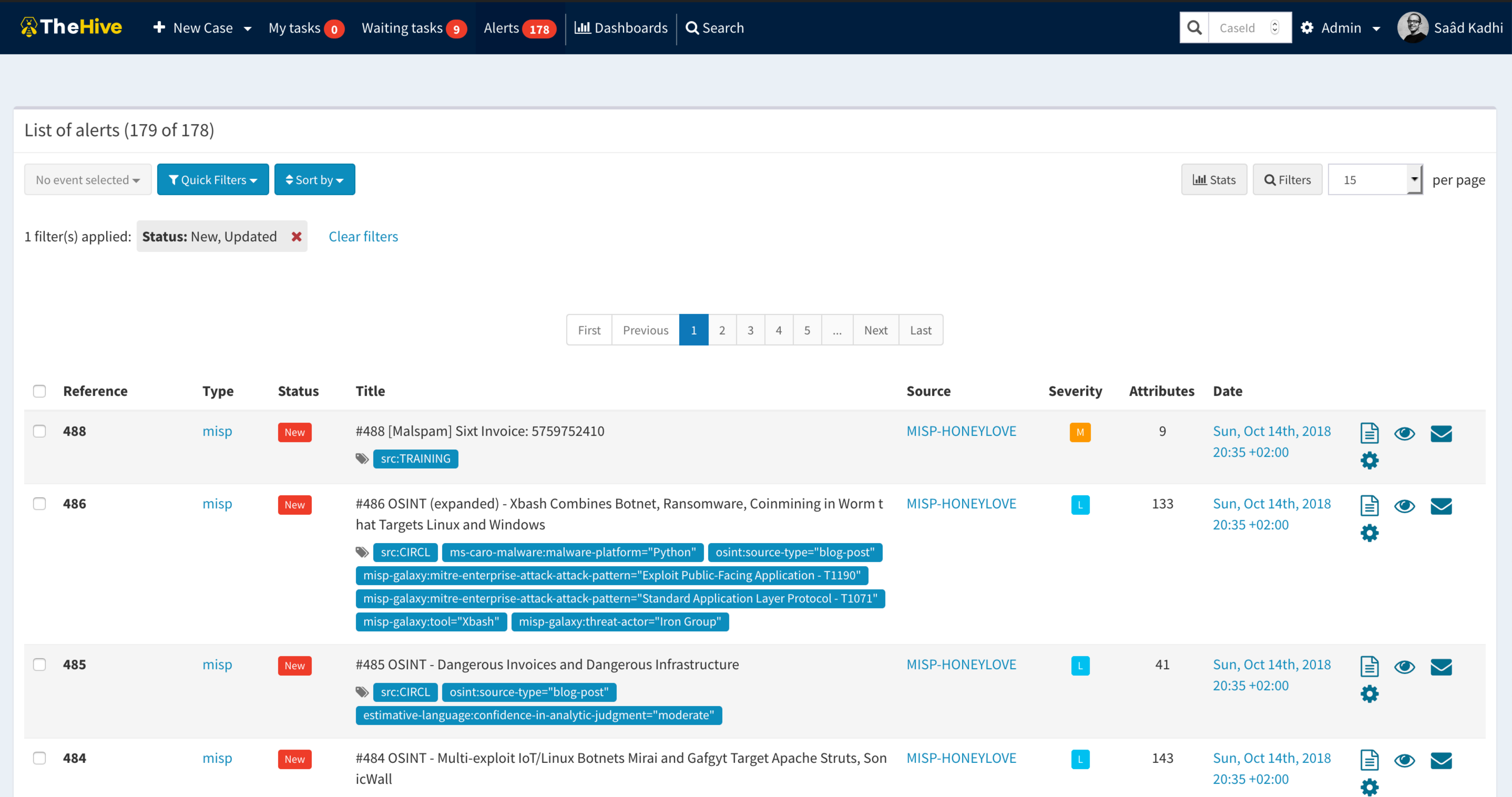
QRADAR2ALERT WORKFLOW

THEHIVE CONNECTOR

THEHIVE4PY

API

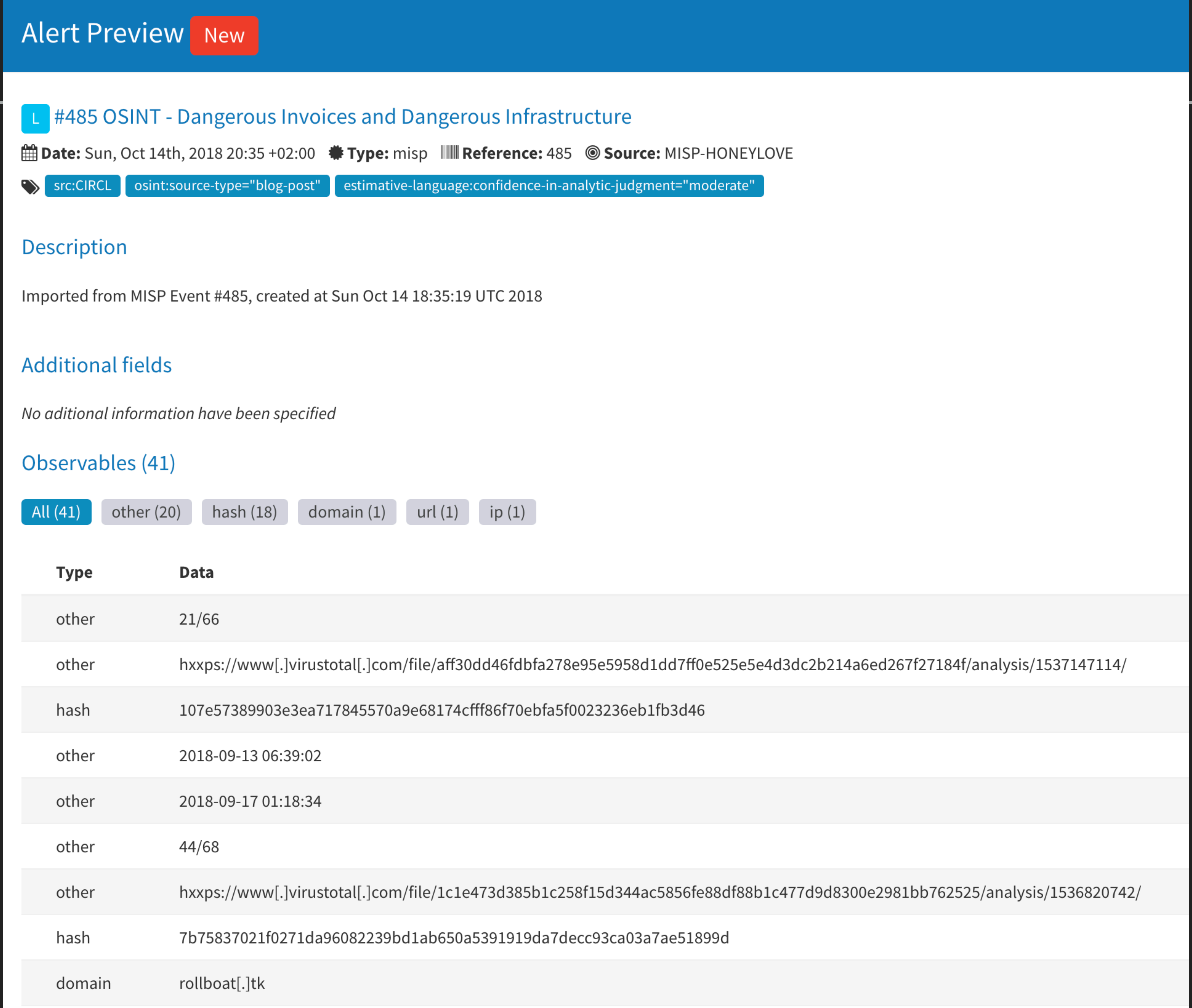
EVENTS



List of alerts (179 of 178)

1 filter(s) applied: **Status:** New, Updated ✖ Clear filters

□	Reference	Type	Status	Title	Source	Severity	Attributes	Date
□	488	misp	New	#488 [Malspam] Sixt Invoice: 5759752410 src:TRAINING	MISP-HONEYLOVE	M	9	Sun, Oct 14th, 2018 20:35 +02:00
□	486	misp	New	#486 OSINT (expanded) - Xbash Combines Botnet, Ransomware, Coinmining in Worm that Targets Linux and Windows src:CIRCL ms-caro-malware:malware-platform="Python" osint:source-type="blog-post" misp-galaxy:mitre-enterprise-attack-attack-pattern="Exploit Public-Facing Application - T1190" misp-galaxy:mitre-enterprise-attack-attack-pattern="Standard Application Layer Protocol - T1071" misp-galaxy:tool="Xbash" misp-galaxy:threat-actor="Iron Group"	MISP-HONEYLOVE	L	133	Sun, Oct 14th, 2018 20:35 +02:00
□	485	misp	New	#485 OSINT - Dangerous Invoices and Dangerous Infrastructure src:CIRCL osint:source-type="blog-post" estimative-language:confidence-in-analytic-judgment="moderate"	MISP-HONEYLOVE	L	41	Sun, Oct 14th, 2018 20:35 +02:00
□	484	misp	New	#484 OSINT - Multi-exploit IoT/Linux Botnets Mirai and Gafgyt Target Apache Struts, SonicWall	MISP-HONEYLOVE	L	143	Sun, Oct 14th, 2018 20:35 +02:00



Alert Preview New

L #485 OSINT - Dangerous Invoices and Dangerous Infrastructure

Date: Sun, Oct 14th, 2018 20:35 +02:00 **Type:** misp **Reference:** 485 **Source:** MISP-HONEYLOVE

src:CIRCL osint:source-type="blog-post" estimative-language:confidence-in-analytic-judgment="moderate"

Description

Imported from MISP Event #485, created at Sun Oct 14 18:35:19 UTC 2018

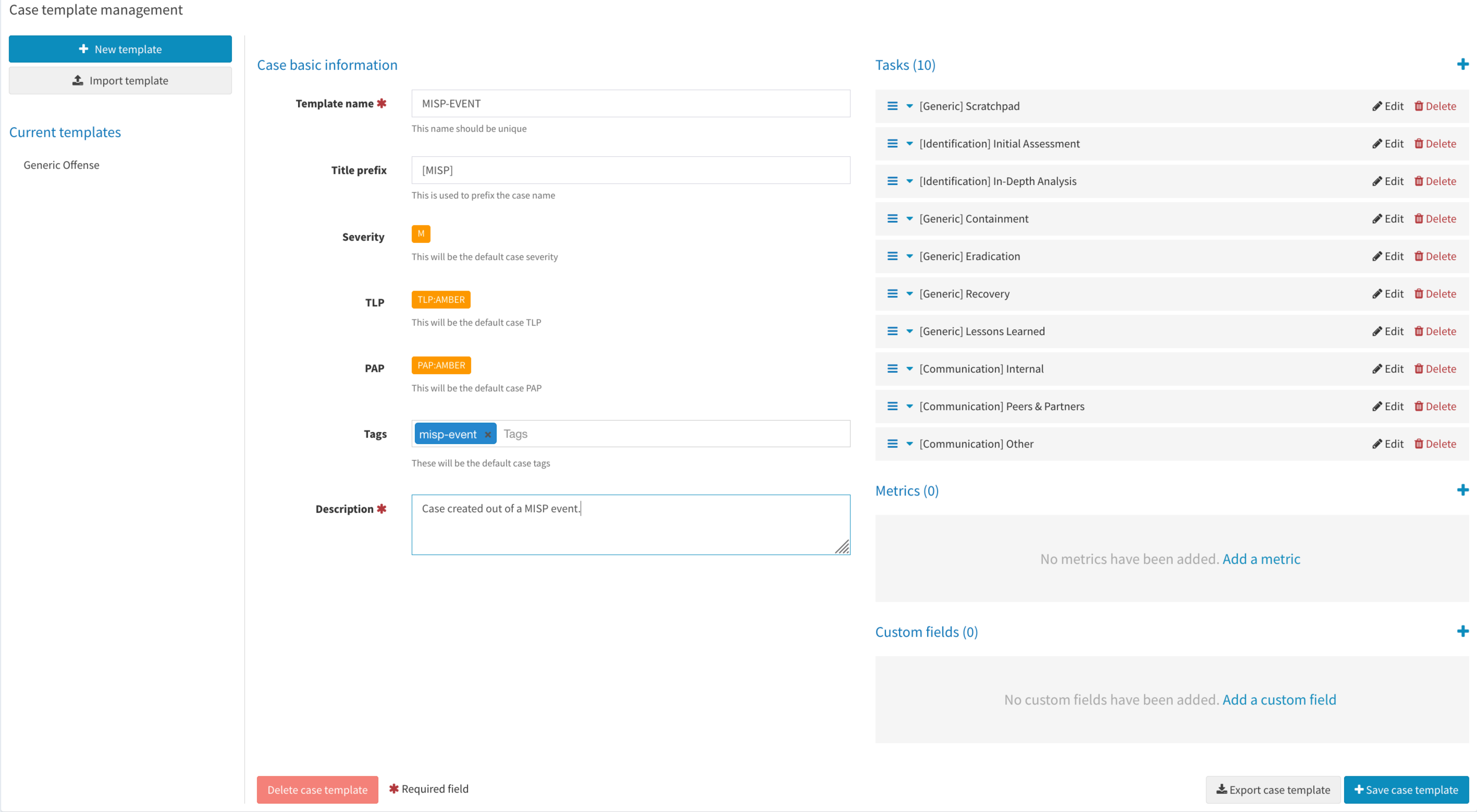
Additional fields

No aditional information have been specified

Observables (41)

All (41) other (20) hash (18) domain (1) url (1) ip (1)

Type	Data
other	21/66
other	hxxps://www[.]virustotal[.]com/file/aff30dd46fdbfa278e95e5958d1dd7ff0e525e5e4d3dc2b214a6ed267f27184f/analysis/1537147114/
hash	107e57389903e3ea717845570a9e68174cfff86f70ebfa5f0023236eb1fb3d46
other	2018-09-13 06:39:02
other	2018-09-17 01:18:34
other	44/68
other	hxxps://www[.]virustotal[.]com/file/1c1e473d385b1c258f15d344ac5856fe88df88b1c477d9d8300e2981bb762525/analysis/1536820742/
hash	7b75837021f0271da96082239bd1ab650a5391919da7decc93ca03a7ae51899d
domain	rollboat[.]tk



Case template management

Current templates

Generic Offense

Case basic information

Template name ✱: MISP-EVENT

This name should be unique

Title prefix: [MISP]

This is used to prefix the case name

Severity: M

This will be the default case severity

TLP: TLP:AMBER

This will be the default case TLP

PAP: PAP:AMBER

This will be the default case PAP

Tags: misp-event × Tags

These will be the default case tags

Description ✱: Case created out of a MISP event.

✱ Required field

Tasks (10)

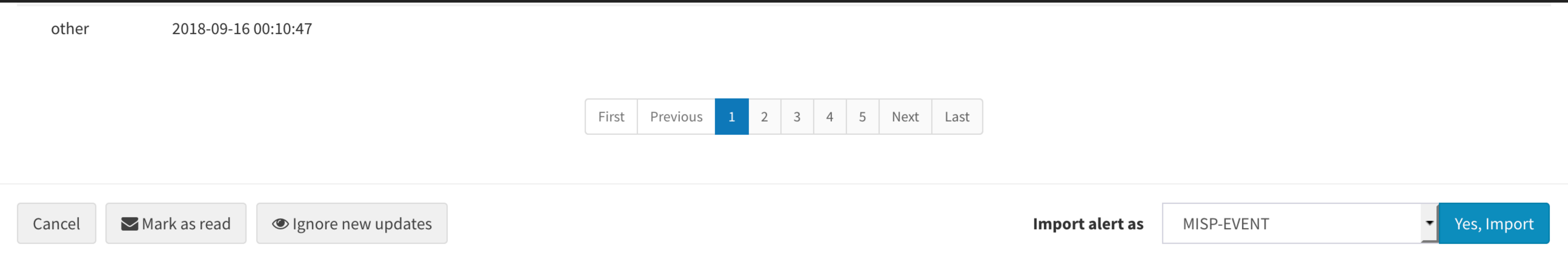
- [Generic] Scratchpad
- [Identification] Initial Assessment
- [Identification] In-Depth Analysis
- [Generic] Containment
- [Generic] Eradication
- [Generic] Recovery
- [Generic] Lessons Learned
- [Communication] Internal
- [Communication] Peers & Partners
- [Communication] Other

Metrics (0)

No metrics have been added. Add a metric

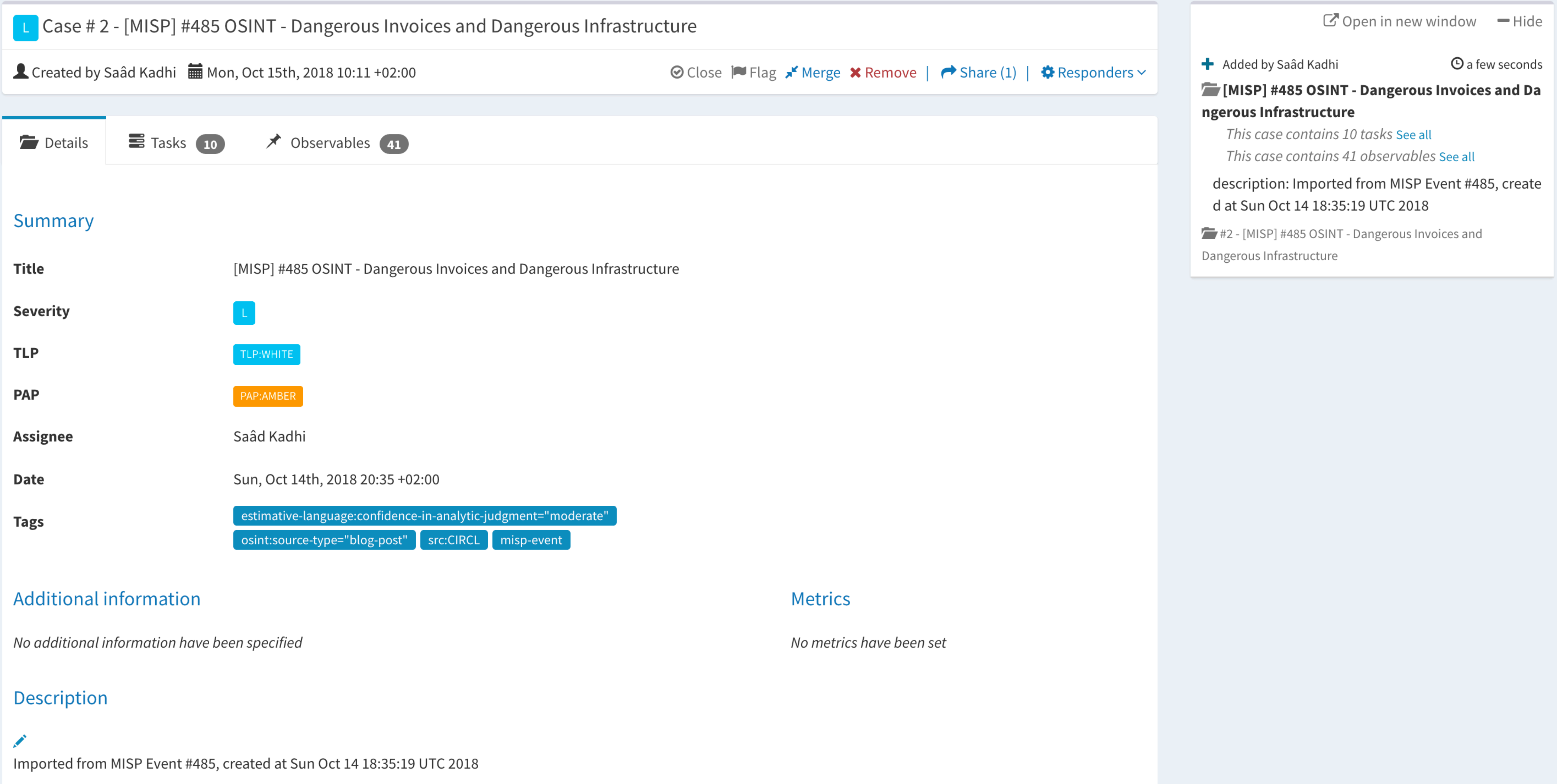
Custom fields (0)

No custom fields have been added. Add a custom field



other 2018-09-16 00:10:47

Import alert as MISP-EVENT



L Case # 2 - [MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure

Created by Saâd Kadhi Mon, Oct 15th, 2018 10:11 +02:00

Summary

Title	[MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure
Severity	L
TLP	TLP:WHITE
PAP	PAP:AMBER
Assignee	Saâd Kadhi
Date	Sun, Oct 14th, 2018 20:35 +02:00
Tags	estimative-language:confidence-in-analytic-judgment="moderate" osint:source-type="blog-post" src:CIRCL misp-event

Additional information

No additional information have been specified

Metrics

No metrics have been set

Description

Imported from MISP Event #485, created at Sun Oct 14 18:35:19 UTC 2018

Added by Saâd Kadhi a few seconds

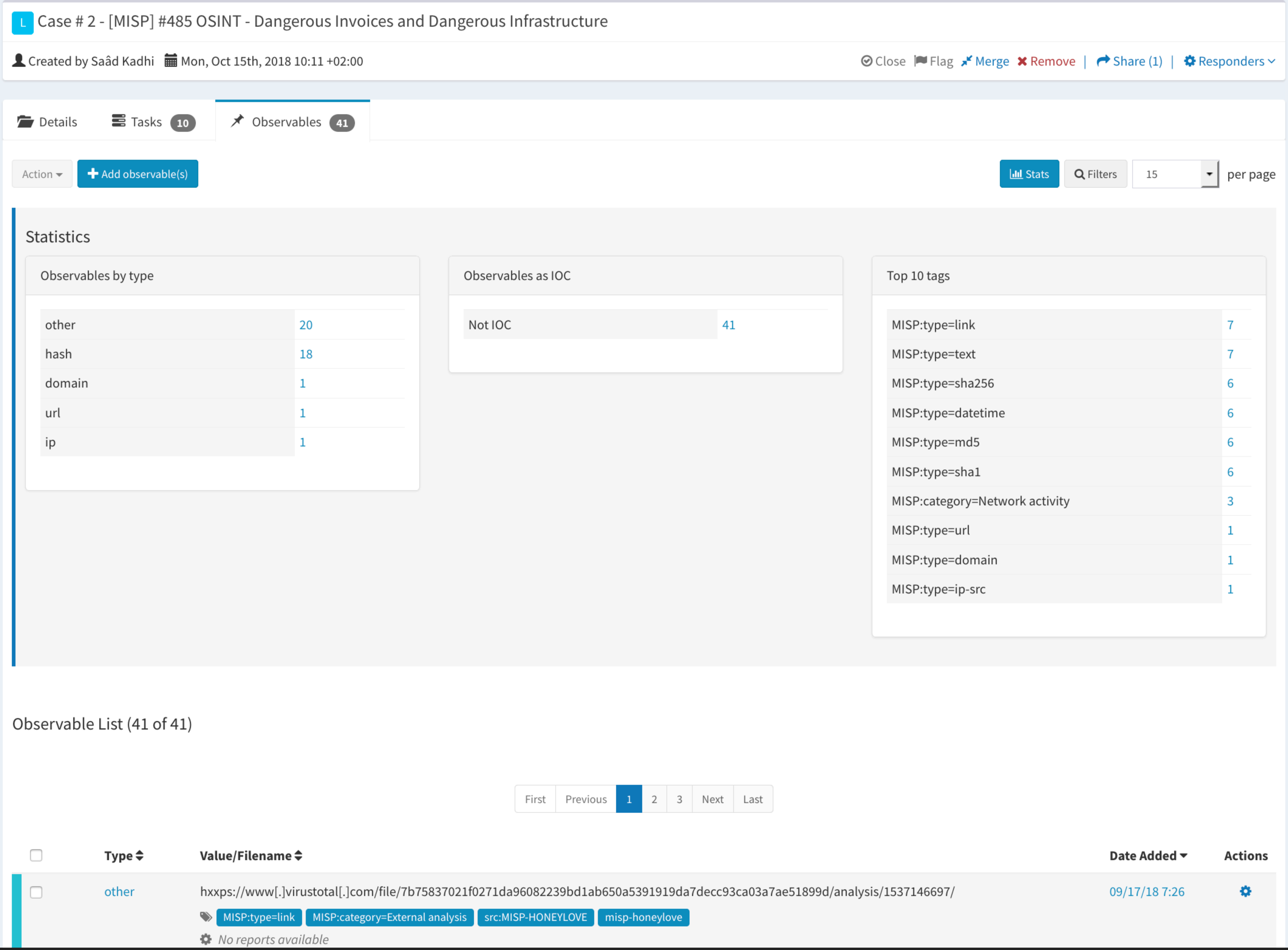
[MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure

This case contains 10 tasks See all

This case contains 41 observables See all

description: Imported from MISP Event #485, created at Sun Oct 14 18:35:19 UTC 2018

#2 - [MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure



Case # 2 - [MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure

Created by Saâd Kadhi Mon, Oct 15th, 2018 10:11 +02:00

Statistics

Observables by type

other	20
hash	18
domain	1
url	1
ip	1

Observables as IOC

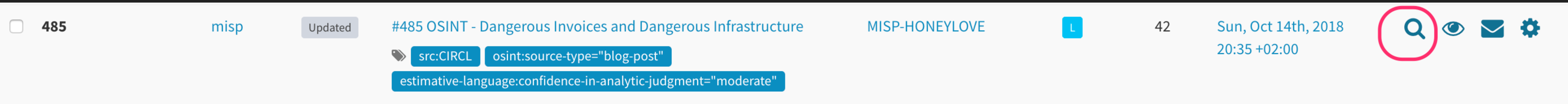
Not IOC	41

Top 10 tags

MISP:type=link	7
MISP:type=text	7
MISP:type=sha256	6
MISP:type=datetime	6
MISP:type=md5	6
MISP:type=sha1	6
MISP:category=Network activity	3
MISP:type=url	1
MISP:type=domain	1
MISP:type=ip-src	1

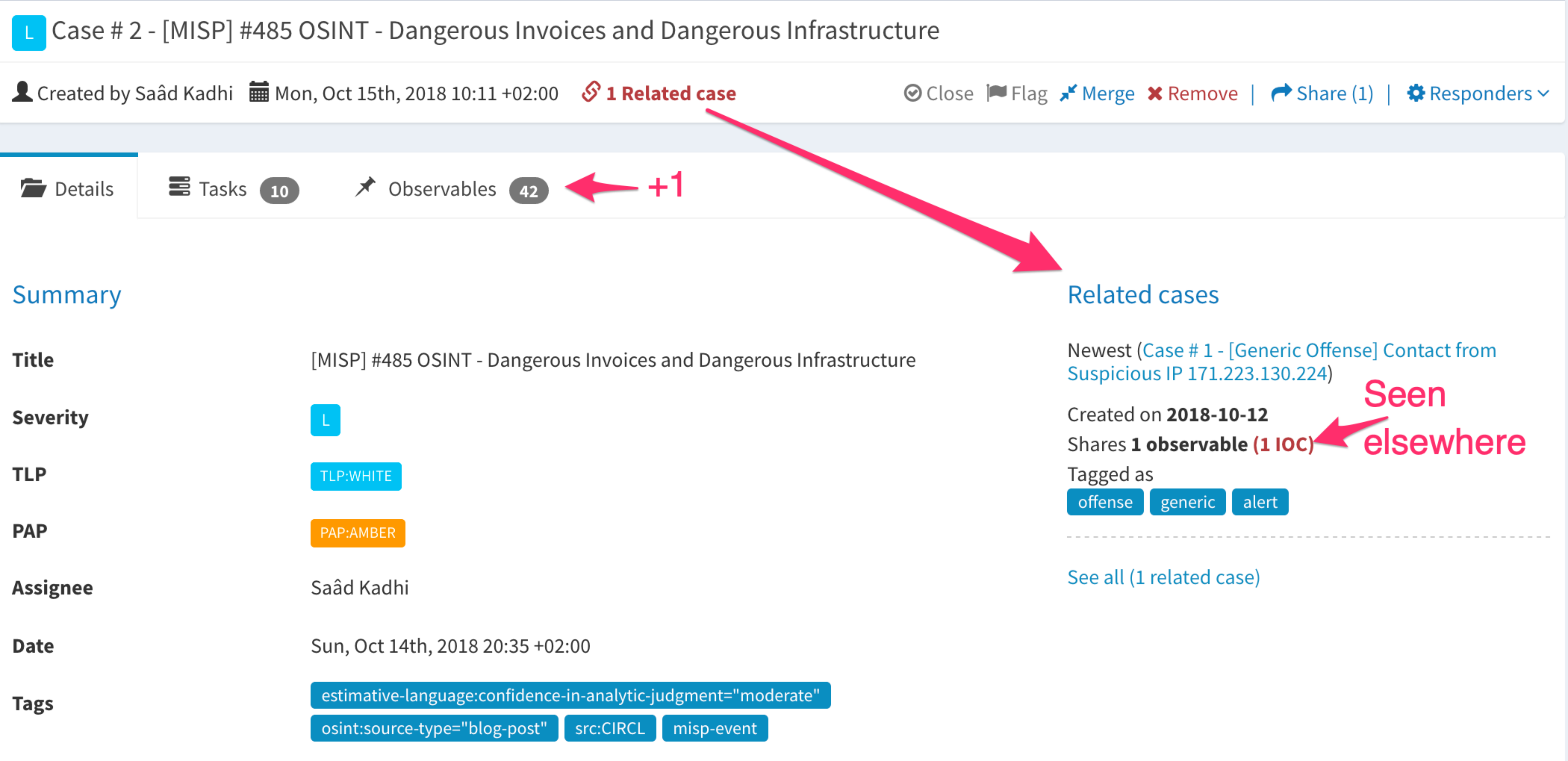
Observable List (41 of 41)

☐	Type	Value/Filename	Date Added	Actions
☐	other	hxxps://www[.]virustotal[.]com/file/7b75837021f0271da96082239bd1ab650a5391919da7decc93ca03a7ae51899d/analysis/1537146697/ MISP:type=link MISP:category=External analysis src:MISP-HONEYLOVE misp-honeylove *No reports available*	09/17/18 7:26	⚙



□ 485 misp Updated #485 OSINT - Dangerous Invoices and Dangerous Infrastructure MISP-HONEYLOVE L 42 Sun, Oct 14th, 2018 20:35 +02:00

src:CIRCL osint:source-type="blog-post" estimative-language:confidence-in-analytic-judgment="moderate"



L Case # 2 - [MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure

Created by Saâd Kadhi Mon, Oct 15th, 2018 10:11 +02:00 1 Related case

+1

Summary

Title	[MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure
Severity	L
TLP	TLP:WHITE
PAP	PAP:AMBER
Assignee	Saâd Kadhi
Date	Sun, Oct 14th, 2018 20:35 +02:00
Tags	estimative-language:confidence-in-analytic-judgment="moderate" osint:source-type="blog-post" src:CIRCL misp-event

Related cases

Newest (Case # 1 - [Generic Offense] Contact from Suspicious IP 171.223.130.224)

Created on **2018-10-12**

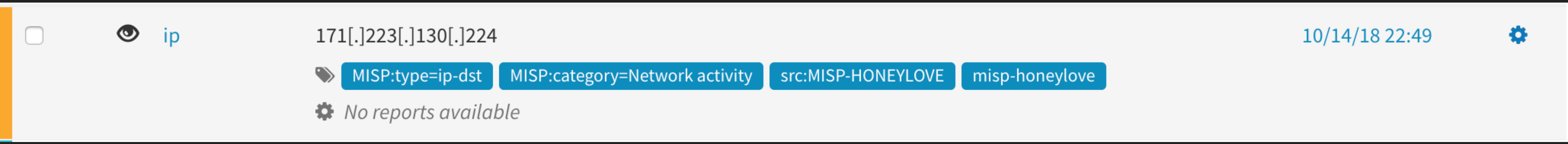
Shares **1 observable** **(1 IOC)**

Tagged as

offense generic alert

See all (1 related case)

Seen elsewhere

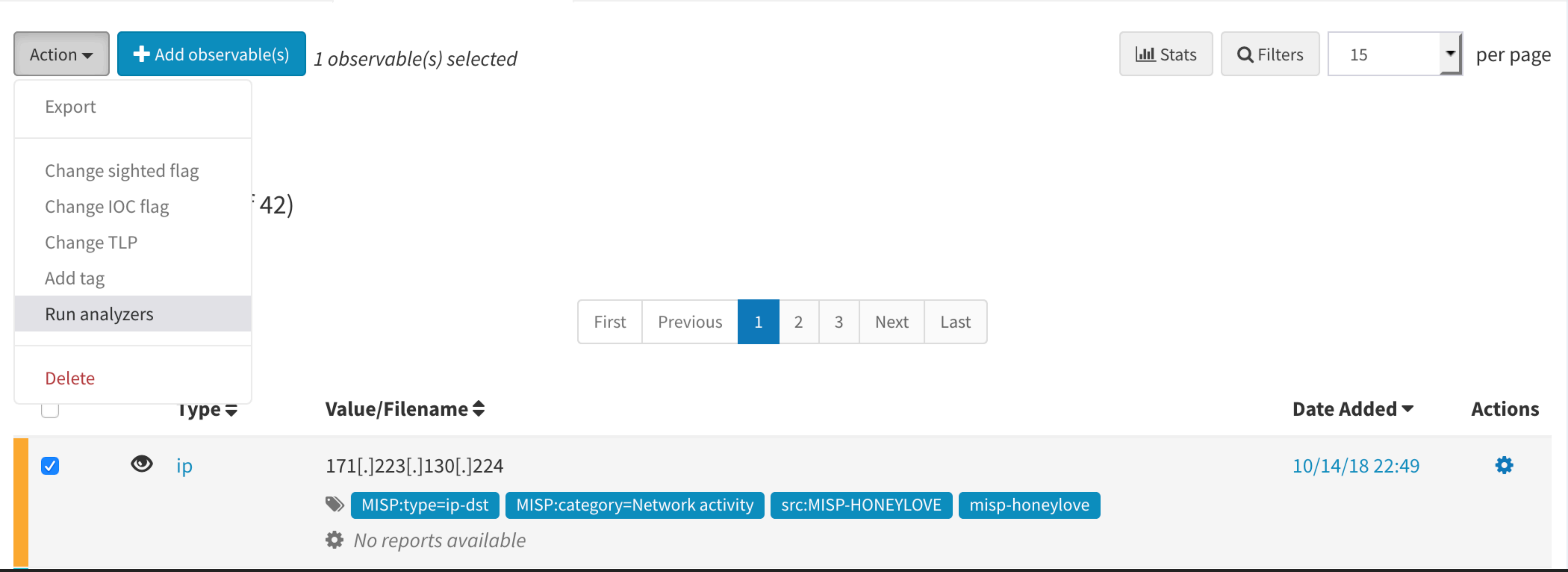


□ ip 171[.]223[.]130[.]224 10/14/18 22:49

MISP:type=ip-dst MISP:category=Network activity src:MISP-HONEYLOVE misp-honeylove

No reports available

ONTO ANALYSIS



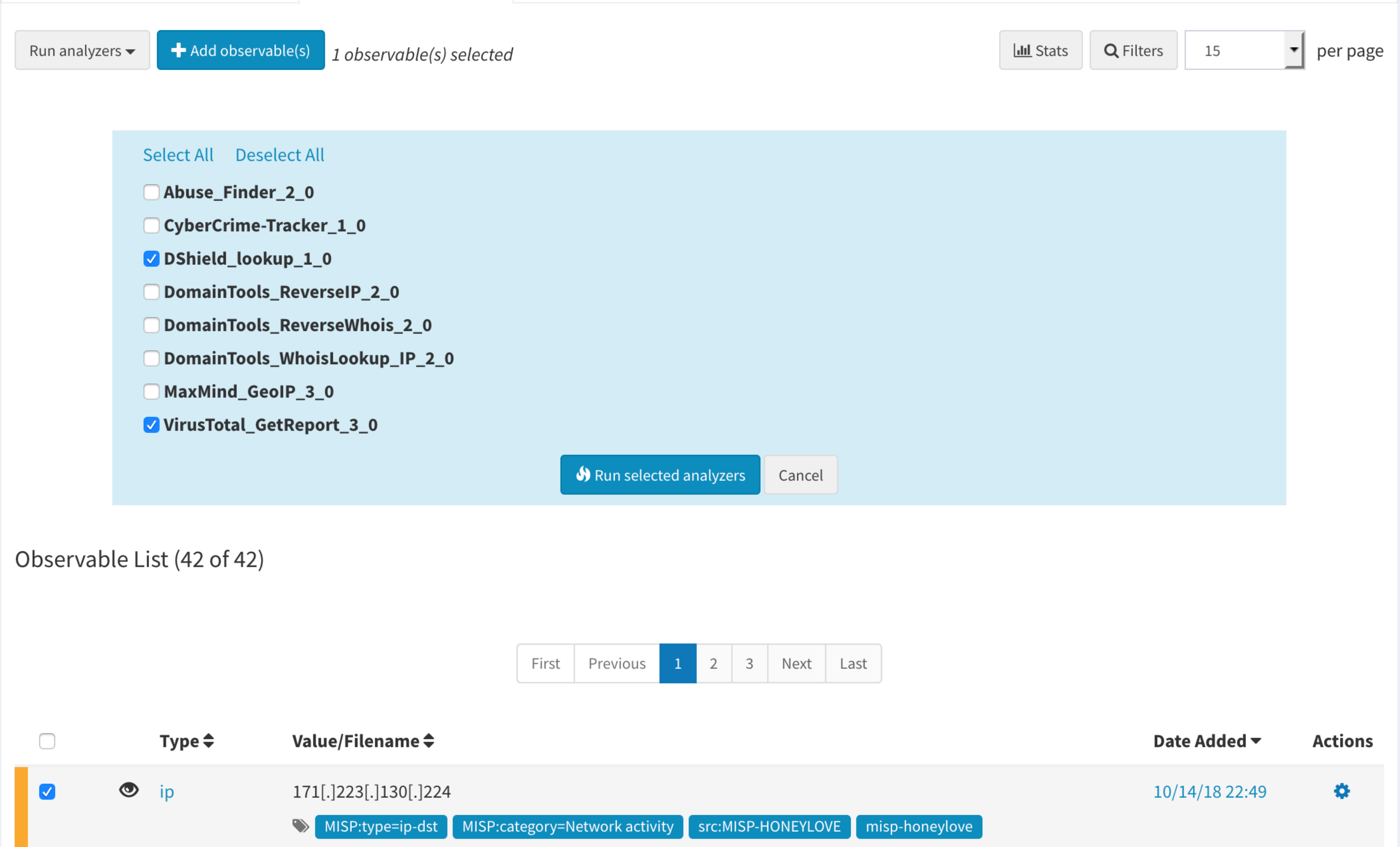
1 observable(s) selected

15 per page

42)

☐		Type	Value/Filename	Date Added	Actions
☑	👁	ip	171[.]223[.]130[.]224 MISP:type=ip-dst MISP:category=Network activity src:MISP-HONEYLOVE misp-honeylove *No reports available*	10/14/18 22:49	⚙

ONTO ANALYSIS



1 observable(s) selected

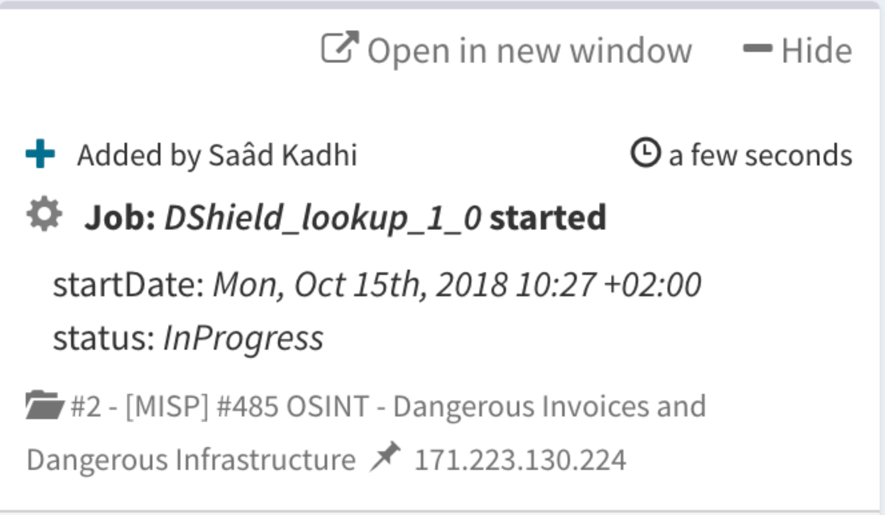
15 per page

☐ Abuse_Finder_2_0
☐ CyberCrime-Tracker_1_0
☑ DShield_lookup_1_0
☐ DomainTools_ReverseIP_2_0
☐ DomainTools_ReverseWhois_2_0
☐ DomainTools_WhoisLookup_IP_2_0
☐ MaxMind_GeoIP_3_0
☑ VirusTotal_GetReport_3_0

Observable List (42 of 42)

☐		Type	Value/Filename	Date Added	Actions
☑		ip	171[.]223[.]130[.]224 MISP:type=ip-dst MISP:category=Network activity src:MISP-HONEYLOVE misp-honeylove	10/14/18 22:49	

ONTO ANALYSIS



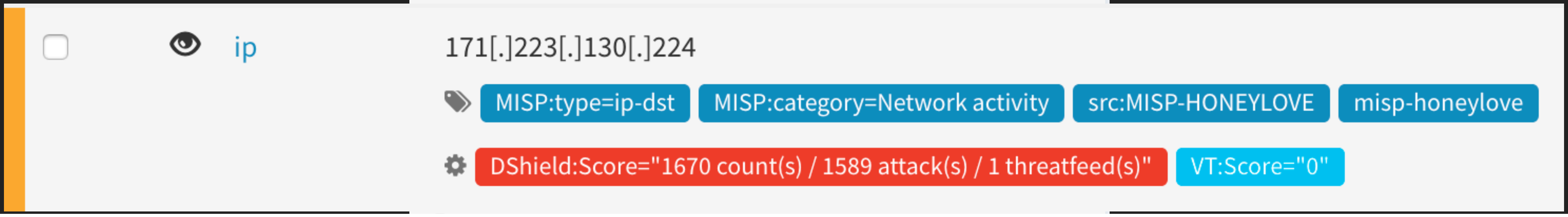
Added by Saâd Kadhi a few seconds

Job: ***DShield_lookup_1_0*** **started**

startDate: *Mon, Oct 15th, 2018 10:27 +02:00*

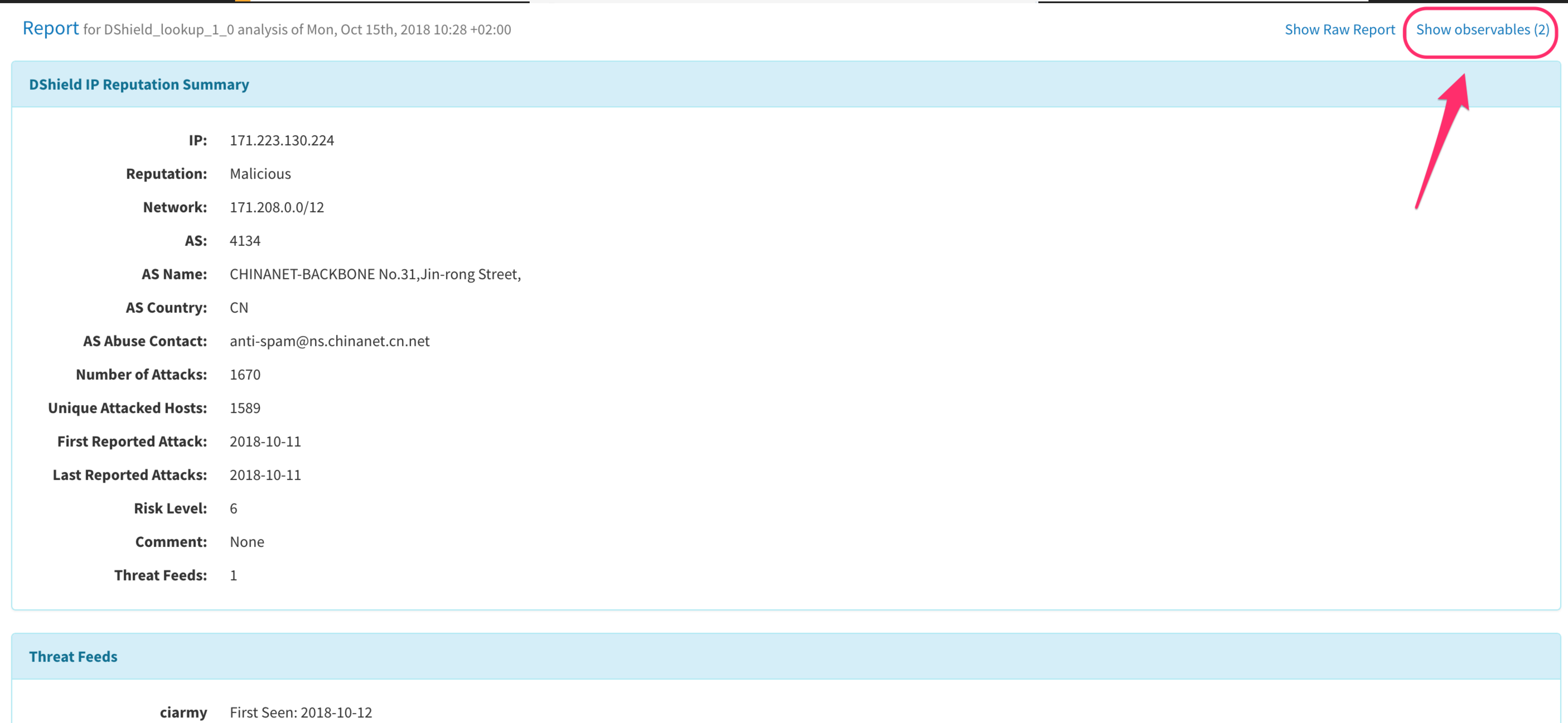
status: *InProgress*

#2 - [MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure 171.223.130.224


☐ ip 171[.]223[.]130[.]224

MISP:type=ip-dst MISP:category=Network activity src:MISP-HONEYLOVE misp-honeylove

DShield:Score="1670 count(s) / 1589 attack(s) / 1 threatfeed(s)" VT:Score="0"



Report for DShield_lookup_1_0 analysis of Mon, Oct 15th, 2018 10:28 +02:00

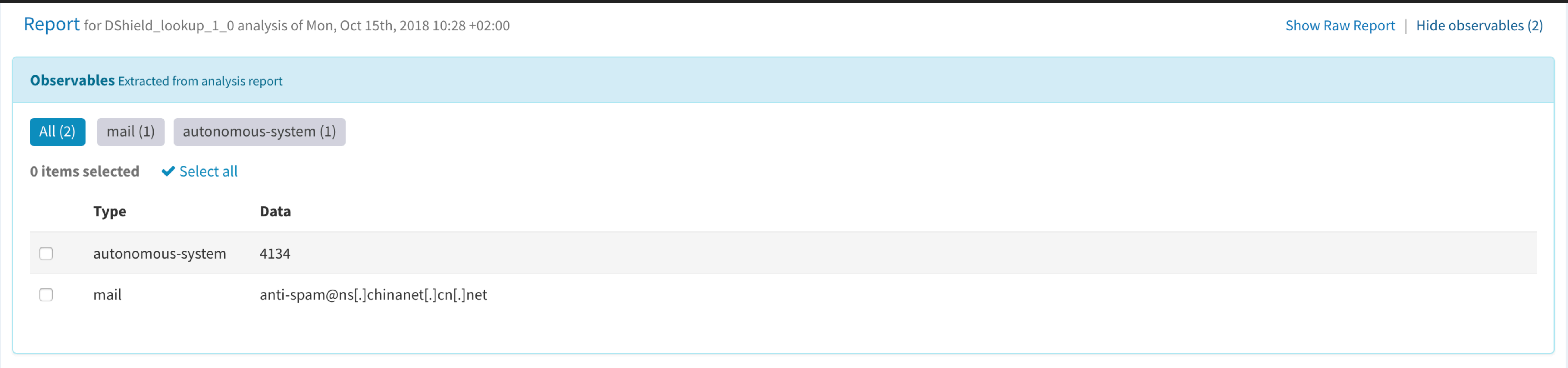
DShield IP Reputation Summary

IP:	171.223.130.224
Reputation:	Malicious
Network:	171.208.0.0/12
AS:	4134
AS Name:	CHINANET-BACKBONE No.31,Jin-rong Street,
AS Country:	CN
AS Abuse Contact:	anti-spam@ns.chinanet.cn.net
Number of Attacks:	1670
Unique Attacked Hosts:	1589
First Reported Attack:	2018-10-11
Last Reported Attacks:	2018-10-11
Risk Level:	6
Comment:	None
Threat Feeds:	1

Threat Feeds

ciarmy	First Seen: 2018-10-12

ONTO ANALYSIS



Report for DShield_lookup_1_0 analysis of Mon, Oct 15th, 2018 10:28 +02:00

Observables Extracted from analysis report

0 items selected ✓ Select all

	Type	Data
□	autonomous-system	4134
□	mail	anti-spam@ns[.]chinanet[.]cn[.]net

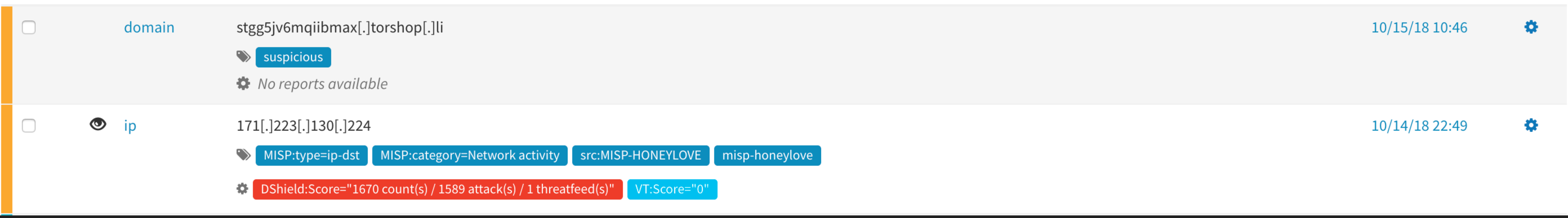
MISP && THEHIVE

MIND THE INTERVAL (1H BY DEFAULT)

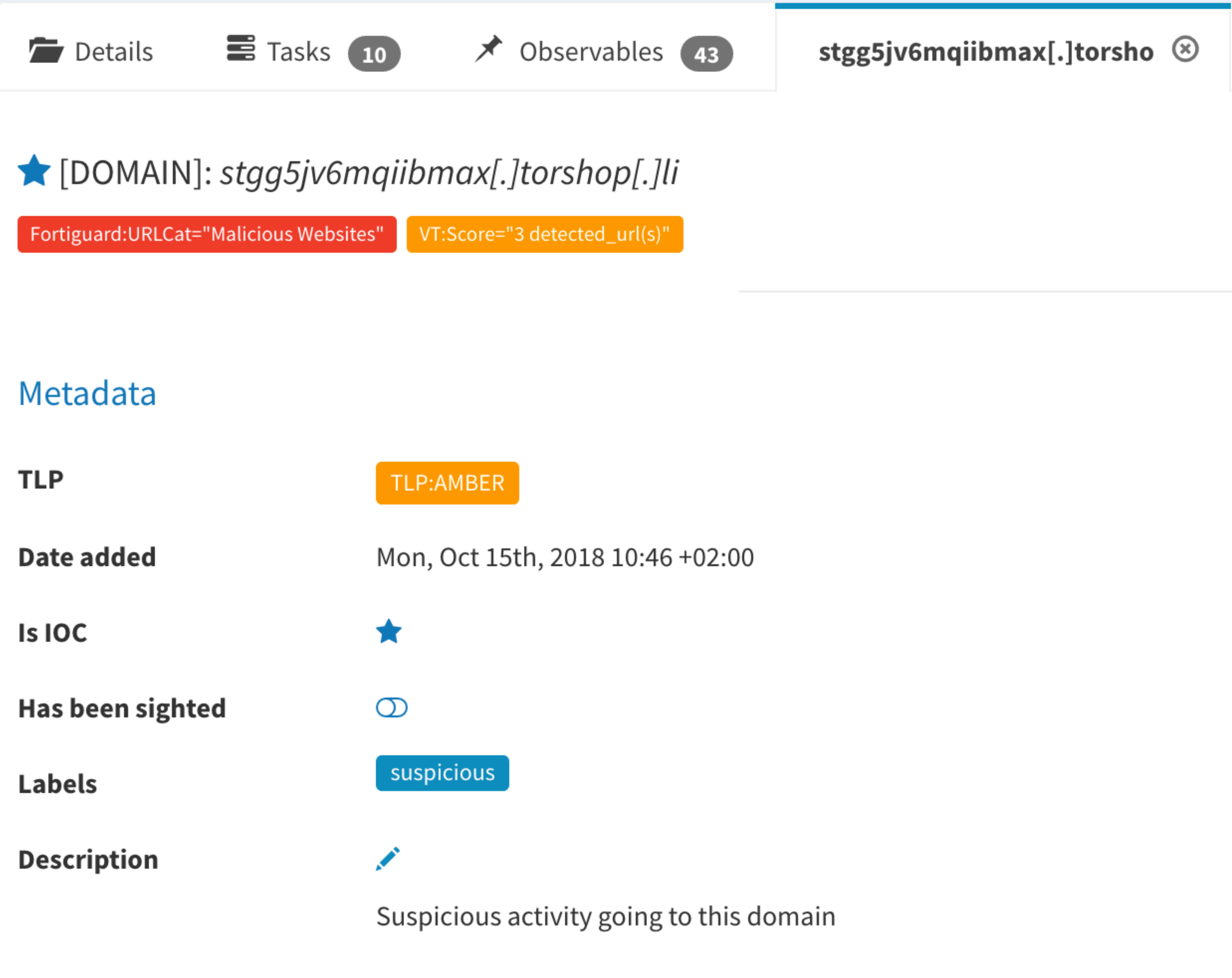
AS LONG AS YOU DON'T MERGE CASES

- The MISP event used to create the case will feed new observables when new attributes are added to it
- When you add observables to your case during your investigation, only those flagged as IOCs can be shared back to the MISP event you used to create your case
- If its sync user cannot write to that event (different org for ex.), TheHive will create an extended event
- You can also create a new event on as many instances as you'd like

EXTENDED EVENTS



□		domain	stgg5jv6mqiibmax[.]torshop[.]li suspicious *No reports available*	10/15/18 10:46	⚙
□	👁	ip	171[.]223[.]130[.]224 MISP:type=ip-dst MISP:category=Network activity src:MISP-HONEYLOVE misp-honeylove DShield:Score="1670 count(s) / 1589 attack(s) / 1 threatfeed(s)" VT:Score="0"	10/14/18 22:49	⚙



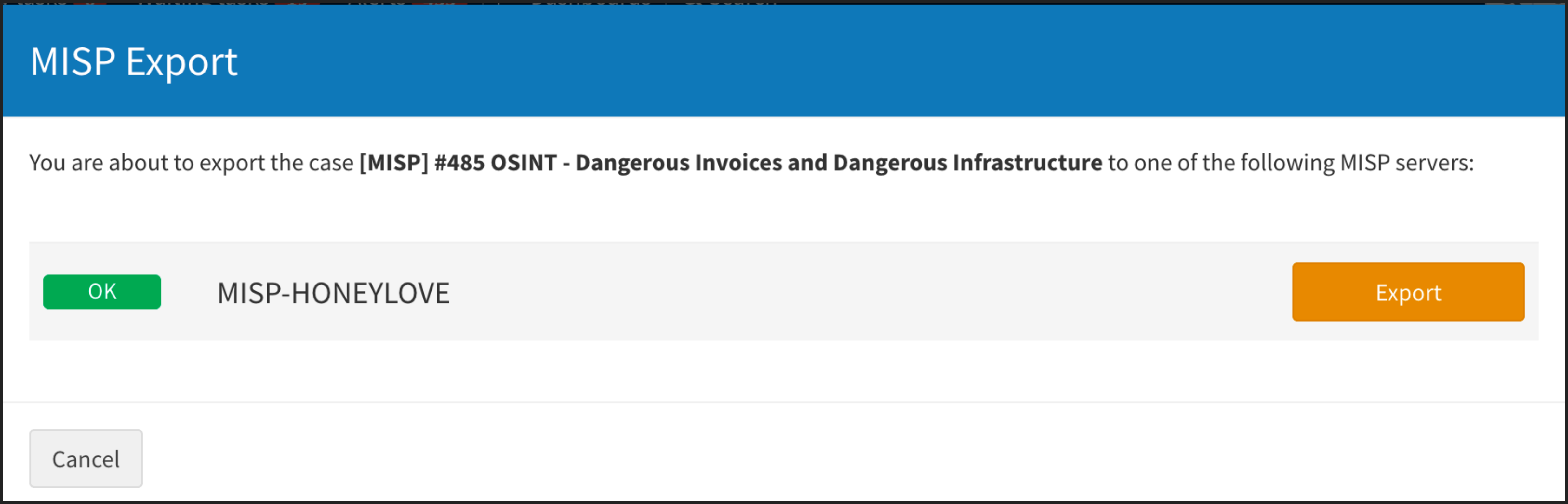
★ [DOMAIN]: *stgg5jv6mqiibmax[.]torshop[.]li*

Fortiguard:URLCat="Malicious Websites" VT:Score="3 detected_url(s)"

Metadata

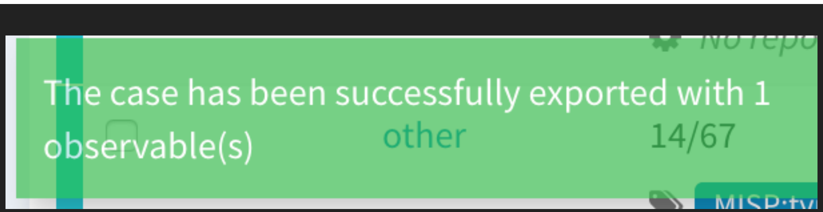
TLP	TLP:AMBER
Date added	Mon, Oct 15th, 2018 10:46 +02:00
Is IOC	★
Has been sighted	○
Labels	suspicious
Description	Suspicious activity going to this domain

EXTENDED EVENTS

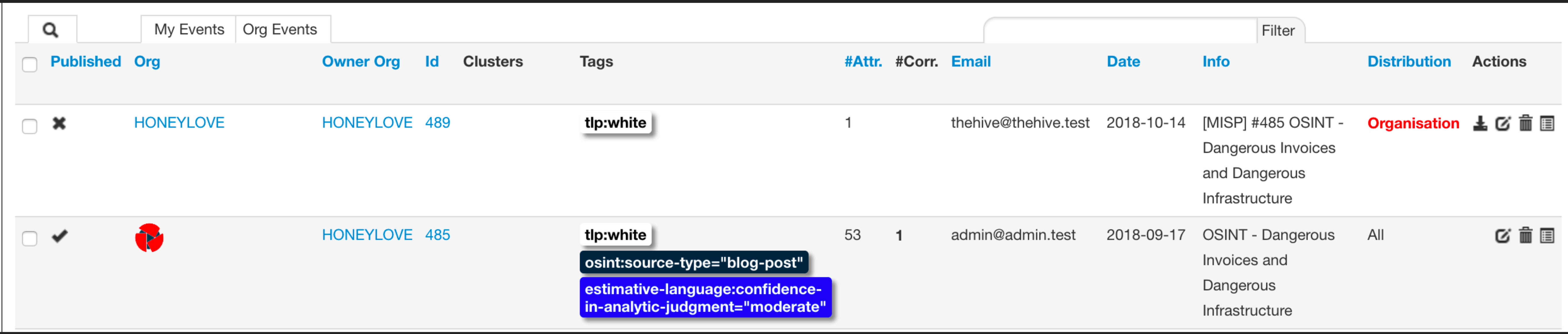


MISP Export

You are about to export the case **[MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure** to one of the following MISP servers:

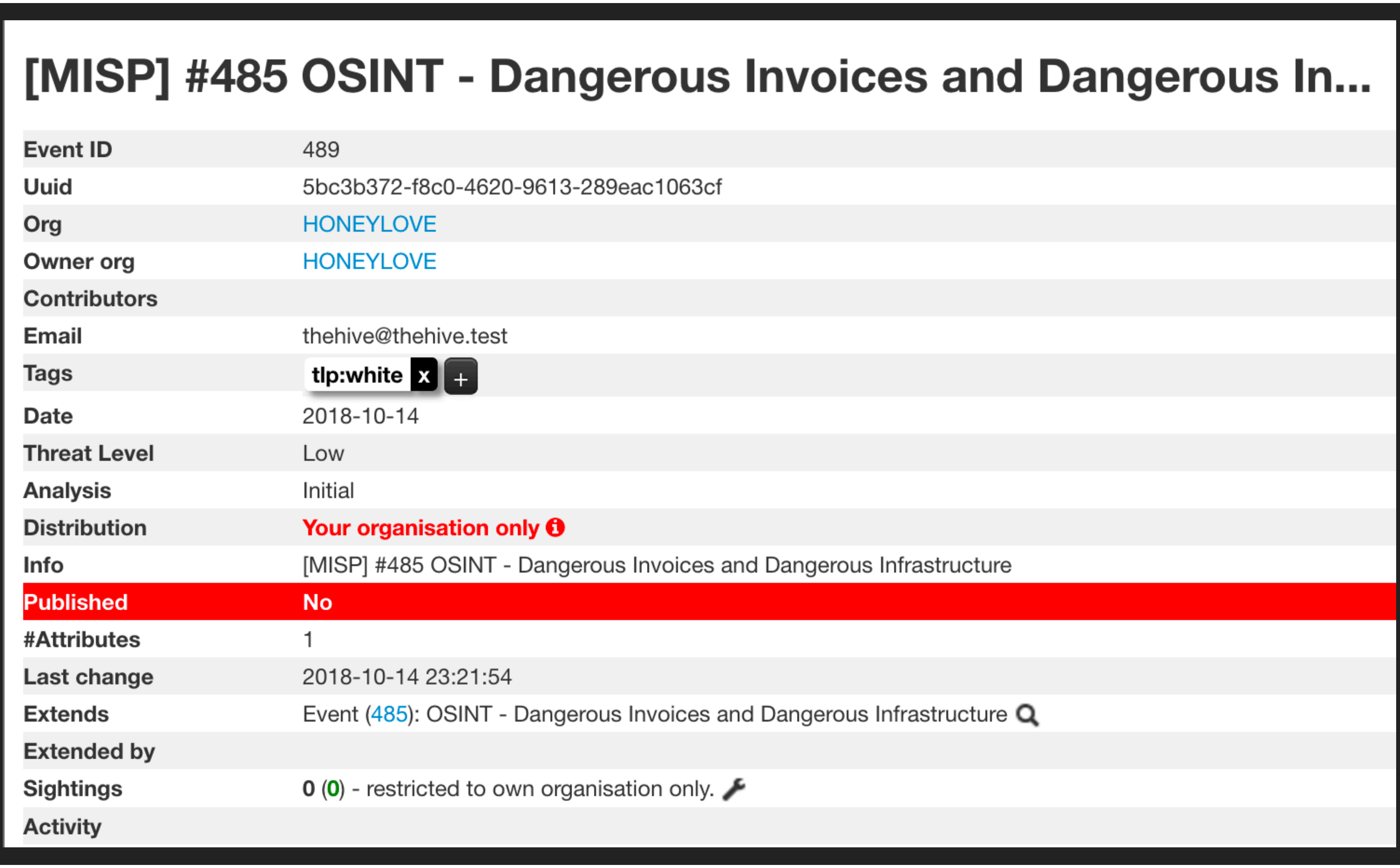


The case has been successfully exported with 1 observable(s)



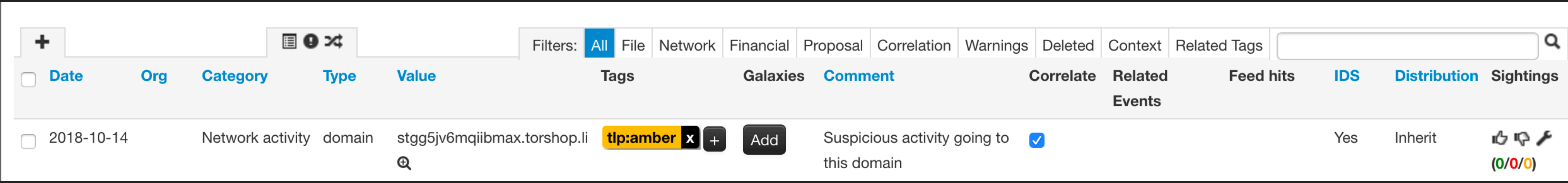
My Events | Org Events | Filter

☐	Published	Org	Owner Org	Id	Clusters	Tags	#Attr.	#Corr.	Email	Date	Info	Distribution	Actions
☐	✖	HONEYLOVE	HONEYLOVE	489		tlp:white	1		thehive@thehive.test	2018-10-14	[MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure	Organisation	
☐	✔		HONEYLOVE	485		tlp:white osint:source-type="blog-post" estimative-language:confidence-in-analytic-judgment="moderate"	53	1	admin@admin.test	2018-09-17	OSINT - Dangerous Invoices and Dangerous Infrastructure	All	



[MISP] #485 OSINT - Dangerous Invoices and Dangerous In...

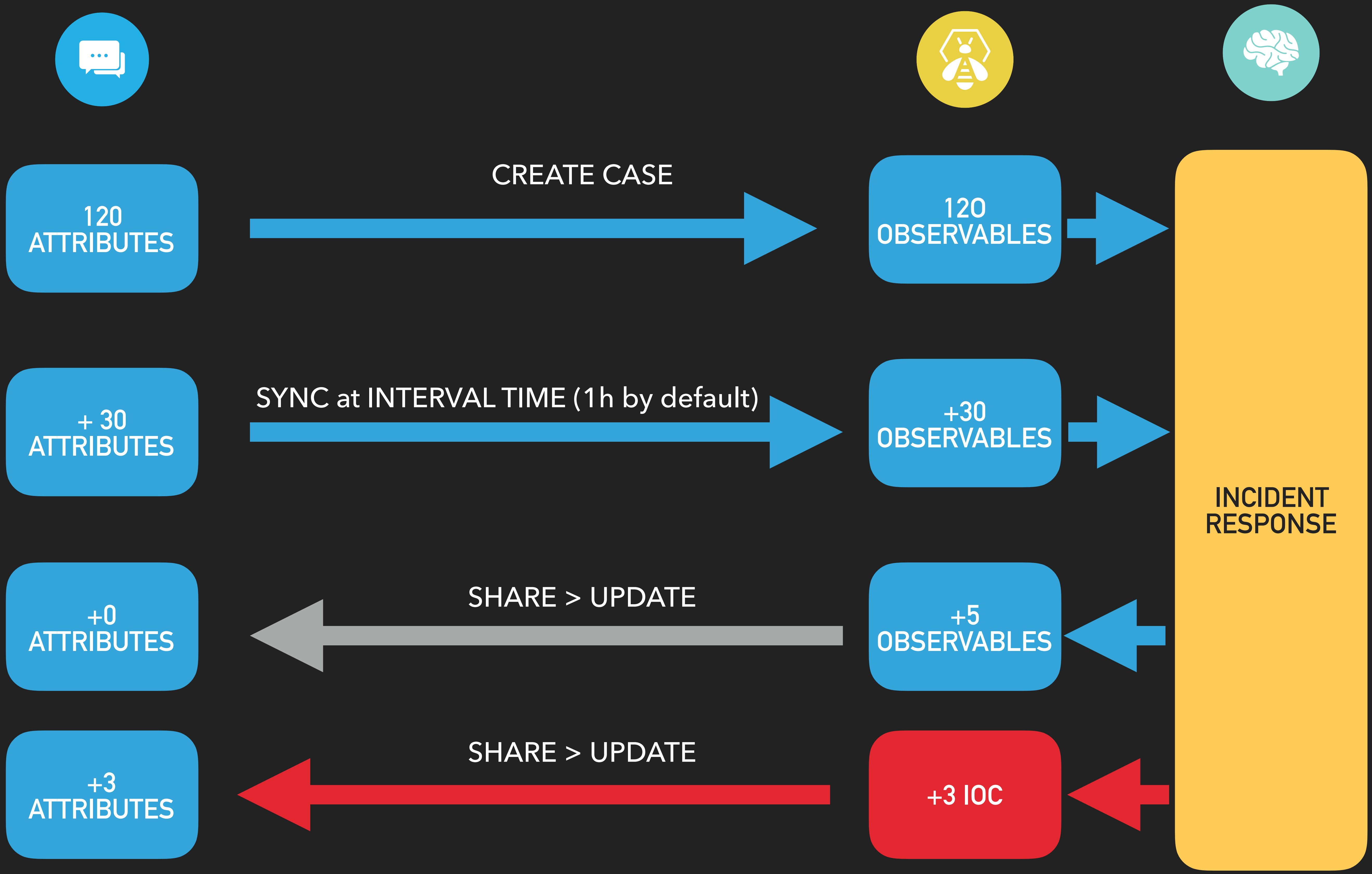
Event ID	489
Uuid	5bc3b372-f8c0-4620-9613-289eac1063cf
Org	HONEYLOVE
Owner org	HONEYLOVE
Contributors	
Email	thehive@thehive.test
Tags	tlp:white x +
Date	2018-10-14
Threat Level	Low
Analysis	Initial
Distribution	Your organisation only
Info	[MISP] #485 OSINT - Dangerous Invoices and Dangerous Infrastructure
Published	No
#Attributes	1
Last change	2018-10-14 23:21:54
Extends	Event (485): OSINT - Dangerous Invoices and Dangerous Infrastructure
Extended by	
Sightings	0 (0) - restricted to own organisation only.
Activity	



Filters: All | File | Network | Financial | Proposal | Correlation | Warnings | Deleted | Context | Related Tags

☐	Date	Org	Category	Type	Value	Tags	Galaxies	Comment	Correlate	Related Events	Feed hits	IDS	Distribution	Sightings
☐	2018-10-14		Network activity	domain	stgg5jv6mqiibmax.torshop.li	tlp:amber x +	Add	Suspicious activity going to this domain	☑			Yes	Inherit	(0/0/0)

MISP && THEHIVE



120 ATTRIBUTES

CREATE CASE

120 OBSERVABLES

+ 30 ATTRIBUTES

SYNC at INTERVAL TIME (1h by default)

+30 OBSERVABLES

+0 ATTRIBUTES

SHARE > UPDATE

+5 OBSERVABLES

+3 ATTRIBUTES

SHARE > UPDATE

+3 IOC

INCIDENT RESPONSE

BUT THERE'S MORE TO IT

- TheHive can monitor the connection 'health' of all the MISP and Cortex instances it is connected with
- You can tailor MISP settings in TheHive in several ways

MAX ATTRIBUTES PER EVENT

AGE OF THE LAST PUBLICATION DATE

TAG WHITELIST*

TAG BLACKLIST

ORG BLACKLIST

MAX JSON SIZE

IMPORT/EXPORT/ (OR BOTH)

* Introduced in TheHive 3.2.0

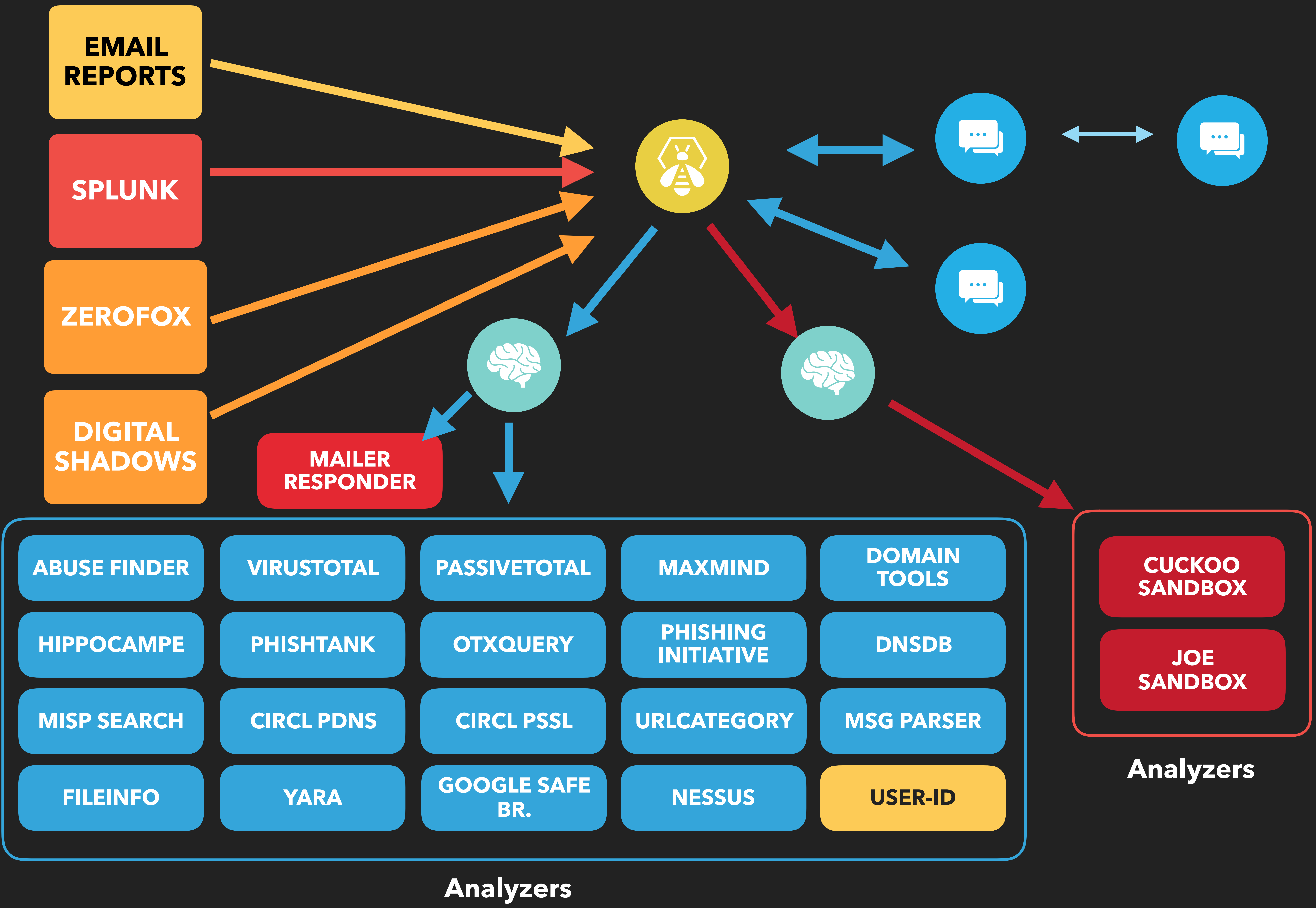
UPCOMING FEATURES

- Cortex 2.2 ~ Q1 2019
  - Dockerized analyzers for easier deployment
- TheHive 4.1 ~ Q2 2019
  - Replace Elasticsearch with a GraphDB
  - Share sightings with MISP
  - Add support for MISP objects
- TheHive 4.3 ~ Q4 2019
  - Add taxonomy (such as ATT&CK) support

TRY THE TRIO

- TheHive, Cortex and MISP are available under a, free, open source AGPLv3 license
- TheHive and Cortex can be installed using RPM, DEB, Docker image, binary package or built from the source code
- MISP can be installed using Vagrant, VM, Docker image or built from the source code
- You can try TheHive, Cortex & MISP using the training VMs
- NEW: combined training VM with TheHive, Cortex and MISP

EXAMPLE 1 - LARGE CORP



EMAIL REPORTS

SPLUNK

ZEROFOX

DIGITAL SHADOWS

MAILER RESPONDER

ABUSE FINDER

VIRUSTOTAL

PASSIVETOTAL

MAXMIND

DOMAIN TOOLS

HIPPOCAMPE

PHISHTANK

OTXQUERY

PHISHING INITIATIVE

DNSDB

MISP SEARCH

CIRCL PDNS

CIRCL PSSL

URLCATEGORY

MSG PARSER

FILEINFO

YARA

GOOGLE SAFE BR.

NESSUS

USER-ID

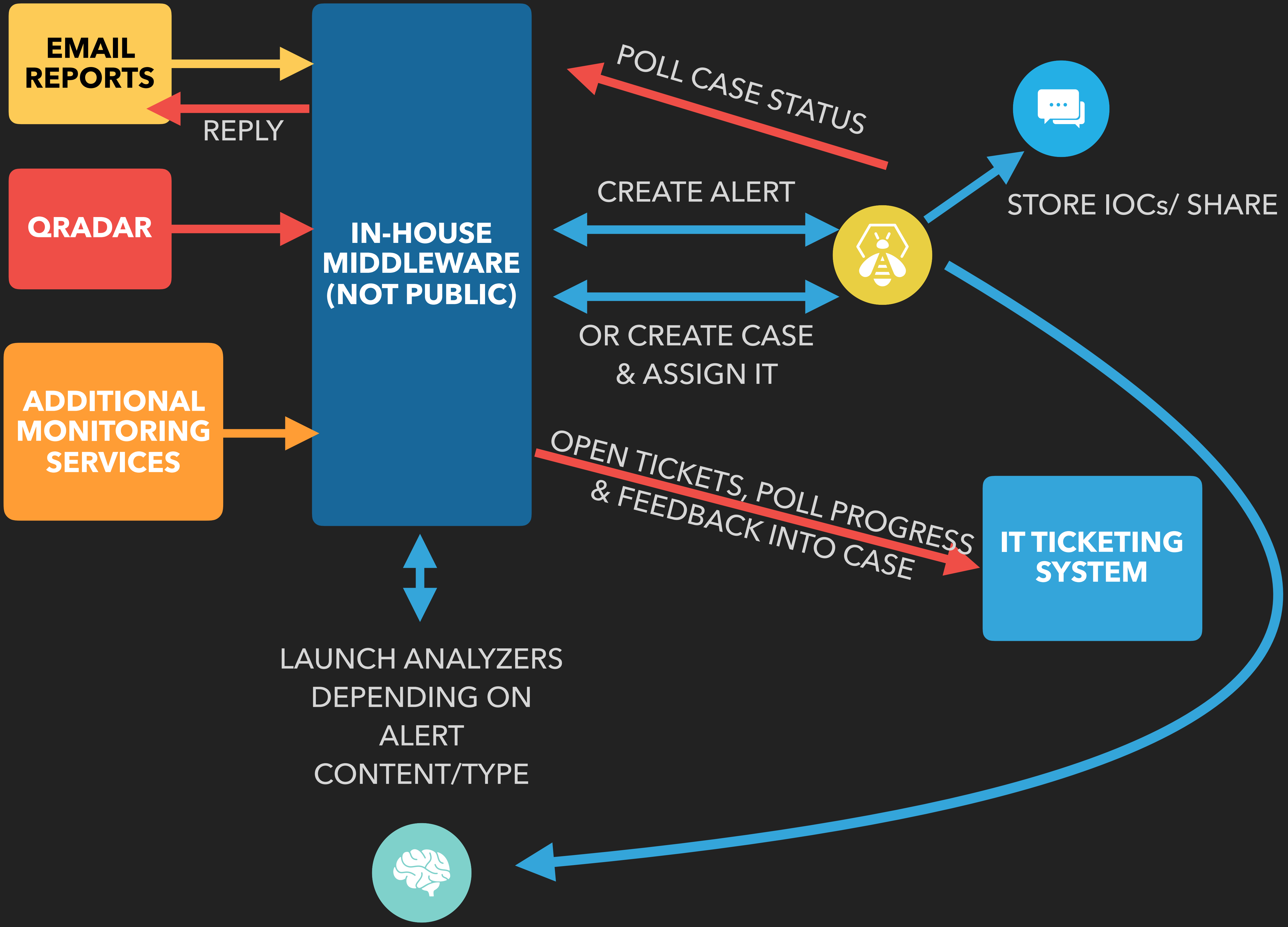
Analyzers

CUCKOO SANDBOX

JOE SANDBOX

Analyzers

EXAMPLE 2 - VERY LARGE CORP



EMAIL REPORTS

REPLY

QRADAR

ADDITIONAL MONITORING SERVICES

IN-HOUSE MIDDLEWARE (NOT PUBLIC)

POLL CASE STATUS

CREATE ALERT

OR CREATE CASE & ASSIGN IT

STORE IOCs/ SHARE

OPEN TICKETS, POLL PROGRESS & FEEDBACK INTO CASE

IT TICKETING SYSTEM

LAUNCH ANALYZERS DEPENDING ON ALERT CONTENT/TYPE

ADDITIONAL SOFTWARE FROM THEHIVE PROJECT & MISP PROJECT

- AIL - Analysis Information Leak Framework by CIRCL with support for TheHive alert creation
- TheHive4Py - Python lib to create alert/case from multiple sources
- Cortex4py - Python lib to submit observables in bulk mode through the Cortex REST API from alternative SIRP platforms & custom scripts
- DigitalShadows2TH - TheHive Alert Feeder for Digital Shadows
- Zerofox2TH - TheHive Alert Feeder for Zerofox
- Synapse - Meta Alert Feeder with custom workflows. Currently supports Exchange, O365 & QRadar

ADDITIONAL SOFTWARE FROM THE COMMUNITY

- FireEye2TH - FireEye iSIGHT Alert Feeder for TheHive by LDO-CERT
- Elastalert Hive Alerter - use a custom Elastalert Alert to create alerts. contributed by Nclose
- Email Feeder - feed emails as alerts to TheHive, contributed by Xavier Mertens (SANS ISC)
- qradar2thehive - automatically create cases out of QRadar offenses, contributed by Pierre Barlet
- TheHive DXL Python Service - Access TheHive API via the Data Exchange fabric
- Go-cortex-analyzers - Additional analyzers written in GO by Rostelecom CERT

Now Let's Get to Work!