

# Sharing Going Wild

or how to extend MISP to map your funky community

Team CIRCL

MISP Project

<https://www.misp-project.org/>

Luxembourg  
20200218



**MISP**  
**Threat Sharing**

- MISP<sup>1</sup> is a threat information sharing free & open source software.
- MISP has **a host of functionalities** that assist users in creating, collaborating & sharing threat information - e.g. flexible sharing groups, **automatic correlation**, free-text import helper, event distribution & proposals.
- Many export formats which support IDses / IPses (e.g. Suricata, Bro, Snort), SIEMs (eg CEF), Host scanners (e.g. OpenIOC, STIX, CSV, yara), analysis tools (e.g. Maltego), DNS policies (e.g. RPZ).
- A rich set of MISP modules<sup>2</sup> to add expansion, import and export functionalities.

---

<sup>1</sup><https://github.com/MISP/MISP>

<sup>2</sup><https://www.github.com/MISP/misp-modules>

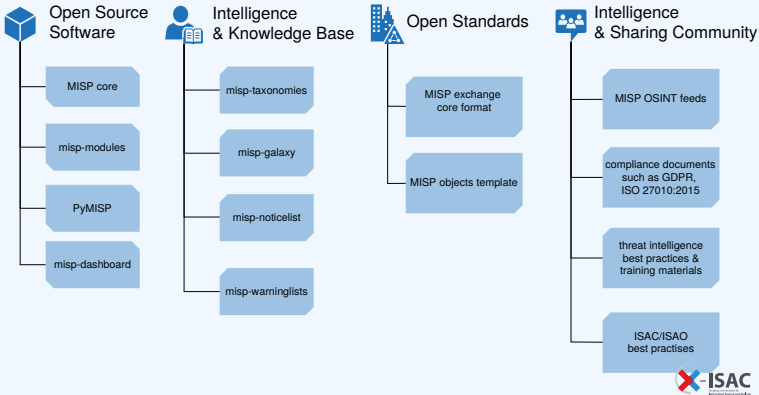
- During a malware analysis workgroup in 2012, we discovered that we worked on the analysis of the same malware.
- We wanted to share information in an easy and automated way **to avoid duplication of work.**
- Christophe Vandeplass (then working at the CERT for the Belgian MoD) showed us his work on a platform that later became MISP.
- A first version of the MISP Platform was used by the MALWG and **the increasing feedback of users** helped us to build an improved platform.
- MISP is now **a community-driven development.**

- Communities are groups of users sharing within a set of common objectives/values.
- CIRCL operates multiple MISP instances with a significant user base (more than 950 organizations with more than 2400 users).
- **Trusted groups** running MISP communities in island mode (air gapped system) or partially connected mode.
- **Financial sector** (banks, ISACs, payment processing organizations) use MISP as a sharing mechanism.
- **Military and international organizations** (NATO, military CSIRTs, n/g CERTs,...).
- **Security vendors** running their own communities (e.g. Fidelis) or interfacing with MISP communities (e.g. OTX).

# MANY OBJECTIVES FROM DIFFERENT USER-GROUPS

- Sharing indicators for a **detection** matter.
  - ▶ 'Do I have infected systems in my infrastructure or the ones I operate?'
- Sharing indicators to **block**.
  - ▶ 'I use these attributes to block, sinkhole or divert traffic.'
- Sharing indicators to **perform intelligence**.
  - ▶ 'Gathering information about campaigns and attacks. Are they related? Who is targeting me? Who are the adversaries?'
- → These objectives can be conflicting (e.g. False-positives have different impacts)

# MISP PROJECT OVERVIEW



# GETTING SOME NAMING CONVENTIONS OUT OF THE WAY...

## ■ Data layer

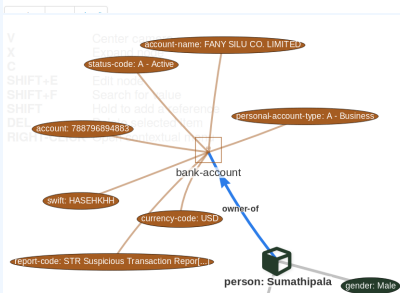
- ▶ **Events** are encapsulations for contextually linked information
- ▶ **Attributes** are individual data points, which can be indicators or supporting data.
- ▶ **Objects** are custom templated Attribute compositions
- ▶ **Object references** are the relationships between other building blocks

## ■ Context layer

- ▶ **Tags** are labels attached to events/attributes and can come from **Taxonomies**
- ▶ **Galaxy-clusters** are knowledge base items used to label events/attributes and come from **Galaxies**.

# A RICH DATA-MODEL: TELLING STORIES VIA RELATIONSHIPS

Date	Org	Category	Type	Value	Tags	Galaxies	Comment	Correlate	Related Events
2018-09-28		Other	status-code:	A - Active		Add		<input type="checkbox"/>	
2018-09-28		Other	report-code:	STR Suspicious Transaction Report		Add		<input type="checkbox"/>	
2018-09-28		Other	personal-account-type:	A - Business		Add		<input type="checkbox"/>	
2018-09-28		Financial fraud	swift:	HASEH09H		Add		<input checked="" type="checkbox"/>	3849 11320 11584
2018-09-28		Financial fraud	account:	788796894883		Add		<input checked="" type="checkbox"/>	
2018-09-28		Other	account-name:	FANY SILU CO. LIMITED		Add		<input checked="" type="checkbox"/>	
2018-09-28		Other	currency-code:	USD		Add		<input type="checkbox"/>	





# CONTEXTUALISATION AND AGGREGATION

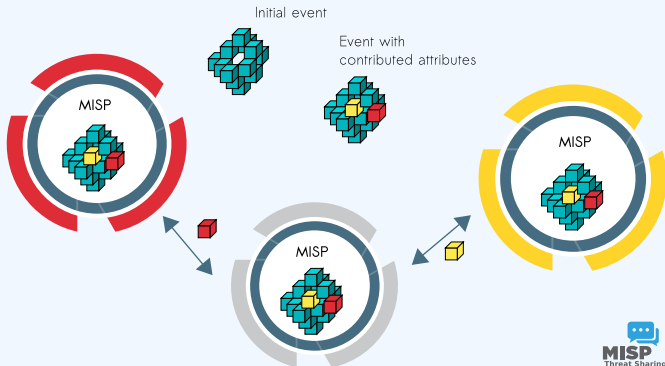
- MISP integrates at the event and the attribute levels MITRE's Adversarial Tactics, Techniques, and Common Knowledge (ATT&CK).

Initial access	Execution	Persistence	Privilege escalation	Defense evasion	Credential access	Discovery	Lateral movement	Collection	Exfiltration	Command and control
Spearphishing Attachment	Scripting	Screensaver	File System Permissions Weakness	Process Hollowing	Secured Memory	Password Policy Discovery	AppleScript	Data from Information Repositories	Exfiltration Over Alternative Protocol	Standard Application Layer Protocol
Spearphishing via Service	Command-Line Interface	Login Item	AppCert DLLs	Code Signing	Input Capture	System Network Configuration Discovery	Distributed Component Object Model	Data from Removable Media	Exfiltration Over Command and Control Channel	Communication Through Removable Media
Trusted Relationship	User Execution	Trap	Application Shimming	Rookit	Bash History	Process Discovery	Pass the Hash	Man in the Browser	Data Compressed	Custom Command and Control Protocol
Replication Through Removable Media	Regsvcs/Regasm	System Firmware	Scheduled Task	NTFS File Attributes	Exploitation for Credential Access	Network Share Discovery	Exploitation of Remote Services	Data Staged	Automated Exfiltration	Multi-Stage Channels
Exploit Public Facing Application	Trusted Developer Utilities	Registry Run Keys / Start Folder	Startup Items	Exploitation for Defense Evasion	Private Keys	Peripheral Device Discovery	Remote Desktop Protocol	Screen Capture	Scheduled Transfer	Remote Access Tools
Spearphishing Link	Windows Management Instrumentation	LC_LOAD_DYLIB Addition	New Service	Network Share Connection Removal	Brute Force	Account Discovery	Pass the Ticket	Email Collection	Data Encrypted	Uncommonly Used Port
Valid Accounts	Service Execution	LSASS Driver	Sudo Caching	Process Doppelganging	Password Filter DLL	System Information Discovery	Windows Remote Management	Clipboard Data	Exfiltration Over Other Network Medium	Multilayer Encryption
Supply Chain Compromise	CMSTP	Rc common	Process Injection	Disabling Security Tools	Two-Factor Authentication Interception	System Network Connections Discovery	Windows Admin Shares	Video Capture	Exfiltration Over Physical Medium	Domain Fronting
Drive-by Compromise	Control Panel Items	Authentication Package	Bypass User Account Control	Timestamp	LLMNR/NBT-NS Poisoning	Network Service Scanning	Remote Services	Audio Capture	Data Transfer Size Limits	Data Obfuscation
Hardware Additions	Dynamic Data Exchange	Component Firmware	Extra Window Memory Injection	Modify Registry	Credentials in Files	File and Directory Discovery	Taint Shared Content	Data from Network Shared Drive		Connection Proxy
	Source	Windows Management Instrumentation Event Subscription	Setuid and Setgid	Indicator Removal from Tools	Forced Authentication	Security Software Discovery	Application Deployment Software	Data from Local System		Commonly Used Port
	Space after Filename	Change Default File	Launch Daemon	Hidden Window	Keychain	System Service Discovery	Third-party Software	Automated Collection		Data Encoding

- Sharing via distribution lists - **Sharing groups**
- **Delegation** for pseudo-anonymised information sharing
- **Proposals** and **Extended events** for collaborated information sharing
- Synchronisation, Feed system, air-gapped sharing
- User defined **filtered sharing** for all the above mentioned methods
- Cross-instance information **caching** for quick lookups of large data-sets
- Support for multi-MISP internal enclaves

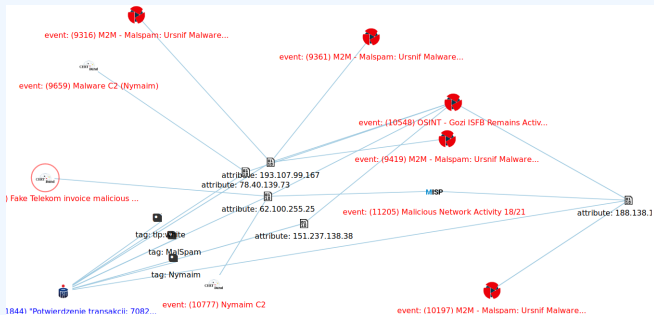
# MISP CORE DISTRIBUTED SHARING FUNCTIONALITY

- MISPs' core functionality is sharing where everyone can be a consumer and/or a contributor."
- Quick benefit without the obligation to contribute.
- Low barrier access to get acquainted to the system.



- Correlating data
- Feedback loop from detections via **Sightings**
- **False positive management** via the warninglist system
- **Enrichment system** via MISP-modules
- **Integrations** with a plethora of tools and formats
- Flexible **API** and support **libraries** such as PyMISP to ease integration
- **Timelines** and giving information a temporal context
- Full chain for **indicator life-cycle management**

# CORRELATION FEATURES: A TOOL FOR ANALYSTS



- To **corroborate a finding** (e.g. is this the same campaign?), **reinforce an analysis** (e.g. do other analysts have the same hypothesis?), **confirm a specific aspect** (e.g. are the sinkhole IP addresses used for one campaign?) or just find if this **threat is new or unknown in your community**.

The screenshot displays a software interface for managing sightings. At the top, there is a table with the following columns: a checkbox, a status field, a date field, and an action menu. The table contains three rows, all with the status 'No'. A tooltip is visible over the first row, showing the text 'Sightings' and 'CIRCL: 2 (2017-03-19 16:17:59)'. Below the table, there is a detailed view of a sighting. The 'Sighting Details' section shows a red bar with the word 'No' in white. Below this, the text '4 (2) - restricted to own organisation only.' is visible. The 'Discussion' section is currently empty.

Events	Status	Date	Action
<input checked="" type="checkbox"/>	No		
<input checked="" type="checkbox"/>	No		
<input checked="" type="checkbox"/>	No	Inherit	

Tags: +

Date: 2016-02-24

Threat Level: High

Analysis: Initial

Distribution: Connected communities

Sighting Details: freetext test

MISP: 2

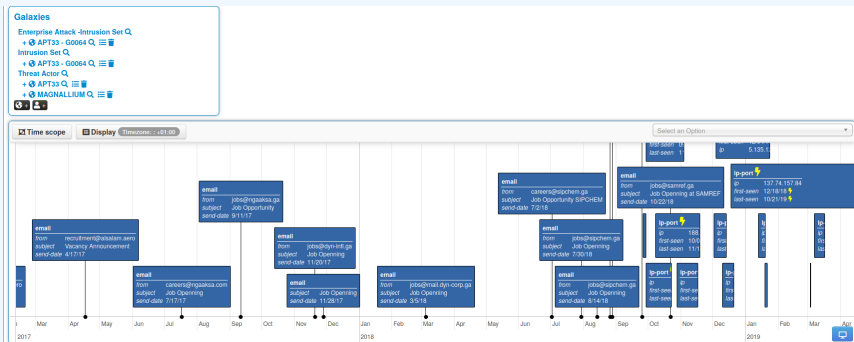
CIRCL: 2

Discussion

- Has a data-point been **sighted** by me or the community before?
- Additionally, the sighting system supports negative sightings (FP) and expiration sightings.
- Sightings can be performed via the API or the UI.
- Many use-cases for **scoring indicators** based on users sighting.
- For large quantities of data, **SightingDB** by Devo

# TIMELINES AND GIVING INFORMATION A TEMPORAL CONTEXT

- Recently introduced **first\_seen** and **last\_seen** data points
- All data-points can be placed in time
- Enables the **visualisation** and **adjustment** of indicators timeframes



# LIFE-CYCLE MANAGEMENT VIA DECAYING OF INDICATORS

The screenshot shows a web interface for managing indicators. At the top, there are navigation tabs: "Photos", "Galaxy", "Event graph", "Correlation graph", "ATTACK matrix", "Attributes", and "Discussion". Below these is a search bar containing "45: Decay...". A "Galaxies" section is visible with a search icon and a plus sign. Below that are navigation buttons: "previous", "next >", and "view all".

The main content is a table with the following columns: "Date", "Org", "Category", "Type", "Value", "Tags", "Galaxies", "Comment", "Correlate", "Related Events", "Feed hits", "IDS", "Distribution", "Sightings", "Activity", "Score", and "Actions". The table is filtered by "Decay score" (indicated by a blue toggle button).

Date	Org	Category	Type	Value	Tags	Galaxies	Comment	Correlate	Related Events	Feed hits	IDS	Distribution	Sightings	Activity	Score	Actions
2019-09-12		Network activity	ip-src	5.5.5.5								Inherit	(0/0)		NIDS Simple Decaying ... 65.26 Model 5 79.88	
2019-08-13		Network activity	ip-src	8.8.8.8	adm_rality_scale:source-reliability="A" x retention:expired x				1 2 2 2 Show S1.1 S1.2 11 more...			Inherit	(5/0)		NIDS Simple Decaying ... 54.6 Model 5 52.69	
2019-08-13		Network activity	ip-src	9.9.9.9	adm_rality_scale:source-reliability="C" x msp:confidence-level="completely-confident" x Ipnumber				1 3 1 9 Show S1.1 28 more...			Inherit	(4/1)		NIDS Simple Decaying ... 37.43 Model 5 0	
2019-08-13		Network activity	ip-src	7.7.7.7	adm_rality_scale:information-credibility="4" x retention:20 x				41			Inherit	(3/0)		NIDS Simple Decaying ... 37.41 Model 5 0	
2019-07-18		Network activity	ip-src	6.6.6.6					41			Inherit	(0/0)		NIDS Simple Decaying ... 23.31 Model 5 0	

## ■ Decay score toggle button

- ▶ Shows Score for each Models associated to the Attribute type



# DECAYING OF INDICATORS: FINE TUNING TOOL

**Decaying Of Indicator Fine Tuning Tool**

Attribute Type | Category | Model ID

Attribute Type	Category	Model ID
aba-rtn	Financial fraud	
authen@hash	Payload delivery	
bank-account-rt	Financial fraud	
bc	Financial fraud	
bn	Financial fraud	
bro	Network activity	10-11
bc	Financial fraud	11
cc-number	Financial fraud	
cd@hash	Payload delivery	
community-id	Network activity	
domain	Network activity	
domain@ip	Network activity	10-94
email-attachment	Payload delivery	
email-dst	Network activity	11
email-enc	Payload delivery	
headers	Payload delivery	
headers/authen@hash	Payload delivery	
headers@fuzzy	Payload delivery	
headers@p@hash	Payload delivery	
headers@r@f	Payload delivery	13
headers@p@hash	Payload delivery	13
headers@h@L	Payload delivery	13

Polynomial

Score

Days

Lifetime: 3 days

Decay speed: 2.3

Cutoff threshold: 30

Expire after (lifetime): 1 days and 7 hours

Score halved after (Half-life): 0 day and 6 hours

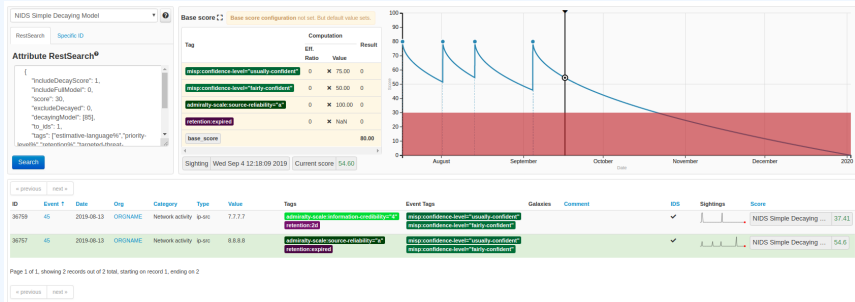
Adjust base score | Simulate this model

Phishing model | Simple model to rapidly decay | Edit

Parameters													
ID	Model Name	Org ID	Description	Formula	Lifetime	Decay speed	Threshold	Default basescore	Basescore config	Settings	# Types	Enabled	Action
29	Phishing model	1	Simple model to rapidly decay phishing website	Polynomial	3	2.3	30	80	estimate-language phishing	0.5	0.5	✓	Edit model

Create, modify, visualise, perform mapping

# DECAYING OF INDICATORS: SIMULATION TOOL



Simulate *Attributes* with different *Models*

- **Information sharing practices come from usage** and by example (e.g. learning by imitation from the shared information).
- MISIP is just a tool. What matters is your sharing practices. The tool should be as transparent as possible to support you.
- Enable users to customize MISIP to meet their community's use-cases.
- MISIP project combines open source software, open standards, best practices and communities to make information sharing a reality.