Interoperability in MISP

Enabling a Flawless Stream of Information

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Agenda

- The pivotal role of interoperability in threat intelligence sharing
- MISP Standard format: designed for interoperability
- Interoperability mechanisms
- Data feeding mechanisms

Interoperability in threat intelligence sharing

The pivotal role of interoperability in threat intelligence sharing

- Ensuring a **seamless flow of information** between tools
  - Efficiency in information sharing
  - Enables faster dissemination of threat intelligence
- Enabling the scalability of the CTI pipeline with the integration of more tools
  - Flexibility in the choice of tools
  - More comprehensive view of threats
- Fostering **collaboration**
  - Encouraging the sharing of information
  - Can lead to faster response to threats

Important features improving interoperability

- **Standardisation is key**
  - Relying on **standard formats** is mandatory
  - **Wide adoption** of these formats is highly encouraged
  - **Conversion mechanisms** between formats are essential
- Taking advantages of **automation tools**
  - **Efficiency in detection and response** is highly dependent on automation
  - **Automated conversion** between formats included in your CTI pipeline is crucial
  - Providing automation mechanisms to all users is a vector for **more collaboration**

A generic Data Format designed for interoperability

MISP standard format

- **JSON** format
- Designed for **flexibility** and **extensibility**

- A combination of meta-models with **generic field names** to describe data structures
  - Flexible to allow the description of any kind of information in a structured manner
  - Adaptable to easily extend the format to new use-cases

- Ensuring **long term interoperability** with existing MISP software and other Threat Intelligence Platforms and tools

MISP standard format

- Events as simple containers for embedded information
  - Can be an incident, a security analysis, a threat intelligence report, or anything else
  - No semantic meaning attached to the event itself
  - Meaning of an Event only **depends on the embedded information**

- Attributes as the granular pieces of information to describe IoCs
  - Made up of a **category** - **type** - **value** triplet
  - Category and type give meaning to the value
  - Difference between IoCs and observed data relies on a flag

MISP OBJECT TEMPLATES

- **Simple containers** grouping MISP Attributes to describe more complex data points
  - JSON format with generic meta information, such as the `name` and `meta-category`
  - The meaning of each Attribute within the object is defined by the `object relation`
- A generic templating system
  - Commonly used templates are provided by default
  - Easily **extensible** to new use-cases
  - Users can create **their own templates**
- Include a vocabulary to describe the various **inter object and object to attribute relationships**

MISP Taxonomies and Galaxies

- Taxonomies are ensuring the **consistency** of the tags used in MISP
  - Providing a **global classification** of data
  - **Reused by other tools** interacting with MISP

- MISP Galaxies provide a way to attach **more complex structures** to MISP data
  - They basically are tags with meta information
  - Describing known threat actors, malware, techniques or other collections of **contextual information**
  - MISP uses the tag name derived from the Galaxy Cluster
  - Support for **custom** Galaxy Clusters

The support of focused specific formats

Supporting several patterning languages & signature formats

- Provide information on how data has been detected/extracted in addition to the actual data
- Including:
  - Yara & Sigma signatures
  - Snort / Suricata & Zeek (previously Bro) rules
  - STIX patterns

- Each of these formats is a **specific attribute type** in MISP
- Given rules, patterns and signatures can be extracted from MISP and **used to feed the respective tools**

Several automation tools to support interoperability

RESTfull APIs / PyMISP

- Export **data collections** from MISP
  - Enabled for several data structures - Events, Attributes, Galaxies, etc.
  - Default format is **MISP standard - JSON**
  - Supports a wide range of other formats, including CSV, XML, `Yara`, etc.
  - **Advanced filtering capabilities**
  - RESTfull API queries can be **automated** with *curl* commands or *Python* scripts using **PyMISP**

- Import data into MISP Events
  - **Lossless** MISP JSON Events ingestion
  - **PyMISP** can parse different formats too and convert data into MISP format

An advanced STIX conversion feature

- Works as a **built-in module**
  - Convert any data collection to STIX
  - Import STIX files into MISP
- Supporting all STIX versions
  - STIX 1.x - XML
  - STIX 2.x - JSON
- Continuous development on STIX 2.x to **improve the conversion capacities** following evolutions on the STIX standards as well as the extensions of the MISP standard format
- Filling the mapping gaps over time to **improve interoperability** between MISP and other tools supporting STIX, such as TAXII, or STIX feeds producers
- Standalone conversion ability with the *Python* library[1]

[1] https://github.com/MISP/misp-stix

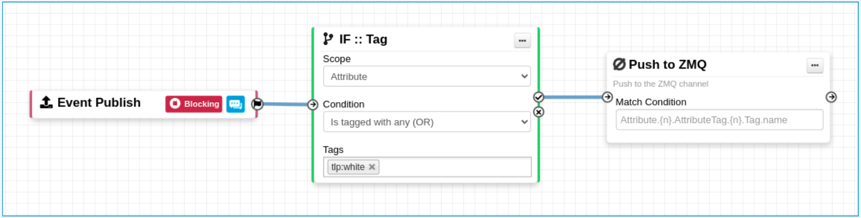
MISP modules[2]

- **Simple Python scripts** to automate the **import/export** of data
  - Extending the range of supported formats
  - Allows anyone to build their own module to either:
    - Populate MISP Events with data from external sources/formats
    - Extract and convert data from MISP Events
- Enrichment modules
  - Use-case examples:
    - **enrich** data with additional context
    - **cross-reference** data with external sources
    - **validate** data
  - Can be triggered automatically by **Workflows**

[2] https://github.com/MISP/misp-modules

MISP Workflows

- Needs that Workflows can address:
  - Prevent default MISP behaviors
  - Trigger specific actions to run callbacks



Event Publish

IF :: Tag

Scope: Attribute

Condition: Is tagged with any (OR)

Tags: tlp:white

Push to ZMQ

Push to the ZMQ channel

Match Condition: Attribute.{n}.AttributeTag.{n}.Tag.name

PubSub channels

- ZeroMQ channels
  - N-to-N Asynchronous message-processing tasks
  - Publisher(MISP) and consumer (scripts)

- **Streaming data as it is created in MISP**
- Advantage is the subscriber can **automatically use the published data**
- Be careful though with data being **republished**
- Also, there is **no access control** on the data that is streamed

Data feeding mechanisms

Synchronisation between MISP instances

- **Synchronisation is the default communication mechanism between MISP instances**
  - Exchance of MISP standard format
  - **Bidirectional** communication
  - **Filtering** capabilities
- Multiple data structures can be synchronised
  - **Events are synchronised by default** with their **Attributes** & **Objects**
  - Synchronisation of Galaxy Clusters, Analyst Data & Sightings can be enabled/disabled

Syncing / caching

- **2-Step** process when Pulling Events
  - Caching of the data
    - Lookup of the Events in the remote instance
    - Correlations with the Attributes in my instance
  - Fetching data
    - Pulling the Events with their content on my instance
- Automated pushing mechanism
  - **Published Events** and their content are pushed to the remote instance(s)
  - Users can manually push Events

MISP Feeds[3]

- MISP Feeds provide a way to:
  - **Exchange information via any transport method** (HTTP, TLP, USB key, etc.)
  - Preview events along with their attributes, objects
  - Select and import events
  - **Correlate attributes using caching**
- Feeds work without the need of MISP synchronisation
- **Feeds can be produced without the need of a MISP instance**

[3] https://www.misp-project.org/feeds/

References

- References on the presented topics
  - MISP Standards: https://www.misp-standard.org/standards/
  - MISP Concepts Cheat sheet: https://www.misp-project.org/misp-training/cheatsheet.pdf
- More details on MISP
  - Contact: info@circl.lu
  - https://www.misp-project.org
  - https://github.com/MISP