AN Introduction to Cybersecu-RITY Information Sharing

MISP - THREAT SHARING

CIRCL / TEAM MISP PROJECT

MISP PROJECT https://www.misp-project.org/

CIISI-IE DUBLIN 2024



CONTENT OF THE PRESENTATION

- Data sharing in MISP
- Data models for the Data layer
- Data models for the Context layer

LAYERS OF DATA MODEL

Data layer

- ► The raw data itself as well as element to link them together
- Indicators, Observables and means to contextually link them
- ► MISP terminology: Event, Attributes, misp-objects, ...

■ Context layer

- As important as the data layer, allow triage, false-positive management, risk-assessment and prioritisation
- Latches on the data layer, usually referencing threat intelligence, concepts, knowledge base and vocabularies
- ► Tags, Taxonomies, Galaxies, ...

DATA SHARING IN MISP

SHARING IN MISP: DISTRIBUTION

MISP offers granulars distribution settings:

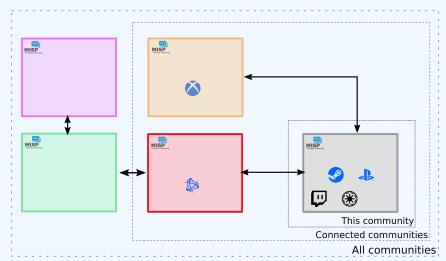
- Organisation only
- This community
- Connected communities
- All communities
- Distribution lists aka **Sharing groups**



At multiple levels: **Events, Attributes, Objects** (and their **Attributes**) and **Galaxy-clusters**

SHARING IN MISP: DISTRIBUTION





DATA LAYER

DATA LAYER: NAMING CONVENTIONS

Data layer

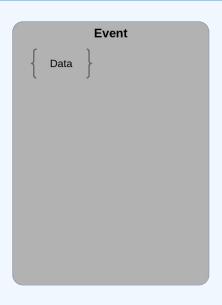
- Events are encapsulations for contextually linked information
- Attributes are individual data points, which can be indicators or supporting data.
- ▶ **Objects** are custom templated Attribute compositions
- Object references are the relationships between individual building blocks
- ► **Shadow Attributes/Proposal** are suggestions made by users to modify an existing *attribute*
- Sightings are a means to convey that a data point has been seen
- ► **Event reports** are supporting materials for analysts to describe *events*, *processes*, etc

DATA LAYER: EVENTS

- **Events** are encapsulations for contextually linked information
 - **Purpose**: Group datapoints and context together. Acting as an envelop, it allows setting distribution and sharing rules for itself and its children.
 - **Usecase**: Encode incidents / events / reports / ...



DATA LAYER: EVENT BUILDING BLOCKS - BASE



DATA LAYER: EVENTS

```
"date": "2019-02-20",
3
       "info": "IoT malware - Gafgyt.Gen28 (active)",
       "uuid": "5c6d21e5-bb60-47b7-b892-42e6950d2111",
4
5
6
       "analysis": "2",
       "timestamp": "1602315388",
       "distribution": "3",
8
       "sharing_group_id": "o",
       "threat_level_id": "3",
9
       "extends_uuid": "",
10
       "Attribute": [...],
11
       "Object": [...],
12
       "EventReport": [...],
13
       "Tag": [...],
14
       "Galaxy": [...]
15
16
```

DATA LAYER: ATTRIBUTES

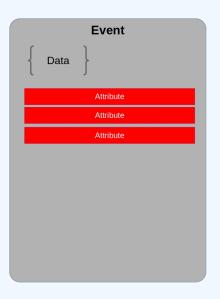
Attributes are individual data points, indicators or supporting data

Purpose: Individual data point. Can be an indicator or supporting data.

Usecase: Domain, IP, link, sha1, attachment, ...



DATA LAYER: EVENT BUILDING BLOCKS - RAW DATA



DATA LAYER: ATTRIBUTES

```
"type": "url",
       "category": "Network activity",
       "to ids": true,
       "uuid": "5c6d24bd-d094-4dd6-a1b6-4fa3950d2111",
       "event_id": "178",
       "distribution": "5".
8
       "sharing_group_id": "o",
       "timestamp": "1550656701",
10
       "comment": "Delivery point for the malware",
       "object_id": "o",
11
12
       "object_relation": null,
       "first_seen": null,
13
       "last seen": null.
14
       "value": "ftp://185.135.80.163/",
15
       "Tag": [...]
16
       "Galaxy": [...]
17
18 }
```

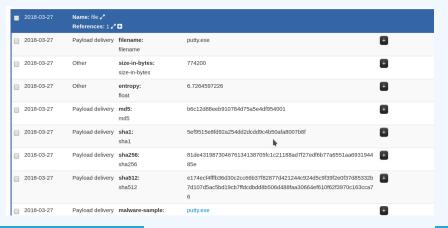
DATA LAYER: MISP OBJECTS

Objects are custom templated Attribute compositions

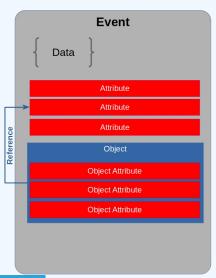
Purpose: Groups Attributes that are intrinsically linked

together

Usecase: File, person, credit-card, x509, device, ...



DATA LAYER: EVENT BUILDING BLOCKS - DATA COMPOSITION



13 **|** 3

DATA LAYER: MISP OBJECTS

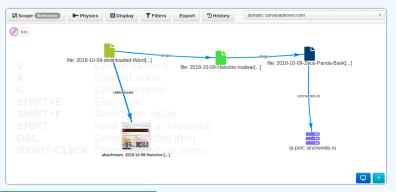
```
"name": "elf-section",
3
       "meta-category": "file",
       "description": "Object describing a sect...",
       "template_uuid": "ca271f32 -1234-4e87-b240-6b6e882de5de",
 5
6
       "template version": "4".
       "uuid": "ab5foc85-5623-424c-bco3-d79841700d74".
8
       "timestamp": "1550655984",
       "distribution": "5",
9
       "sharing_group_id": "o",
10
11
       "comment": "".
       "first_seen": null,
12
       "last_seen": null,
13
       "ObjectReference": [].
14
       "Attribute": [...]
15
16
```

DATA LAYER: OBJECT REFERENCES

Object references are the relationships between individual building blocks

Purpose: Allows to create relationships between entities, thus creating a graph where they are the edges and entities are the nodes.

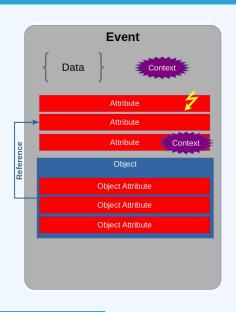
Usecase: Represent behaviours, similarities, affiliation, ...



DATA LAYER: OBJECT REFERENCES

```
1 {
2     "uuid": "5c6d21f9-0384-4bd2-b256-40de950d2111",
3     "timestamp": "1602318569",
4     "object_id": "1024",
5     "source_uuid": "23275e05-c202-460e-aadf-819c417fb326",
6     "referenced_uuid": "ab5foc85-5623-424c-bc03-d79841700d74",
7     "referenced_type": "1",
8     "relationship_type": "included-in",
9     "comment": "Section o of ELF"
10 }
```

DATA LAYER: EVENT BUILDING BLOCKS - CONTEXT



DATA LAYER: SIGHTINGS

Sightings are a means to convey that a data point has been seen **Purpose**: Allows to add temporality to the data.

Usecase: Record activity or occurence, perform IoC expiration, ...



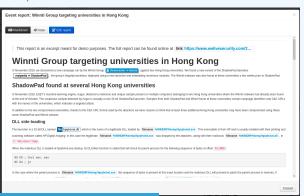
```
1 {
2     "org_id": "1",
3     "date_sighting": "1573722432",
4     "uuid": "5dcd1940-5de8-4462-93dd-12a2a5e38e14",
5     "source": "",
6     "type": "0",
7     "attribute_uuid": "5da97b59-9650-4be2-9443-2194a5e38e14"
8 }
```

DATA LAYER: EVENT REPORTS

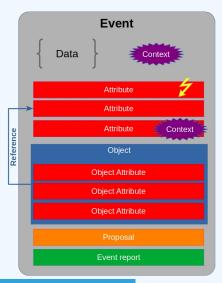
Event reports are supporting data for analysis to describe **events**, **processes**, ect

Purpose: Supporting data point to describe events or processes

Usecase: Encode reports, provide more information about the Event, ...



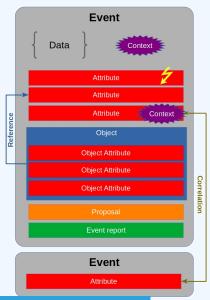
DATA LAYER: EVENT BUILDING BLOCKS - COLLABORATION & INTELLIGENCE



DATA LAYER: EVENT REPORTS

```
1 {
2     "uuid": "076e240b-5a76-4a8b-9eab-cfff551993dd",
3     "event_id": "2127",
4     "name": "Event report (1607362986)",
5     "content": "...",
6     "distribution": "5",
7     "sharing_group_id": "0",
8     "timestamp": "1607362986"
9 }
```

DATA LAYER: EVENT BUILDING BLOCKS - FULL



CONTEXT LAYER

CONTEXT LAYER: NAMING CONVENTIONS

Context layer

- Tags are free-text labels attached to events/attributes and can come from Taxonomies
 - Android Malware, C2,...
- ► **Taxonomies** are a set of common classification allowing to express the same vocabulary among a distributed set of users and organisations
 - tlp:green, false-positive:risk="high", admiralty-scale:information-credibility="2"

CONTEXT LAYER: NAMING CONVENTIONS

■ Context layer

- Galaxies are container copmosed of Galaxy-clusters that belongs to the same family
 - Similar to what Events are to Attributes
 - Country, Threat actors, Botnet, ...
- Galaxy-clusters are knowledge base items coming from Galaxies.
 - Basically a taxonomy with additional meta-information
 - misp-galaxy:threat-actor="APT 29",
 misp-galaxy:country="luxembourg"

CONTEXT LAYER: TAGS

Simple free-text labels

```
TLP AMBER

TLP:AMBER

Threat tip:Amber

tip-amber

tip::amber
```

CONTEXT LAYER: TAXONOMIES

Simple label standardised on common set of vocabularies

Purpose: Enable efficent classification globally understood, easing consumption and automation.

Usecase: Provide classification such as: TLP, Confidence,

Source, Workflows, Event type, ...

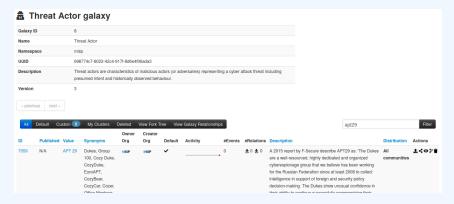


CONTEXT LAYER: TAXONOMIES

```
"Taxonomy": {
2
       "namespace": "admiralty-scale".
       "description": "The Admiralty Scale or Ranking (also called
           the NATO System)...",
       "version": "6".
       "exclusive": false.
7
8
     "entries": [
          "tag": "admiralty-scale:information-credibility=\"1\"",
10
          "expanded": "Information Credibility: Confirmed by other
11
              sources",
          "numerical_value": 100,
12
          "exclusive predicate": true.
13
14
15
16
17
```

CONTEXT LAYER: GALAXIES

Collections of galaxy clusters



CONTEXT LAYER: GALAXY CLUSTERS

Kownledge base items including a description, links, synonyms, meta-information and relationships

Purpose: Enable description of complex high-level

information for classification

Usecase: Extensively describe elements such as threat

actors, countries, technique used, ...



CONTEXT LAYER: GALAXY CLUSTERS

Galaxy cluster elements: Tabular view



Galaxy cluster elements: JSON view

```
Tabular view JSON www +Add JSON as cluster's elements

{
    "attribution-confidence": [
        "50"
],
    "cfr-suspected-state-sponsor": [
        "Russian Federation"
],
    "cfr-suspected-victims": [
        "United States",
        "China",
        "New Zealand",
        "Ukerae",
```

CONTEXT LAYER: GALAXY CLUSTERS

```
"uuid": "5edaoa53-1d98-4d01-ae06-40daoa00020f",
3
       "type": "fellowship-characters",
       "value": "Aragorn wielding Anduril",
       "tag_name": "misp-galaxy:fellowship-characters=\"c3fe907a-6a36
 5
           -4cd1-9456-dcdf35c3f907\"",
       "description": "The Aragorn character wielding Anduril",
6
       "source": "Middle-earth universe by J. R. R. Tolkien",
8
       "authors": null.
9
       "version": "1591347795",
       "distribution": "o",
10
11
       "sharing_group_id": null,
       "default": false,
12
       "extends_uuid": "5eda0117-1e14-4b0a-9e26-34aff331dc3b",
13
       "extends_version": "1591345431",
14
       "GalaxyElement": [...],
15
       "GalaxyClusterRelation": [...]
16
17
```

CONTEXT LAYER: GALAXIES & GALAXY CLUSTERS

- MISP integrates MITRE's Adversarial Tactics, Techniques, and Common Knowledge (ATT&CK) and similar Galaxy Matrix
- MISP terminology of these matrixes: Galaxy Matrix



GALAXY JSON MATRIX-LIKE

```
"description": "Universal Development and Security Guidelines as
           Applicable to Election Technology.",
     "icon": "map".
     "kill_chain_order": {
                                      \\Tab in the matrix
5
          "example-of-threats": [
                                      \\Column in the matrix
          "setup | party/candidate-registration",
7
8
          "setup | electoral-rolls",
          "campaign | campaign-IT",
          "all-phases | governement-IT",
9
          "voting | election-technology",
10
          "campaign/public-communication | media/press"
11
12
13
     "name": "Election guidelines",
14
     "namespace": "misp",
15
     "type": "guidelines".
16
17
     "uuid": "c1dco3b2-89b3-42a5-9d41-782ef726435a",
     "version": 1
18
19
```

CLUSTER ISON MATRIX-LIKE

```
"description": "DoS or overload of party/campaign
              registration, causing them to miss the deadline",
         "meta": {
           "date": "March 2018.",
5
            "kill_chain": [ \\Define in which column the cluster should be placed
               "example-of-threats:setup | party/candidate-registration"
           "refs": [
              "https://www.ria.ee/sites/default/files/content-editors/
                  kuberturve/cyber security of election technology.pdf
10
11
         "uuid": "154c6186-a007-4460-a029-ea23163448fe",
12
         "value": "DoS or overload of party/campaign registration,
13
              causing them to miss the deadline"
14
```

EXPRESSING RELATION BETWEEN CLUSTERS

Cluster can be related to one or more clusters using default relationships from MISP objects and a list of tags to classify the relation.

ACKNOWLEDGEMENTS

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