

# DEEP-DIVE INTO PYMISP

MISP - THREAT SHARING

CIRCL / TEAM MISP PROJECT

[HTTP://WWW.MISP-PROJECT.ORG/](http://www.misp-project.org/)  
TWITTER: @MISPPROJECT

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2022-09-13

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- MISP is a large project
- Your production environment is even more complex
- 3rd party services are even worse
- Querying MISP via CURL is doable, but get's painful fast
- Talking to MySQL directly can be dangerous
- POST a JSON blob, receive a JSON blob. You can do it manually(-ish)

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## Deep-dive into PyMISP

### └ Context

CONTEXT

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- Your production environment is even more complex
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- Querying MISP via CURL is doable, but get's painful fast
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- POST a JSON blob, receive a JSON blob. You can do it manually(-ish)

- Core goal: providing stable access to APIs, respect access control
- Simplifying handling & automation of indicators in 3rd party tools
- Hiding complexity of the JSON blobs
- Providing pre-cooked examples for commonly used operations
- Helping integration with existing infrastructure

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## Deep-dive into PyMISP

└ Big picture

BIG PICTURE

- Core goal: providing stable access to APIs, respect access control
- Simplifying handling & automation of indicators in 3rd party tools
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- Providing pre-cooked examples for commonly used operations
- Helping integration with existing infrastructure

There are 4 main cases here:

- Metadata of the events that have been modified
  - ▶ **search\_index** ⇒ timestamp (1h, 1d, 7d, ...), returns list of all the modified events
- Full events (metadata + attributes)
  - ▶ **search** ⇒ timestamp (1h, 1d, 7d, ...)
- Modified attributes
  - ▶ **search** ⇒ controller = attributes and timestamp (1h, 1d, 7d, ...)
- Other use case: get last **published** events by using the last parameter in the **search** method.

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└ Common queries: Recent changes on a timeframe

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There are 3 main cases here:

- Easy, but slow: full text search with **search\_all**
- Faster: use the **search** method and search by tag, type, enforce the warning lists, with(-out) attachments, dates interval, ...
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- Add Event, edit its metadata
- Add attributes or objects to event
- (un)Tag event or attribute (soon object)
- Edit Attributes metadata
- Upload malware sample (and automatically expand it)

### └ Common queries: create things

There are 3 main cases here:

- Add Event, edit its metadata
- Add attributes or objects to event
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- Upload malware sample (and automatically expand it)

Assuming you have the right to do it on the instance.

- Managing users
- Managing organisations
- Managing sync servers

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- Upload/download samples
- **Proposals:** add, edit, accept, discard
- **Sightings:** Get, set, update
- Export **statistics**
- Manage **feeds**
- Get MISP server version, recommended PyMISP version
- And more, look at the api file

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## Deep-dive into PyMISP

### └─ Other Capabilities

- Upload/download samples
- **Proposals:** add, edit, accept, discard
- **Sightings:** Get, set, update
- Export **statistics**
- Manage **feeds**
- Get MISP server version, recommended PyMISP version
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```
from pymisp import MISPEvent, EncodeUpdate
```

```
# Create a new event with default values
event = MISPEvent()
```

```
# Load an existing JSON dump (optional)
event.load_file('Path/to/event.json')
event.info = 'My cool event' # Duh.
```

```
# Add an attribute of type ip-dst
event.add_attribute('ip-dst', '8.8.8.8')
```

```
# Mark an attribute as deleted (From 2.4.60)
event.delete_attribute('<Attribute UUID>')
```

```
# Dump as json
event_as_jsondump = json.dumps(event, cls=EncodeUpdate)
```

- Python 3.5+ is recommended
- PyMISP is always inline with current version (pip3 install pymisp)
- Dev version: pip3 install  
git+https://github.com/MISP/PyMISP.git
- Get your auth key from:  
<https://misppriv.circl.lu/events/automation>
  - ▶ Not available: you don't have "Auth key access" role. Contact your instance admin.
- Source available here: git clone  
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## └ Basics

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## ■ PyMISP needs to be installed (duh)

### ■ Usage:

- Create examples/keys.py with the following content

```
misp_url = "https://url-to-your-misp"
misp_key = "<API_KEY>"
misp_verifycert = True
```

### ■ Proxy support:

```
proxies = {
    'http': 'http://127.0.0.1:8123',
    'https': 'http://127.0.0.1:8123',
}
PyMISP(misp_url, misp_key, misp_verifycert, proxies=proxies)
```

### └─ Examples

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- Lots of ideas on how to use the API
- You may also want to look at the tests directory
- All the examples use argparse. Help usage is available:  
**script.py -h**
  - ▶ **add\_file\_object.py**: Attach a file (PE/ELF/Mach-O) object to an event
  - ▶ **upload.py**: Upload a malware sample (use advanced expansion is available on the server)
  - ▶ **last.py**: Returns all the most recent events (on a timeframe)
  - ▶ **add\_named\_attribute.py**: Add attribute to an event
  - ▶ **sighting.py**: Update sightings on an attribute
  - ▶ **stats.py**: Returns the stats of a MISP instance
  - ▶ **{add,edit,create}\_user.py** : Add, Edit, Create a user on MISP

### └─ Examples

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## ■ Basic example

```
from pymisp import PyMISP
api = PyMISP(url, apikey, verifycert=True, debug=False, proxies=None)
response = api.<function>
if response['error']:
    # <something went wrong>
else:
    # <do something with the output>
```

## └ Usage

```
■ Basic example
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```

- JSON blobs are python dictionaries
- ... Accessing content can be a pain
- **AbstractMISP inherits collections.MutableMapping**, they are all dictionaries!
- ... Has helpers to load, dump, and edit JSON blobs
- **Important:** All the public attributes (not starting with a \_) defined in a class are dumped to JSON
- **Tags:** Events and Attributes have tags, soon Objects. Tag handling is defined in this class.
- **edited:** When pushing a full MISPEvent, only the objects without a timestamp, or with a newer timestamp will be updated. This method recursively finds updated events, and removes the timestamp key from the object.

### └─ Concept behind AbstractMISP

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## ■ Pythonic representation of MISP elements

### ■ Easy manipulation

- ▶ Load an existing event
- ▶ Update te metadata, add attributes, objects, tags, mark an attribute as deleted, ...
- ▶ Set relations between objects
- ▶ Load and add attachments or malware samples as pseudo files

### ■ Dump to JSON

└ MISPEvent, MISPAttribute, MISPObject,  
MISPSighting...

- Pythonic representation of MISP elements
- Easy manipulation
  - ▶ Load an existing event
  - ▶ Update te metadata, add attributes, objects, tags, mark an attribute as deleted, ...
  - ▶ Set relations between objects
  - ▶ Load and add attachments or malware samples as pseudo files
- Dump to JSON

- `load_file(event_path)`
- `load(json_event)`
- `add_attribute(type, value, **kwargs)`
- `add_object(obj=None, **kwargs)`
- `add_attribute_tag(tag, attribute_identifier)`
- `get_attribute_tag(attribute_identifier)`
- `add_tag(tag=None, **kwargs)`
- `objects[], attributes[], tags[]`
- `edited`, all other parameters of the MISPEvent element (`info`, `date`, ...)
- `to_json()`

### └ MISPEvent - Main entrypoints

MISPEVENT - MAIN ENTRYPOINTS

- `load_file(event_path)`
- `load(json_event)`
- `add_attribute(type, value, **kwargs)`
- `add_object(obj=None, **kwargs)`
- `add_attribute_tag(tag, attribute_identifier)`
- `get_attribute_tag(attribute_identifier)`
- `add_tag(tag=None, **kwargs)`
- `objects[], attributes[], tags[]`
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- `add_attribute(object_relation, **value)`
- `add_reference(referenced_uuid, relationship_type, comment=None, **kwargs)`
- `has_attributes_by_relation(list_of_relations)`
- `get_attributes_by_relation(object_relation)`
- `attributes[], relations[]`
- `edited`, all other parameters of the MISPObject element (name, comment, ...)
- `to_json()`
- Can be validated against their template
- Can have default parameters applied to all attributes (i.e. distribution, category, ...)

### └ MISPObject - Main entrypoints

MISPOBJECT - MAIN ENTRYPOINTS

- `add_attribute(object_relation, **value)`
- `add_reference(referenced_uuid, relationship_type, comment=None, **kwargs)`
- `has_attributes_by_relation(list_of_relations)`
- `get_attributes_by_relation(object_relation)`
- `attributes[], relations[]`
- `edited`, all other parameters of the MISPObject element (name, comment, ...)
- `to_json()`
- Can be validated against their template
- Can have default parameters applied to all attributes (i.e. distribution, category, ...)

- `add_tag(tag=None, **kwargs)`
- `delete()`
- `malware_binary` (if relevant)
- `tags[]`
- `edited`, all other parameters of the MISPObjekt element (value, comment, ...)
- `to_json()`

### └─ MISPAttribute - Main entrypoints

- `add_tag(tag=None, **kwargs)`
- `delete()`
- `malware_binary` (if relevant)
- `tags[]`
- `edited`, all other parameters of the MISPObjekt element (value, comment, ...)
- `to_json()`

- Libraries requiring specific 3rd party dependencies
- Callable via PyMISP for specific usecases
- Currently implemented:
  - ▶ **OpenIOC** to MISP Event
  - ▶ MISP to **Neo4j**

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- Libraries requiring specific 3rd party dependencies
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- File - PE/ELF/MachO - Sections
- VirusTotal
- Generic object generator

### └─ PyMISP - Default objects generators

- File - PE/ELF/MachO - Sections
- VirusTotal
- Generic object generator

- debug=True passed to the constructor enable debug to stdout
- Configurable using the standard logging module
- Show everything send to the server and received by the client

```
import pymisp
import logging
```

```
logger = logging.getLogger('pymisp')
logger.setLevel(logging.DEBUG) # enable debug to stdout
```

```
logging.basicConfig(level=logging.DEBUG, # Enable debug to file
                    filename="debug.log",
                    filemode='w',
                    format=pymisp.FORMAT)
```

### PyMISP - Logging / Debugging

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■ Show everything send to the server and received by the
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- <https://github.com/MISP/PyMISP>
- <https://github.com/MISP/>
- <https://pymisp.readthedocs.io/>
- We welcome new functionalities and pull requests.

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## Deep-dive into PyMISP

└─ Q&A



- <https://github.com/MISP/PyMISP>
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