Automation in MISP

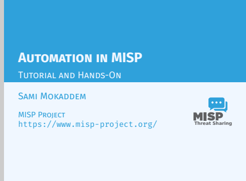
Tutorial and Hands-On

Sami Mokaddem

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

2024-05-09

Automation in MISP



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Content of the presentation

1. Automation in MISP
2. MISP API / PyMISP
3. PubSub channels (ZeroMQ)
4. MISP Workflows
   - Fundamentals
   - Demo with examples
   - Using the system
   - How it can be extended

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Automation in MISP

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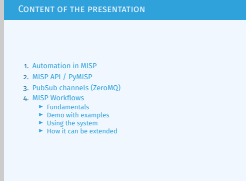

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Automation in MISP: What already exists?

MISP API / PyMISP

- Needs CRON Jobs in place
- Potentially heavy for the server
- Not realtime

PubSub channels

- After the actions happen: No feedback to MISP
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MISP API / PyMISP - Fundamentals

Objective: Get to know how to use the MISP API PyMISP

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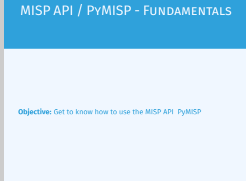

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MISP API / PyMISP - Demo

- Generate an API key
- RestClient overview
- MISP API Overview notebook[1]
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[1] https://github.com/MISP/misp-training/blob/main/a.7-rest-API/Training%20-%20Using%20the%20API%20in%20MISP.ipynb

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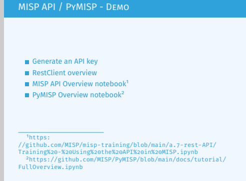
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PubSub channels (ZeroMQ) - Fundamentals

Objective: Learn how to setup realtime automation using the ZeroMQ channel

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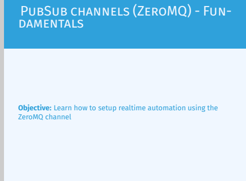

PubSub channels (ZeroMQ) - Fundamentals

Objective: Learn how to setup realtime automation using the ZeroMQ channel

ZeroMQ channel - Demo

- What is ZeroMQ?
  - *N-to-N Asynchronous message-processing tasks*
  - *Publisher (MISP) and consumer (scripts)*
- Configuring ZeroMQ in MISP
- Integrating with the ZeroMQ of MISP

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MISP Workflows - Fundamentals

Objective: Learn how to use the MISP Worklfow feature

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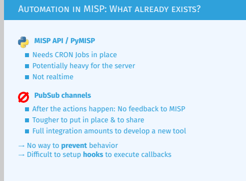
→ No way to **prevent** behavior
→ Difficult to setup **hooks** to execute callbacks



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What type of use-cases are we trying to support?

- **Prevent** default MISP behaviors to happen
  - Prevent **publication of events** not passing sanity checks
  - Prevent **querying** thrid-party **services** with sensitive information
  - ...
- **Hook** specific actions to run callbacks
  - **Automatically run** enrichment services
  - Modify data on-the-fly: False positives, enable CTI-Pipeline
  - Send notifications in a chat rooms
  - ...

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Simple automation in MISP made easy

- Why?
  - Everyone loves **simple automation**
  - **Visual** dataflow programming
  - Users want **more control**
- How?
  - **Drag & Drop** editor
  - Prevent actions **before they happen**
  - Flexible **Plug & Play** system
  - **Share** workflows, **debug** and **replay**

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Automation in MISP

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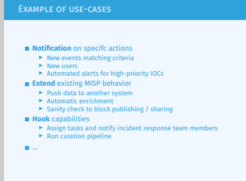
Example of use-cases

- **Notification** on specifc actions
  - New events matching criteria
  - New users
  - Automated alerts for high-priority IOCs
- **Extend** existing MISP behavior
  - Push data to another system
  - Automatic enrichment
  - Sanity check to block publishing / sharing
- **Hook** capabilities
  - Assign tasks and notify incident response team members
  - Run curation pipeline
- ...



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Workflow - Fundamentals

Objective: Start with the foundation to understand the basics

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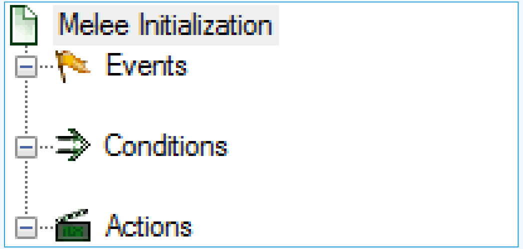
How does it work



Melee Initialization
- Events
- Conditions
- Actions

1. An **event** happens in MISP
2. Check if all **conditions** are satisfied
3. Execute all **actions**
   - May prevent MISP to complete its original event

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Automation in MISP

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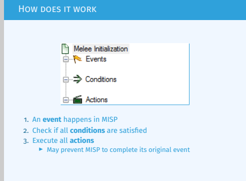

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What kind of events?

Events

- New MISP Event
- Attribute has been saved
- New discussion post
- New user created
- Query against third-party services
- ...

? Supported events in MISP are called **Triggers**

? A **Trigger** is associated with **1-and-only-1 Workflow**

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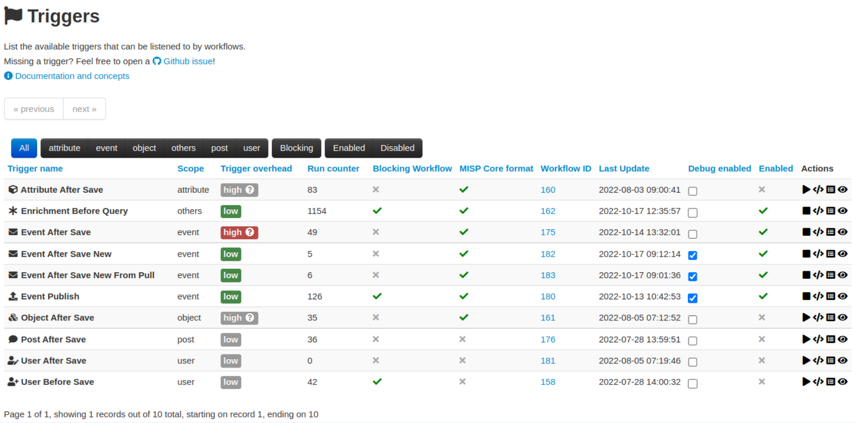
Triggers currently available

Currently 10 triggers can be hooked. 3 being ● Blocking.



Triggers

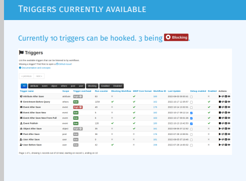
List the available triggers that can be listened to by workflows.
Missing a trigger? Feel free to open a Github issue!
Documentation and concepts

« previous | next »

All | attribute | event | object | others | post | user | Blocking | Enabled | Disabled

Trigger name	Scope	Trigger overhead	Run counter	Blocking Workflow	MISP Core format	Workflow ID	Last Update	Debug enabled	Enabled	Actions
Attribute After Save	attribute	high	83	✗	✓	160	2022-08-03 09:00:41	☐	✗	▶ </> ▤ ◉
Enrichment Before Query	others	low	1154	✓	✓	162	2022-10-17 12:35:57	☐	✓	■ </> ▤ ◉
Event After Save	event	high	49	✗	✓	175	2022-10-14 13:32:01	☐	✓	■ </> ▤ ◉
Event After Save New	event	low	5	✗	✓	182	2022-10-17 09:12:14	☑	✓	■ </> ▤ ◉
Event After Save New From Pull	event	low	6	✗	✓	183	2022-10-17 09:01:36	☑	✓	■ </> ▤ ◉
Event Publish	event	low	126	✓	✓	180	2022-10-13 10:42:53	☑	✓	■ </> ▤ ◉
Object After Save	object	high	35	✗	✓	161	2022-08-05 07:12:52	☐	✗	▶ </> ▤ ◉
Post After Save	post	low	36	✗	✗	176	2022-07-28 13:59:51	☐	✗	▶ </> ▤ ◉
User After Save	user	low	0	✗	✗	181	2022-08-05 07:19:46	☐	✗	▶ </> ▤ ◉
User Before Save	user	low	42	✓	✗	158	2022-07-28 14:00:32	☐	✗	▶ </> ▤ ◉

Page 1 of 1, showing 1 records out of 10 total, starting on record 1, ending on 10

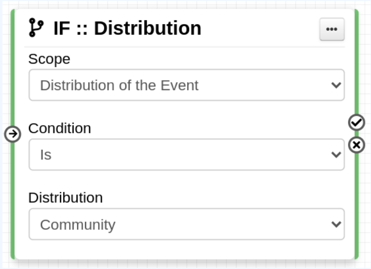


What kind of conditions?

⇛ Conditions

- A MISP Event is tagged with `tlp:red`
- The distribution of an Attribute is a sharing group
- The creator organisation is `circl.lu`
- Or any other **generic** conditions

? These are also called **Logic modules**

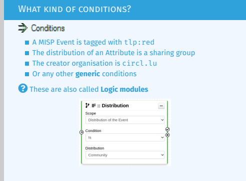


IF :: Distribution

Scope: Distribution of the Event

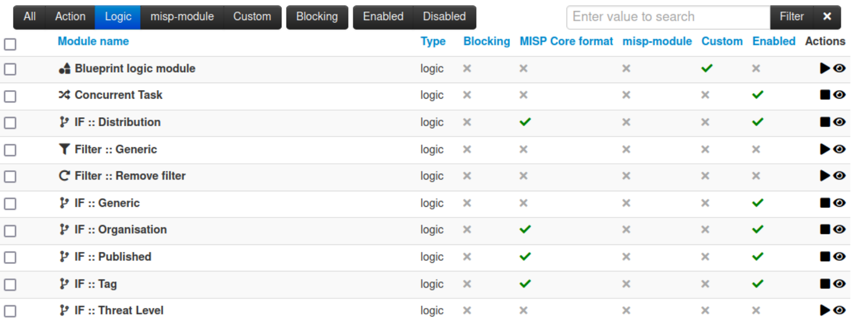
Condition: Is

Distribution: Community

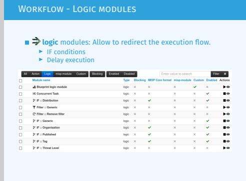


Workflow - Logic modules

- ⇛ **logic** modules: Allow to redirect the execution flow.
  - IF conditions
  - Delay execution



□	Module name	Type	Blocking	MISP Core format	misp-module	Custom	Enabled	Actions
□	Blueprint logic module	logic	×	×	×	✓	×	▶ 👁
□	Concurrent Task	logic	×	×	×	×	✓	■ 👁
□	IF :: Distribution	logic	×	✓	×	×	✓	■ 👁
□	Filter :: Generic	logic	×	×	×	×	×	▶ 👁
□	Filter :: Remove filter	logic	×	×	×	×	×	▶ 👁
□	IF :: Generic	logic	×	×	×	×	✓	■ 👁
□	IF :: Organisation	logic	×	✓	×	×	✓	■ 👁
□	IF :: Published	logic	×	✓	×	×	✓	■ 👁
□	IF :: Tag	logic	×	✓	×	×	✓	■ 👁
□	IF :: Threat Level	logic	×	×	×	×	×	▶ 👁

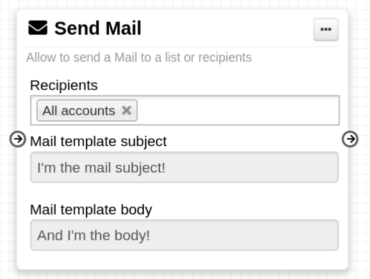


What kind of actions?

Actions

- Send an email notification
- Perform enrichments
- Send a chat message on MS Teams
- Attach a local tag
- ...

? These are also called **Action modules**


Send Mail

Allow to send a Mail to a list or recipients

Recipients: All accounts ×

Mail template subject: I'm the mail subject!

Mail template body: And I'm the body!

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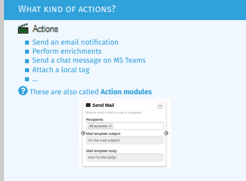
└What kind of actions?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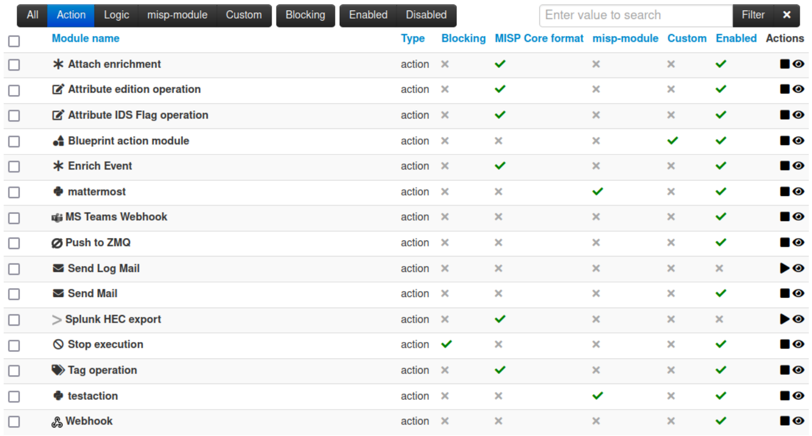
Workflow - Action modules

- action modules: Allow to executes operations
  - Tag operations
  - Send notifications
  - Webhooks & Custom scripts



All | Action | Logic | misp-module | Custom | Blocking | Enabled | Disabled | Enter value to search | Filter | ✕

□	Module name	Type	Blocking	MISP Core format	misp-module	Custom	Enabled	Actions
□	Attach enrichment	action	✗	✓	✗	✗	✓	■ 👁
□	Attribute edition operation	action	✗	✓	✗	✗	✓	■ 👁
□	Attribute IDS Flag operation	action	✗	✓	✗	✗	✓	■ 👁
□	Blueprint action module	action	✗	✗	✗	✓	✓	■ 👁
□	Enrich Event	action	✗	✓	✗	✗	✓	■ 👁
□	mattermost	action	✗	✗	✓	✗	✓	■ 👁
□	MS Teams Webhook	action	✗	✗	✗	✗	✓	■ 👁
□	Push to ZMQ	action	✗	✗	✗	✗	✓	■ 👁
□	Send Log Mail	action	✗	✗	✗	✗	✗	▶ 👁
□	Send Mail	action	✗	✗	✗	✗	✓	■ 👁
□	Splunk HEC export	action	✗	✓	✗	✗	✗	▶ 👁
□	Stop execution	action	✓	✗	✗	✗	✓	■ 👁
□	Tag operation	action	✗	✓	✗	✗	✓	■ 👁
□	testaction	action	✗	✗	✓	✗	✓	■ 👁
□	Webhook	action	✗	✗	✗	✗	✓	■ 👁

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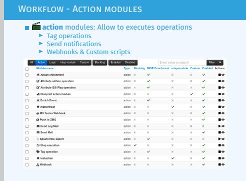
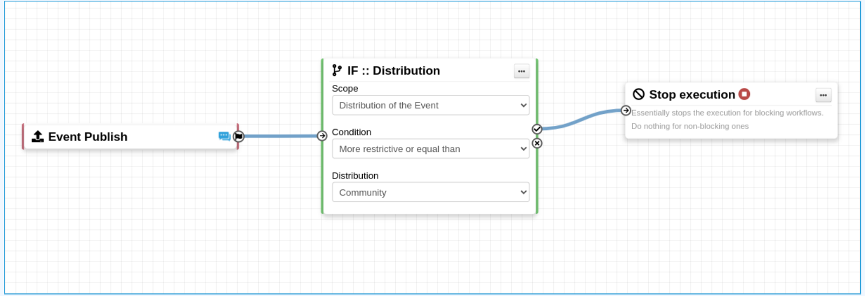


What is a MISP Workflow?

- Sequence of all nodes to be executed in a specific order
- Workflows can be enabled / disabled
- A Workflow is associated to **1-and-only-1 trigger**



Event Publish

IF :: Distribution

Scope: Distribution of the Event

Condition: More restrictive or equal than

Distribution: Community

Stop execution

Essentially stops the execution for blocking workflows.
Do nothing for non-blocking ones

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Automation in MISP

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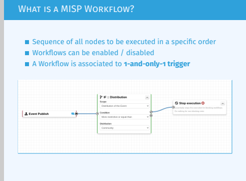

What is a MISP Workflow?

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Workflow execution for Event publish

An Event is about to be published

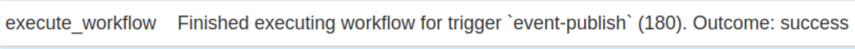
- The workflow for the `event-publish` trigger starts

Conditions are evaluated

- They might change the path taken during the execution

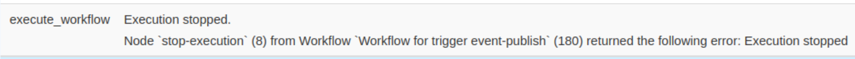
Actions are executed

- **success**: Continue the publishing action



```
execute_workflow    Finished executing workflow for trigger `event-publish` (180). Outcome: success
```

- **failure** | `blocked`: Stop publishing and log the reason



```
execute_workflow    Execution stopped.
                    Node `stop-execution` (8) from Workflow `Workflow for trigger event-publish` (180) returned the following error: Execution stopped
```

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└Workflow execution for Event publish

Workflow execution for Event publish
An Event is about to be published
The workflow for the event-publish trigger starts
Conditions are evaluated
They might change the path taken during the execution
Actions are executed
success: Continue the publishing action
failure | blocked: Stop publishing and log the reason

Blocking and non-blocking

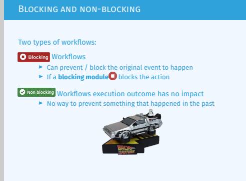
Two types of workflows:

⏹ Blocking Workflows

- Can prevent / block the original event to happen
- If a **blocking module** ⏹ blocks the action

✓ Non blocking Workflows execution outcome has no impact

- No way to prevent something that happened in the past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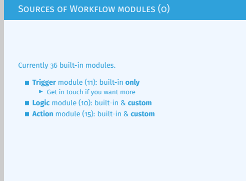
Sources of Workflow modules (o)

Currently 36 built-in modules.

- **Trigger** module (11): built-in **only**
  - Get in touch if you want more
- **Logic** module (10): built-in & **custom**
- **Action** module (15): built-in & **custom**



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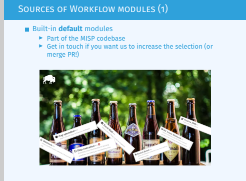
Sources of Workflow modules (1)

- Built-in **default** modules
  - Part of the MISP codebase
  - Get in touch if you want us to increase the selection (or merge PR!)

Tag operation v0.2
Add or remove tags on Event or Attributes.
Send Mail v0.1
Allow to send a Mail to a list or recipients
Push to ZMQ v0.1
Push to the ZMQ channel
MS Teams Webhook v0.2
Perform callbacks to the MS Teams webhook provided by the "Incoming Webhook" connector
Webhook v0.2
Allow to perform custom callbacks to the provided URL
Stop execution v0.1
Essentially stops the execution for blocking workflows. Do nothing for non-blocking ones
Enrich Event v0.1
Enrich all Attributes contained in the Event with the provided module.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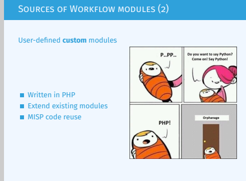
Sources of Workflow modules (2)

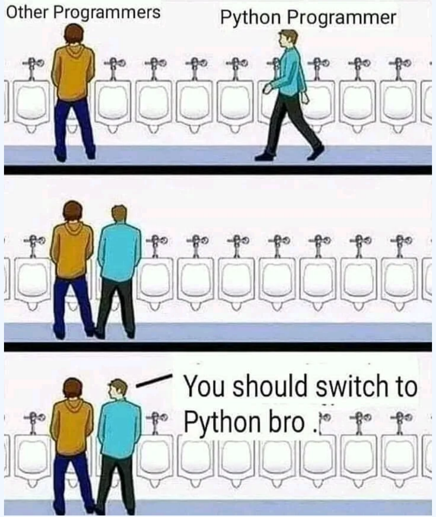
User-defined **custom** modules

- Written in PHP
- Extend existing modules
- MISP code reuse

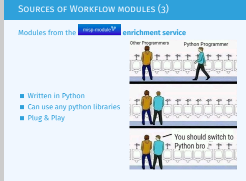

Sources of Workflow modules (2)
User-defined **custom** modules
- Written in PHP
- Extend existing modules
- MISP code reuse

Sources of Workflow modules (3)

Modules from the misp-module enrichment service



- Written in Python
- Can use any python libraries
- Plug & Play


Sources of Workflow modules (3)
Modules from the misp-module enrichment service
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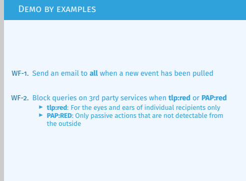
Can use any python libraries
Plug & Play

Demo by examples

WF-1. Send an email to **all** when a new event has been pulled

WF-2. Block queries on 3rd party services when **tlp:red** or **PAP:red**
- **tlp:red**: For the eyes and ears of individual recipients only
- **PAP:RED**: Only passive actions that are not detectable from the outside



Demo by examples

WF-1. Send an email to **all** when a new event has been pulled

WF-2. Block queries on 3rd party services when **tlp:red** or **PAP:red**
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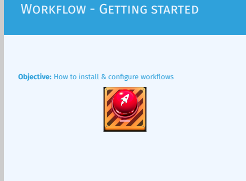
Workflow - Getting started

Objective: How to install & configure workflows

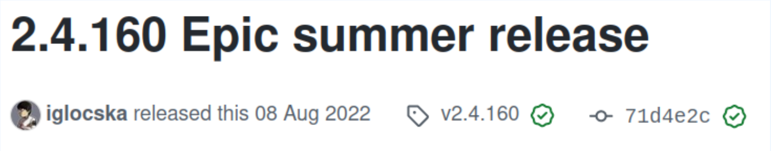
└Workflow - Getting started



Workflow - Getting started

Objective: How to install & configure workflows

Getting started with workflows (1)



2.4.160 Epic summer release

iglocska released this 08 Aug 2022 v2.4.160 ✓ 71d4e2c ✓

1. Update your MISP server
2. Update all your sub-modules

2024-05-09

Automation in MISP

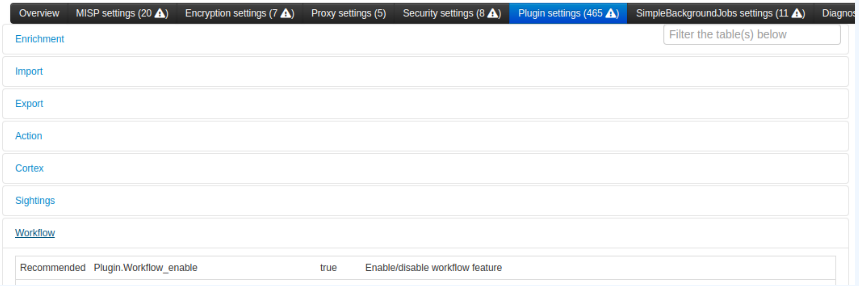
└─Getting started with workflows (1)

Getting started with workflows (1)
2.4.160 Epic summer release
iglocska released this 08 Aug 2022 v2.4.160 ✓ 71d4e2c ✓
1. Update your MISP server
2. Update all your sub-modules
Upgrades, people. Upgrades.

Getting started with workflows (2)

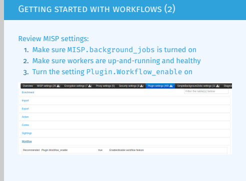
Review MISP settings:

1. Make sure `MISP.background_jobs` is turned on
2. Make sure workers are up-and-running and healthy
3. Turn the setting `Plugin.Workflow_enable` on



Recommended	Plugin.Workflow_enable	true	Enable/disable workflow feature

└─Getting started with workflows (2)



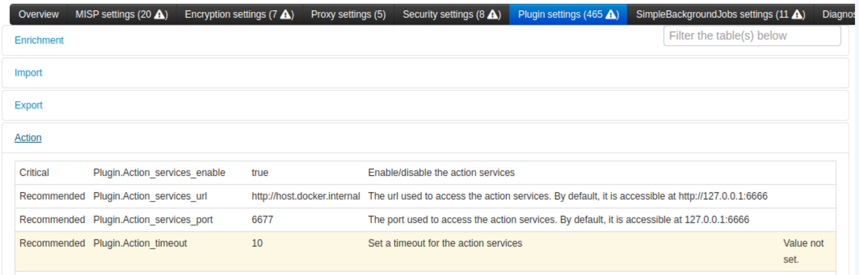
Getting started with workflows (2)

Review MISP settings:
1. Make sure MISP.background_jobs is turned on
2. Make sure workers are up-and-running and healthy
3. Turn the setting Plugin.Workflow_enable on

Getting started with workflows (3)

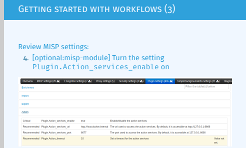
Review MISP settings:

4. [optional:misp-module] Turn the setting `Plugin.Action_services_enable` on



Critical	Plugin.Action_services_enable	true	Enable/disable the action services	
Recommended	Plugin.Action_services_url	http://host.docker.internal	The url used to access the action services. By default, it is accessible at http://127.0.0.1:6666	
Recommended	Plugin.Action_services_port	6677	The port used to access the action services. By default, it is accessible at 127.0.0.1:6666	
Recommended	Plugin.Action_timeout	10	Set a timeout for the action services	Value not set.

└─Getting started with workflows (3)

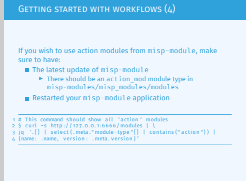


Getting started with workflows (4)

If you wish to use action modules from `misp-module`, make sure to have:

- The latest update of `misp-module`
    - There should be an `action_mod` module type in `misp-modules/misp_modules/modules`
- Restarted your `misp-module` application

```
# This command should show all ‘action‘ modules
$ curl -s http://127.0.0.1:6666/modules | \
jq '.[] | select(.meta."module-type"[] | contains("action")) |
{name: .name, version: .meta.version}'
```



Getting started with workflows (4)

If you wish to use action modules from misp-module, make sure to have:

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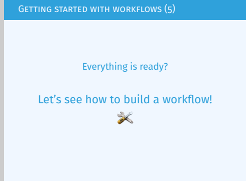
{name: .name, version: .meta.version}'
```

Getting started with workflows (5)

Everything is ready?

Let’s see how to build a workflow!

🛠



Getting started with workflows (5)

Everything is ready?

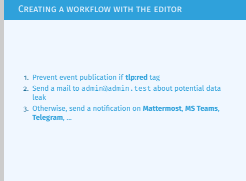
Let’s see how to build a workflow!

🛠

Creating a workflow with the editor

1. Prevent event publication if **tlp:red** tag
2. Send a mail to `admin@admin.test` about potential data leak
3. Otherwise, send a notification on **Mattermost**, **MS Teams**, **Telegram**, ...

└─Creating a workflow with the editor



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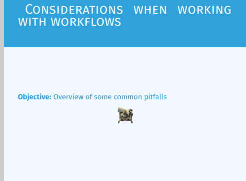
CONSIDERATIONS WHEN WORKING WITH WORKFLOWS

Objective: Overview of some common pitfalls

└Considerations when

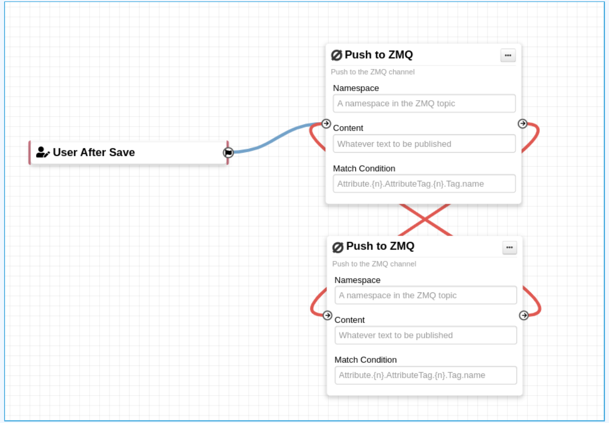


CONSIDERATIONS WHEN WORKING WITH WORKFLOWS

Objective: Overview of some common pitfalls

Working with the editor - Operations not allowed

Execution loop are not authorized



User After Save

Push to ZMQ

Push to the ZMQ channel

Namespace

A namespace in the ZMQ topic

Content

Whatever text to be published

Match Condition

Attribute.{n}.AttributeTag.{n}.Tag.name

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Push to the ZMQ channel

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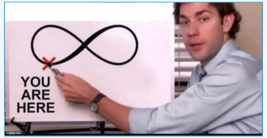

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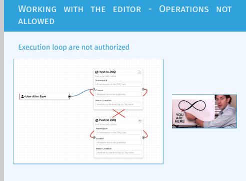
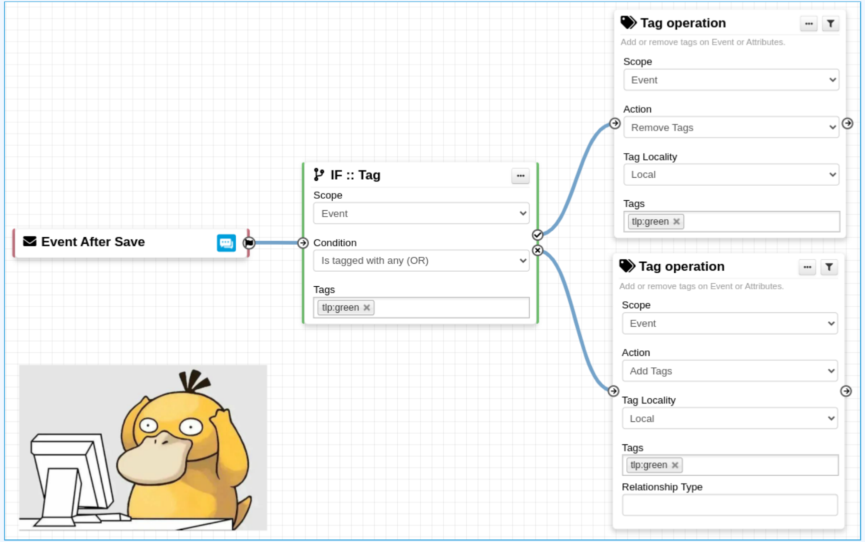
Automation in MISP

└Working with the editor - Operations not allowed



Recursive workflows



Event After Save

IF :: Tag

Scope: Event

Condition: Is tagged with any (OR)

Tags: tlp:green

Tag operation

Add or remove tags on Event or Attributes.

Scope: Event

Action: Remove Tags

Tag Locality: Local

Tags: tlp:green

Tag operation

Add or remove tags on Event or Attributes.

Scope: Event

Action: Add Tags

Tag Locality: Local

Tags: tlp:green

Relationship Type:

⚠Recursion: If an action re-run the workflow

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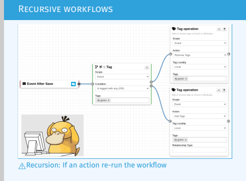
Automation in MISP

└─Recursive workflows

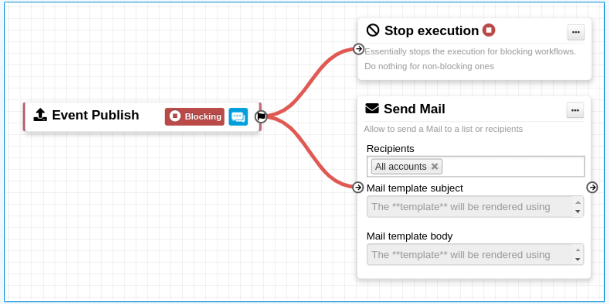


Recursive workflows

⚠Recursion: If an action re-run the workflow

Working with the editor - Operations not allowed

Multiple connections from the same output



Event Publish
Blocking

Stop execution
Essentially stops the execution for blocking workflows. Do nothing for non-blocking ones

Send Mail
Allow to send a Mail to a list or recipients

Recipients
All accounts ×

Mail template subject
The **template** will be rendered using

Mail template body
The **template** will be rendered using

- Execution order not guaranted
- Confusing for users

Automation in MISP

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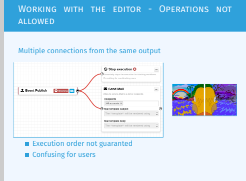
└─Working with the editor - Operations not allowed



Working with the editor - Operations not allowed

Multiple connections from the same output

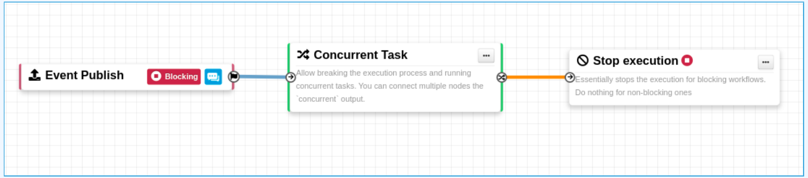
- Execution order not guaranted
- Confusing for users

Working with the editor

Cases showing a warning:

- **Blocking** modules ⏹ in a ✓ Non blocking workflow

- **Blocking** modules ⏹ after a **concurrent tasks** module



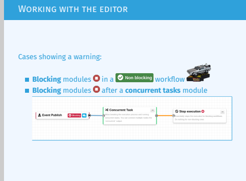
Event Publish ⏹ Blocking

Concurrent Task

Allow breaking the execution process and running concurrent tasks. You can connect multiple nodes the `concurrent` output.

Stop execution ⏹

Essentially stops the execution for blocking workflows. Do nothing for non-blocking ones



Working with the editor

Cases showing a warning:

- Blocking modules ⏹ in a ✓ Non blocking workflow
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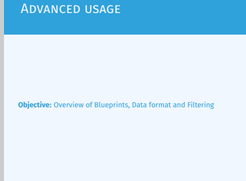
Advanced usage

Objective: Overview of Blueprints, Data format and Filtering

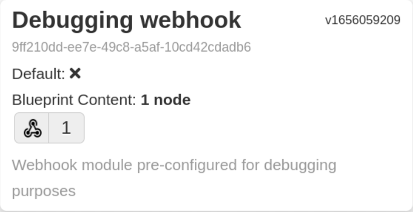


Advanced usage

Objective: Overview of Blueprints, Data format and Filtering

Workflow blueprints

1. Blueprints allow to **re-use parts** of a workflow in another one
2. Blueprints can be saved, exported and **shared**



Debugging webhook v1656059209

9ff210dd-ee7e-49c8-a5af-10cd42cdadb6

Default: ✗

Blueprint Content: **1 node**

1

Webhook module pre-configured for debugging purposes

Blueprints sources:

1. Created or imported by users
2. From the `MISP/misp-workflow-blueprints` repository[3]

[3] https://github.com/MISP/misp-workflow-blueprints

Workflow blueprints

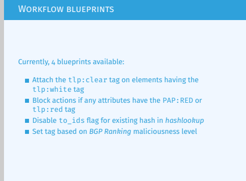
Currently, 4 blueprints available:

- Attach the `tlp:clear` tag on elements having the `tlp:white` tag
- Block actions if any attributes have the `PAP:RED` or `tlp:red` tag
- Disable `to_ids` flag for existing hash in *hashlookup*
- Set tag based on *BGP Ranking* maliciousness level

2024-05-09

Automation in MISP

└Workflow blueprints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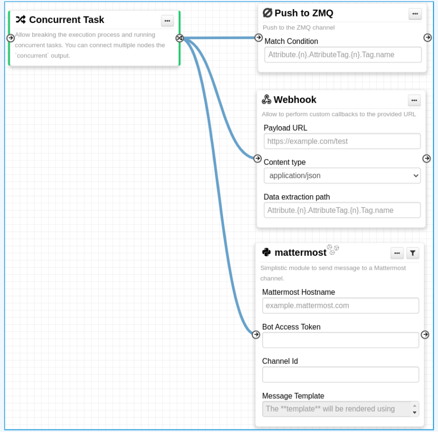
- Disable `to_ids` flag for existing hash in *hashlookup*
- Set tag based on *BGP Ranking* maliciousness level

Logic module: Concurrent Task

- Logic module allowing **multiple output** connections
- **Postpone the execution** for remaining modules
- Convert **Blocking** → **✓ Non blocking**



Concurrent Task

Allow breaking the execution process and running concurrent tasks. You can connect multiple nodes the `concurrent` output.

Push to ZMQ

Push to the ZMQ channel

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

Webhook

Allow to perform custom callbacks to the provided URL

Payload URL: https://example.com/test

Content type: application/json

Data extraction path: Attribute.{n}.AttributeTag.{n}.Tag.name

mattermost

Simplistic module to send message to a Mattermost channel.

Mattermost Hostname: example.mattermost.com

Bot Access Token

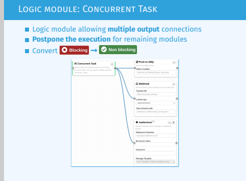
Channel Id

Message Template: The **template** will be rendered using

Automation in MISP

2024-05-09

└Logic module: Concurrent Task



Data format in Workflows

- In most cases, the format is the **MISP Core format**
  - Attributes are **always encapsulated** in the Event or Object
- But has **additional properties**
  - Additional key **`_AttributeFlattened`**
  - Additional key **`_allTags`**
  - Additional key **`inherited`** for Tags

Data format in Workflows

Event Publish Blocking

- In most cases, the format is the **MISP Core format**
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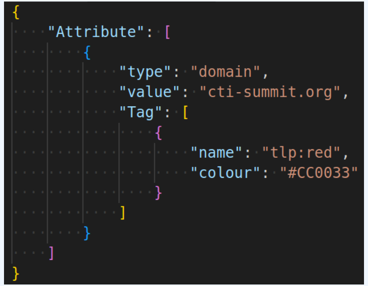
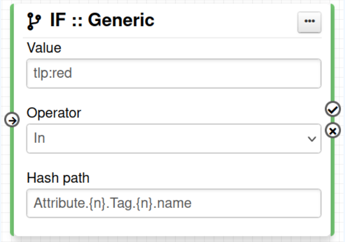
Hash path filtering (1)

Filtering and checking conditions using hash path expression.

```
$path_expression = '{n}[name=fred].id';
$users = [
    {'id': 123, 'name': 'fred', 'surname': 'bloggs'},
    {'id': 245, 'name': 'fred', 'surname': 'smith'},
    {'id': 356, 'name': 'joe', 'surname': 'smith'},
];
$ids = Hash::extract($users, $path_expression);
// => $ids will be [123, 245]
```



```
{
    "Attribute": [
        {
            "type": "domain",
            "value": "cti-summit.org",
            "Tag": [
                {
                    "name": "tlp:red",
                    "colour": "#CC0033"
                }
            ]
        }
    ]
}
```



IF :: Generic

Value: tlp:red

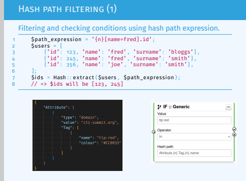
Operator: In

Hash path: Attribute.{n}.Tag.{n}.name

2024-05-09

Automation in MISP

└─Hash path filtering (1)



Hash path filtering (1)

Filtering and checking conditions using hash path expression.

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$ids = Hash::extract($users, $path_expression);
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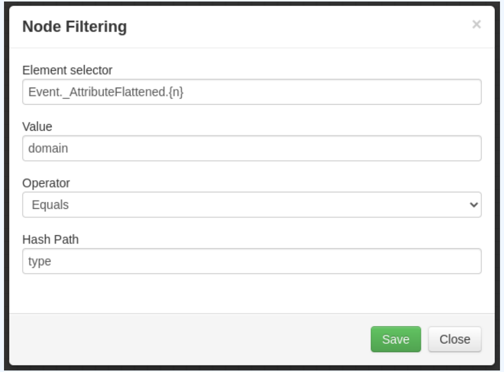
Hash path filtering (2)

Hash path filtering can be used to **filter** data **on the node** it is passed to or on the **execution path**.



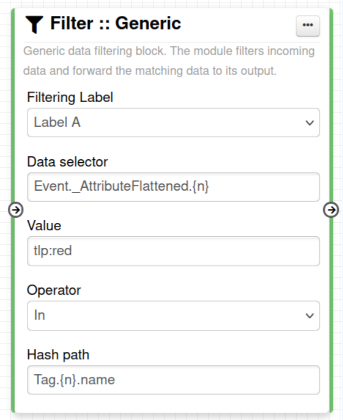
Node Filtering ×

Element selector: Event._AttributeFlattened.{n}

Value: domain

Operator: Equals

Hash Path: type



Filter :: Generic

Generic data filtering block. The module filters incoming data and forward the matching data to its output.

Filtering Label: Label A

Data selector: Event._AttributeFlattened.{n}

Value: tlp:red

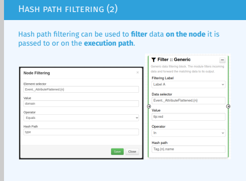
Operator: In

Hash path: Tag.{n}.name

2024-05-09

Automation in MISP

└Hash path filtering (2)



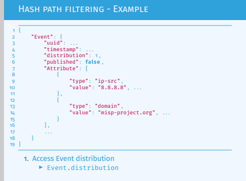
Hash path filtering (2)

Hash path filtering can be used to **filter** data **on the node** it is passed to or on the **execution path**.

Hash path filtering - Example

```
{
    "Event": {
        "uuid": ...
        "timestamp": ...
        "distribution": 1,
        "published": false ,
        "Attribute": [
            {
                "type": "ip-src",
                "value": "8.8.8.8", ...
            },
            {
                "type": "domain",
                "value": "misp-project.org", ...
            }
        ],
        ...
    }
}
```

1. Access Event distribution
   - `Event.distribution`



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1. Access Event distribution
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Hash path filtering - Exercise (1)

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            }
        ],
        ...
    }
}
```
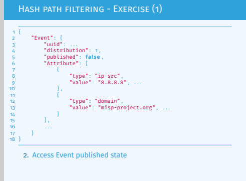

2. Access Event published state



Hash path filtering - Exercise (1)

2. Access Event published state

Hash path filtering - Exercise (1)

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        "published": false ,
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            {
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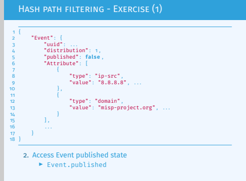
            }
        ],
        ...
    }
}
```

2. Access Event published state
   - `Event.published`



Hash path filtering - Exercise (1)

```
{
    "Event": {
        "uuid": ...
        "distribution": 1,
        "published": false ,
        "Attribute": [
            {
                "type": "ip-src",
                "value": "8.8.8.8", ...
            },
            {
                "type": "domain",
                "value": "misp-project.org", ...
            }
        ],
        ...
    }
}
```

2. Access Event published state
   - Event.published

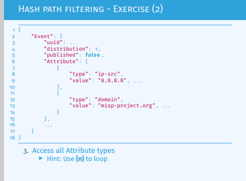
Hash path filtering - Exercise (2)

```
{
    "Event": {
        "uuid": ...
        "distribution": 1,
        "published": false ,
        "Attribute": [
            {
                "type": "ip-src",
                "value": "8.8.8.8", ...
            },
            {
                "type": "domain",
                "value": "misp-project.org", ...
            }
        ],
        ...
    }
}
```

3. Access all Attribute types
   - Hint: Use **{n}** to loop

Automation in MISP

└Hash path filtering - Exercise (2)



Hash path filtering - Exercise (2)

```
{
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        "uuid": ...
        "distribution": 1,
        "published": false ,
        "Attribute": [
            {
                "type": "ip-src",
                "value": "8.8.8.8", ...
            },
            {
                "type": "domain",
                "value": "misp-project.org", ...
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        ],
        ...
    }
}
```

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Hash path filtering - Exercise (2)

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    "Event": {
        "uuid": ...
        "distribution": 1,
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            {
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        ],
        ...
    }
}
```

3. Access all Attribute types
   - Hint: Use **{n}** to loop
   - `Event.Attribute.{n}.type`

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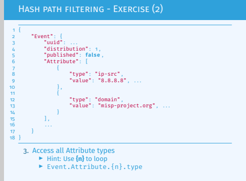
Automation in MISP

└─Hash path filtering - Exercise (2)



Hash path filtering - Exercise (2)

```
{
    "Event": {
        "uuid": ...
        "distribution": 1,
        "published": false,
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            {
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            },
            {
                "type": "domain",
                "value": "misp-project.org", ...
            }
        ],
        ...
    }
}
```

3. Access all Attribute types
   - Hint: Use {n} to loop
   - Event.Attribute.{n}.type

Hash path filtering - Exercise (3)

```
{
    "Event": {
        "Attribute": [
            {
                "type": "ip-src",
                "value": "8.8.8.8",
                "Tag": [
                    {
                        "name": "PAP:AMBER", ...
                    }
                ], ...
            }
        ],
        ...
    }
}
```

3. Access all Tags attached to Attributes

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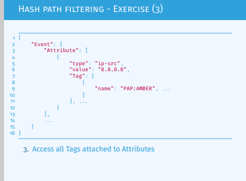
Automation in MISP

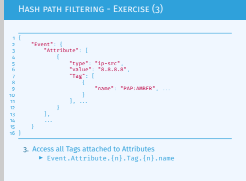
└Hash path filtering - Exercise (3)



Hash path filtering - Exercise (3)

```
{
    "Event": {
        "Attribute": [
            {
                "type": "ip-src",
                "value": "8.8.8.8",
                "Tag": [
                    {
                        "name": "PAP:AMBER", ...
                    }
                ], ...
            }
        ],
        ...
    }
}
```

3. Access all Tags attached to Attributes
   - `Event.Attribute.{n}.Tag.{n}.name`



Hash path filtering - Exercise (3)

```
{
    "Event": {
        "Attribute": [
            {
                "type": "ip-src",
                "value": "8.8.8.8",
                "Tag": [
                    {
                        "name": "PAP:AMBER", ...
                    }
                ], ...
            }
        ],
        ...
    }
}
```

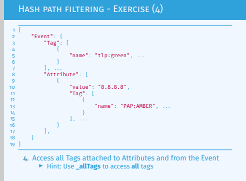
3. Access all Tags attached to Attributes
   - Event.Attribute.{n}.Tag.{n}.name

Hash path filtering - Exercise (4)

```
{
    "Event": {
        "Tag": [
            {
                "name": "tlp:green", ...
            }
        ], ...
        "Attribute": [
            {
                "value": "8.8.8.8",
                "Tag": [
                    {
                        "name": "PAP:AMBER", ...
                    }
                ], ...
            }
        ],
    }
}
```

4. Access all Tags attached to Attributes and from the Event
    - Hint: Use **_allTags** to access **all** tags

└Hash path filtering - Exercise (4)



Hash path filtering - Exercise (4)

```
{
    "Event": {
        "Tag": [
            {
                "name": "tlp:green", ...
            }
        ], ...
        "Attribute": [
            {
                "value": "8.8.8.8",
                "Tag": [
                    {
                        "name": "PAP:AMBER", ...
                    }
                ], ...
            }
        ],
    }
}
```

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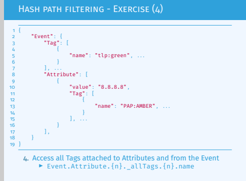
Hash path filtering - Exercise (4)

```
{
    "Event": {
        "Tag": [
            {
                "name": "tlp:green", ...
            }
        ], ...
        "Attribute": [
            {
                "value": "8.8.8.8",
                "Tag": [
                    {
                        "name": "PAP:AMBER", ...
                    }
                ], ...
            }
        ],
    }
}
```

4. Access all Tags attached to Attributes and from the Event
    - `Event.Attribute.{n}._allTags.{n}.name`



Hash path filtering - Exercise (4)

```
{
    "Event": {
        "Tag": [
            {
                "name": "tlp:green", ...
            }
        ], ...
        "Attribute": [
            {
                "value": "8.8.8.8",
                "Tag": [
                    {
                        "name": "PAP:AMBER", ...
                    }
                ], ...
            }
        ],
    }
}
```

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    - `Event.Attribute.{n}._allTags.{n}.name`

Hash path filtering - Exercise (4)

```
{
    "Event": {
        "Tag": [...],
        "Attribute": [
            {
                "value": "8.8.8.8",
                "_allTags": [
                    {
                        "name": "tlp:green",
                        "inherited": true, ...
                    },
                    {
                        "name": "PAP:AMBER",
                        "inherited": false, ...
                    }
                ],
            }
        ...
}
```

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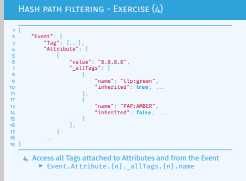
    - Event.Attribute.{n}._allTags.{n}.name



Hash path filtering - Exercise (4)

```
{
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        "Tag": [...],
        "Attribute": [
            {
                "value": "8.8.8.8",
                "_allTags": [
                    {
                        "name": "tlp:green",
                        "inherited": true, ...
                    },
                    {
                        "name": "PAP:AMBER",
                        "inherited": false, ...
                    }
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            }
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```

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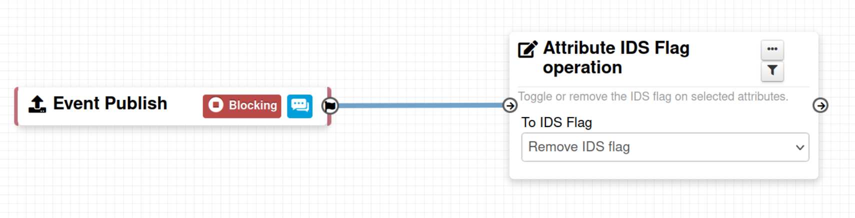
    - Event.Attribute.{n}._allTags.{n}.name

Fitlering data on which to apply a module

What happens when an Event is about to be published?

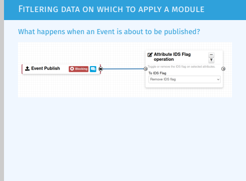


Event Publish | Blocking

Attribute IDS Flag operation

Toggle or remove the IDS flag on selected attributes.

To IDS Flag: Remove IDS flag



Fitlering data on which to apply a module

What happens when an Event is about to be published?

Fitlering data on which to apply a module

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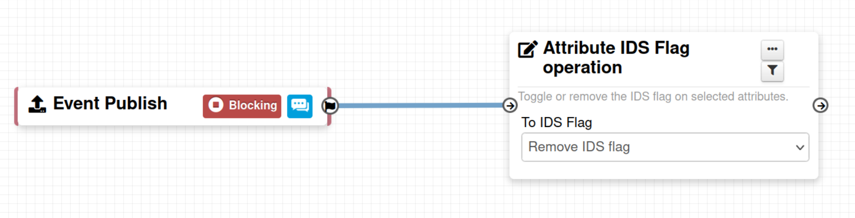


Attribute IDS Flag operation

Toggle or remove the IDS flag on selected attributes.

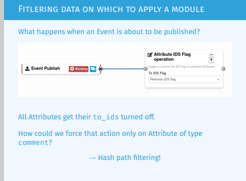
To IDS Flag

Remove IDS flag

All Attributes get their `to_ids` turned off.

How could we force that action only on Attribute of type `comment`?

→ Hash path filtering!


Fitlering data on which to apply a module

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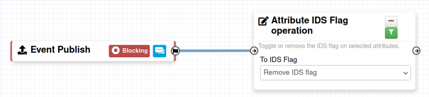
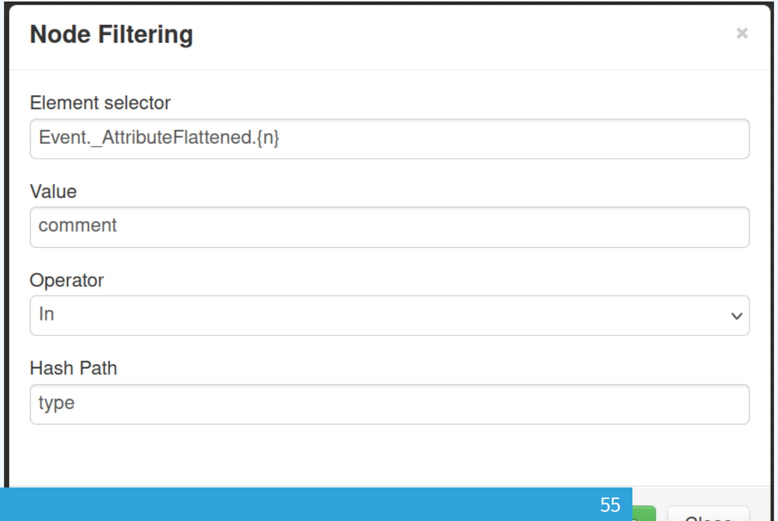
Fitlering data on which to apply a module



Toggle or remove the IDS flag on selected attributes.

To IDS Flag: Remove IDS flag



Node Filtering

Element selector: Event._AttributeFlattened.{n}

Value: comment

Operator: In

Hash Path: type

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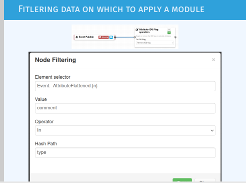
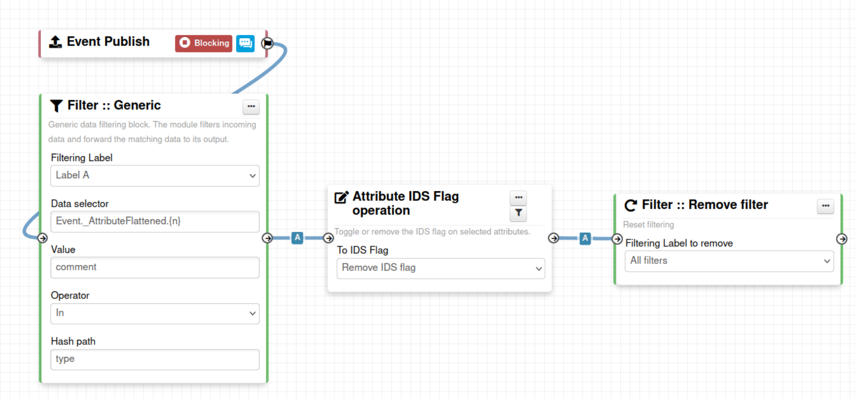
└─Fitlering data on which to apply a module



Fitlering data on which to apply on multiple modules

New feature as of **v2.4.171** allows setting filters on a path.



Event Publish — Blocking

Filter :: Generic

Generic data filtering block. The module filters incoming data and forward the matching data to its output.

Filtering Label: Label A

Data selector: Event._AttributeFlattened.{n}

Value: comment

Operator: In

Hash path: type

Attribute IDS Flag operation

Toggle or remove the IDS flag on selected attributes.

To IDS Flag: Remove IDS flag

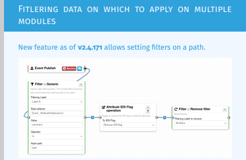
Filter :: Remove filter

Reset filtering

Filtering Label to remove: All filters

Automation in MISP

└Fitlering data on which to apply on multiple modules



Fitlering data on which to apply on multiple modules

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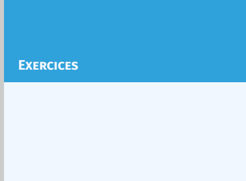
Exercices

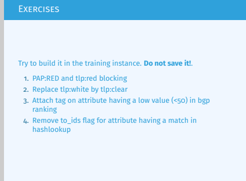


Exercices

Exercises

Try to build it in the training instance. **Do not save it!**.

1. PAP:RED and tlp:red blocking
2. Replace tlp:white by tlp:clear
3. Attach tag on attribute having a low value (<50) in bgp ranking
4. Remove to_ids flag for attribute having a match in hashlookup



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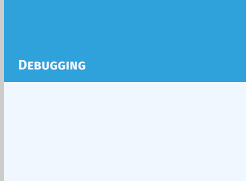
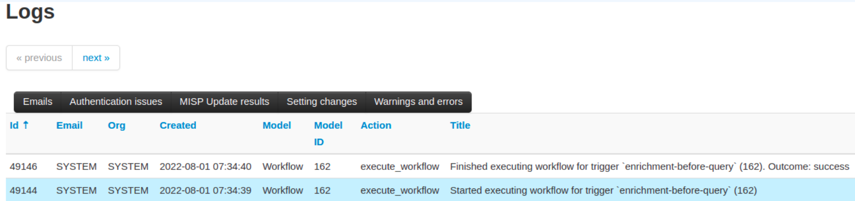
Debugging



Debugging

Debugging Workflows: Log Entries

- Workflow execution is logged in the application logs:
  - `/admin/logs/index`
  - Note: Might be phased out as its too verbose
- Or stored on disk in the following file:
  - `/app/tmp/logs/workflow-execution.log`



Logs

Id ↑	Email	Org	Created	Model	Model ID	Action	Title
49146	SYSTEM	SYSTEM	2022-08-01 07:34:40	Workflow	162	execute_workflow	Finished executing workflow for trigger `enrichment-before-query` (162). Outcome: success
49144	SYSTEM	SYSTEM	2022-08-01 07:34:39	Workflow	162	execute_workflow	Started executing workflow for trigger `enrichment-before-query` (162)

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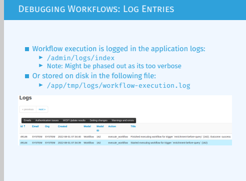
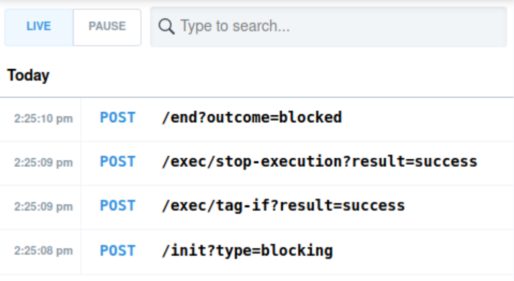
Automation in MISP
└─Debugging
└─Debugging Workflows: Log Entries



Debugging Workflows: Debug mode

- The Debug Mode: On can be turned on for each workflows
- Each nodes will send data to the provided URL
  - Configure the setting: `Plugin.Workflow_debug_url`
- Result can be visualized in
  - **offline**: `tools/misp-workflows/webhook-listener.py`
  - **online**: `requestbin.com` or similar websites



Today

```
2:25:10 pm   POST   /end?outcome=blocked
2:25:09 pm   POST   /exec/stop-execution?result=success
2:25:09 pm   POST   /exec/tag-if?result=success
2:25:08 pm   POST   /init?type=blocking
```

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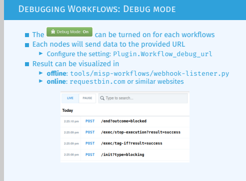
Automation in MISP
└─Debugging
 └─Debugging Workflows: Debug mode


Debugging Workflows: Debug mode

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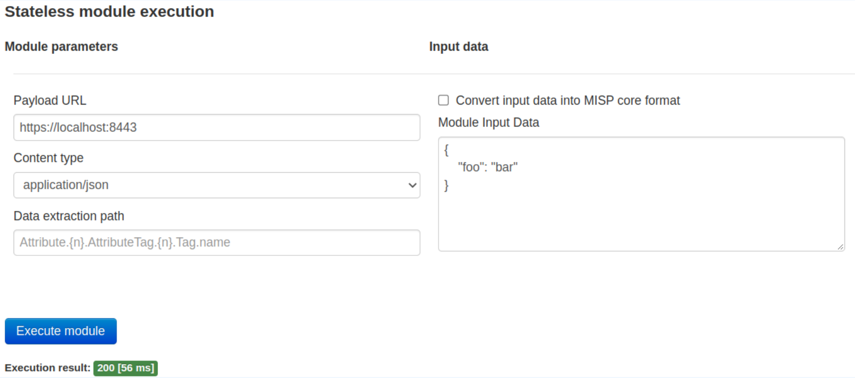
Debugging modules: Stateless execution

- Test custom modules with custom input



Stateless module execution

Module parameters

Payload URL: https://localhost:8443

Content type: application/json

Data extraction path: Attribute.{n}.AttributeTag.{n}.Tag.name

Input data

☐ Convert input data into MISP core format

Module Input Data

```
{
    "foo": "bar"
}
```

Execution result: 200 [56 ms]

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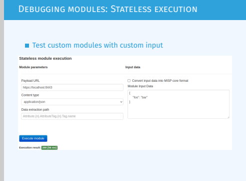
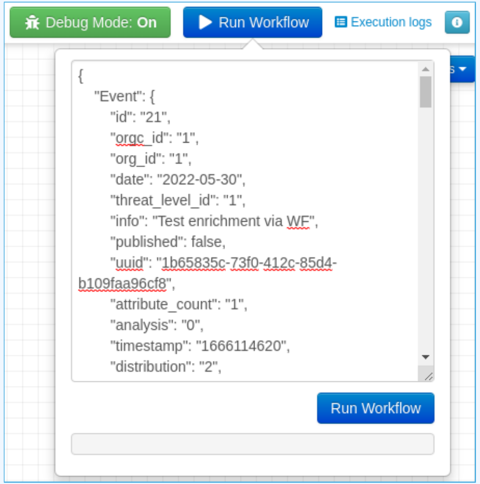
Automation in MISP
└Debugging
└Debugging modules: Stateless execution



Debugging modules: Re-running workflows

- Try workflows with custom input
- Re-run workflows to ease debugging



```
{
    "Event": {
        "id": "21",
        "orgc_id": "1",
        "org_id": "1",
        "date": "2022-05-30",
        "threat_level_id": "1",
        "info": "Test enrichment via WF",
        "published": false,
        "uuid": "1b65835c-73f0-412c-85d4-
b109faa96cf8",
        "attribute_count": "1",
        "analysis": "0",
        "timestamp": "1666114620",
        "distribution": "2",
```

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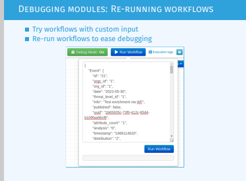
Automation in MISP
└─Debugging
└─Debugging modules: Re-running workflows


Debugging modules: Re-running workflows
- Try workflows with custom input
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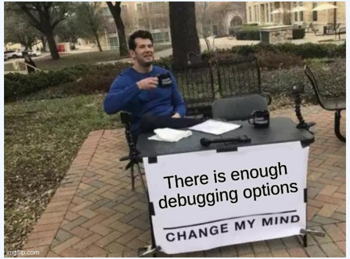
Debugging options

- Workflow **execution and outcome**
- Module **execution and outcome**
- **Live** workflow debugging with module inspection
- **Re-running/testing** workflows with custom data
- **Stateless** module execution



Debugging options

- Workflow **execution and outcome**
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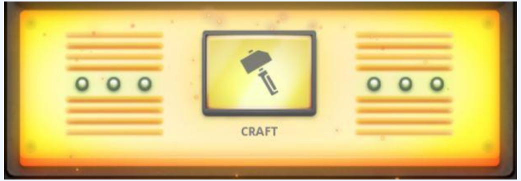
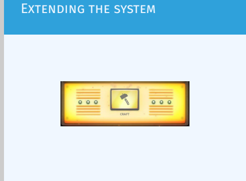
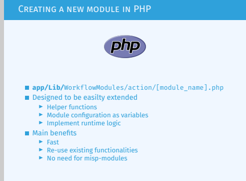
Extending the system




Extending the system

Creating a new module in PHP

- **app/Lib/**`WorkflowModules/action/[module_name].php`
- Designed to be easilty extended
  - Helper functions
  - Module configuration as variables
  - Implement runtime logic
- Main benefits
  - Fast
  - Re-use existing functionalities
  - No need for misp-modules



Creating a new module in PHP

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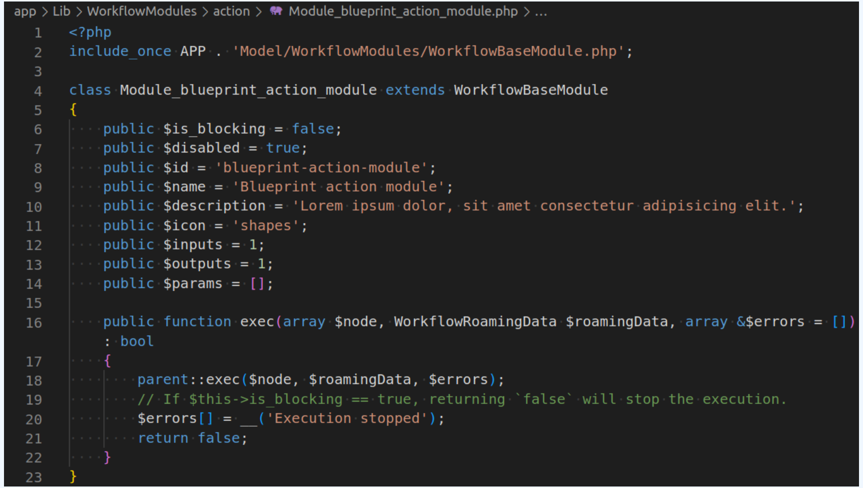

app > Lib > WorkflowModules > action > Module_blueprint_action_module.php > ...

```php
<?php
include_once APP . 'Model/WorkflowModules/WorkflowBaseModule.php';

class Module_blueprint_action_module extends WorkflowBaseModule
{
    public $is_blocking = false;
    public $disabled = true;
    public $id = 'blueprint-action-module';
    public $name = 'Blueprint action module';
    public $description = 'Lorem ipsum dolor, sit amet consectetur adipisicing elit.';
    public $icon = 'shapes';
    public $inputs = 1;
    public $outputs = 1;
    public $params = [];

    public function exec(array $node, WorkflowRoamingData $roamingData, array &$errors = []): bool
    {
        parent::exec($node, $roamingData, $errors);
        // If $this->is_blocking == true, returning `false` will stop the execution.
        $errors[] = __('Execution stopped');
        return false;
    }
}
```

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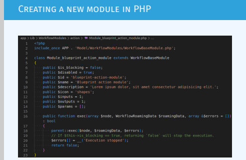
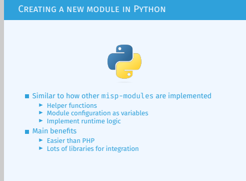
Automation in MISP
└Debugging
└Creating a new module in PHP



Creating a new module in Python

- Similar to how other `misp-modules` are implemented
  - Helper functions
  - Module configuration as variables
  - Implement runtime logic
- Main benefits
  - Easier than PHP
  - Lots of libraries for integration



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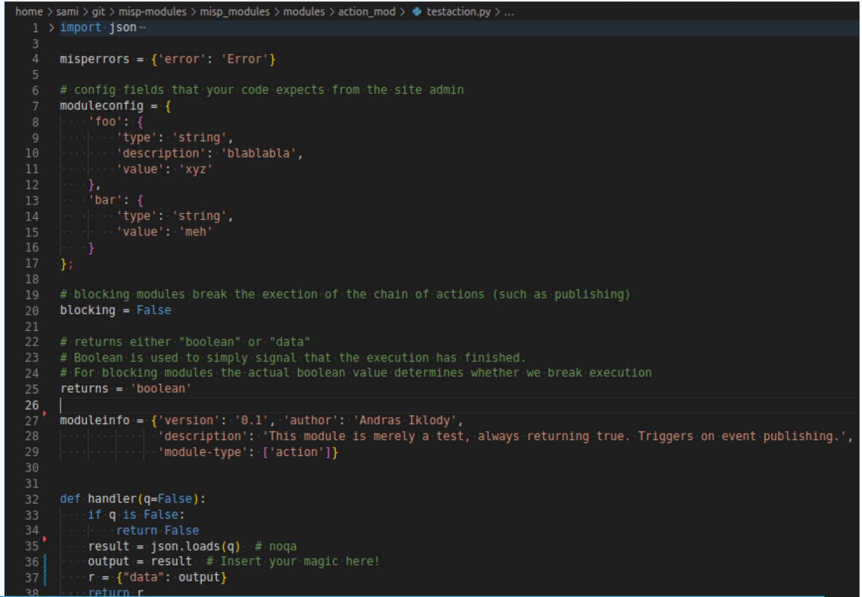
home > sami > git > misp-modules > misp_modules > modules > action_mod > testaction.py > ...

```python
import json

misperrors = {'error': 'Error'}

# config fields that your code expects from the site admin
moduleconfig = {
    'foo': {
        'type': 'string',
        'description': 'blablabla',
        'value': 'xyz'
    },
    'bar': {
        'type': 'string',
        'value': 'meh'
    }
};

# blocking modules break the exection of the chain of actions (such as publishing)
blocking = False

# returns either "boolean" or "data"
# Boolean is used to simply signal that the execution has finished.
# For blocking modules the actual boolean value determines whether we break execution
returns = 'boolean'

moduleinfo = {'version': '0.1', 'author': 'Andras Iklody',
              'description': 'This module is merely a test, always returning true. Triggers on event publishing.',
              'module-type': ['action']}


def handler(q=False):
    if q is False:
        return False
    result = json.loads(q)  # noqa
    output = result  # Insert your magic here!
    r = {"data": output}
    return r
```

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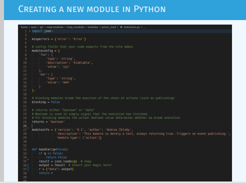
Automation in MISP
└─Debugging

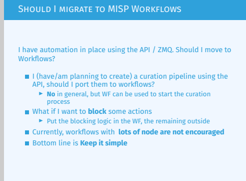
└─Creating a new module in Python



Should I migrate to MISP Workflows

I have automation in place using the API / ZMQ. Should I move to Workflows?

- I (have/am planning to create) a curation pipeline using the API, should I port them to workflows?
  - **No** in general, but WF can be used to start the curation process
- What if I want to **block** some actions
  - Put the blocking logic in the WF, the remaining outside
- Currently, workflows with **lots of node are not encouraged**
- Bottom line is **Keep it simple**



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Future works

- More 🎬 modules
- More ⇶ modules
- More 🚩 triggers
- More documentation
- Recursion prevention system
- On-the-fly data override?

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Automation in MISP
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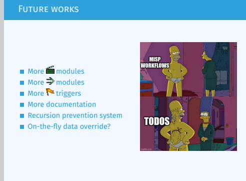
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Final words

- Designed to **quickly** and **cheaply** integrate MISP in CTI pipelines
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  - New modules?
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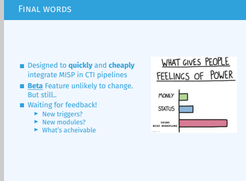
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