

# AUTOMATION WITH WORKFLOWS IN MISP

SHORT VERSION

SAMI MOKADDEM

MISP PROJECT

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



2024-04-15

Automation with Workflows in MISP

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## 1. Automation in MISP

## 2. MISP Workflows

- ▶ Fundamentals
- ▶ Demo with examples
- ▶ Using the system
- ▶ How it can be extended

### └ Content of the presentation

- 1. Automation in MISP
- 2. MISP Workflows
  - ▶ Fundamentals
  - ▶ Demo with examples
  - ▶ Using the system
  - ▶ How it can be extended



## 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
- Tougher to put in place & to share
- Full integration amounts to develop a new tool

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

### 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
    - Tougher to put in place & to share
    - Full integration amounts to develop a new tool
- No way to **prevent** behavior  
→ Difficult to setup **hooks** to execute callbacks



- **Visual** dataflow programming
- **Drag & Drop** editor
- Flexible **Plug & Play** system
- **Share** workflows, **debug** and **replay**

└ Simple automation in MISP made easy



- Visual dataflow programming
- Drag & Drop editor
- Flexible Plug & Play system
- Share workflows, debug and replay

- **Notification** on specific 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
  - ▶ Curation pipelines
- **Hook** capabilities
  - ▶ Assign tasks and notify incident response team members
- ...

### Example of use-cases

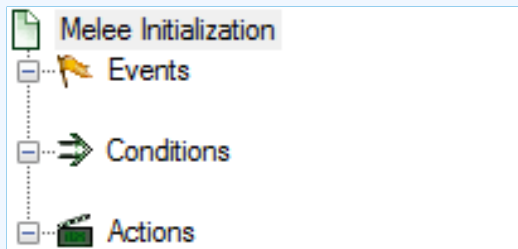
- **Notification** on specific actions
  - ▶ New events matching criteria
  - ▶ New users
  - ▶ Automated alerts for high-priority IOCs
- **Extend** existing MISP behavior
  - ▶ Push data to another system
  - ▶ Automatic enrichment
  - ▶ Sanity check to block publishing / sharing
  - ▶ Curation pipelines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

**Objective:** Start with the foundation to understand the basics



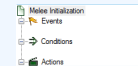
## Workflow - Fundamentals





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

└─ How does it work



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

## 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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└─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**



# TRIGGERS CURRENTLY AVAILABLE

Currently 11 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 log 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	110	×	✓	160	2023-09-14 06:54:37	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Enrichment Before Query	others	low	2226	✓	✓	162	2023-10-09 07:56:42	<input type="checkbox"/>	✓	▶ ⚡ 📄 🔍	
Event After Save	event	high	191	×	✓	175	2023-10-02 14:55:19	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Event After Save New	event	low	7	×	✓	182	2023-03-16 14:05:07	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Event After Save New From Pull	event	low	6	×	✓	183	2023-10-09 07:57:02	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Event Publish	event	low	2	✓	✓	188	2023-10-09 07:56:25	<input type="checkbox"/>	✓	▶ ⚡ 📄 🔍	
Log After Save	log	high	0	×	×	185	2023-06-05 13:26:50	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Object After Save	object	high	35	×	✓	161	2023-06-05 13:27:00	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Post After Save	post	low	36	×	×	176	2022-07-28 13:59:51	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
User After Save	user	low	0	×	×	181	2022-08-05 07:19:46	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
User Before Save	user	low	42	✓	×	158	2023-06-05 13:27:25	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	

Page 1 of 1, showing 1 records out of 11 total, starting on record 1, ending on 11

## Automation with Workflows in MISP

Triggers currently available

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### TRIGGERS CURRENTLY AVAILABLE

Currently 11 triggers can be hooked. 3 being Blocking.

Trigger name	Scope	Trigger overhead	Run counter	Blocking	Workflow	MISP Core format	Workflow ID	Last Update	Debug enabled	Enabled	Actions
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Event After Save New	event	low	7	×	✓	182	2023-03-16 14:05:07	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Event After Save New From Pull	event	low	6	×	✓	183	2023-10-09 07:57:02	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Event Publish	event	low	2	✓	✓	188	2023-10-09 07:56:25	<input type="checkbox"/>	✓	▶ ⚡ 📄 🔍	
Log After Save	log	high	0	×	×	185	2023-06-05 13:26:50	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Object After Save	object	high	35	×	✓	161	2023-06-05 13:27:00	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
Post After Save	post	low	36	×	×	176	2022-07-28 13:59:51	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	
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User Before Save	user	low	42	✓	×	158	2023-06-05 13:27:25	<input type="checkbox"/>	×	▶ ⚡ 📄 🔍	

# 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**

The screenshot shows the configuration for an 'IF :: Distribution' logic module. It has three main sections: 'Scope' with a dropdown menu set to 'Distribution of the Event', 'Condition' with a dropdown menu set to 'Is', and 'Distribution' with a dropdown menu set to 'Community'. There are small icons for adding, deleting, and refreshing the module.

# Automation with Workflows in MISP

└─What kind of conditions?

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The thumbnail slide contains the following text:  
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**  
Below the text is a small screenshot of the 'IF :: Distribution' logic module configuration, showing the 'Scope' dropdown set to 'Distribution of the Event', the 'Condition' dropdown set to 'Is', and the 'Distribution' dropdown set to 'Community'.

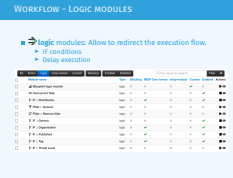
➡ **logic** modules: Allow to redirect the execution flow.

- ▶ IF conditions
- ▶ Delay execution

All	Action	Logic	misp-module	Custom	Blocking	Enabled	Disabled	Enter value to search	Filter	X
<input type="checkbox"/>	Module name	Type	Blocking	MISP Core format	misp-module	Custom	Enabled	Actions		
<input type="checkbox"/>	🏠 Blueprint logic module	logic	x	x	x	✓	x	▶👁		
<input type="checkbox"/>	🔄 Concurrent Task	logic	x	x	x	x	✓	■👁		
<input type="checkbox"/>	📊 IF :: Distribution	logic	x	✓	x	x	✓	■👁		
<input type="checkbox"/>	🔍 Filter :: Generic	logic	x	x	x	x	x	▶👁		
<input type="checkbox"/>	🗑 Filter :: Remove filter	logic	x	x	x	x	x	▶👁		
<input type="checkbox"/>	📊 IF :: Generic	logic	x	x	x	x	✓	■👁		
<input type="checkbox"/>	📊 IF :: Organisation	logic	x	✓	x	x	✓	■👁		
<input type="checkbox"/>	📊 IF :: Published	logic	x	✓	x	x	✓	■👁		
<input type="checkbox"/>	📊 IF :: Tag	logic	x	✓	x	x	✓	■👁		
<input type="checkbox"/>	📊 IF :: Threat Level	logic	x	x	x	x	x	▶👁		

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### Workflow - Logic modules

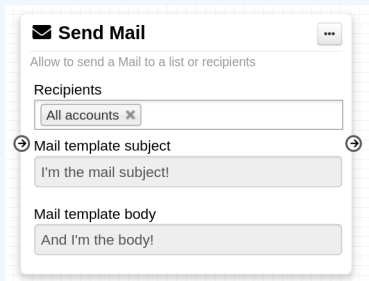


# WHAT KIND OF ACTIONS?

## 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!

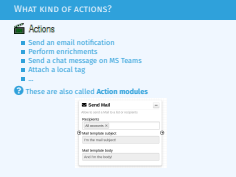
Mail template body

And I'm the body!

# Automation with Workflows in MISP

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└─What kind of actions?



## ■ 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	X
<input type="checkbox"/>	Module name	Type	Blocking	MISP	Core format	misp-module	Custom	Enabled	Actions	
<input type="checkbox"/>	* Attach enrichment	action	x	✓	x	x	✓	✓		
<input type="checkbox"/>	Attribute edition operation	action	x	✓	x	x	✓	✓		
<input type="checkbox"/>	Attribute IDS Flag operation	action	x	✓	x	x	✓	✓		
<input type="checkbox"/>	Blueprint action module	action	x	x	x	✓	✓	✓		
<input type="checkbox"/>	* Enrich Event	action	x	✓	x	x	✓	✓		
<input type="checkbox"/>	mattermost	action	x	x	✓	x	✓	✓		
<input type="checkbox"/>	MS Teams Webhook	action	x	x	x	x	✓	✓		
<input type="checkbox"/>	Push to ZMQ	action	x	x	x	x	✓	✓		
<input type="checkbox"/>	Send Log Mail	action	x	x	x	x	x	x		
<input type="checkbox"/>	Send Mail	action	x	x	x	x	✓	✓		
<input type="checkbox"/>	> Splunk HEC export	action	x	✓	x	x	x	x		
<input type="checkbox"/>	Stop execution	action	✓	x	x	x	✓	✓		
<input type="checkbox"/>	Tag operation	action	x	✓	x	x	✓	✓		
<input type="checkbox"/>	testaction	action	x	x	✓	x	✓	✓		
<input type="checkbox"/>	Webhook	action	x	x	x	x	✓	✓		

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## └ Workflow - Action modules

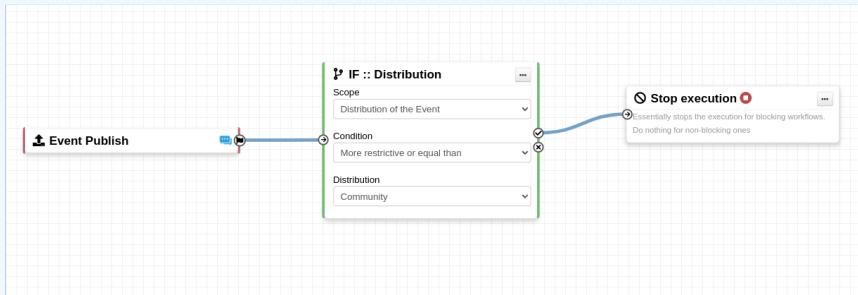
WORKFLOW - ACTION MODULES

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

Module name	Type	Blocking	Enabled	Disabled	Actions
Attach enrichment	action	x	✓	x	✓
Attribute edition operation	action	x	✓	x	✓
Attribute IDS Flag operation	action	x	✓	x	✓
Blueprint action module	action	x	x	x	✓
Enrich Event	action	x	✓	x	✓
mattermost	action	x	x	✓	✓
MS Teams Webhook	action	x	x	x	✓
Push to ZMQ	action	x	x	x	✓
Send Log Mail	action	x	x	x	x
Send Mail	action	x	x	x	✓
Splunk HEC export	action	x	✓	x	x
Stop execution	action	✓	x	x	✓
Tag operation	action	x	✓	x	✓
testaction	action	x	x	✓	✓
Webhook	action	x	x	x	✓

# 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**



## Automation with Workflows in MISP

└─What is a MISP Workflow?

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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**



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 (20): built-in & **custom**

### └ 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 (20): built-in & **custom**

# 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!)



# Automation with Workflows in MISP

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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!)





## User-defined **custom** modules

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




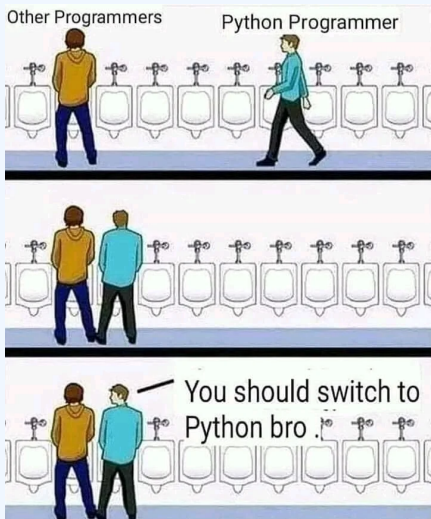
## Sources of Workflow modules (2)

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



# SOURCES OF WORKFLOW MODULES (3)

Modules from the **misp-module**  **enrichment service**

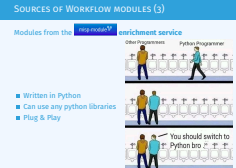


- Written in Python
- Can use any python libraries
- Plug & Play

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## Automation with Workflows in MISP

└ Sources of Workflow modules (3)



WF-1. Send an email to **all admins** 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

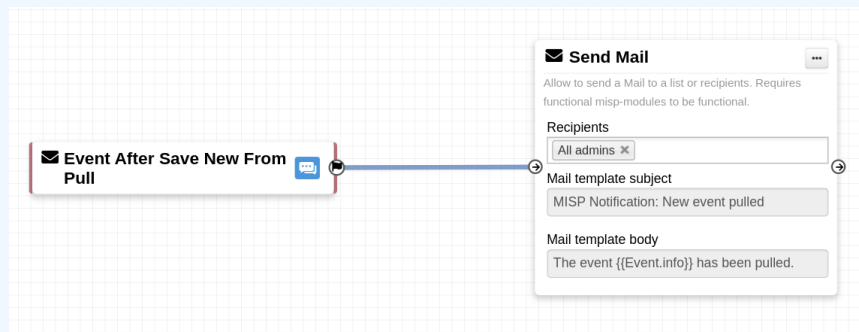
### └ Demo by examples

WF-1. Send an email to **all admins** 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 WF-1: SEND AN EMAIL TO **ALL ADMINS** WHEN A NEW EVENT HAS BEEN PULLED



## Automation with Workflows in MISP

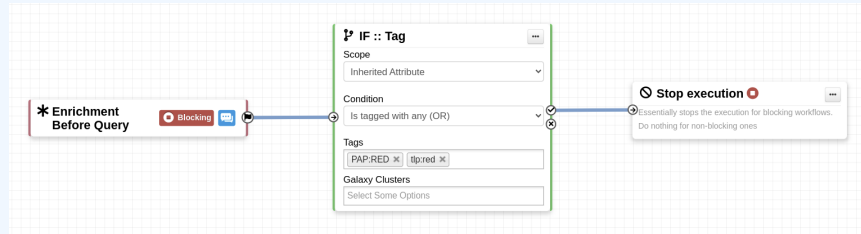
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└ Demo WF-1: Send an email to **all admins** when a new event has been pulled



# DEMO 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



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## Automation with Workflows in MISP

└ Demo 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



Everything is ready?

Let's see how to build a workflow!



Getting started with workflows

Everything is ready?

Let's see how to build a workflow!



1. Prevent event publication **if tlp:red** tag
  - ▶ Send a mail to `admin@admin.test` about potential data leak
2. **else**, send a notification on Mattermost

### └─ Creating a workflow with the editor

- CREATING A WORKFLOW WITH THE EDITOR
1. Prevent event publication **if tlp:red** tag
    - ▶ Send a mail to `admin@admin.test` about potential data leak
  2. **else**, send a notification on Mattermost

# CONSIDERATIONS WHEN WORKING WITH WORKFLOWS

**Objective:** Overview of some common pitfalls



Automation with Workflows in MISP

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## └ Considerations when

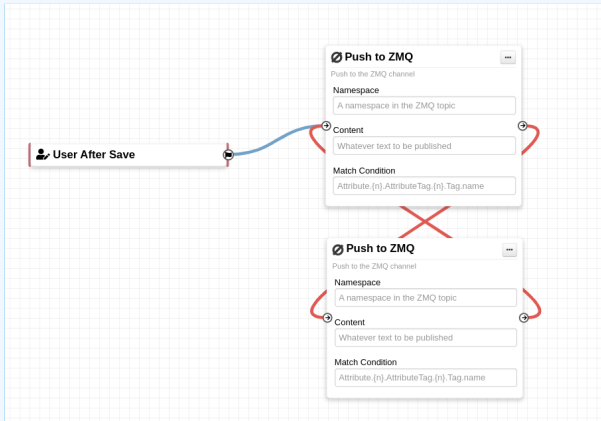
Objective: Overview of some common pitfalls





# WORKING WITH THE EDITOR - OPERATIONS NOT ALLOWED

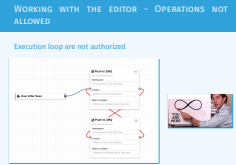
Execution loop are not authorized

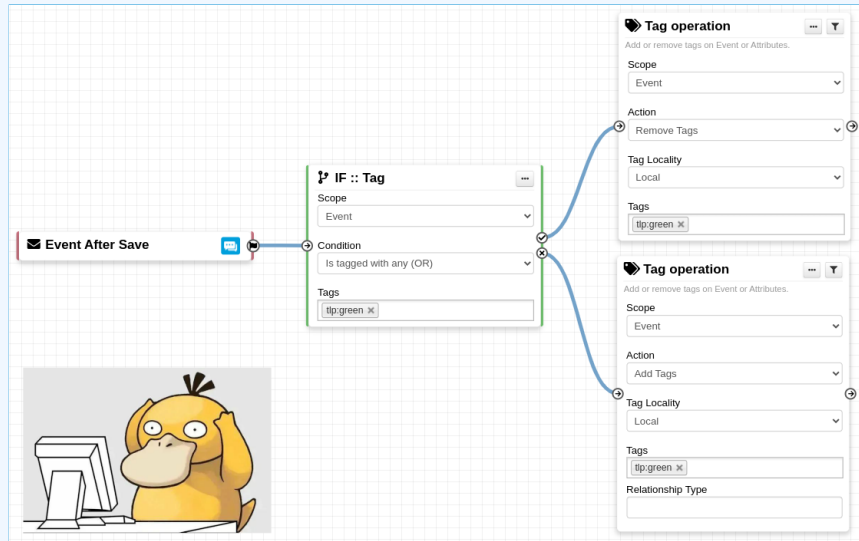


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## Automation with Workflows in MISP

Working with the editor - Operations not allowed





⚠ Recursion: If an action re-run the workflow

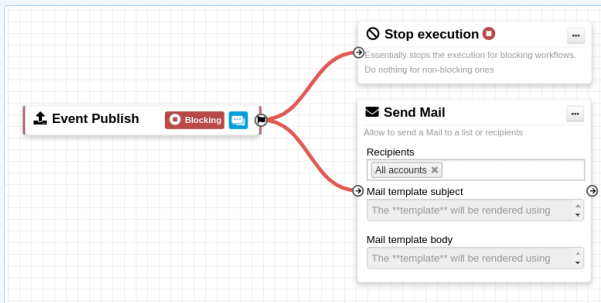
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└ Recursive workflows



# WORKING WITH THE EDITOR - OPERATIONS NOT ALLOWED

## Multiple connections from the same output



- Execution order not guaranteed
- Confusing for users

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## Automation with Workflows in MISP

Working with the editor - Operations not allowed



**Objective:** Overview of Blueprints, Data format and Filtering

## └ Advanced usage


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: [MISP/misp-workflow-blueprints repository](https://github.com/MISP/misp-workflow-blueprints)<sup>1</sup>

- Block actions if any attributes have the PAP:RED or tlp:red tag
- Curation pipeline
- Enrich data from 3rd-party

<sup>1</sup><https://github.com/MISP/misp-workflow-blueprints>

### Workflow blueprints

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



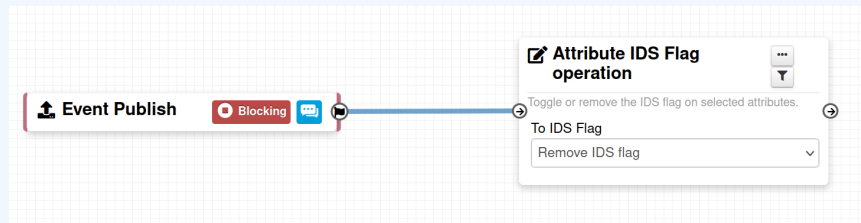
Blueprints sources: [MISP/misp-workflow-blueprints repository](https://github.com/MISP/misp-workflow-blueprints)<sup>1</sup>

- Block actions if any attributes have the PAP:RED or tlp:red tag
- Curation pipeline
- Enrich data from 3rd-party

<sup>1</sup><https://github.com/MISP/misp-workflow-blueprints>

# FITLERING DATA ON WHICH TO APPLY A MODULE

What is the outcome of executing this workflow?



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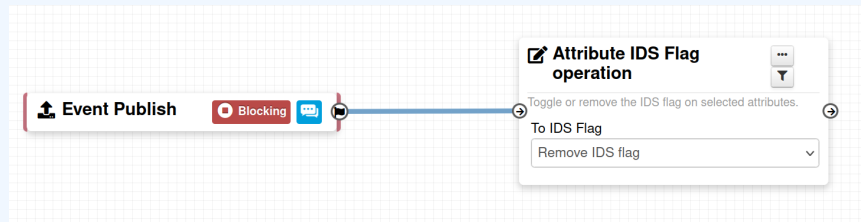
## Automation with Workflows in MISP

└─ Filtering data on which to apply a module



# FITLERING DATA ON WHICH TO APPLY A MODULE

What is the outcome of executing this workflow?



All Attributes get their to\_ids turned off.

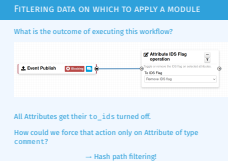
How could we force that action only on Attribute of type comment?

→ Hash path filtering!

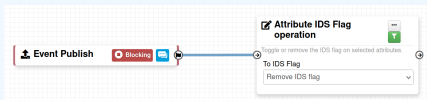
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## Automation with Workflows in MISP

↳ Filtering data on which to apply a module



# FITLERING DATA ON WHICH TO APPLY A MODULE



### Node Filtering

Element selector

Value

Operator

Hash Path

## Automation with Workflows in MISP

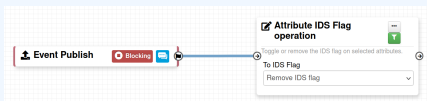
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Fitlering data on which to apply a module

A screenshot of the 'Node Filtering' configuration window in MISP. The fields are filled with the same values as in the previous image: Element selector: Event.\_AttributeFlattened.{n}, Value: comment, Operator: In, Hash Path: type.



# FITLERING DATA ON WHICH TO APPLY A MODULE



### Node Filtering

Select elements on which to apply the filtering

Element selector  
Event.\_AttributeFlattened.{n}

Value  
comment  
Fixed value

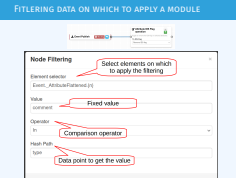
Operator  
In  
Comparison operator

Hash Path  
type  
Data point to get the value

## Automation with Workflows in MISP

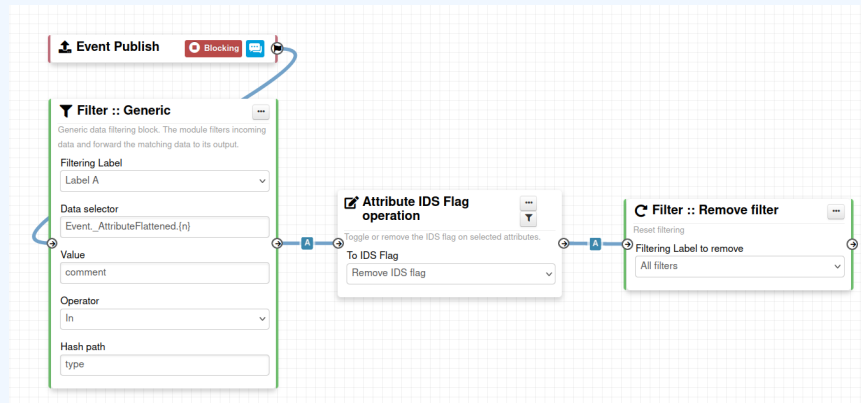
2024-04-15

Fitlering data on which to apply a module



# FILTERING DATA ON WHICH TO APPLY ON MULTIPLE MODULES

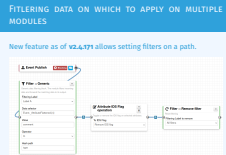
New feature as of **v2.4.171** allows setting filters on a path.



## Automation with Workflows in MISP

2024-04-15

└─ Filtering data on which to apply on multiple modules



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

- I have a curation pipeline using the API, should I port it to workflows?
  - ▶ **No** in general, but WF can be used to start the curation process or perform simple pre-processing
- What if I want to **block** some actions
  - ▶ Put the blocking logic in the WF, keep the remaining outside
- Bottom line is **Keep it simple** for you to maintain

└─ Should I migrate to MISP Workflows

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- More 📁 modules
- More ➡ modules
- More 🖱️ triggers
- Recursion prevention system



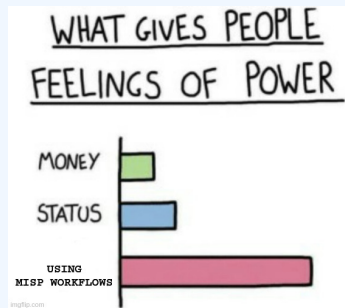
2024-04-15

└ Future works

- More 📁 modules
- More ➡ modules
- More 🖱️ triggers
- Recursion prevention system



- Designed to **quickly** and **cheaply** integrate MISP in CTI pipelines
- **Beta** Feature unlikely to change. But still..
- Waiting for feedback!
  - ▶ New triggers?
  - ▶ New modules?



2024-04-15

## Automation with Workflows in MISP

Final words

- Designed to **quickly** and **cheaply** integrate MISP in CTI pipelines
- **Beta** Feature unlikely to change. But still..
- Waiting for feedback!
  - ▶ New triggers?
  - ▶ New modules?

