

AUTOMATION WITH WORKFLOWS IN MISP

SHORT VERSION

SAMI MOKADDEM

MISP PROJECT

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



2024-09-11

Automation with Workflows in MISP

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

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Automation with Workflows in MISP

└ Content of the presentation

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

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

Automation with Workflows in MISP

└ 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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 - Full integration amounts to develop a new tool
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→ 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**

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

■ ...

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└ Example of use-cases

EXAMPLE OF USE-CASES

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WORKFLOW - FUNDAMENTALS

Objective: Start with the foundation to understand the basics



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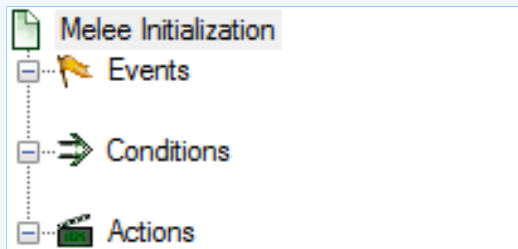
Workflow - Fundamentals

WORKFLOW - FUNDAMENTALS

Objective: Start with the foundation to understand the basics



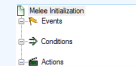
HOW DOES IT WORK



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

Automation with Workflows in MISP

└─ 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

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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└─What kind of events?

WHAT KIND OF EVENTS?

 Events

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- Attribute has been saved
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- ...

 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

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Triggers currently available

TRIGGERS CURRENTLY AVAILABLE

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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"/>	✓	■ ⚡ 📄 🔍
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Page 1 of 1, showing 1 records out of 11 total, starting on record 1, ending on 11

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 a configuration window for a logic module titled "IF :: Distribution". It contains three fields: "Scope" set to "Distribution of the Event", "Condition" set to "Is", and "Distribution" set to "Community". There are status icons on the right: a checkmark for the condition and a cross for the distribution field.

Automation with Workflows in MISP

└─What kind of conditions?

WHAT KIND OF CONDITIONS?

⇒ Conditions

- A MISP Event is tagged with `tlp:red`
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- The creator organisation is `circl.lu`
- Or any other **generic** conditions

These are also called **Logic modules**

The thumbnail shows the same configuration window as the main image, with "Scope" set to "Distribution of the Event", "Condition" set to "Is", and "Distribution" set to "Community".

WORKFLOW - LOGIC MODULES

■ ➡ **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	×
<input type="checkbox"/>	Module name		Type	Blocking	MISP Core format	misp-module	Custom	Enabled	Actions	
<input type="checkbox"/>	🏗️ Blueprint logic module		logic	×	×	×	✓	×	▶ 🔍	
<input type="checkbox"/>	⚡ Concurrent Task		logic	×	×	×	×	✓	■ 🔍	
<input type="checkbox"/>	🔗 IF :: Distribution		logic	×	✓	×	×	✓	■ 🔍	
<input type="checkbox"/>	🔗 Filter :: Generic		logic	×	×	×	×	×	▶ 🔍	
<input type="checkbox"/>	🔗 Filter :: Remove filter		logic	×	×	×	×	×	▶ 🔍	
<input type="checkbox"/>	🔗 IF :: Generic		logic	×	×	×	×	✓	■ 🔍	
<input type="checkbox"/>	🔗 IF :: Organisation		logic	×	✓	×	×	✓	■ 🔍	
<input type="checkbox"/>	🔗 IF :: Published		logic	×	✓	×	×	✓	■ 🔍	
<input type="checkbox"/>	🔗 IF :: Tag		logic	×	✓	×	×	✓	■ 🔍	
<input type="checkbox"/>	🔗 IF :: Threat Level		logic	×	×	×	×	×	▶ 🔍	

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Automation with Workflows in MISP

Workflow - Logic modules

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	Disabled	Clear search icon			
🏗️ 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

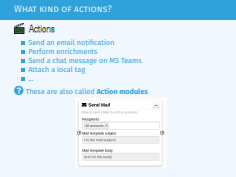
- Send an email notification
- Perform enrichments
- Send a chat message on MS Teams
- Attach a local tag
- ...

? These are also called **Action modules**

The screenshot shows the 'Send Mail' action module configuration. It has a title bar with an envelope icon and the text 'Send Mail'. Below the title bar, it says 'Allow to send a Mail to a list or recipients'. There are three main sections: 'Recipients' with a dropdown menu showing 'All accounts', 'Mail template subject' with a text input field containing 'I'm the mail subject!', and 'Mail template body' with a text input field containing 'And I'm the body!'. Each section has a circular arrow icon on its right side.

Automation with Workflows in MISP

└─What kind of actions?



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	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	▶	👁
<input type="checkbox"/>	✉ Send Mail	action	X	X		X	X	✓	■	👁
<input type="checkbox"/>	> Splunk HEC export	action	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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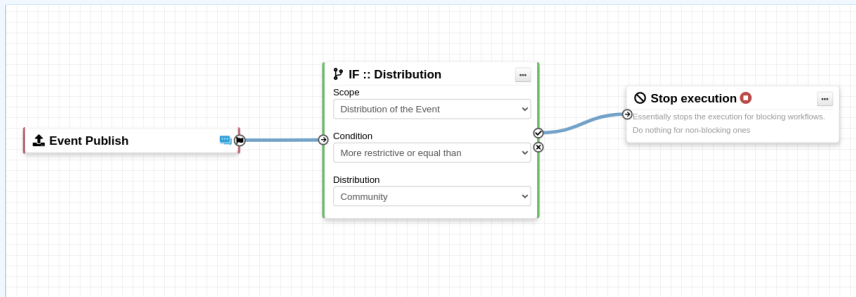
Automation with Workflows in MISP

└ Workflow - Action modules

Workflow - ACTION MODULES									
■ action modules: Allow to executes operations									
▶ Tag operations									
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▶ Webhooks & Custom scripts									
ID	Name	Type	Blocking	MISP	Core format	misp-module	Custom	Enabled	Actions
1	Attach enrichment	action	X	✓		X	X	✓	■
2	Attribute edition operation	action	X	✓		X	X	✓	■
3	Attribute IDS Flag operation	action	X	✓		X	X	✓	■
4	Blueprint action module	action	X	X		X	✓	✓	■
5	Enrich Event	action	X	✓		X	X	✓	■
6	mattermost	action	X	X		✓	X	✓	■
7	MS Teams Webhook	action	X	X		X	X	✓	■
8	Push to ZMQ	action	X	X		X	X	✓	■
9	Send Log Mail	action	X	X		X	X	X	▶
10	Send Mail	action	X	X		X	X	✓	■
11	Splunk HEC export	action	X	✓		X	X	X	▶
12	Stop execution	action	✓	X		X	X	✓	■
13	Tag operation	action	X	✓		X	X	✓	■
14	testaction	action	X	X		✓	X	✓	■
15	Webhook	action	X	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?

- 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**



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**

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Automation with Workflows in MISP

└ Sources of Workflow modules (o)

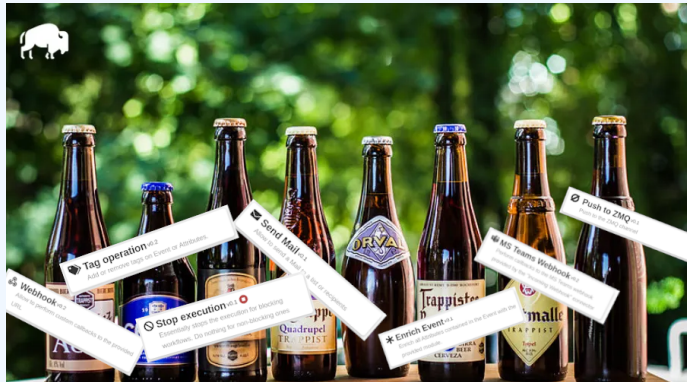
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- **Action** module (20): built-in & **custom**

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

└ 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!)



SOURCES OF WORKFLOW MODULES (2)

User-defined **custom** modules

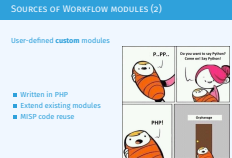
- Written in PHP
- Extend existing modules
- MISP code reuse



Automation with Workflows in MISP

└ Sources of Workflow modules (2)

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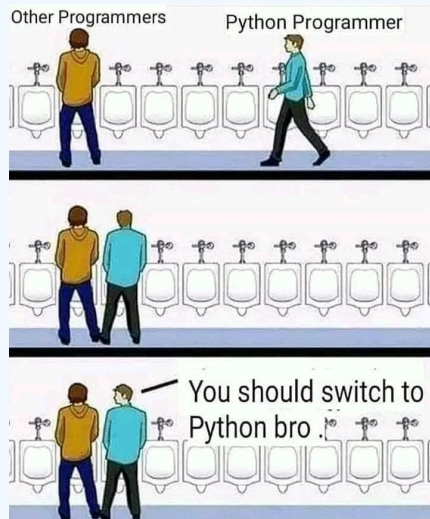


SOURCES OF WORKFLOW MODULES (3)

Modules from the

misp-module

enrichment service

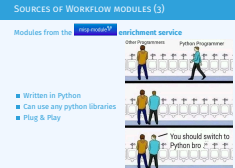


- Written in Python
- Can use any python libraries
- Plug & Play

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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

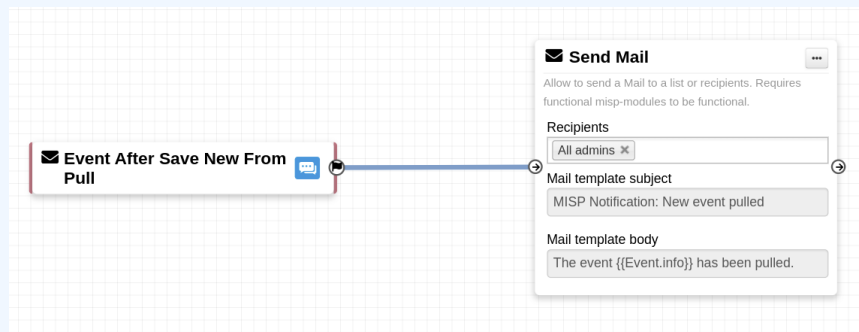
└ Demo by examples

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
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DEMO WF-1: SEND AN EMAIL TO **ALL ADMINS** WHEN A NEW EVENT HAS BEEN PULLED



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Automation with Workflows in MISP

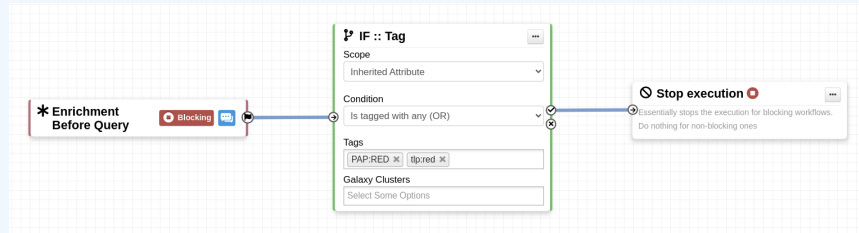
└ Demo WF-1: Send an email to **all admins** when a new event has been pulled

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



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

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



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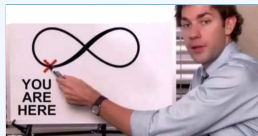
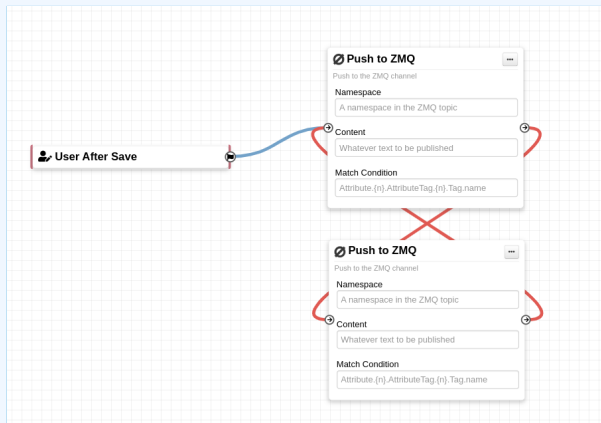
└ Considerations when

Objective: Overview of some common pitfalls



WORKING WITH THE EDITOR - OPERATIONS NOT ALLOWED

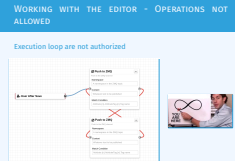
Execution loop are not authorized



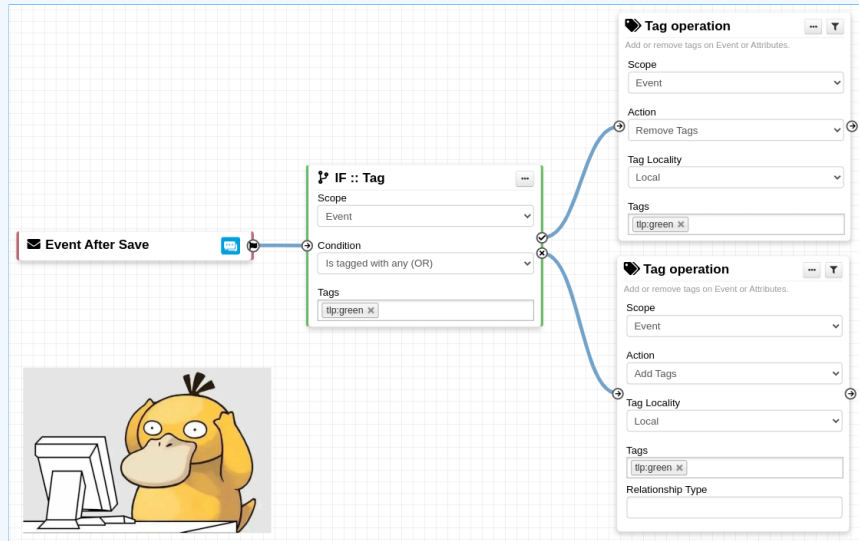
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Working with the editor - Operations not allowed

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RECURSIVE WORKFLOWS



⚠ Recursion: If an action re-run the workflow

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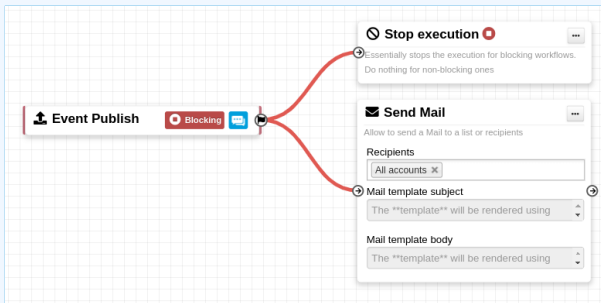
Automation with Workflows in MISP

└ 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



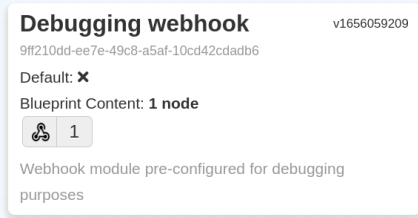
- Execution order not guaranteed
- Confusing for users

Objective: Overview of Blueprints, Data format and Filtering

└ Advanced usage

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)¹

- Block actions if any attributes have the `PAP:RED` or `t1p:red` tag
- Curation pipeline
- Enrich data from 3rd-party

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

Automation with Workflows in MISP

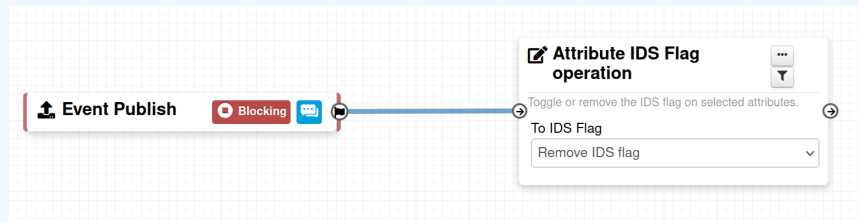
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Workflow blueprints



FITLERING DATA ON WHICH TO APPLY A MODULE

What is the outcome of executing this workflow?



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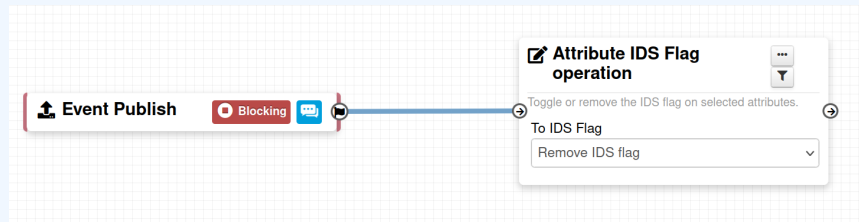
Automation with Workflows in MISP

└─ Fitlering 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.

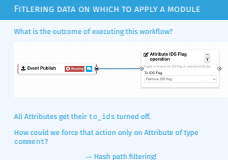
How could we force that action only on Attribute of type comment?

→ Hash path filtering!

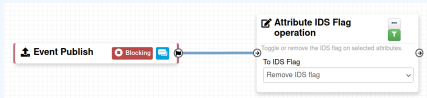
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Automation with Workflows in MISP

└ Fitlering data on which to apply a module



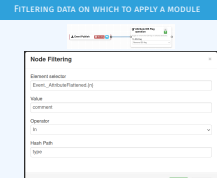
FITLERING DATA ON WHICH TO APPLY A MODULE



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Automation with Workflows in MISP

└ Fitlring data on which to apply a module



Node Filtering

Element selector

Event._AttributeFlattened.{n}

Value

comment

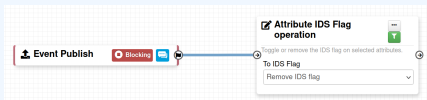
Operator

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

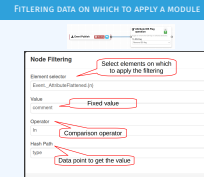
Hash Path

type

Data point to get the value

Automation with Workflows in MISP

Fitlering data on which to apply a module



SHOULD I MIGRATE TO MISP WORKFLOWS

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

Automation with Workflows in MISP

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- More 🎬 modules
- More ➡ modules
- More 🦊 triggers
- Recursion prevention system



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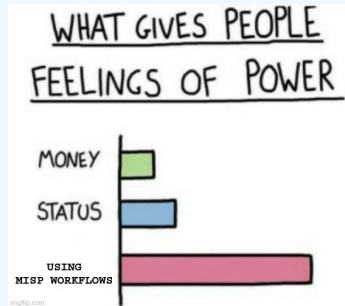
Automation with Workflows in MISP

└ 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?



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Automation with Workflows in MISP

Final words

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

