sekoia

# Meshroom
# The cybersecurity mesh assistant

#OXA-granted-project #opensource #opencyberalliance

David Bizeul
Jérôme Fellus

# All-in-one platform
# *vs* Cybersecurity Mesh architecture

## All-in-one

- Unified operation model
- Unified UI/UX

- Captive Silo
- Expensive non-modular licensing
- Full replacement of existing stack
- Can’t cherry-pick functionalities

- Can’t be good at everything…

## CSMA

- Favor interoperability
- Adapt & extend existing stack
- Do one job, do it right
- Focused expertise

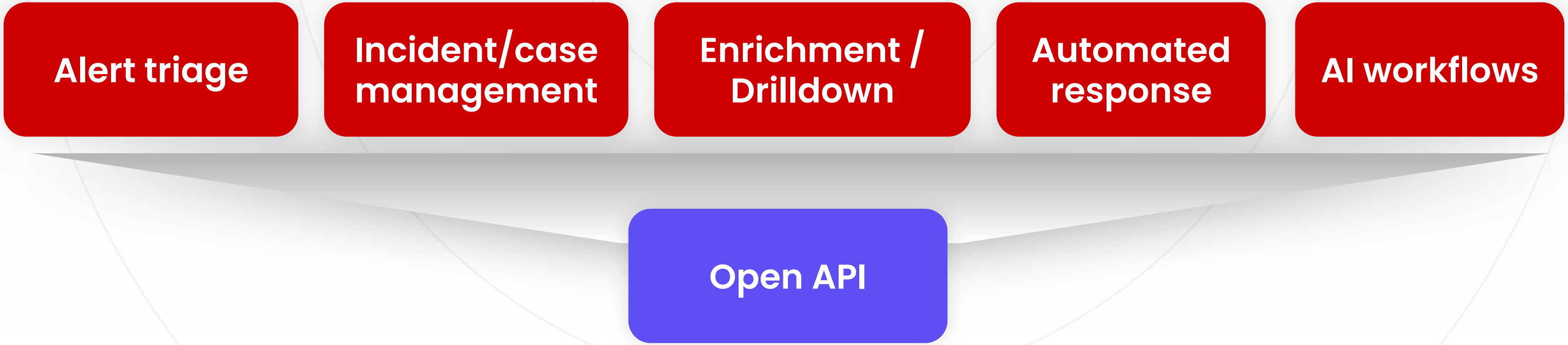
- Need vendors cooperation
- Integration development burden
- Scattered SOC configuration

# Challenge : Standards adoption in security operations

## Some cybersecurity operations have found their standard

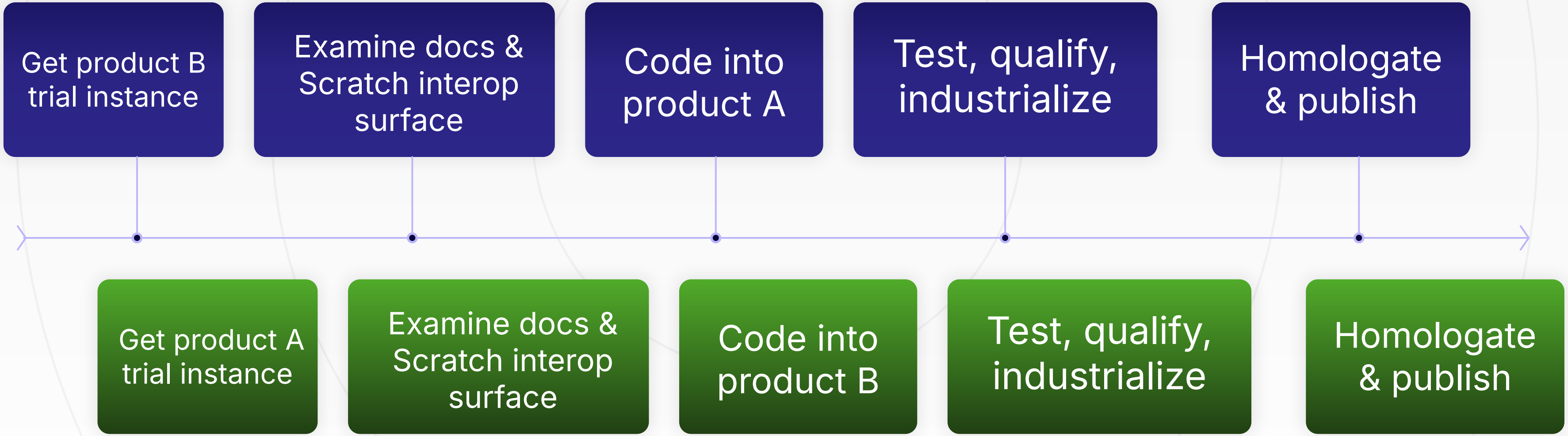
| | |
|---|---|
| Threat intelligence | STIX |
| Detection rules | SIGMA |
| Security events | ECS, OCSF |

## Others remain mostly vendor-specific



# The N-to-N integrations curse

Product A



Get product B trial instance

Examine docs & Scratch interop surface

Code into product A

Test, qualify, industrialize

Homologate & publish

Get product A trial instance

Examine docs & Scratch interop surface

Code into product B

Test, qualify, industrialize

Homologate & publish

Product B

# Building a mesh is …

Cumbersome for vendors

Tedious for integrators

Unmanageable for devsec operators

Uncertain for buyers & end users

★ Our contribution : an opensource assistant to compose cybersecurity meshes

# Compose…

**Containerized stacks**
docker compose up

**Infrastructure-as-a-Service**
terraform apply

**Provisioning**
ansible-playbook

**Cybersecurity Mesh**
📢 meshroom up !

# Scope

- ❏ Remotely operate your products via their API
- ❏ Securely store tenant credentials
- ❏ Declarative mesh definition
- ❏ Share mesh via git

# Out-of-scope

- ❏ No builtin data store, nor queuing or processing
- ❏ Unopinionated data/remote call format & protocol
- ❏ No mesh-level user management

# Assisted mesh integration journey

## ① Declare new product from template

```
$ meshroom create product —from edr
```

## ② Define python hooks to automate setup

```
@setup_consumer('events')
def my_setup_func(plug: Plug):
    ...
```

## ③ Instantiate and plug

```
$ meshroom add <product> <name>
$ meshroom plug <instance> <instance>
```

## ④ meshroom up 🚀

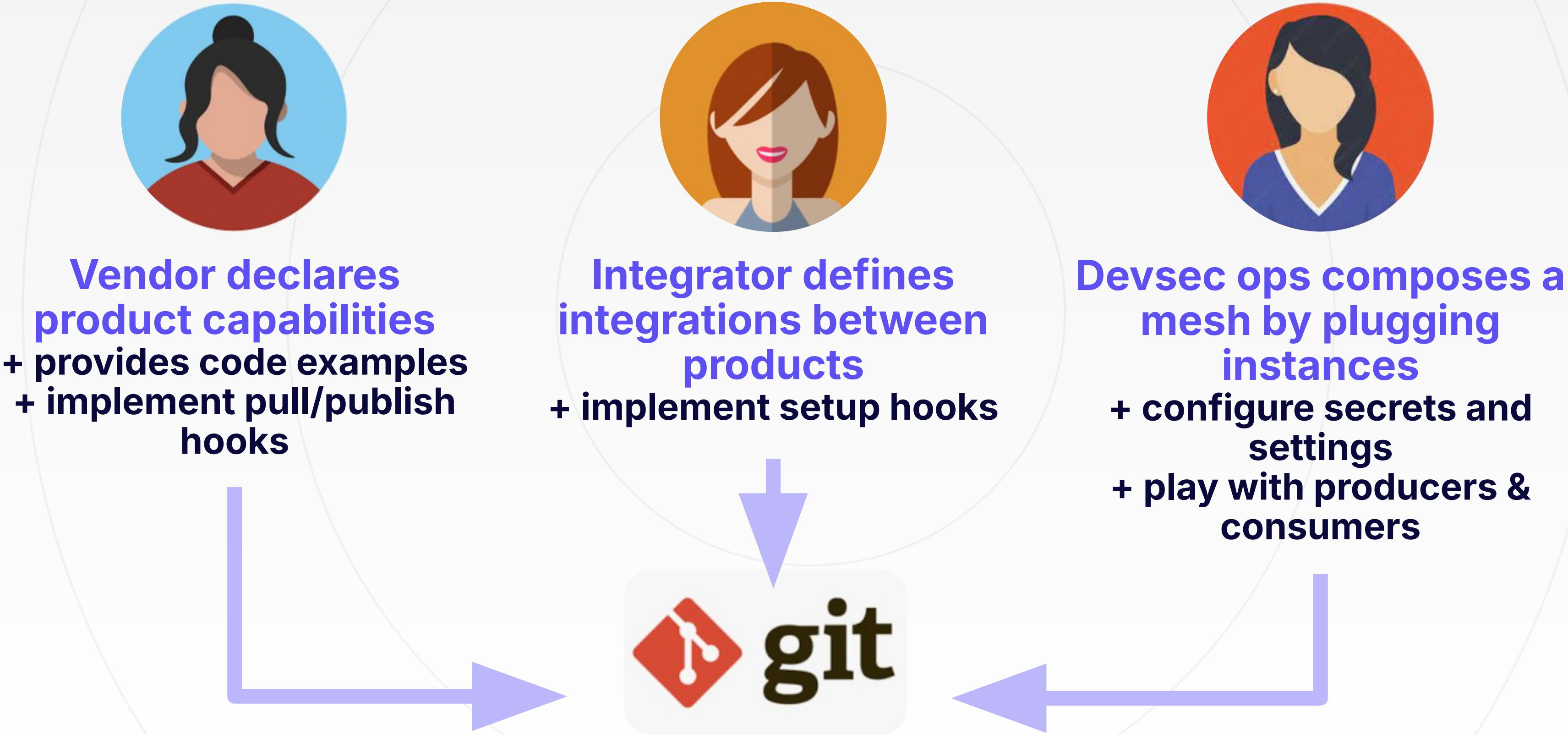
## ⑤ Play and test

```
$ meshroom produce <topic> <instance>
$ meshroom watch <topic> <instance>
```

## ⑥ Publish & share via git

```
$ meshroom publish <product>
```

# Who ?



**Vendor declares product capabilities**
+ provides code examples
+ implement pull/publish hooks

**Integrator defines integrations between products**
+ implement setup hooks

**Devsec ops composes a mesh by plugging instances**
+ configure secrets and settings
+ play with producers & consumers

Everyone publish 🎉

# How ?

- **producer→consumer**

  producer sends data to a topic,
  consumer receives data from the topic

- **trigger→executor**

  trigger submit commands to a topic,
  executor executes commands submitted to the topic

- **operation mode**

  push mode: source is active, destination is passive *(e.g., HTTP API)*
  pull mode: producer is passive, consumer is active *(e.g., syslog forwarding)*

- **plug ownership**

  cooperative: both producer & consumer need configuration to work *(e.g., AWS SQS)*
  unilateral: one end can setup everything without any action on the other end *(e.g., TAXII)*

- **python hooks**

  automate remote setup of real product instances and scaffolding of new integration via vendor-provided python functions executed upon meshroom commands *[see next slide 👀]*

📢 Full interop definition between two products

- ◉ **Dataflow**
- ◉ **Setup procedure**
- ◉ **Boilerplate generator**

# Meshroom model

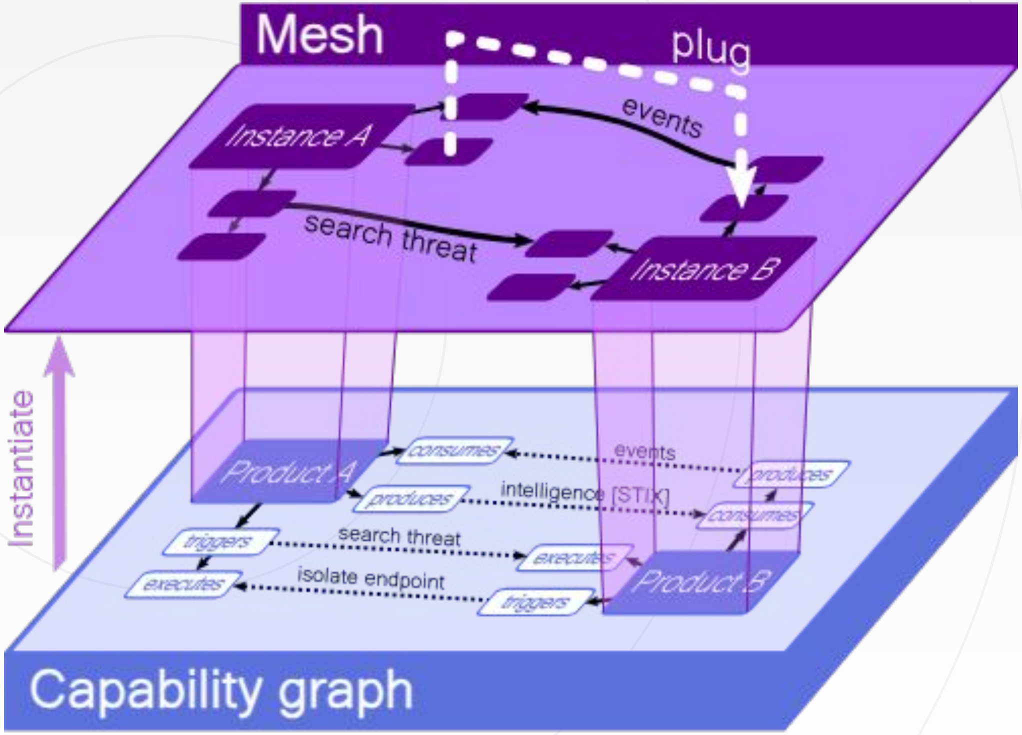
① Describe product capabilities

② Scaffold integrations between products

③ Instantiate products

④ Plug instances

⑤ meshroom up 🚀



# Meshroom basic usage

```
meshroom init <path>

cd path

meshroom pull sekoia

meshroom create product

meshroom create integration
```

```
meshroom add

meshroom plug

meshroom up

meshroom produce

meshroom watch

meshroom down

meshroom publish
```

# Hooks

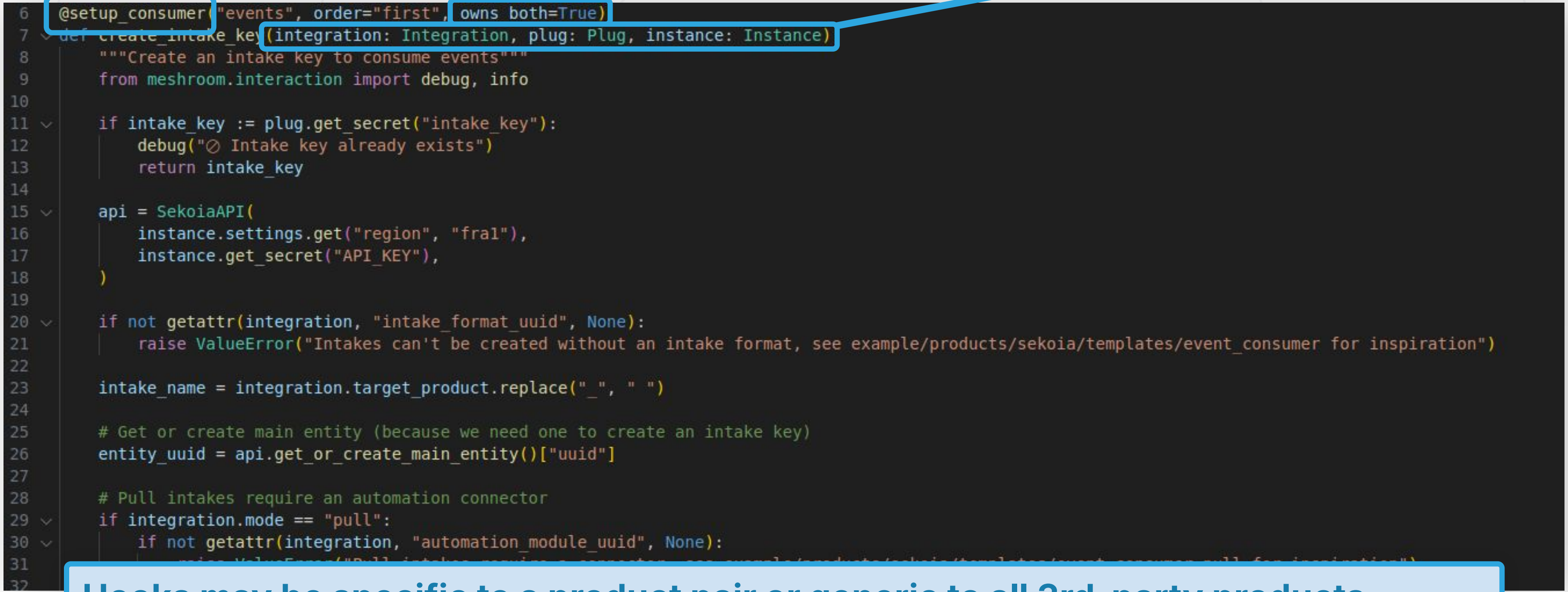
| hook decorator | called upon | usage | |
|---|---|---|---|
| @setup | $ meshroom up | Define an automated setup step to get a plug up-and-running on a given instance | optional |
| @teardown | $ meshroom down | Define an automated step to shutdown and cleanup a plug from a given instance | optional |
| @scaffold | $ meshroom create integration | Generate files for a new integration for a certain topic | optional |
| @pull | $ meshroom pull | Generate integrations by pulling the vendor's online integration catalog | required |
| @publish | $ meshroom publish | Submit all defined integrations to the vendor's catalog for public homologation | required |
| @produce | $ meshroom produce | Send data to the plug's destination for testing | required |
| @watch | $ meshroom watch | Inspect data flowing through the plug | required |

# Hooks : example

**Setup hook, called upon $ meshroom up**

**Unilateral setup**
**No remote configuration on producer side is required**

**Hooks have access to product instance and plugs**



```python
@setup_consumer("events", order="first", owns both=True)
def create_intake_key(integration: Integration, plug: Plug, instance: Instance)
    """Create an intake key to consume events"""
    from meshroom.interaction import debug, info

    if intake_key := plug.get_secret("intake_key"):
        debug("⊘ Intake key already exists")
        return intake_key

    api = SekoiaAPI(
        instance.settings.get("region", "fra1"),
        instance.get_secret("API_KEY"),
    )

    if not getattr(integration, "intake_format_uuid", None):
        raise ValueError("Intakes can't be created without an intake format, see example/products/sekoia/templates/event_consumer for inspiration")

    intake_name = integration.target_product.replace("_", " ")

    # Get or create main entity (because we need one to create an intake key)
    entity_uuid = api.get_or_create_main_entity()["uuid"]

    # Pull intakes require an automation connector
    if integration.mode == "pull":
        if not getattr(integration, "automation_module_uuid", None):
```

**Hooks may be specific to a product pair or generic to all 3rd-party products**

# Meshroom features

## Git-backed projects

For easy versioning and sharing

## Builtin secrets store with GPG encryption

Keep all your instances' secrets in one secure place

## One command to setup and teardown a full mesh

meshroom up / meshroom down

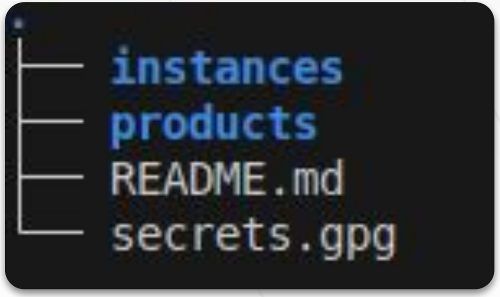
## Scaffolding hooks

Help others building integrations with your products without pain

# Tutorial – 1. Init a mesh

**$ meshroom init *<path>***

- Initializes a git-backed meshroom project at *<path>*
- Creates the initial project structure



```
.
├── instances
├── products
├── README.md
└── secrets.gpg
```

- Starts with 0 product, 0 integration, 0 instance and 0 plug…

**$ meshroom list *products***

**$ meshroom list integrations**

# Tutorial – 2. Leverage product definitions

```
$ git clone https://github.com/opencybersecurityalliance/meshroom.git meshroom
$ cp -r meshroom/products/sekoia products/
$ rm -rf meshroom
```

- Vendor has declared a product’s capabilities and hooks
- Clone product definition, copy to products/ directory
- We now have 1 product, with ready to use hooks. Let’s use them !

```
$ meshroom pull sekoia
```

- @pull hook downloads all known integrations from Sekoia’s official catalog

```
$ meshroom list products
```

```
$ meshroom list integrations
```

# Tutorial – 3. Instantiate products

```
$ meshroom add sekoia
$ meshroom add harfanglab
```

- Instantiate product instances
- Products may have defined settings and secrets : user is prompted for them here
- Nothing is submitted to the real user's tenants yet
- Instances are ready for calling `$ meshroom up`

```
$ meshroom list instances
```

# Tutorial – 4. Plug products

```
$ meshroom plug events harfanglab sekoia
$ meshroom plug listprocesses sekoia harfanglab
```

- Finds matching integrations
  - ⦿ If one of the products has a unilateral setup hook [own_both=True], it takes ownership (no need for a defined integration on the other side)
  - ⦿ Otherwise, find a pair of integrations matching the desired operation mode [push/pull] and topic
- Plugs instances to each other
- Integrations may have defined settings and secrets: user is prompted for them here

```
$ meshroom list plugs
```

# Tutorial – 5. Meshroom up !

```
$ meshroom up 🚀
```

- Connect & configure each defined instance
- Execute @setup hooks to configure plugs
- Wait for the whole mesh to be ready

- You’re now ready to use your Cybersecurity Mesh !

# Tutorial – 6. Produce/consume data

```
$ meshroom watch events harfanglab sekoia
```

- Runs the @watch hook if defined on consumer side
- Inspects data flowing to the consumer and prints to standard output for debugging purposes

```
$ meshroom produce events harfanglab sekoia
```

- Runs the @produce hook if defined on producer side
- Reads data from standard input and send it to the topic, as if it was produced by the producer itself

# Tutorial – 7. Execute/Trigger actions

```
$ meshroom execute action harfanglab sekoia
```

- Runs the @execute hook if defined on executor side
- Instructs the executor to directly execute the action as if it were sent by the trigger

```
$ meshroom trigger action harfanglab sekoia
```

- Runs the @trigger hook if defined on trigger side
- Instructs the trigger to submit a command to its executor

# Tutorial – 8. Meshroom down

```
$ meshroom down
```

- Cleanup all real product instances from what meshroom up had setup
- Leaves the user's tenants in a clean and predictable state

💡 **$ meshroom up/down** commands pair works exactly as **$ docker compose up/down** commands pair

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# Tutorial – 9. Define new products

```
$ meshroom create product myedr --from edr
```

- Scaffolds a product definition from a predefined template of product capabilities [see *https://github.com/opencybersecurityalliance/meshroom/tree/master/meshroom/templates/products*]

- We can define python hooks for our new product
  - @setup + @teardown hooks for `$ meshroom up/down`
  - @pull + @publish to grab and contribute to our product's official integrations catalog via `$ meshroom pull/publish`
  - @scaffold hook to provide code generators for `$ meshroom create`
  - @produce/@watch hooks for emulation via `$ meshroom produce/watch`

# Tutorial – 10. Share your mesh

```
$ git commit -a -m “share my mesh” && git push
```

- Meshroom projects are git projects
  - Use git to version your mesh
  - Use git to share your mesh, privately or publicly
  - Integrate contribution from other repos to extend your mesh

- Vendor can provide @publish hooks to streamline 3rd-party contributions to their integrations catalog

# Tutorial – 11. Publish your material

```
$ git commit -a -m “share my mesh” && git push
```

- **Meshroom projects are git projects**
  - ⦿ Use git to version your mesh
  - ⦿ Use git to share your mesh, privately or publicly
  - ⦿ Integrate contribution from other repos to extend your mesh

```
$ git push
```

- **Contribute to Meshroom’s** products/ **directory to make your product definition public !** 💖
  **https://github.com/opencybersecurityalliance/meshroom**

# Going further ...

## 📣 Meshroom is Github Copilot friendly

Leverage code examples from your meshroom project
to bootstrap new integrations with LLMs

## 📣 Let’s build the largest opensource mesh of cybersecurity products

Contribute your meshroom materials to
*https://github.com/opencybersecurityalliance/meshroom*
(within **products/** folder)

sekoia

📢 https://github.com/opencybersecurityalliance/meshroom

📢 https://opencybersecurityalliance.github.io/meshroom/tutorial/