CIRCL
Computer Incident
Response Center
Luxembourg

Kunai Updates

Quentin JEROME

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Computer Incident Response Center Luxembourg (CIRCL)

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Introduction

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Brief History

Project[1] started **end-2022** as a “good first Rust project”:

12/2022 - 01/2024: worked on it under my own company
since 01/2024: joined **CIRCL** and working on the project in the context of an EU co-funded project

Why starting such a project:

- I was disappointed by **Sysmon for Linux** for many reasons
- Yet there are many good ideas in Sysmon and I think we can do much better by:
  - getting rid of XML (for configuration and events)
  - do not transpose something primarily done for Windows into Linux

[1] https://github.com/kunai-project/kunai

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What can we do with Kunai ?

An **open-source** monitoring tool designed for threat-detection/hunting

- Monitor many **events**[2] (execve, shared object loaded, BPF programs loaded, files read/write/delete ...)
- Events comes with the following:
  - Relevant information to build solid **behavioral detections**
  - In chronological order
  - Grouping capability through a uuid
  - Parent/child tracking
  - Enriched with data from previous events (i.e. network connect/send)
- Accurately track security events generated by Linux container solutions

[2] https://why.kunai.rocks/docs/category/kunai—events

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What’s new since last public talk ?

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Add Missing events

- Clone
  - improves task tracking
- Prctl
  - some malware use this to change task name
- File Unlink (i.e. deletion)
  - to be able to detect crypto-lockers
- Bpf Socket Filter (used to filter specific network traffic on a socket)
  - used by BPFDoor[3] malware on a raw socket

[3] https://github.com/gwillgues/BPFDoor/blob/main/bpfdoor.c

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Tacking a Step Back

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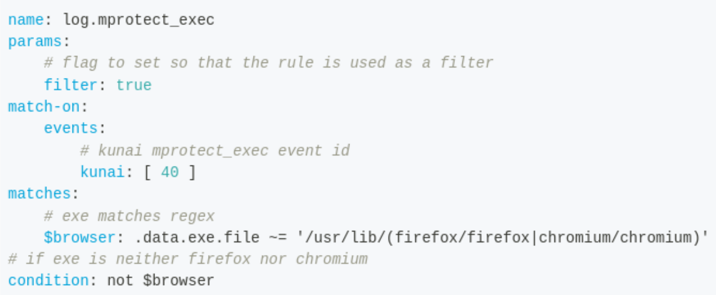
Filtering rules

Kunai generates a lot of activity, it was already possible to turn **on/off** events but there is a need for **event filtering** :

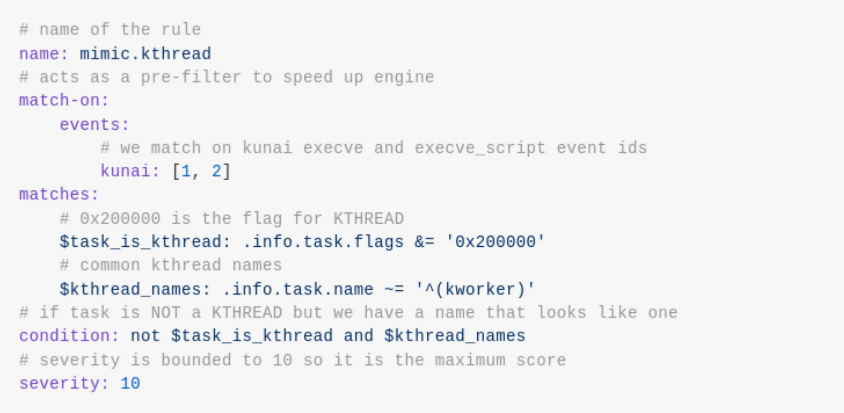
1. reduce noise
2. without context a security alert is **useless** !



```yaml
name: log.mprotect_exec
params:
    # flag to set so that the rule is used as a filter
    filter: true
match-on:
    events:
        # kunai mprotect_exec event id
        kunai: [ 40 ]
matches:
    # exe matches regex
    $browser: .data.exe.file ~= '/usr/lib/(firefox/firefox|chromium/chromium)'
# if exe is neither firefox nor chromium
condition: not $browser
```

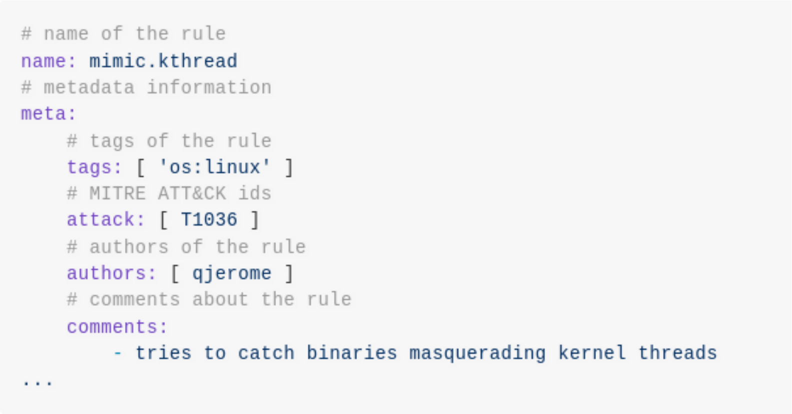
Detection rules

Addresses the need to detect a very specific pattern



```
# name of the rule
name: mimic.kthread
# acts as a pre-filter to speed up engine
match-on:
    events:
        # we match on kunai execve and execve_script event ids
        kunai: [1, 2]
matches:
    # 0x200000 is the flag for KTHREAD
    $task_is_kthread: .info.task.flags &= '0x200000'
    # common kthread names
    $kthread_names: .info.task.name ~= '^(kworker)'
# if task is NOT a KTHREAD but we have a name that looks like one
condition: not $task_is_kthread and $kthread_names
# severity is bounded to 10 so it is the maximum score
severity: 10
```

Detection rules



```
# name of the rule
name: mimic.kthread
# metadata information
meta:
    # tags of the rule
    tags: [ 'os:linux' ]
    # MITRE ATT&CK ids
    attack: [ T1036 ]
    # authors of the rule
    authors: [ qjerome ]
    # comments about the rule
    comments:
        - tries to catch binaries masquerading kernel threads
...
```

Configuration with IoCs

Kunai uses a straightforward **IoC format**

```
{"uuid": "ioc_uuid", "source":"Some IoC source", "value":"ioc_value"}
```

1. kunai perfectly know which field of its events can be an IoC
2. so it takes only a few lookups (per events) in a **hash map**

This make **IoC scanning** very fast and not depending on the number of **IoCs** being loaded

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IoC Provider Integration

- So far it is integrated with **MISP** through the **misp-to-kunai.py** [4]
  - Can be configured to ingest **MISP feeds** (no API key needed)
  - Can be configured to export events from a given MISP instance (API key needed)
  - Able to run as a service to regularly pull updates

This script lives in a repository [5] where you can find other **tools** (mainly written in Python)

[4] misp-to-kunai.py

[5] kunai tools repository

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Demo

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Conclusion / Future Work

Kunai is a fairly young project but we believe it can bring added value to the Linux ecosystem and more precisely as a cheap, free and open solution to make advanced threat hunting and detection. Many improvements are foreseen to make it even more powerful:

- make it capable of executing **actions** defined in detection rules
  - kill process, dump memory, collect information ...
- embed a Yara scanning engine using the very recent **Yara-X**[6]
  - trigger scan as an **action** or to scan every file executed
- continuous integration
  - add several Linux distributions testing in CI/CD
  - monitor kernel changes impacting kunai functionalities

[6] https://github.com/VirusTotal/yara-x

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Final Words

Q & A

Do you want to practice ?

Join workshop on friday morning ;)

References:

- Project: https://github.com/kunai-project/
- Documentation: https://why.kunai.rocks/docs/quickstart
- Tools: https://github.com/kunai-project/tools

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Thank you all !

Kunai is an **Open-Source project** developed in the context of **NGSOTI** a co-funded project under **DEP** (Digital Europe Programme) via the **ECCC** (European Cybersecurity Competence Centre) and the **CIRCL** (Computer Incident Response Center Luxembourg).

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