CYBERSECURITY LAB

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EPSS – LAB

Academic Year 2025/2026

Exam
Folder name for material submission **01_EPSS**

EPSS Lab

- *Can you predict which recent CVEs will achieve high EPSS scores in the coming months?*

… aka "***Fanta CVE***"

Tasks and delivery

Overview – Step 1 – Individual lab activity

Deadline: 17/10/2025

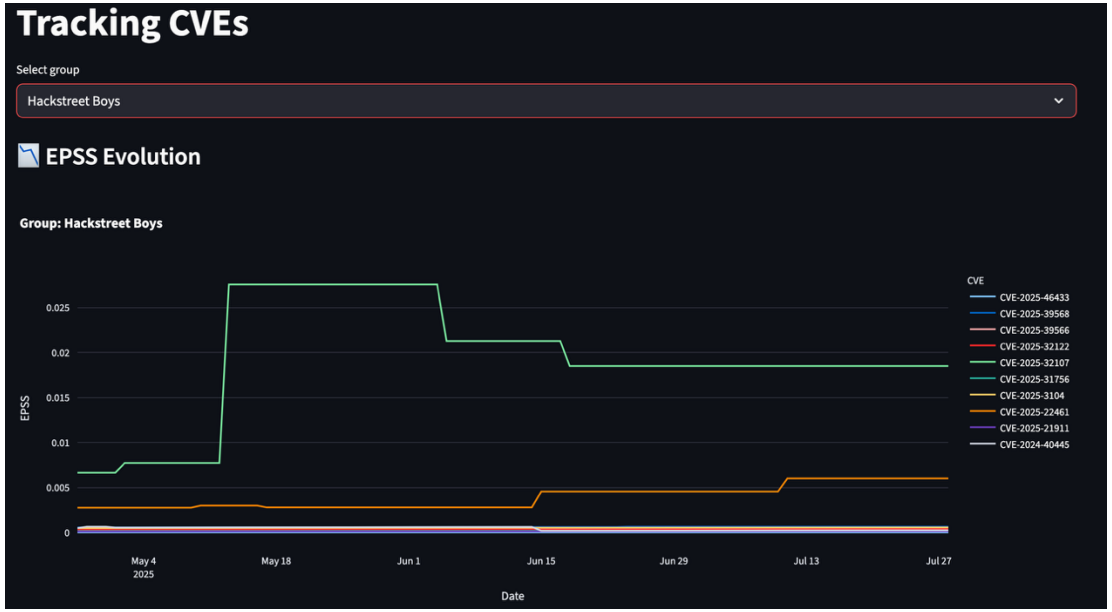
- Data gathering
  - NVD Data (published within the last month **01/09/2025 – 30/09/2025**)
  - EPSS Data (latest available as of today, **01/10/2025**)
- Data exploration
- CVE selection
  - Filter the CVEs with low EPSS (<1%)
  - Select 10 CVEs with low EPSS that you think will reach high EPSS by the end of the course
  - Share the selected CVE ids with the instructor (by the deadline, i.e., two weeks)
  - Track the EPSS of your CVEs over time

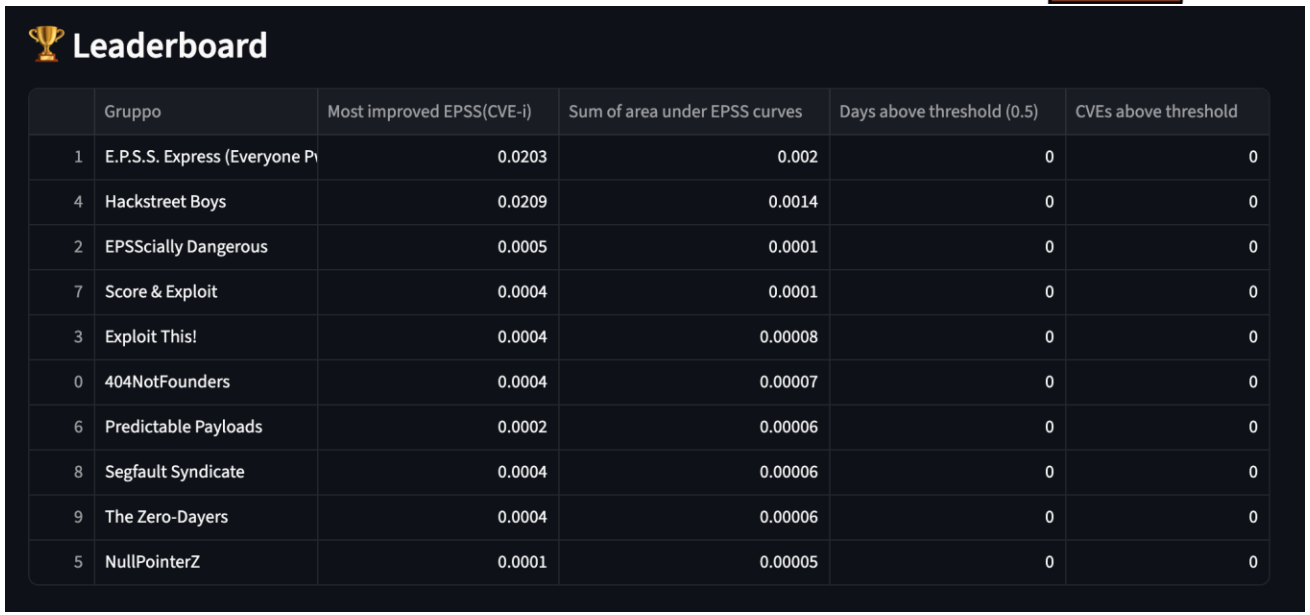
- See `template_submsission.csv` as an example for submission
- Update your file in the `Submissions` folder in Teams as `[fancy-name].csv`

Overview – Step 2 – Class activity

On last course lecture

- Discussion of takeaways
- Leaderboard reveal





	Gruppo	Most improved EPSS(CVE-i)	Sum of area under EPSS curves	Days above threshold (0.5)	CVEs above threshold
1	E.P.S.S. Express (Everyone P	0.0203	0.002	0	0
4	Hackstreet Boys	0.0209	0.0014	0	0
2	EPSScially Dangerous	0.0005	0.0001	0	0
7	Score & Exploit	0.0004	0.0001	0	0
3	Exploit This!	0.0004	0.00008	0	0
0	404NotFounders	0.0004	0.00007	0	0
6	Predictable Payloads	0.0002	0.00006	0	0
8	Segfault Syndicate	0.0004	0.00006	0	0
9	The Zero-Dayers	0.0004	0.00006	0	0
5	NullPointerZ	0.0001	0.00005	0	0

Exam: codebase and report required

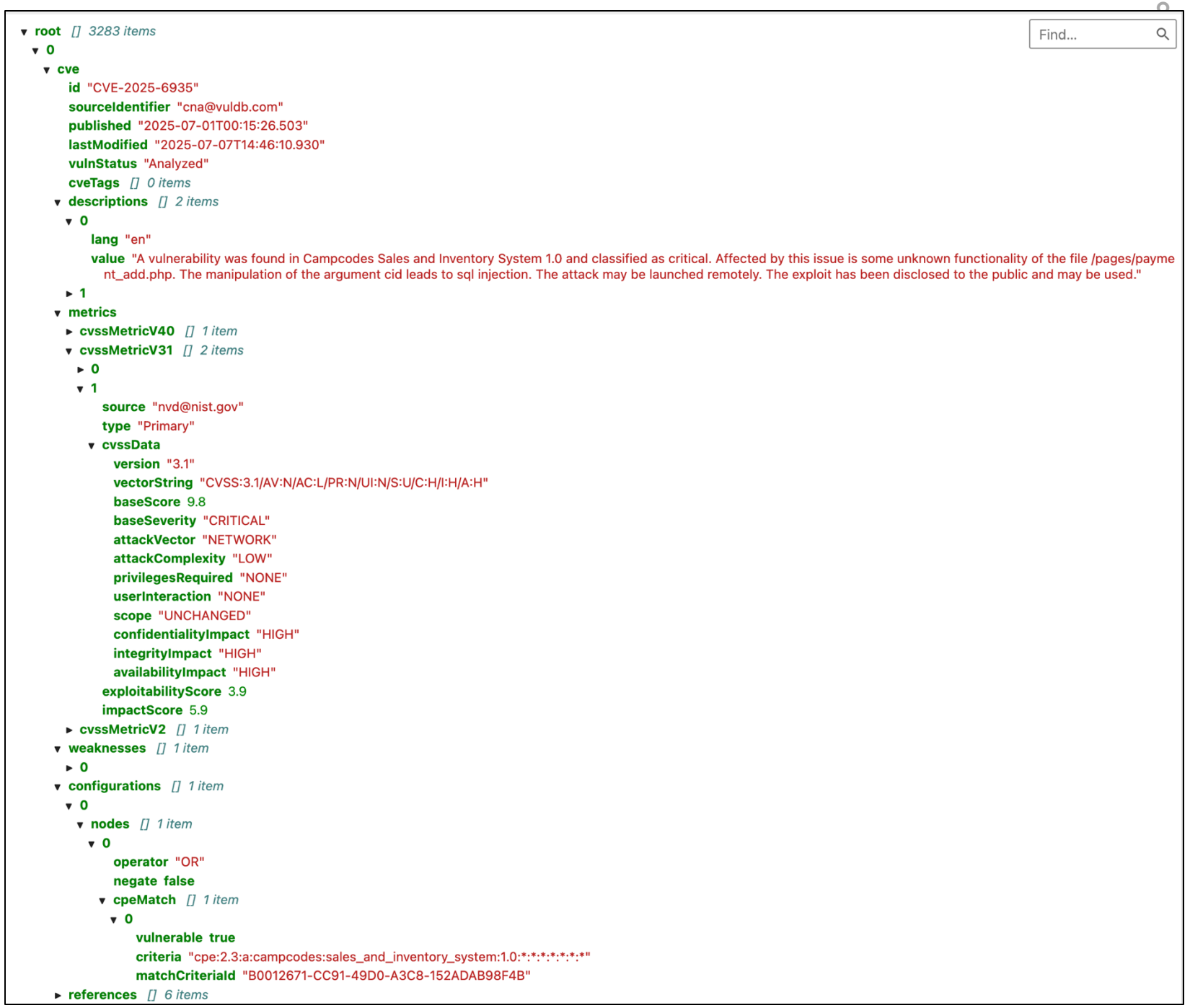
- Codebase
- Technical report with the description and discussion of each step
  - Data gathering
    - NVD Data (published within the last month 01/09/2025 – 30/09/2025)
    - EPSS Data (as of today, 25/09/2025)
  - Data exploration
  - CVE selection
    - Filter the CVEs with low EPSS (<1%)
    - Select 10 CVEs with low EPSS that you think will reach high EPSS by the end of the course
    - Share the selected CVE ids with the instructor (by the deadline, i.e., two weeks)
    - Track the EPSS of your CVEs over time
  - Include takeaways at the end of the monitoring period

- Suggested tools for the required material in a later slide

Tools

Data Gathering

- CVEs metadata
- NVD API
  https://nvd.nist.gov/developers/vulnerabilities
- JSON format



Data Gathering

- EPSS data
  https://www.first.org/epss/data_stats
- CSV format
  - CVE ID
  - EPSS
  - Percentile
    - CVE-1999-0005: EPSS = 0.17478 and percentile = 0.94767
    - It is more likely to be exploited than 94.767% of all CVEs

	cve	epss	percentile
0	CVE-1999-0001	0.01269	0.78596
1	CVE-1999-0002	0.16835	0.94646
2	CVE-1999-0003	0.90339	0.99569
3	CVE-1999-0004	0.04164	0.88205
4	CVE-1999-0005	0.17478	0.94767
...	...	...	...
287670	CVE-2025-8225	0.00013	0.01366
287671	CVE-2025-8226	0.00025	0.05121
287672	CVE-2025-8227	0.00051	0.15837
287673	CVE-2025-8228	0.00036	0.08912
287674	CVE-2025-8229	0.00028	0.06076

287675 rows × 3 columns

(Suggested) tools

- Programming language: Python
- Environment: Jupyter notebooks (or Google Colab)
  - Interactive web-based environment
  - New to jupyter? See LAB_01_Environment.ipynb for an introduction

- MISC (other tools and libraries)
  - Pandas
    - "*designed to make **data pre-processing** and **data analysis** fast and easy in Python*"
    - New to Pandas? See LAB_ 02_Pandas.ipynb for an introduction
  - You may want to also look at
    - LAB_03_Plotting.ipynb for an introduction to the plotting landscape in Python
    - Streamlit: open-source Python framework to deliver dynamic data apps

(Suggested) tools for the **technical report**

1. Start from the template LAB_EPSS.ipynb
   - It contains code cells for initial data gathering
   - It contains some code cells for data exploration and text cells for comments
2. Modify the template
   - Update and add *code cells* at your need
   - Include *text cells* to explain and discuss each step
3. Produce the report
   - An html export of a well documented notebook is enough
   - … include takeaways at the end of the monitoring period
4. Share codebase and report with the instructor

In particular:

- Discuss insights from exploratory analysis
- Describe CVE selection

Asynchronous project development

- *… that is: you develop the project after the first deadline*

- Use the **same dataset**
  - NVD Data (published within **01/09/2025 – 30/09/2025**)
  - EPSS Data (as of **01/10/2025**)
- Exact same steps but **no need to share the selection**
  - Filter the CVEs with low EPSS (<1%)
  - Select 10 CVEs with low EPSS that you think will reach high EPSS by the end of the course
  - ~~Share the selected CVE ids with the instructor (by the deadline, i.e., two weeks)~~
  - Track the EPSS of your CVEs over time