cve-search - a free software to collect, search and analyse common vulnerabilities and exposures in software

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What we were looking for?

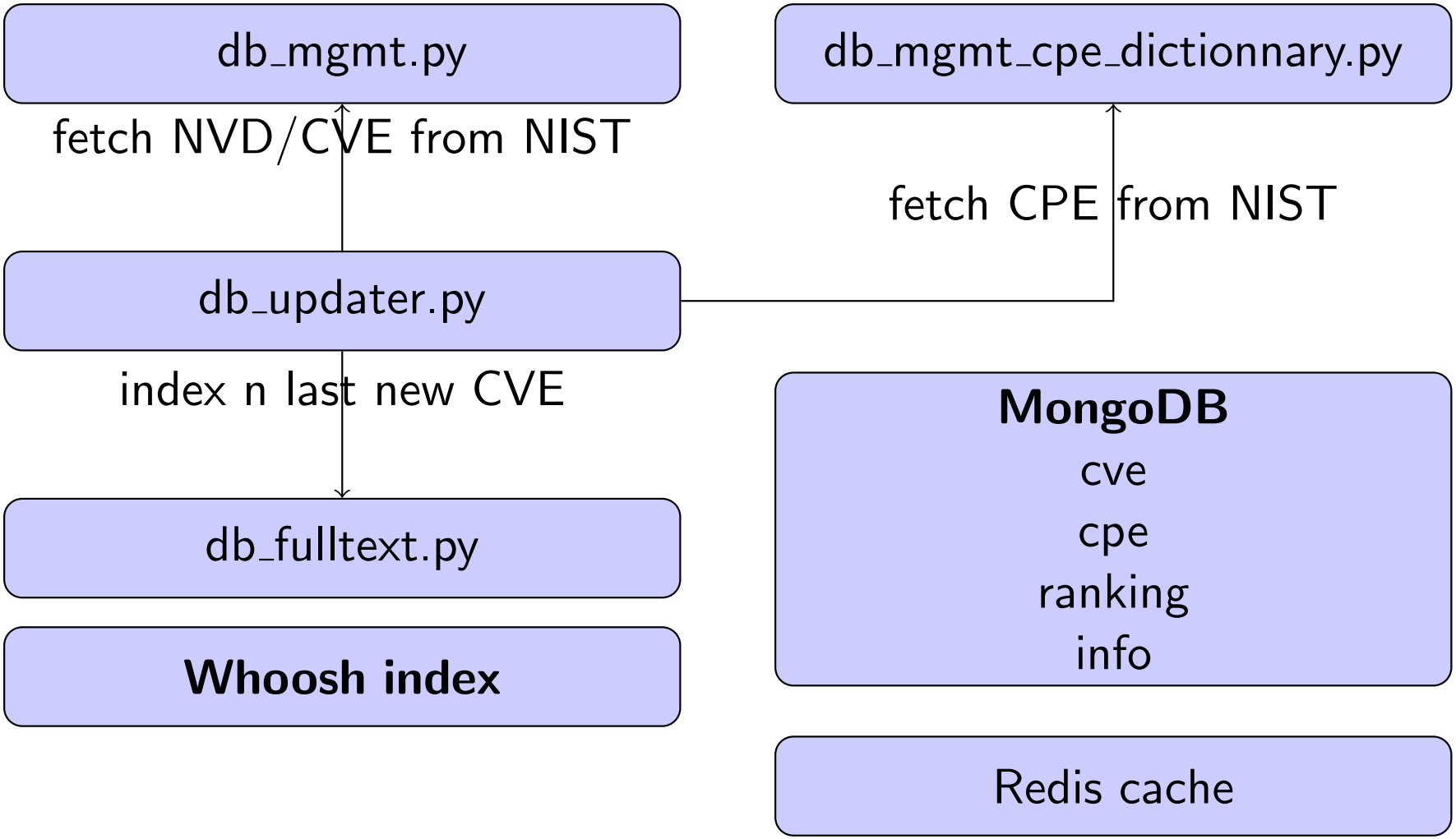
- **Offline** local search of common vulnerabilities and exposures
  - $\rightarrow$ Do you really want to search NIST (based in US) for your current vulnerable software...
- **Fast-lookup** of vulnerabilities (e.g. live evaluation of network traffic for vulnerable software).
- Allow **localized** classification of vulnerabilities (e.g. classify software following your exposure).
- **Flexible** data structure (e.g. NIST/NVD is not the only source).
- Allowing the use of **Unix-like tools** to process the vulnerabilities.
- **Build new tools** based on local database of software and hardware vulnerabilities.

History of cve-search

- Wim Remes started with a simple script to read CVE and import it in MongoDB.

- In late 2012, Alexandre Dulaunoy improved the back-end of cve-search and associated tools.
- In 2014, Pieter-Jan Moreels improved the various Web interface to make them usable.
- Today, Alexandre and Pieter-Jan are lead and **welcome all additional contributions**.

A functional overview of cve-search (populating databases)



Data sources imported and used by cve-search

- NIST NVD
  - Common Vulnerabilities and Exposure (CVE), Common Platform Enumeration (CPE), Official Vendor Statements, Common Weakness Enumeration (CWE), Common Attack Pattern Enumeration and Classification (CAPEC), NIST MITRE cross-reference assignment.
- Exploitation reference from D2 Elliot Web Exploitation Framework (D2SEC).
- Microsoft Bulletin (Security Vulnerabilities and Bulletin).
- vFeed[1] additional cross-references from Toolswatch.

[1] `https://github.com/toolswatch/vFeed`

A functional overview of cve-search (tools)

MongoDB
cve
cpe
ranking
info

search.py / search_fulltext.py

dump_last.py

search_xmpp.py

index.py / minimal-web.py

search_irc.py

search_cpe.py

cve_doc.py

DB tools
db_blacklist.py
db_cpe_browser.py
db_fulltext.py db_mgmt_*.py
db_notification.py
db_ranking.py db_updater.py
db_whitelist.py

cve-search starting up...

Import and update of the CVE/NVD and CPE database:

```
% python3.3 db_updater.py -v -i
```

Search CVE of a specific vendor (via CPE):

```
% python3.3 search.py -p joomla:
...
CVE-2012-5827
CVE-2012-6503
CVE-2012-6514
CVE-2013-1453
CVE-2013-1454
CVE-2013-1455
```

cve-search simple query and JSON output

```
search.py -c CVE-2013-1455 -n
{"Modified": "2013-02-13T13:01:45.353-05:00", "Published": "2013-02-12T20:55:05.387-05:00", "_id": {"$oid": "514cce0db26102134fa3f211"}, "cvss": "5.0", "id": "CVE-2013-1455", "references": ["http://xforce.iss.net/xforce/xfdb/81926", "http://developer.joomla.org/security/news/549-20130202-core-information-disclosure.html"], "summary": "Joomla! 3.0.x through 3.0.2 allows attackers to obtain sensitive information via unspecified vectors related to an \"Undefined variable.\"", "vulnerable_configuration": ["Joomla! 3.0.0", "Joomla! 3.0.1"]}
```

Without CPE name lookup:

```
"vulnerable_configuration": ["cpe:/a:joomla:joomla%21:3.0.0", "cpe:/a:joomla:joomla%21:3.0.1"]}
```

CPE - an overview

```
cpe:/{part}:{vendor}:{product}:{version}:{update}:{
    edition}:{language}
```

part	name
o	Operating System
a	Application
h	Hardware

An empty part defines any element. CPE are updated at a regular interval by NIST but it happens that CPE dictionnary are updated afterwards. cve-search supports version 2.2 and 2.3 of the CPE format.

Which are the top vendors using the word "unknown"?

```
search_fulltext.py -q unknown -f | jq -c '. | .
    vulnerable_configuration[0]' | cut -f3 -d: | sort |
    uniq -c | sort -nr | head -10
```

Count	CPE vendor name
1145	oracle
367	sun
327	hp
208	google
192	ibm
113	mozilla
102	microsoft
98	adobe
76	apple
68	linux

Which are the top products using the word "unknown"?

```
search_fulltext.py -q unknown -f | jq -c '. | .
    vulnerable_configuration[0]' | cut -f3,4 -d: | sort |
    uniq -c | sort -nr | head -10
```

Count	CPE vendor/product name
191	oracle:database_server
189	google:chrome
115	oracle:e-business_suite
111	sun:jre
101	mozilla:firefox
99	oracle:fusion_middleware
95	oracle:application_server
80	sun:solaris
68	linux:linux_kernel

oracle:java versus sun:jre

```
search.py -p oracle:java -o json  | jq -r '.cvss' | Rscript -e 'summary(as.numeric(read.table(file("stdin"))[,1]))'

   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   1.80    7.60   10.00    8.45   10.00   10.00

search.py -p sun:jre -o json  | jq -r '.cvss' | Rscript -e 'summary(as.numeric(read.table(file("stdin"))[,1]))'

   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  0.000   5.000   7.500   7.376  10.000  10.000
```

Ranking of vulnerabilities

```
db_ranking.py  -c sap: -g accounting -r 3
search.py -c CVE-2012-4341 -o json  -r
..."cvss": "10.0", "id": "CVE-2012-4341", "ranking": [[{"
    accounting": 3}]]...
```

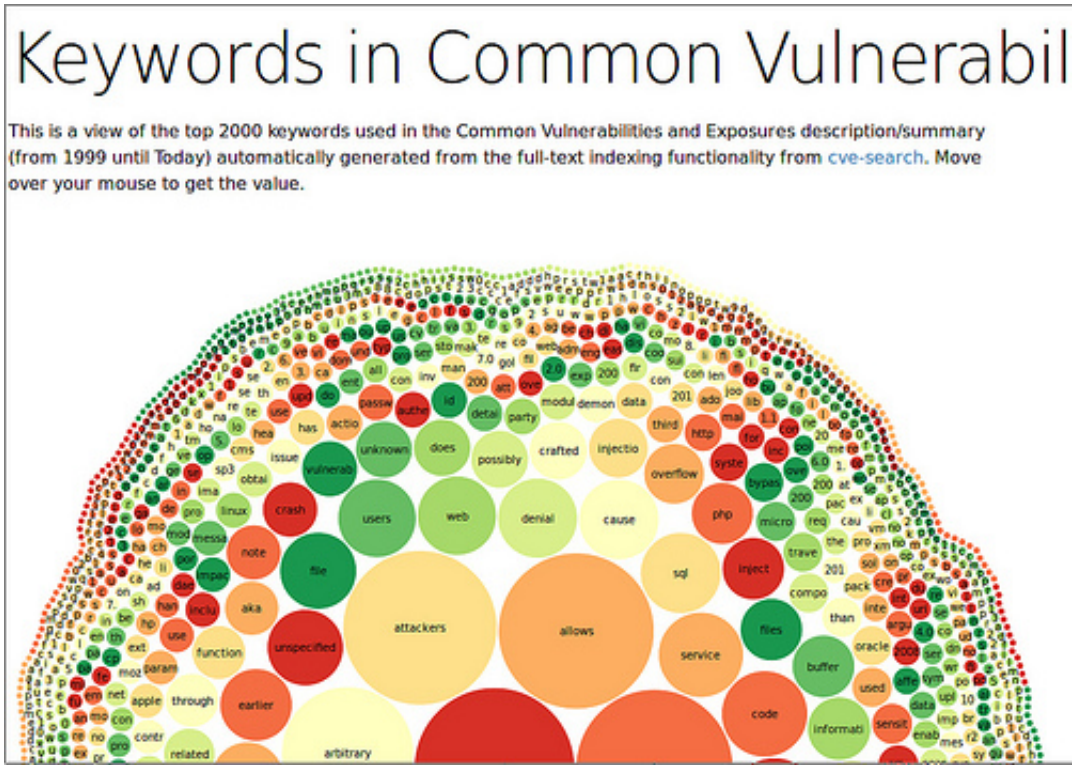
- Ranking is a simple and flexible approach based on CPE value.
  - An organisation or a dept (-g) and an integer value is set when a CPE hits.
- If you are a CSIRT or a local ICT team, you can use your own tagging to weight the critical software/vendor in your constituency.

Ranking helping for internal publishing of vulnerabilities

dump_last.py can be used to generate an overview of the current/recent vulnerabilities in your organization. You can limit the result to the ranked software to avoid non-related software vulnerabilities.

```
dump_last.py -r -l 100 -f html
dump_last.py -r -l 100 -f atom
```

search_fulltext.py -g -s



Keywords in Common Vulnerabil

This is a view of the top 2000 keywords used in the Common Vulnerabilities and Exposures description/summary (from 1999 until Today) automatically generated from the full-text indexing functionality from cve-search. Move over your mouse to get the value.

Visualization using the browser (index.py)

cve-search Recent Browse per vendor Search CVE search Admin

Hide/Show filter

« 4 5 6 7 8 »

Don't mark Mark seen Mark unseen

ID	CVSS	Summary	Last (major) update	Published
CVE-2015-0514	5.0	EMC M&R (aka Watch4Net) before 6.5u1 and ViPR SRM before 3.6.1 might allow remote attackers to obtain cleartext data-center discovery credentials by leveraging certain SRM access to conduct a decryption attack.	29-09-2015 - 02:34	21-01-2015 - 16:17
CVE-2015-0158	4.3	Cross-site scripting (XSS) vulnerability in the Coach NG framework in IBM Business Process Manager (BPM) 8.0 through 8.0.1.3, 8.5.0 through 8.5.0.1, and 8.5.5 through 8.5.5.0 allows remote attackers to inject arbitrary web script or HTML via a crafte	29-09-2015 - 02:33	24-03-2015 - 03:01
CVE-2014-9403	4.0	The CWebAdminMod::ChanPage function in modules/webadmin.cpp in ZNC before 1.4 allows remote authenticated users to cause a denial of service (NULL pointer dereference and crash) by adding a channel with the same name as an existing channel but withou	29-09-2015 - 02:31	19-12-2014 - 16:59
CVE-2014-8600	4.3	Multiple cross-site scripting (XSS) vulnerabilities in KDE-Runtime 4.14.3 and earlier, kwebkitpart 1.3.4 and earlier, and kio-extras 5.1.1 and earlier allow remote attackers to inject arbitrary web script or HTML via a crafted URI using the (1) zip,	29-09-2015 - 02:31	08-12-2014 - 12:59
CVE-2014-7231	2.1	The strutils.mask_password function in the OpenStack Oslo utility library, Cinder, Nova, and Trove before 2013.2.4	29-09-2015 -	08-10-2014 -

Optimizing search results - Web interface

Hide/Show filter

BlackList	On	Whitelist	On	Unlisted	Show
Time	All	Start date	End date	Last Major Update	
CVSS	All	0	Rejected	Hide	Seen CVEs	Show

Search

Add an item to the Blacklist

full or partial CPE

comments, separated by enter

Add

Browse...

or

Add CPE keywords to the Blacklist

Target Software

Target Software/Hardware Name

comments, separated by enter

Add

CPE Rules

		Rule	Comments
✖		cpe:2.3:a:znc:znc:1.2	
✖		cpe:2.3:a:ibm:maximo_asset_management:	

Keywords

		Rule	Keyword	Comments
✖		android	Target Software	

`github.com/cve-search/cve-search-mt` (management tools)

Simple ReST API (minimal-web.py)

```
curl https://cve.circl.lu/api/last
```

- API returns JSON data
  - Browse vendors (/api/browse).
  - Find products associated to a vendor (/api/browse/microsoft).
  - Find CVEs for a specific product (/api/search/microsoft/xbox_360).
  - Get CVE detailed information including CAPEC and CWE (/api/cve/CVE-2015-0001).
  - Recent CVEs (/api/last).
- Public version running on `https://cve.circl.lu/`.

Can cve-search be used by bad guys?

- If you know that a system is vulnerable, you have two options:
  - If you are a good guy, you inform the system owner to fix the vulnerability.
  - If you are a bad guy[2], you abuse your position and compromise the vulnerable system.
- cve-search could help both guys. Don't forget the freedom 0 of free software *The freedom to run the program, for any purpose.*

[2] `http://www.foo.be/torinj/`

How can you help?

- Looking for open data source of software vulnerabilities to integrate into cve-search.
  - **Software or hardware vendors who provide a new open data source are elligible for 1Kg of Belgian chocolade or a pack of 6 Orval beers.**
- Dataset of cve-search ranking can be shared with localized information (e.g. per country/region/sector).
- Pushing vendors to release their vulnerability information in an open way.
- Asking vendors to support CPE naming convention (e.g. openssl versus libssl in Debian).
- Fork it, abuse it and then send pull request →
  `github.com/adulau/cve-search` (stable)
  `github.com/pidgeyl/cve-search` (unstable)

Roadmap and future

- **Add** vulnerabilities data sources from software and hardware vendors.
- **Improve** data structure and back-end to reduce code size.
- **Expand** cve-search to include vulnerabilities without CVE assignment.
- Improve **documentation** and external tools relying on cve-search.

Software using and relying cve-search

CVE-Portal

CVE Notification Portal

`https://github.com/CIRCL/cve-portal`

CVE-Scan

Extract vunerabilities in systems from NMAP scans

`https://github.com/NorthernSec/cve-scan`

NorthernSec Vulnerability-Management

Vulnerability management tool

`https://github.com/NorthernSec/Vulnerability-management`

(Still under development)

Contact Details

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