

AIL Framework for Analysis of Information Leaks

Workshop - A generic analysis open source software



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August 3, 2017

Objectives of the workshop

- Learn how to install and start AIL
- Learn how to manage current modules/features
- Learn how to create new modules/features
- Discover a new open source software \o/

Planning

- Introduction to AIL-Framework
 - Why? and what?
 - Capabilities and screenshots demo
- How to use AIL-Framework
 - Installation
 - Running your own instance
 - Using the web interface
 - Managing modules
- How to feed data to AIL-Framework
 - Feeding your own data
- Writing your own module
- Try it out!

AIL Framework: a framework for Analysis of Information Leaks

"AIL is a modular framework to analyse potential information leaks from unstructured data sources like pastes from Pastebin."



A source of leaks: Paste monitoring (1)

- Example: `http://pastebin.com/`
 - Easily storing and sharing text online
 - Used by programmers and legitimate users
 - Source code & configuration information

A source of leaks: Paste monitoring (1)

- Example: <http://pastebin.com/>
 - Easily storing and sharing text online
 - Used by programmers and legitimate users
 - Source code & configuration information
- Abused by attackers to store:
 - List of vulnerable/compromised sites
 - Software vulnerability (e.g. exploits)
 - Database dumps
 - User data
 - Credentials
 - Credit card details
 - ... more and more ...

A source of leaks: Paste monitoring (2)

- Mistakes from users

- https://github.com/search?q=remove_password&type=Commits&ref=searchresults

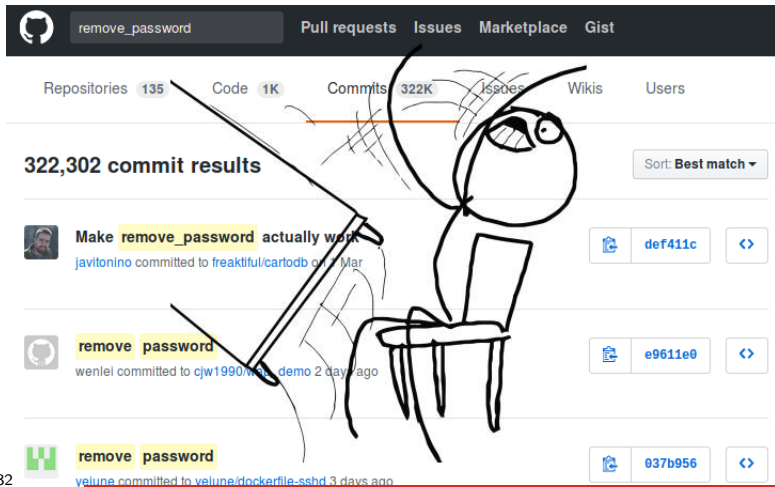
The screenshot shows the GitHub search interface for the query 'remove_password'. The search bar at the top contains the text 'remove_password'. Below the search bar, navigation links for 'Pull requests', 'Issues', 'Marketplace', and 'Gist' are visible. The main navigation bar shows 'Repositories 135', 'Code 1K', 'Commits 322K', 'Issues', 'Wikis', and 'Users'. The 'Commits' section is highlighted with an orange underline. Below this, the search results are displayed, showing '322,302 commit results' and a 'Sort: Best match' dropdown. Three commit results are visible, each with a profile picture, commit title, author, date, and commit hash.

Profile	Commit Title	Author	Date	Commit Hash
	Make remove_password actually work	javitonino	committed to freakiful/cartodb on 1 Mar	def411c
	remove password	wenlei	committed to cjl1990/wap_demo 2 days ago	e9611e0
	remove password	yelune	committed to yelune/dockerfile-sshd 3 days ago	037b956

A source of leaks: Paste monitoring (2)

- Mistakes from users

- https://github.com/search?q=remove_password&type=Commits&ref=searchresults



The screenshot shows the GitHub search interface for the query "remove_password". The search bar at the top contains the text "remove_password". Below the search bar, navigation tabs for "Pull requests", "Issues", "Marketplace", and "Gist" are visible. The search results are filtered to "Commits" and show "322,302 commit results". A hand-drawn cartoon character, resembling a stick figure with a large head and glasses, is sitting on a chair and pointing a long, thin object (possibly a pencil or a pointer) towards the search results. The character has a somewhat grumpy or focused expression. The search results list several commits, with the first one being "Make remove_password actually work" by javitonino, committed to freaktiful/cartodb on 7 Mar. Other results include "remove password" by wenlei and "remove password" by yelune. Each result includes a commit hash and a link to view the commit details.


remove_password


Pull requests Issues Marketplace Gist


Repositories 135 Code 1K Commits 322K Issues Wikis Users

322,302 commit results

Sort: Best match ▾

 Make **remove_password** actually work
javitonino committed to freaktiful/cartodb on 7 Mar

 **remove password**
wenlei committed to cjlw1990/w... demo 2 day ago

 **remove password**
yelune committed to yelune/dockerfile-ssh3 3 days ago

def411c

e9611e0

037b956

Examples of pastes

text 4.41 KB

```
1. - - - - - Tool by Y3t1y3t ( u  
2.  
3.
```

text 4.57 KB

```
1. #include "wejwyj.h"  
2.  
3. int zapisz (FILE *plik_  
4.     int i, j;  
5. if (obr->KOLOR==0) {  
6.  
7.     fprintf (plik_wy, "P2  
8.     fprintf (plik_wy, "%d  
9.     fprintf (plik_wy, "%d  
10. for (i=0; i<obr->wymy  
11.     for (j=0; j<obr->wymx; j++  
12.         fprintf (plik_wy, "%d ",  
13.     }
```

text 2.02 KB

```
1. KillerGram - Yuffie - Smoke The Big Dick [smkwhr] (Upload  
2.  
3.
```

text 2.66 KB

```
1. <item name="%the_component_to_be_disabled%" xsi:type="array">  
2.     <item name="config" xsi:type="array">  
3.         <item name="componentDisabled" xsi:type="boolean">true</item>  
4.     </item>  
5. </item>  
6.  
7. <?xml version="1.0"?>  
8.  
9. <page xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespace  
/etc/page_configuration.xsd">  
10.     <body>  
11.         <referenceBlock name="checkout.root">  
12.             <arguments>  
13.                 <argument name="jsLayout" xsi:type="array">
```

Examples of pastes

~\ (ツ) _/

```
1. - - - - - Tool by Y3t1y3t ( u
2.
3.
4. text 4.57 KB
5. 1. #include "wejwyj.h"
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7. 3. int zapisz (FILE *plik_
8. 4.     int i, j;
9. 5.     if (obr->KOLOR==0) {
10. 6.
11. 7.     fprintf (plik_wy, "P2
12. 8.     fprintf (plik_wy, "%d
13. 9.     fprintf (plik_wy, "%d
14. 10.    for (i=0; i<obr->wymy
15. 11.        for (j=0; j<obr->wymx; j++
16. 12.            fprintf (plik_wy, "%d ",
17. 13.    }
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Paste monitoring at CIRCL: Statistics

- Monitored paste sites: 27
 - *pastebin.com*
 - *ideone.com*
 - ...

Table: Statistics for 2016

Pastes 2016	Monthly average	Total
Fetches pastes	1 547 094	18 565 124
Security related (TR-46)	21	252
Incidents & investigations	54	649

AIL Framework - History

- AIL initially started as an internship project (2014) to evaluate the feasibility to automate the analysis of (un)structured information to find leaks.
- In 2017, AIL framework is an open source software in Python. The software is actively used (and maintained) by CIRCL.

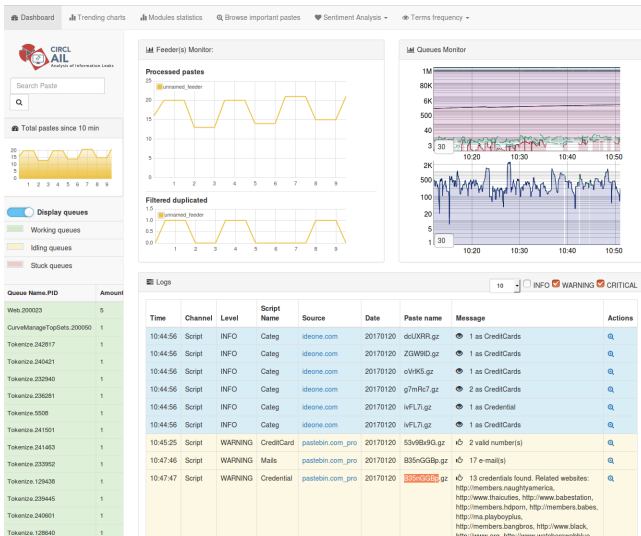
AIL Framework - History

- AIL initially started as an internship project (2014) to evaluate the feasibility to automate the analysis of (un)structured information to find leaks.
- In 2017, AIL framework is an open source software in Python. The software is actively used (and maintained) by CIRCL.
- Extending AIL to add a new **analysis module** can be done in 50 lines of Python.
- The framework **supports multi-processors/cores by default**. Any analysis module can be started multiple times to support faster processing during peak times or bulk import.

Current capabilities

- **Multiple** concurrent **data input**
- Extracting **credit cards numbers, credentials, phone numbers, ...**
- Extracting and validating potential **hostnames**
- Keep track of **duplicates**
- **Full-text indexer** to index unstructured information
- Terms, sets and regex **tracking and occurrences**
- **Sentiment/Mood analyser** for incoming data
- Modules manager
- And many more



AIL: Following a notification (0) - Dashboard



AIL: Following a notification (1) - Searching

Q 1 Results for "B35nGGBp"

Show entries Search:

#	Path	Date	Size (Kb)	Action
1	/home/adulau/git/AIL-framework/PASTES/archive/pastebin.com_pro/2017/01/20/B35nGGBp.gz	2017/01/20	5.8	 

Showing 1 to 1 of 1 entries Previous **1** Next

Totalling 0 results related to paste content

AIL: Following a notification (2) - Metadata

Date	Source	Encoding	Language	Size (Kb)	Mime	Number of lines	Max line length
20/01/2017	pastebin.com_pro	text/plain	('en', 1.0)	5.8	text/plain	510	336

Duplicate list:

Show entries Search:

Hash type	Paste info	Date	Path
tlsh	Similarity: 93%	2017-01-12	/home/adulau/git/AIL-framework/PASTES/archive/pastebin.com_pro/2017/01/12/WeizLQUx.gz
tlsh	Similarity: 93%	2017-01-17	/home/adulau/git/AIL-framework/PASTES/archive/pastebin.com_pro/2017/01/17/Xqbx62vU.gz
tlsh	Similarity: 93%	2017-01-10	/home/adulau/git/AIL-framework/PASTES/archive/pastebin.com_pro/2017/01/10/iynet4UM.gz
tlsh	Similarity: 92%	2017-01-14	/home/adulau/git/AIL-framework/PASTES/archive/pastebin.com_pro/2017/01/14/G7AB7q1m.gz
tlsh	Similarity: 92%	No date available	/home/adulau/git/AIL-framework/PASTES/archive/pastebin.com_pro/2016/12/31/CpDdkKbU.gz

ALL: Following a notification (3) - Browsing content

Content:

```
http://members2.mofosnetwork.com/access/login/  
somoextremos:buddy1990  
brazzers_glenn:cocklick  
brazzers61:braves01
```

```
http://members.naughtyamerica.com/index.php?m=login  
gernblanston:3unc2352  
Janhuss141200:310575  
igetaliwant:1377zeph  
pwilks89:mon22key  
Bman1551:hockey
```

```
MoFos IKnowThatGir1 PublicPickUps  
http://members2.mofos.com  
ChriSmagg40884:loganm40  
brando1:zzbrando1  
aacoen:1q2w3e4r  
1rstunkle23:my8self
```

```
BraZZers  
http://ma.brazzers.com  
gcjensen:gcj21pva  
skycsc17:rbcndnd
```

```
#####
```

```
>| Get Daily Update Fresh Porn Password Here |<
```

```
=> http://www.erq.io/4mF1
```

AIL: Following a notification (3) - Browsing content

Content:

```
Over 50000+ custom hacked xxx passwords by us! Thousands of free xxx passwords to the hottest paysites!  
  
#####  
>| Get Fresh New Premium XXX Site Password Here |<  
  
=> http://www.erq.io/4mF1  
  
#####  
  
http://ddfnetwork.com/home.html  
eu172936:hCSBgKh  
UecwB6zs:159X0$!r#6K78FuU  
  
http://pornxn.stiffia.com/user/login  
feldwWek8939:R0bluJ8xB  
dabudka:17891789  
brajits:brajits1  
  
http://members.pornstarplatinum.com/sblogin/login.php/  
gigiriveracom:xxxjay  
jayx123:xxxjay69  
  
http://members.vividceleb.com/  
Rufio99:fairhaven  
SchIFRvi:102091  
Chaos84:HOLE5244  
Riptor795:blade7  
Domi80:harkonnen  
GaggedUK:a1k0chan  
  
http: [REDACTED]
```

**UNCLE SAM
WANTS YOU**



imgflip.com

Installation

Setting up AIL-Framework

```
1 git clone https://github.com/CIRCL/AIL-framework.git
2 cd AIL-framework
3 ./installing_deps.sh
4 cd var/www/
5 ./update_thirdparty.sh
```

Running your own instance

Accessing the environment and Starting AIL

```
1 cd ~/AIL-Framework/  
2 . ./AILENV/bin/activate  
3 cd bin/  
4 ./LAUNCH
```

Running your own instance

Accessing the environment and Starting AIL

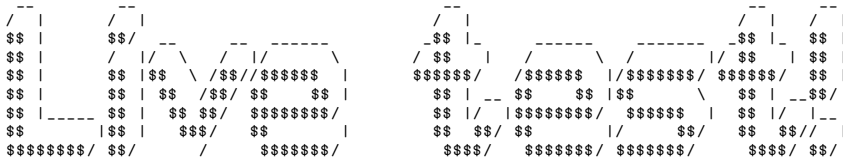
```
1 cd ~/AIL-Framework/  
2 . ./AILENV/bin/activate  
3 cd bin/  
4 ./LAUNCH
```

Starting the web interface

```
1 cd $AILENV  
2 cd var/www/  
3 ./Flask_server.py  
4 # -> Browse http://localhost:7000/
```

Using the web interface

Using the web interface



Managing your modules: Old fashion way

Access the script screen

```
1 screen -r Script
```

Table: GNU screen shortcuts

Shortcut	Action
C-a d	detach screen
C-a c	Create new window
C-a n	next window screen
C-a p	previous window screen

Managing your modules: Using the helper

```
screen(1: ModuleInformation)
Running Queues
Action Queue name PID # S Time R Time Processed element CPU % Mem % Avg CPU%
<K> Attributes 31731 5 2017-08-03 00:24:03 0:00:01 G3rBPVqV 3.10% 1.56% 3.60%
<K> BrowseWarningPaste 31952 2 2017-08-03 00:23:55 0:00:09 yP3DaL03 0.00% 1.43% 0.00%
<K> Categ 31766 30 2017-08-03 00:23:58 0:00:06 Hs13zr6Y 6.70% 1.64% 17.40%
<K> Credential 31822 7 2017-08-03 00:24:04 0:00:00 yP3DaL03 3.50% 1.63% 3.50%
<K> CreditCards 31783 11 2017-08-03 00:24:04 0:00:00 q9qssLnd 4.80% 1.66% 4.80%
<K> DomClassifier 31755 71 2017-08-03 00:23:52 0:00:12 Wz0FFBX 1.70% 1.64% 5.73%
<K> Indexer 31870 10 2017-08-03 00:24:03 0:00:01 0255zMLU 67.60% 1.93% 61.47%
<K> Lines 31744 5 2017-08-03 00:24:03 0:00:01 zLEpJfB 5.20% 1.57% 3.37%
<K> Mlxer 31704 2 2017-08-03 00:24:03 0:00:01 6GzeZ7zx 0.30% 0.43% 0.40%
<K> ModuleStats 31932 33 2017-08-03 00:23:57 0:00:07 7QCEJHTV 0.00% 1.64% 0.00%
<K> Phone 31888 2 2017-08-03 00:24:04 0:00:00 ghqFECHA 3.40% 1.59% 3.85%
<K> Release 31899 30 2017-08-03 00:23:57 0:00:07 3PwHXVtJ 1.80% 1.64% 0.55%
<K> SQLInjectionDetection 31941 1 2017-08-03 00:23:55 0:00:09 JNP00wmj 0.00% 1.49% 0.10%
<K> Tokenize 31775 42 2017-08-03 00:24:03 0:00:01 WTSF5hgL 6.60% 1.57% 6.60%
<K> Web 31818 17 2017-08-03 00:23:45 0:00:19 JNP00wmj 0.00% 1.74% 0.00%
<K> WebStats 31922 2 2017-08-03 00:23:14 0:00:50 JNP00wmj 0.00% 0.51% 0.00%

Idle Queues
Action Queue Idle Time Last paste hash
<K> Global 31717 0:00:00 nD0wHkX
<K> Keys 31880 0:00:00 yCWJXRlp
<K> Mail 31805 0:00:01 rhn2F3Yt

Queues not running
Action Queue State
<S> Curve Stuck or idle, restarting disabled
<S> CurveManagementTopSets Not running by default
<S> Cve Stuck or idle, restarting disabled
<S> DumpValidOntion Not running by default
<S> Duplicates Stuck or idle, restarting disabled
<S> Ontion Stuck or idle, restarting disabled
<S> PreProcessFeed Not running by default
<S> RegexForTermsFrequency Stuck or idle, restarting disabled
<S> SentimentAnalysis Stuck or idle, restarting disabled
<S> SetForTermsFrequency Stuck or idle, restarting disabled

Logs
TTime Module PID Info
00:23:29 Duplicates 31725 Cleared invalid pid in MODULE_TYPE_Duplicates
00:23:29 SentimentAnalysis 31961 *invalid pid in MODULE_TYPE_SentimentAnalysis
00:23:29 RegexForTermsFrequency 31852 *id pid in MODULE_TYPE_RegexForTermsFrequency
00:23:29 Curve 31837 Cleared invalid pid in MODULE_TYPE_Curve
00:23:29 SetForTermsFrequency 31864 *id pid in MODULE_TYPE_SetForTermsFrequency
00:23:11 * - - cleared redis module info

0:24 0$ bash [1 ModuleInformation] 2-5 Mlxer 3$ Global 4$ Duplicates 5$ Attributes 6$ Lines 7$ DomClassifier 8$ Categ 9$ Tokenize 10$ CreditCards 11$ Ontion 12$ Mail 13$ Web 14$ Creden
```

Feeding AIL

There are different ways to feed AIL with data:

1. Be a collaborator of CIRCL and ask to access our feed
2. Setup *pystemon* and use the custom feeder
 - *pystemon* will collect pastes for you
3. Feed your own data using the `import_dir.py` script

Feeding ALL with your own data - `import_dir.py`

1. Change your local configuration `bin/package/config.cfg`
 - change address of `ZMQ_Global` to `127.0.0.1:5556`

Feeding ALL with your own data - `import_dir.py`

1. Change your local configuration `bin/package/config.cfg`
 - change address of `ZMQ_Global` to `127.0.0.1:5556`
2. launch `import_dir.py` with de directory you want to import
 - `import_dir.py -d dir_path`

Feeding ALL with your own data - `import_dir.py`

1. Change your local configuration `bin/package/config.cfg`
 - change address of `ZMQ_Global` to `127.0.0.1:5556`
2. launch `import_dir.py` with the directory you want to import
 - `import_dir.py -d dir_path`
3. Watch your data being feed to ALL

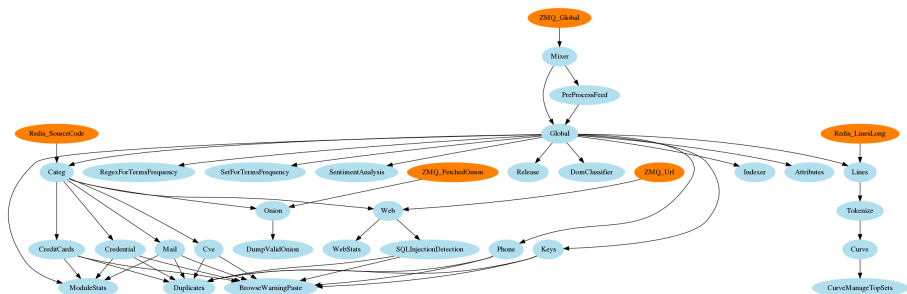


Feeding AIL

- Access to the workshop feed @ xxx.xxx.xxx.xxx:5556
 - change address of ZMQ_Global to xxx.xxx.xxx.xxx:5556 in the file bin/package/config.cfg

AIL - Add your own module

Choose where to locate your module in the data flow:



Then, modify `bin/package/modules.cfg` accordingly

Writing your own modules - /bin/template.py

```
1 import time
2 from pubsublogger import publisher
3 from Helper import Process
4 if __name__ == '__main__':
5     # Port of the redis instance used by pubsublogger
6     publisher.port = 6380
7     # Script is the default channel used for the modules.
8     publisher.channel = 'Script'
9     # Section name in bin/packages/modules.cfg
10    config_section = '<section name>'
11    # Setup the I/O queues
12    p = Process(config_section)
13    # Sent to the logging a description of the module
14    publisher.info("<description of the module>")
15    # Endless loop getting messages from the input queue
16    while True:
17        # Get one message from the input queue
18        message = p.get_from_set()
19        if message is None:
20            publisher.debug("{} queue is empty, waiting".format(config_section))
21            time.sleep(1)
22            continue
23        # Do something with the message from the queue
24        something_has_been_done = do_something(message)
```

AIL - Add your own web interface

1. launch `var/www/create_new_web_module.py`
2. Enter the module's name
3. A template and flask skeleton has been created for your new webpage in `var/www/modules/`
4. You can start **coding!**

How to contribute



How to contribute

- Feel free to fork the code, play with it, make some patches or add additional analysis modules.

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- To contribute your module, feel free to pull your contribution.

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- Feel free to fork the code, play with it, make some patches or add additional analysis modules.
- To contribute your module, feel free to pull your contribution.
- That's it!

< (^ . ^) >

Conclusion

- Building AIL helped us to find additional leaks which cannot be found using manual analysis and **improve the time to detect duplicate/recycled leaks.**

→ Therefore quicker response time to assist and/or inform proactively affected constituents.