AIL Framework for Analysis of Information Leaks

Workshop - A generic analysis open source software

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Luxembourg

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Objectives of the workshop

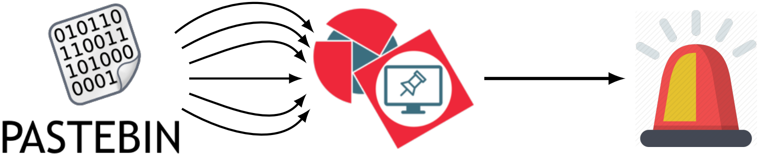
- Learn how to install and start AIL
- Learn how to manage current modules/features
- Learn how to create new modules/features
- Discover a new open source software \o/

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)

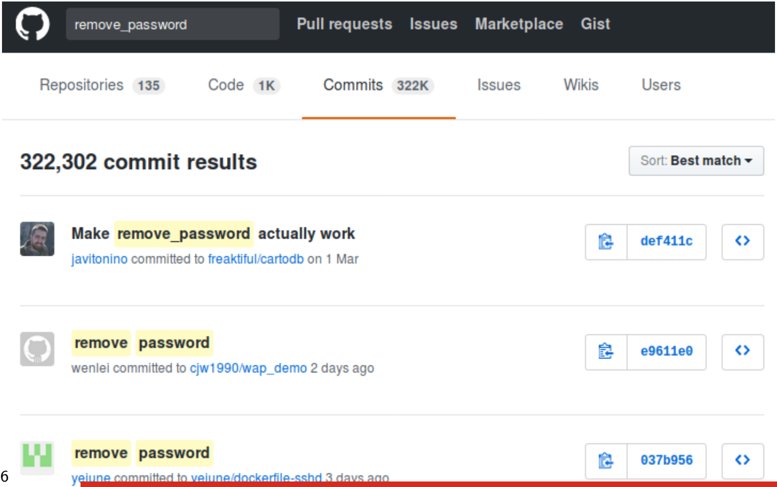
- Example: `http://pastebin.com/`
  - Easily storing and sharing text online
  - Used by programmers and legitimate users
    → Source code & configuration information

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



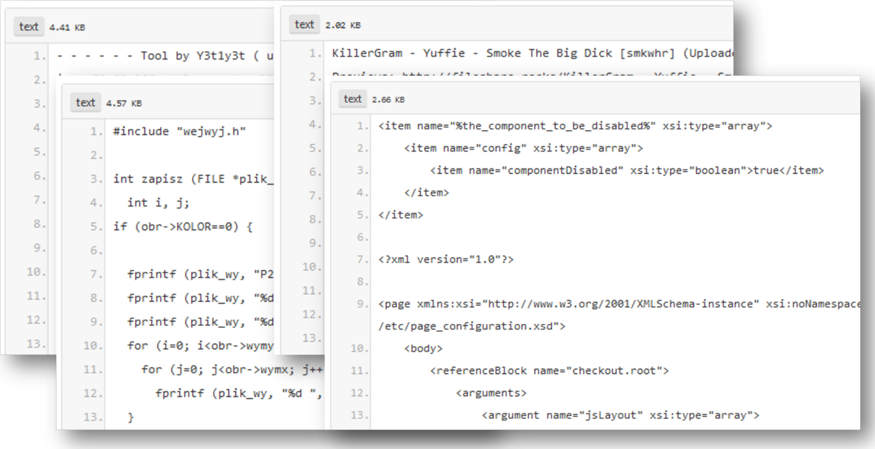
322,302 commit results

Make remove_password actually work
javitonino committed to freaktiful/cartodb on 1 Mar
def411c

remove password
wenlei committed to cjw1990/wap_demo 2 days ago
e9611e0

remove password
yejune committed to yejune/dockerfile-sshd 3 days ago
037b956

Examples of pastes



text 4.41 KB

```
- - - - - - Tool by Y3t1y3t ( u
```

text 4.57 KB

```
#include "wejwyj.h"

int zapisz (FILE *plik_
  int i, j;
if (obr->KOLOR==0) {

  fprintf (plik_wy, "P2
  fprintf (plik_wy, "%d
  fprintf (plik_wy, "%d
  for (i=0; i<obr->wymy
    for (j=0; j<obr->wymx; j++
      fprintf (plik_wy, "%d ",
  }
```

text 2.02 KB

```
KillerGram - Yuffie - Smoke The Big Dick [smkwhr] (Upload
```

text 2.66 KB

```
<item name="%the_component_to_be_disabled%" xsi:type="array">
    <item name="config" xsi:type="array">
        <item name="componentDisabled" xsi:type="boolean">true</item>
    </item>
</item>

<?xml version="1.0"?>

<page xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespace
/etc/page_configuration.xsd">
    <body>
        <referenceBlock name="checkout.root">
            <arguments>
                <argument name="jsLayout" xsi:type="array">
```

Paste monitoring at CIRCL: Statistics

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

Table: Statistics for 2016

Pastes 2016	Monthly average	Total
Fetched 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.

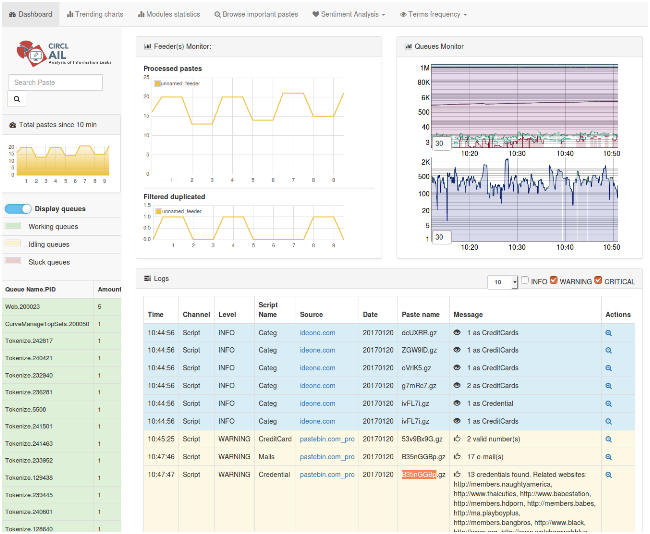
AIL Framework - History

- 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 **creadit 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 occurences**
- **Sentiment/Mood analyser** for incoming data
- Modules manager
- And many more

AIL: Following a notification (0) - Dashboard



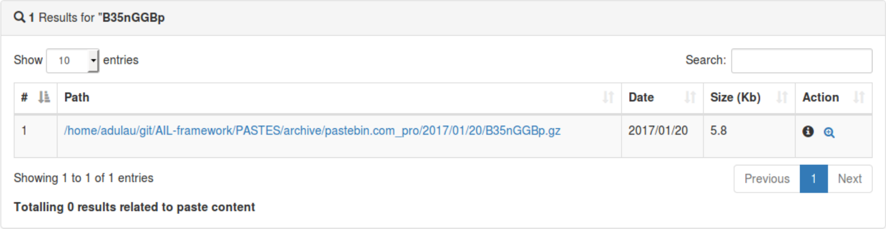
Queue Name.PID	Amount
Web.200023	5
CurveManageTopSets.200050	1
Tokenize.242817	1
Tokenize.240421	1
Tokenize.232940	1
Tokenize.236281	1
Tokenize.5508	1
Tokenize.241501	1
Tokenize.241463	1
Tokenize.233952	1
Tokenize.129438	1
Tokenize.239445	1
Tokenize.240601	1
Tokenize.128640	1

Logs

10 ☐ INFO ☑ WARNING ☑ CRITICAL

Time	Channel	Level	Script Name	Source	Date	Paste name	Message	Actions
10:44:56	Script	INFO	Categ	ideone.com	20170120	dcUXRR.gz	1 as CreditCards	
10:44:56	Script	INFO	Categ	ideone.com	20170120	ZGW9lD.gz	1 as CreditCards	
10:44:56	Script	INFO	Categ	ideone.com	20170120	oVrlK5.gz	1 as CreditCards	
10:44:56	Script	INFO	Categ	ideone.com	20170120	g7mRc7.gz	2 as CreditCards	
10:44:56	Script	INFO	Categ	ideone.com	20170120	ivFL7i.gz	1 as Credential	
10:44:56	Script	INFO	Categ	ideone.com	20170120	ivFL7i.gz	1 as CreditCards	
10:45:25	Script	WARNING	CreditCard	pastebin.com_pro	20170120	53v9Bx9G.gz	2 valid number(s)	
10:47:46	Script	WARNING	Mails	pastebin.com_pro	20170120	B35nGGBp.gz	17 e-mail(s)	
10:47:47	Script	WARNING	Credential	pastebin.com_pro	20170120	B35nGGBp.gz	13 credentials found. Related websites: http://members.naughtyamerica, http://www.thaicuties, http://www.babestation, http://members.hdporn, http://members.babes, http://ma.playboyplus, http://members.bangbros, http://www.black,	

AIL: Following a notification (1) - Searching



1 Results for "**B35nGGBp**

Show 10 entries

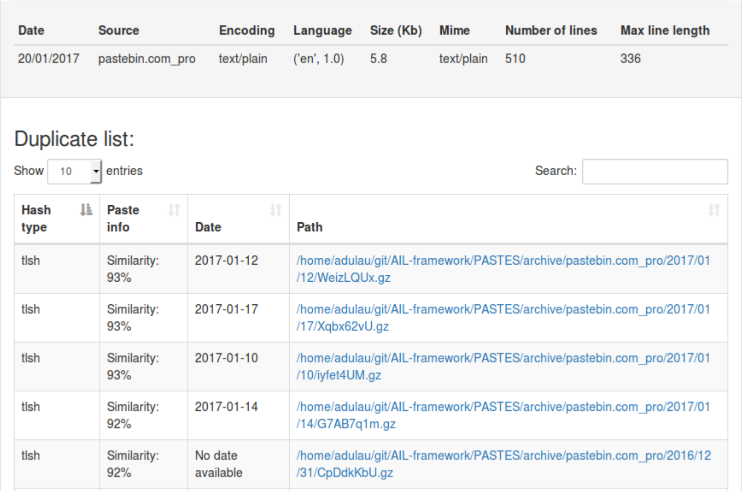
Search:

#	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	ℹ 🔍

Showing 1 to 1 of 1 entries

Totalling 0 results related to paste content

AIL: Following a notification (2) - Metadata

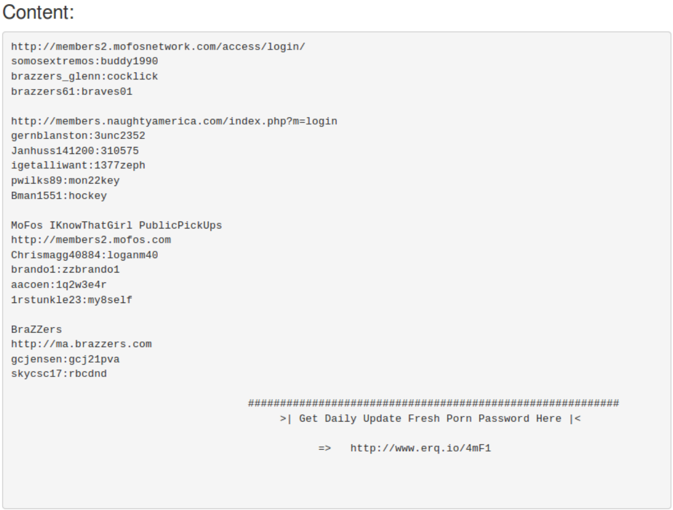


Date	Source	Encoding	Language	Size (Kb)	Mime	Number of lines	Max line length
20/01/2017	pastebin.com_pro	text/plain	('en', 1.0)	5.8	text/plain	510	336

Duplicate list:

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/iyfet4UM.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

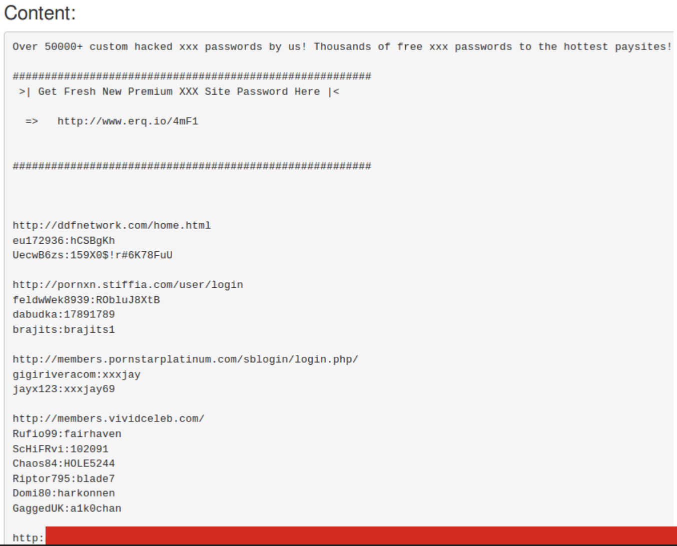
AIL: Following a notification (3) - Browsing content



Content:

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

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

MoFos IKnowThatGirl PublicPickUps
http://members2.mofos.com
Chrismagg40884:loganm40
brando1:zzbrando1
aacoen:1q2w3e4r
1rstunkle23:my8self

BraZZers
http://ma.brazzers.com
gcjensen:gcj21pva
skycsc17:rbcdnd

                                     ##########################################################
                                          >| 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:RObluJ8XtB
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:
```

Installation

Setting up AIL-Framework

```
git clone https://github.com/CIRCL/AIL-framework.git
cd AIL-framework
./installing_deps.sh
cd var/www/
./update_thirdparty.sh
```

Running your own instance

Accessing the environment and Starting AIL

```
cd ~/AIL-Framework/
. ./AILENV/bin/activate
cd bin/
./LAUNCH
# check options 1->5
```

Running your own instance

Accessing the environment and Starting AIL

```
cd ~/AIL-Framework/
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# check options 1->5
```

Starting the web interface

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

Managing your modules: Old fashion way

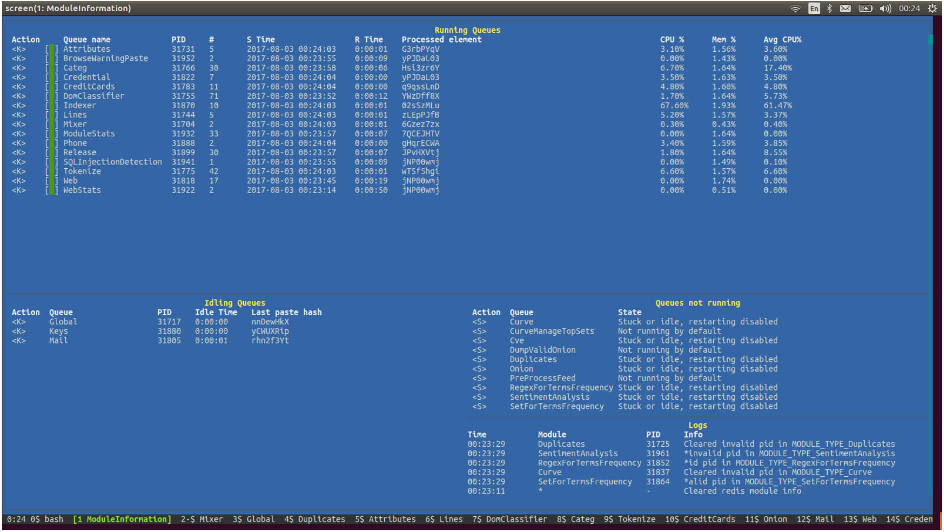
Access the script screen

```
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)                                                                    En          00:24

                                                                 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    G3rbPYqV                                             3.10%      1.56%      3.60%
<K>      [ ] BrowseWarningPaste        31952   2      2017-08-03 00:23:55    0:00:09    yPJDaL03                                             0.00%      1.43%      0.00%
<K>      [ ] Categ                     31766   30     2017-08-03 00:23:58    0:00:06    Hsi3zr6Y                                             6.70%      1.64%      17.40%
<K>      [ ] Credential                31822   7      2017-08-03 00:24:04    0:00:00    yPJDaL03                                             3.50%      1.63%      3.50%
<K>      [ ] CreditCards               31783   11     2017-08-03 00:24:04    0:00:00    q9qssLnD                                             4.80%      1.60%      4.80%
<K>      [ ] DomClassifier             31755   71     2017-08-03 00:23:52    0:00:12    YWzDff8X                                             1.70%      1.64%      5.73%
<K>      [ ] Indexer                   31870   10     2017-08-03 00:24:03    0:00:01    02sSzMLu                                             67.60%     1.93%      61.47%
<K>      [ ] Lines                     31744   5      2017-08-03 00:24:03    0:00:01    zLEpPJfB                                             5.20%      1.57%      3.37%
<K>      [ ] Mixer                     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    gHqrECWA                                             3.40%      1.59%      3.85%
<K>      [ ] Release                   31899   30     2017-08-03 00:23:57    0:00:07    JPvHXVtj                                             1.80%      1.64%      8.55%
<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    wTSf5hgi                                             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%

                      Idling Queues
Action   Queue              PID     Idle Time   Last paste hash
<K>      Global             31717   0:00:00     nnDewHkX
<K>      Keys               31880   0:00:00     yCWUXRip
<K>      Mail               31805   0:00:01     rhn2f3Yt

                                 Queues not running
Action   Queue                  State
<S>      Curve                  Stuck or idle, restarting disabled
<S>      CurveManageTopSets     Not running by default
<S>      Cve                    Stuck or idle, restarting disabled
<S>      DumpValidOnion         Not running by default
<S>      Duplicates             Stuck or idle, restarting disabled
<S>      Onion                  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
Time          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    *alid pid in MODULE_TYPE_SetForTermsFrequency
00:23:11      *                      -        Cleared redis module info

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

Feeding AIL

There are differents way 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 AIL 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`
   - (is already set by default)

Feeding AIL 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`
   - (is already set by default)
2. launch `import_dir.py` with de directory you want to import
   - `import_dir.py -d dir_path`

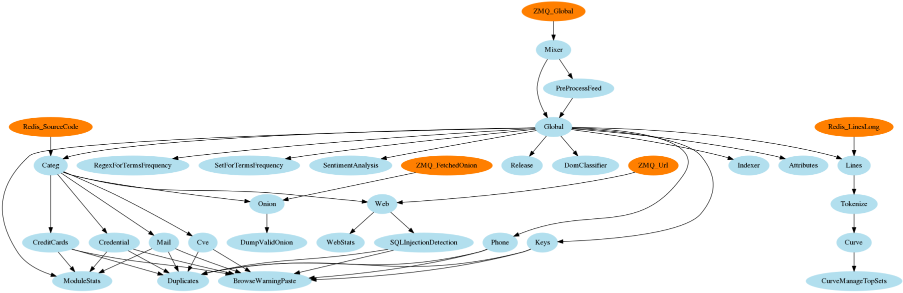
Feeding AIL with your own data - import_dir.py

1. Change your local configuration `bin/package/config.cfg`
   - change address of `ZMQ_Global` to `127.0.0.1:5556`
   - (is already set by default)
2. launch `import_dir.py` with de directory you want to import
   - `import_dir.py -d dir_path`
3. Watch your data being feed to AIL

- You can access the CIRCL feed during the SHA2017
- Just leave `ZMQ_Global->address` to `tcp://crf.circl.lu:5556`

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

```python
import time
from pubsublogger import publisher
from Helper import Process
if __name__ == '__main__':
    # Port of the redis instance used by pubsublogger
    publisher.port = 6380
    # Script is the default channel used for the modules.
    publisher.channel = 'Script'
    # Section name in bin/packages/modules.cfg
    config_section = '<section name>'
    # Setup the I/O queues
    p = Process(config_section)
    # Sent to the logging a description of the module
    publisher.info("<description of the module>")
    # Endless loop getting messages from the input queue
    while True:
        # Get one message from the input queue
        message = p.get_from_set()
        if message is None:
            publisher.debug("{} queue is empty, waiting".format(config_section))
            time.sleep(1)
            continue
        # Do something with the message from the queue
        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

- 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!

く(^.^)ノ

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.