CIRCL
Computer Incident
Response Center
Luxembourg

AIL Project - Practical and Efficient Data-Mining of Chats, Suspicious Websites, Forums and Tor Hidden-Services

CIRCL - Virtual Summer School 2025

https://ail-project.org/

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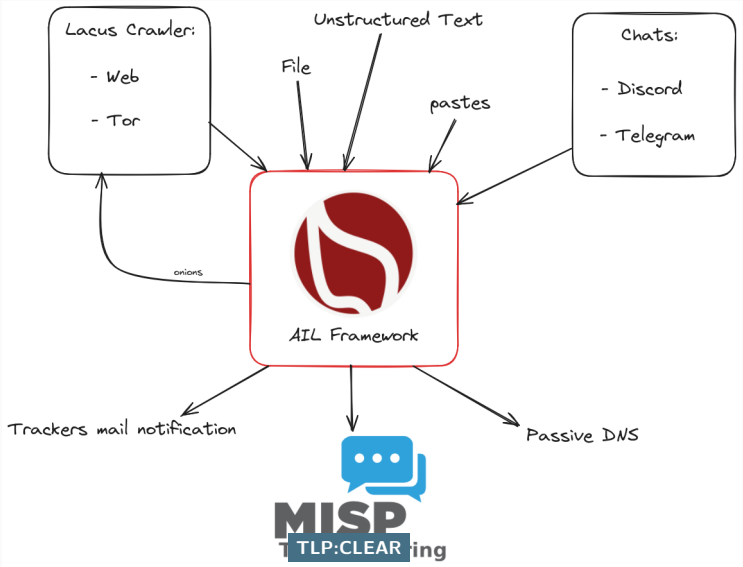
Background

- Over the past years, CIRCL has developed the AIL project[1] to fulfill our needs at CIRCL in intelligence gathering and analysis.
- AIL features an extensible Python-based framework for the **analysis of unstructured information**, collected either through an advanced crawler manager or from various feeders, including social networks and custom feeders.
- The AIL Project is an **open-source** framework[2] comprising various modules designed for the **collection, crawling, digging, and analysis of unstructured data**.

[1] https://www.ail-project.org/
[2] https://github.com/ail-project

High Level Overview



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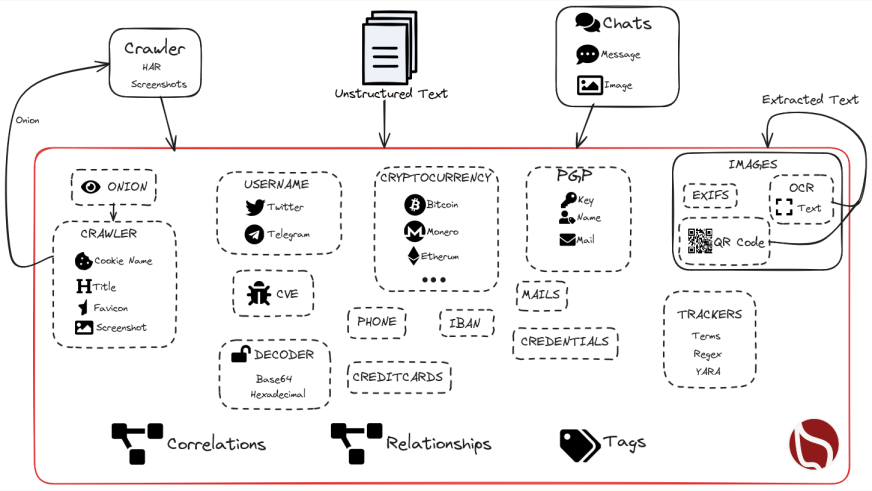
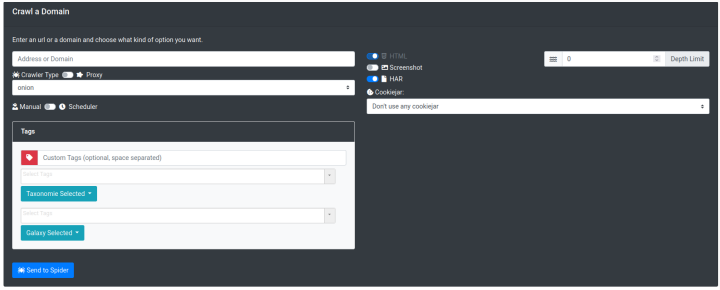
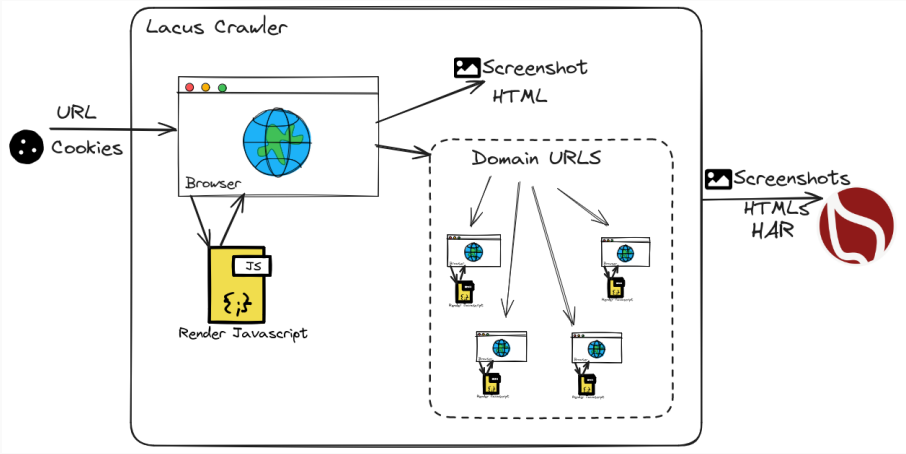
Analysis of unstructured information



- Crawling can be a challenging task, for example, gathering all the blog posts from ransomware groups[3], which can be demanding for an analyst.
- AIL offers a crawling feature that can **initiate regular crawls using a standard spawned browser**.



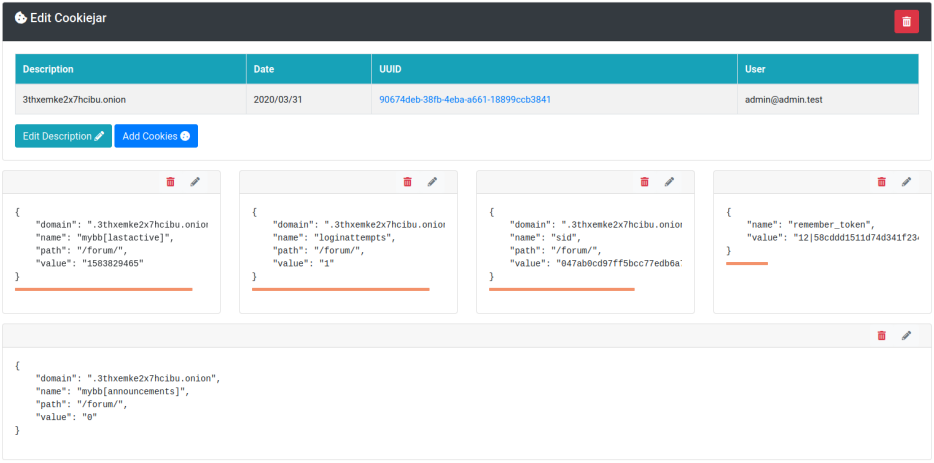
[3] https://www.ransomlook.io/



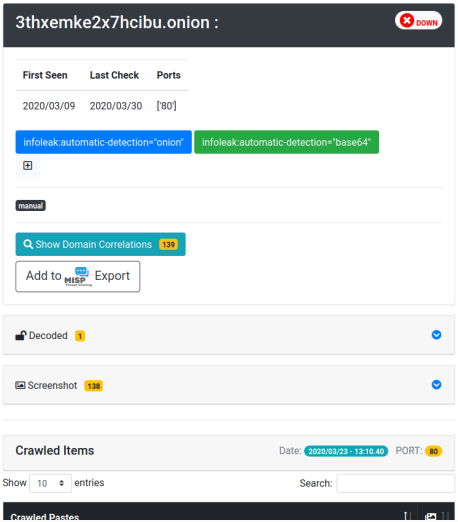
[4] https://github.com/ail-project/lacus

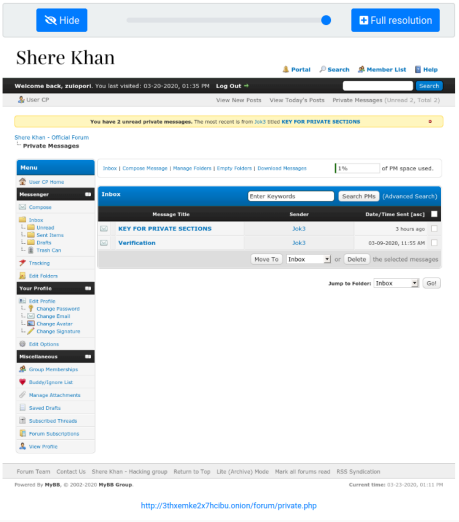
Crawler: Cookiejar

Use your cookies to login and bypass captcha



Crawler: Cookiejar





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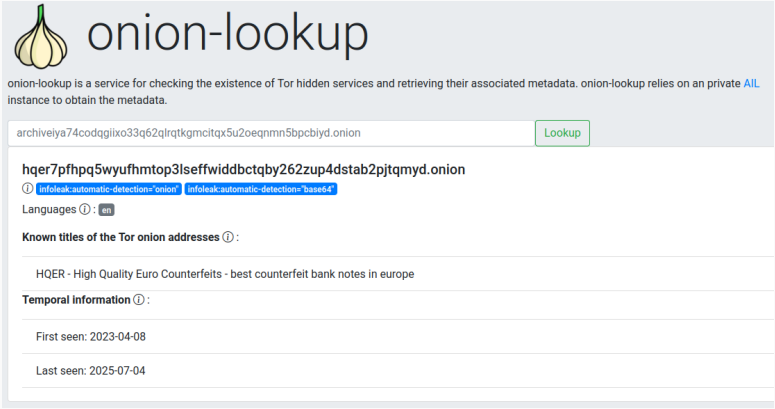
Onion Lookup - onion.ail-project.org

- `https://onion.ail-project.org` is a public search engine powered by AIL.
- Check if a Tor hidden service exists and retrieve its associated metadata.
- Can be used to filter onion domains related to CSAM and other violent content.



Crawler - Pre-Filtering

Filter Unsafe Onion: False

This option enables filtering of onion domains that are considered unsafe due to containing violent content, child sexual abuse material (CSAM), or other harmful materials. When enabled, the system will attempt to identify and exclude such domains from crawling.

⚠ **Disabling this option may result in crawling and downloading content that includes CSAM, extreme violence, or other harmful materials.**
Users are strongly advised to keep this feature enabled to avoid unintentional exposure to such content.

🔍 How It Works: The filtering mechanism leverages known blocklists, heuristics, and automated detection techniques to reduce the risk of crawling unsafe content. While no filtering system is perfect, we continuously strive to improve detection and minimize exposure to harmful materials.

By using this feature, you benefit from an added layer of protection, but please note that some unsafe onion domains may still bypass detection due to evolving content and obfuscation techniques. We encourage users to remain cautious and use this feature as an additional safeguard.

✓ Enable Onion Filter

Crawl Unknown Onion: Disabled

This option controls whether the crawler should proceed with crawling onion domains that have **not yet been classified** as safe or unsafe.

- **If disabled:** The crawler will process domains that have never been checked, potentially discovering new useful content but also increasing the risk of encountering unsafe materials.
- **If enabled:** The crawler will only process domains that have been explicitly identified as safe, reducing risk but potentially missing new, unclassified domains.

This option is useful for users who want to explore uncharted domains while still benefiting from the `filter_unsafe_onion` protection. However, enabling this option increases the likelihood of encountering harmful content, so caution is advised.

✓ Enable Unknown Onion Filter

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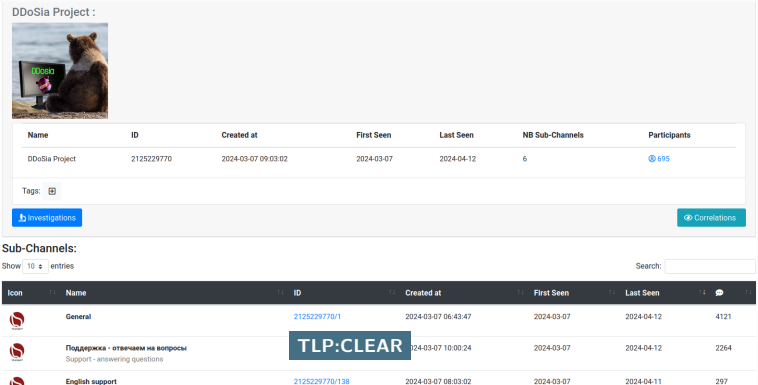
Collection - Automate Collection

- Collecting data from various chat sources can be a **tedious task for analysts**.
- AIL offers a set of feeders (e.g., Telegram, Discord) that can be used to subscribe to chat channels.
- All the **collected messages are then processed and analyzed** within AIL's *processing* and *analysis* stages.



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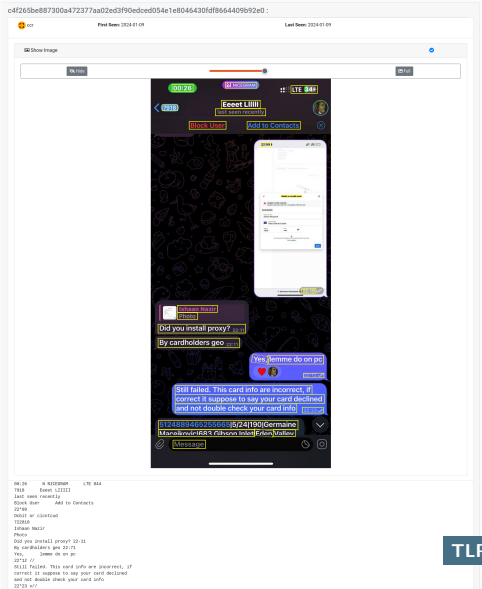
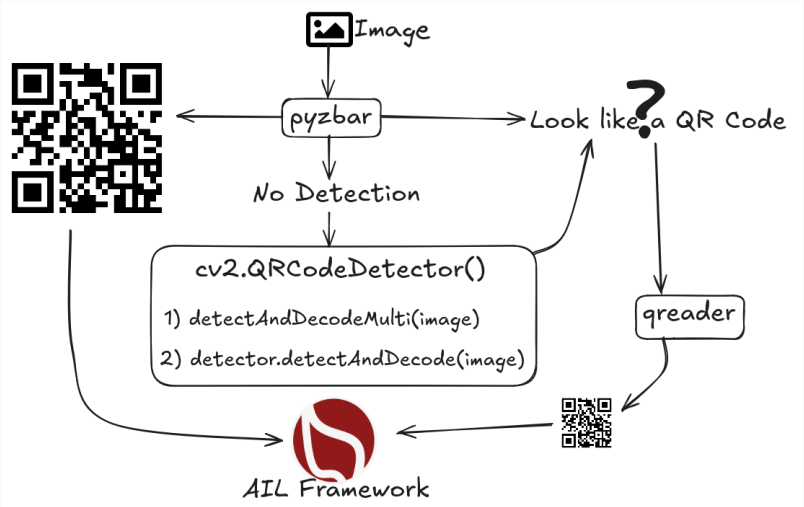
OCR: Optical Character Recognition

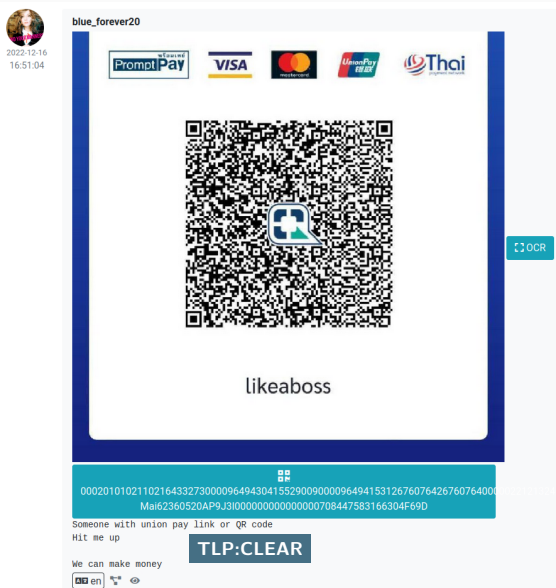


- Threat actors are often verbose and frequently **share extensive details in private channels**.
- Many messages contain screenshots and images.
- Text detection and extraction are performed across 80+ languages using a CRNN (Convolutional Recurrent Neural Network).
- **Enables keyword-based matching and detection**.

QR Code Extractor



QR Codes



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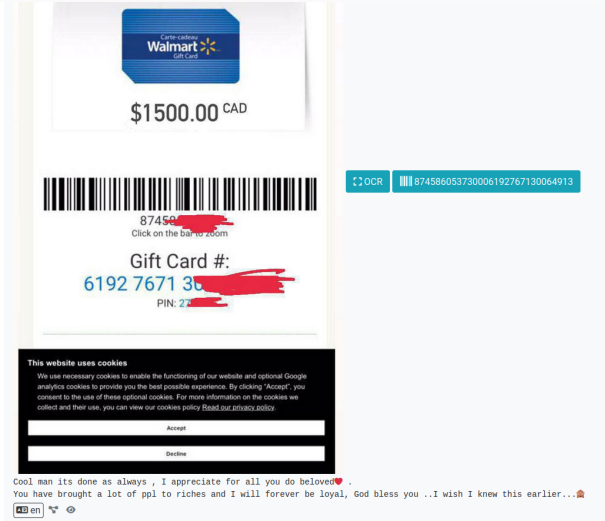
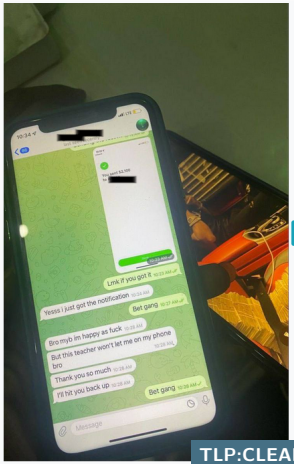
Bar Codes


Carte-cadeau
Walmart
Gift Card
$1500.00 CAD
Click on the bar to zoom
Gift Card #:
6192 7671
PIN:
OCR
This website uses cookies
We use necessary cookies to enable the functioning of our website and optional Google analytics cookies to provide you the best possible experience. By clicking "Accept", you consent to the use of these optional cookies. For more information on the cookies we collect and their use, you can view our cookies policy Read our privacy policy.
Accept
Decline
Cool man its done as always , I appreciate for all you do beloved .
You have brought a lot of ppl to riches and I will forever be loyal, God bless you ..I wish I knew this earlier...
en

Images Descriptions

- Uses **Ollama and Qwen2.5-VL** to automatically generate descriptions for screenshots and other images.



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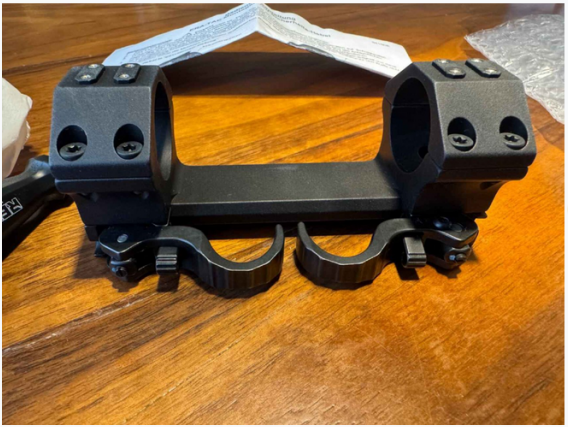
Images Descriptions

- Helps users quickly understand image content without viewing the image directly.
- Generated descriptions provide an extra layer of insight during analysis.



The image shows a black tactical scope mount. This type of mount is typically used for attaching a scope to a firearm, such as a rifle. The mount has a cylindrical opening in the center, which is designed to accept a scope. The mount also has several mounting points and adjustment screws, allowing for precise alignment and adjustment of the scope. The mount appears to be made of metal and is designed for durability and stability. The background shows a wooden surface with some packaging materials, indicating that the mount is new and possibly still in its original packaging.

AIL Framework: Features

- Extracting **credit card numbers, credentials, phone numbers, . . .**
- Extracting and validating potential **hostnames**
- Submission to threat sharing and incident response platforms (**MISP** and **FlowIntel**[5])
- **Tagging**[6] for classification and searches
- Terms, sets, regex, and YARA **tracking, occurrences, and history**
- Archives, files, and raw **submission** from the UI
- Correlation engine based on PGP ID, cryptocurrencies, decoded (Base64, . . .), usernames, cookie names, and many selectors to find relationships
- And many more

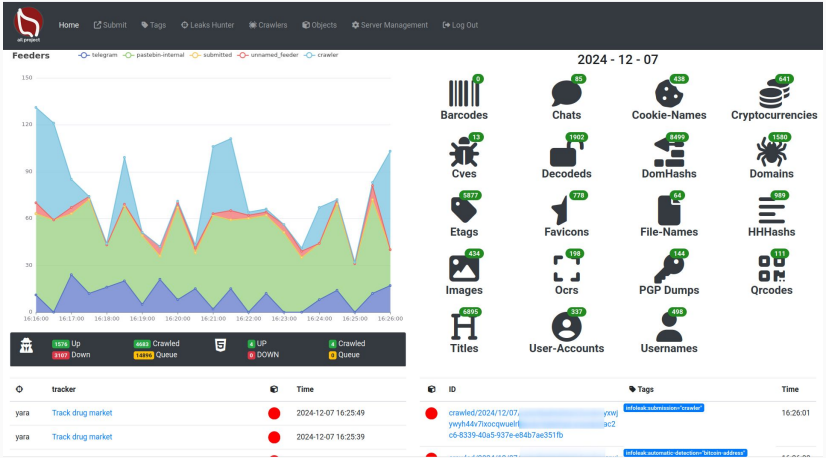
[5] https://github.com/flowintel/flowintel
[6] Relying on MISP taxonomies and galaxy

Live Trackers & Retro Hunt

- Search and monitor specific keywords/patterns
  - Automatic tagging
  - Email/webhook notifications
- Track Word
  - ddos
- Track Set
  - booter, ddos, stresser; 2
- Track Regex
  - circl\lu
- **YARA rules**
  - `https://github.com/ail-project/ail-yara-rules`

Live Demo

Dashboard


Home
Submit
Tags
Leaks Hunter
Crawlers
Objects
Server Management
Log Out
Feeders
telegram
pastebin-internal
submitted
unnamed_feeder
crawler
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Barcodes
Chats
Cookie-Names
Cryptocurrencies
Cves
Decodeds
DomHashs
Domains
Etags
Favicons
File-Names
HHHashs
Images
Ocrs
PGP Dumps
Qrcodes
Titles
User-Accounts
Usernames
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Down
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Queue
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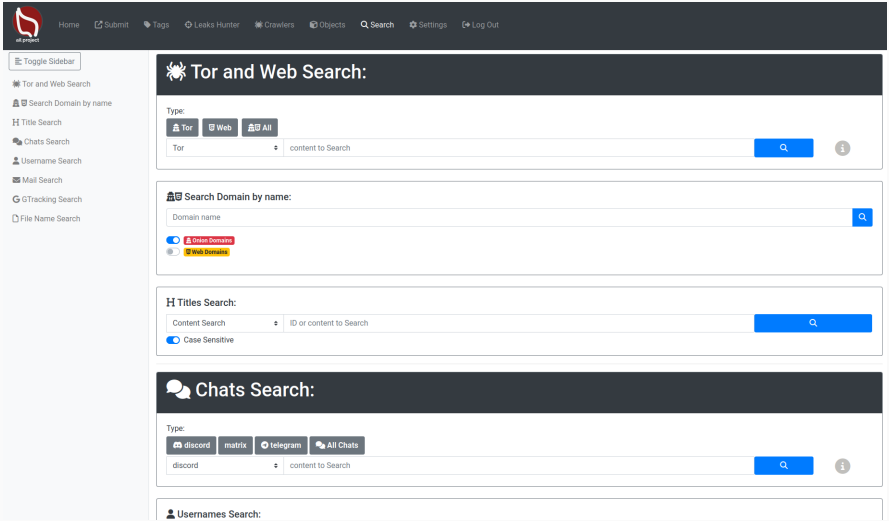
Search


Home
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Objects
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Settings
Log Out
Toggle Sidebar
Tor and Web Search
Search Domain by name
Title Search
Chats Search
Username Search
Mail Search
GTracking Search
File Name Search
Tor and Web Search:
Type:
Tor
Web
All
Tor
content to Search
Search Domain by name:
Domain name
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Content Search
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discord
content to Search
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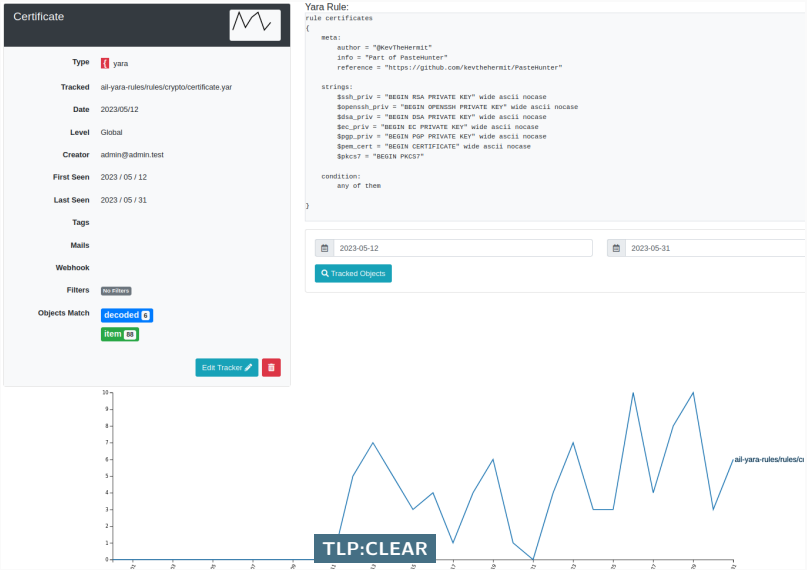
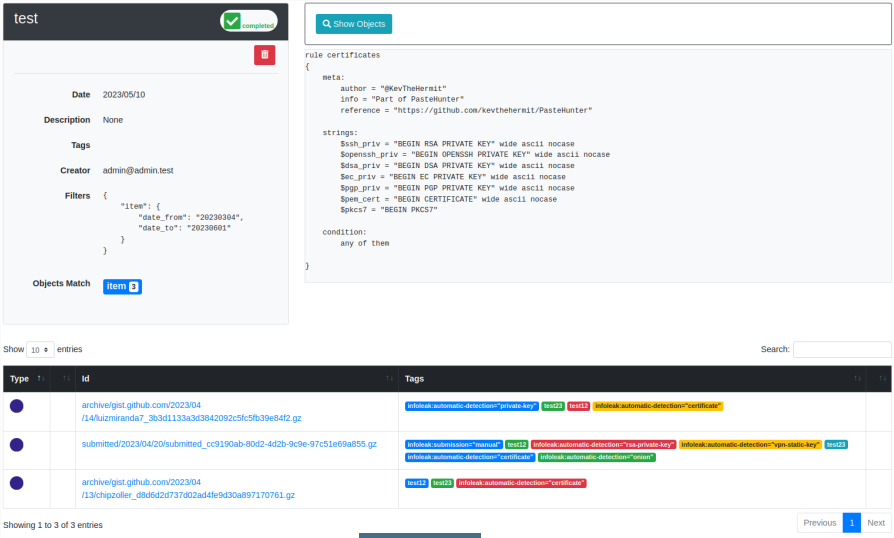
YARA Tracker



Retro Hunt



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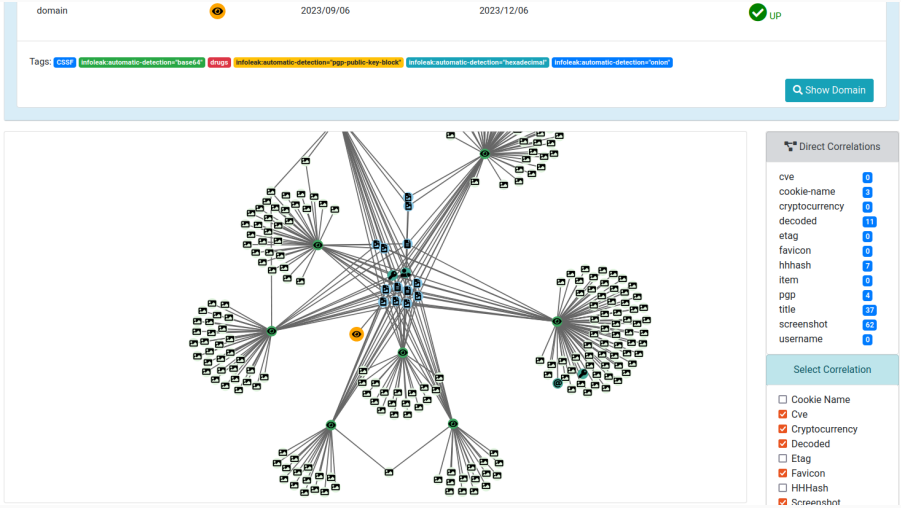
Correlations and relationship



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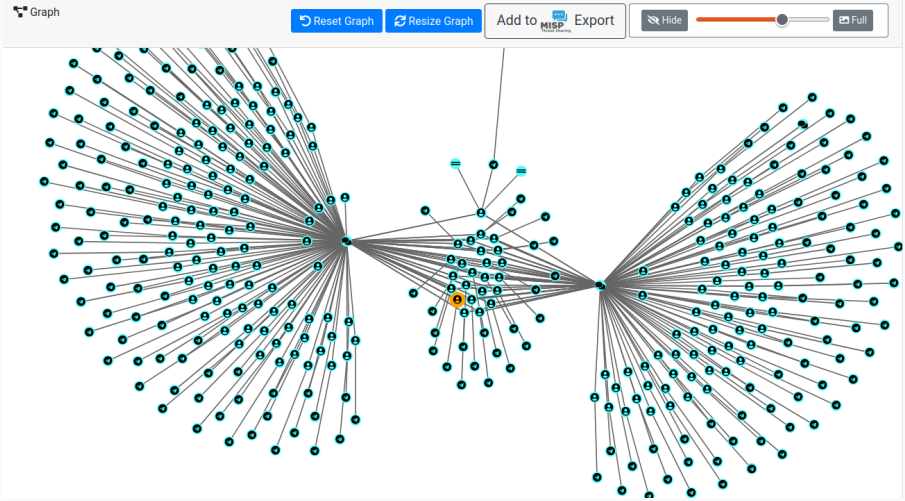
User Correlation - Common Chats



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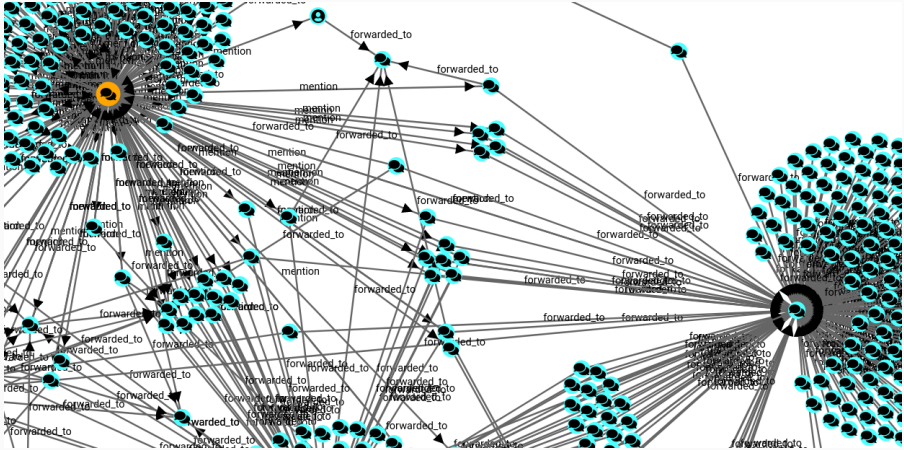
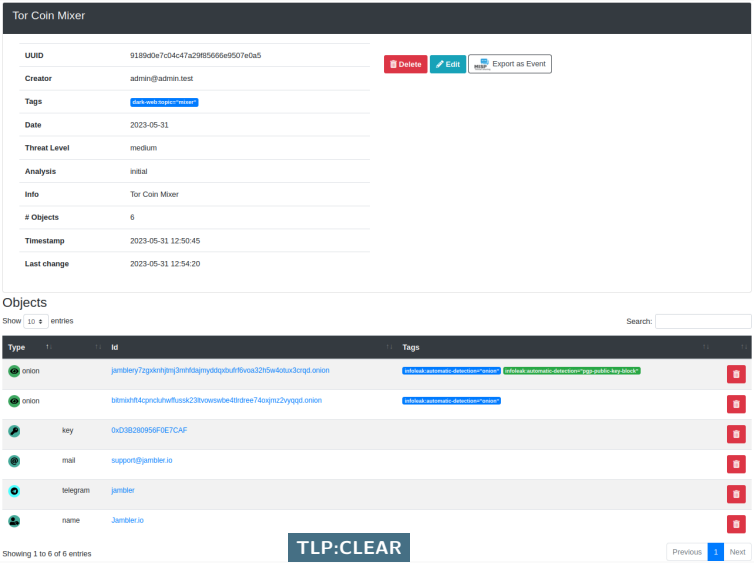
What are the Relationships Between Chats Group?



Investigations



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AIL Framework: Extensible Capabilities

- 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.
- **Multiple** concurrent **data inputs**.
- Tor Crawler (handles cookies and authentication).
- Feeders: Discord, Telegram, ...

Ongoing Developments

- **Mail Search – Next Release**
- **Lacus crawler improvements:** proxy selection, local cache, and cookie state transfer
- **Translate search:** support for searching in other languages
- **Advanced video processing and extraction**
- **MISP export with new correlation types**
- **Automatic geolocation**

Links

- AIL project website `https://ail-project.org`
- AIL project open source framework `https://github.com/ail-project`
- Training materials `https://github.com/ail-project/ail-training`
- Online chat `https://gitter.im/ail-project/community`

Thank you for your attention

- AIL project[7] : `https://github.com/ail-project/ail-framework`
- For questions, contact: info@circl.lu

[7] All techniques and indicators mentioned in these slides are implemented in the AIL project, using an instance backed by a three-year dataset collected from Tor hidden services and various social networks.