

# Whois API Case Study

Dark Crawler, a useful tool to assess child exploitation from online communities.

## I. The Research Organization

### **Simon Fraser University International Cybercrime Research Center**

The International Cybercrime Research Centre (ICCRC) was launched on July 8, 2008, at SFU's Surrey campus, by the B.C. Minister of Labour and Citizen's Services, in partnership with the School of Criminology and the Society for the Policing of Cyberspace (POLCYB).

#### **Mission Statement:**

To promote education and conduct research in cybercrime prevention, detection, and response, in collaboration with the public and private sectors at the regional, national, and international levels.

## II. Members of the Research

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Associate Director, International Cybercrime Research Centre  
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### **Bryan Monk**

He is a master's student in the School of Criminology at Simon Fraser University. His primary research interests include: social network analysis, cybercrime, geocoding IP addresses, Dark Web, crypto currencies, and cryptography.

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### III. INTRODUCTION

Child sexual offenders have historically been quick to adapt technological advances, such as photography and film for the purposes of exploiting children. The movement of CEM to the internet has enabled child sexual offenders to form virtual communities online, allowing them to more easily, and secretively, access and trade CEM, recruit co offenders and/or business partners, as well as validate their deviant behavior amongst other child sexual offenders.

Despite the established harm inherent within child exploitation imagery and distribution online, current attempts to limit such content have been largely unsuccessful. Law enforcement strategies intended to target child exploitation material (CEM) online have included chat-room stings, honey trap sites, injunctions issued against websites hosting child pornography, and traditional criminal investigations and investigatory techniques adapted for online use.

### IV. SOLUTION/METHOD:

Dark Crawler is the tool used by search-engines to automatically navigate the Internet and collect information about each website and webpage. Search engines use them to collect data which allows users to perform queries to find information. They can also be used to seek out specific content, such as child exploitation material (CEM), as in the case of the study presented in this paper. Given a starting webpage, web-crawlers will recursively follow the links out of that webpage, until some user-specified termination conditions apply. During this process, the web-crawler will keep track of all the links between other websites and follow them to retrieve those as well.

To perform this research a software tool called the “Location Extraction of Child Exploitation Networks” (LECEN) was utilized. LECEN is a customized web-crawler and has the unique ability to identify registrants, their physical address, and the domains which belong to them, allowing us to identify potential major players based on an individual’s location within the network.

#### PHASES OF SOLUTIONS:

##### Phase 1 – Data collection

LECEN starts by downloading a set of webpages which have been identified by the operator as containing CEM

##### Phase 2 – Constructing the Network

The resulting web-crawler data was used to construct two networks. It should be stated that at no point does LECEN contravene or enter password protected websites. The first network, referred to as the “Domain Network”, was focused on the domains of the websites, where the nodes consisted only of

website domains, while edges in the network represented the number of hyperlinks between the two corresponding domains.

The second network, referred to as the “Registrant Network”, focused on the registrant data, where the nodes represented the legal owners of those same domains identified in the Domain Network, with the edges representing the number of hyperlinks between the sites that those registrants owned.

### **Phase 3 – Whois**

The Internet’s Whois service, originally referred to as Nicname, is a text-based query-response protocol which allows individuals to find out the registrant information on an internet domain. This lookup allows IP addresses to be traced beyond the simple connection to the hosted site and provides details regarding the individual who owns an account linked to the domain in question

### **Phase 4 – Geolocation**

Geolocation refers to the process of identifying the location of internet devices (such as an IP address, a cellphone, or computer terminal) and involves the mapping of an internet protocol address to a real world geographic location of the host. The end result is either an address in the form of city/state/country, or a longitude/latitude pair.

### **Phase 5 – Storage**

All this information is then stored in a central database for later analysis.

## **V. RESULTS**

The tool will be very beneficial to everyone especially the investigators as it provides a way to easily determine the origin of the offenders. With this, faster investigation and fast result is guaranteed.

## **VI. References:**

Networking in Child Exploitation

<https://www.dropbox.com/s/ea3ps58pstaylpa/Networking%20in%20CE.pdf?dl=0>

Measuring Cybercrime: The Example of Online Child Exploitation

<https://www.dropbox.com/s/l7x2sj7mp7vk55y/Child%20Exploitation.pptx?dl=0>

Dark Crawler

<https://www.dropbox.com/s/gmtox1onq1icrda/Dark%20Crawler%20V02.pdf?dl=0>

LECENing places to hide: Geo - Mapping Child Exploitation Material

<https://www.dropbox.com/s/1za2jjq3gal2rev/CP%20Geolocation%20V14.pdf?dl=0>