Making Sense of **Unstructured Threat Intelligence Data**

Thursday, May 2
IACD

HOSTED BY NICOLAS KSEIB,
LEAD DATA SCIENTIST AT TRUSTAR

Before We Get Started

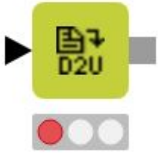
Why Are We Here?

1. About TruSTAR
2. Questions are encouraged
3. We'll send you all resources (Slides, GitHub, Blog) after the presentation.

Agenda

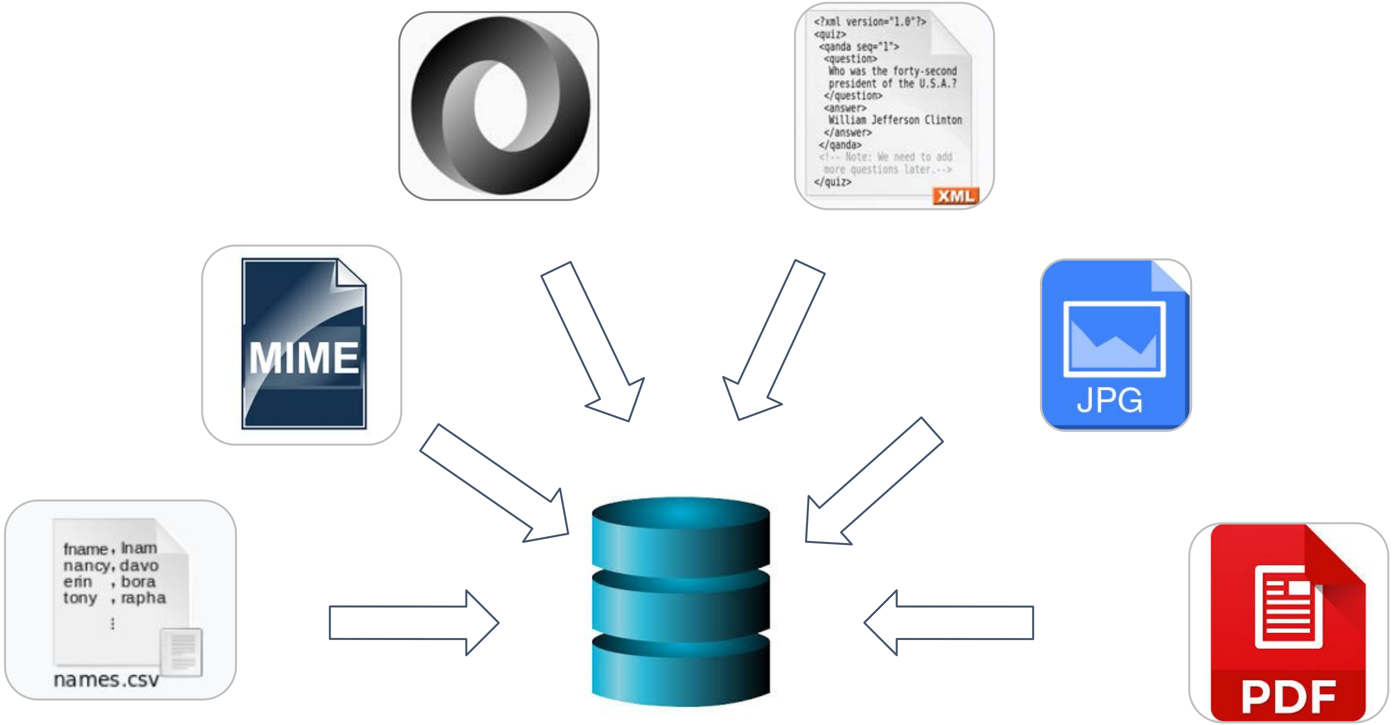
1. Overview of Data Challenges
2. Why do we want to solve these challenges
3. How are solving them
4. NLP

Doc2Vec Learner



I. Overview of Data Challenges in Intelligence

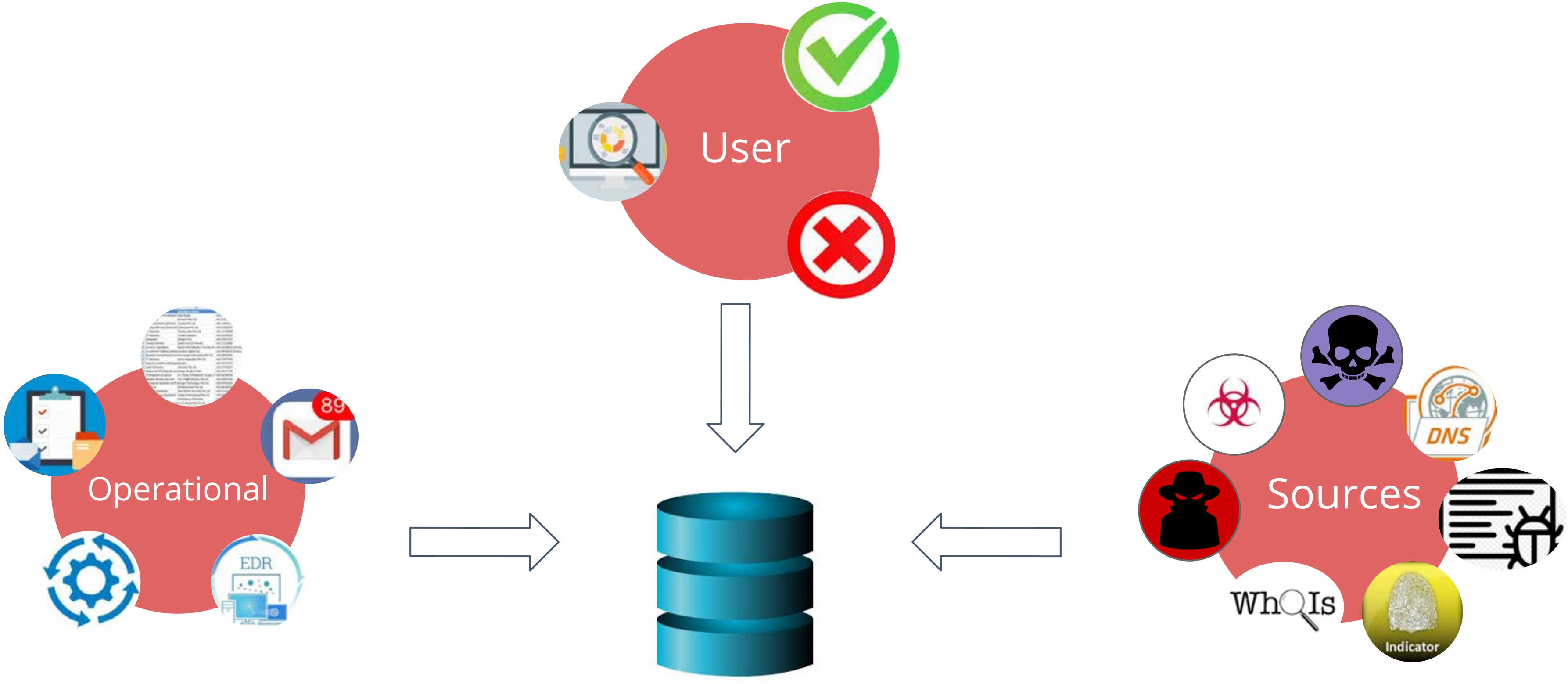
Variety of Data Formats



```
<?xml version="1.0"?>
<quiz>
 <qanda seq="1">
  <question>
   Who was the forty-second
   president of the U.S.A.?
  </question>
  <answer>
   William Jefferson Clinton
  </answer>
 </qanda>
 <!-- Note: We need to add
  more questions later.-->
</quiz>
```

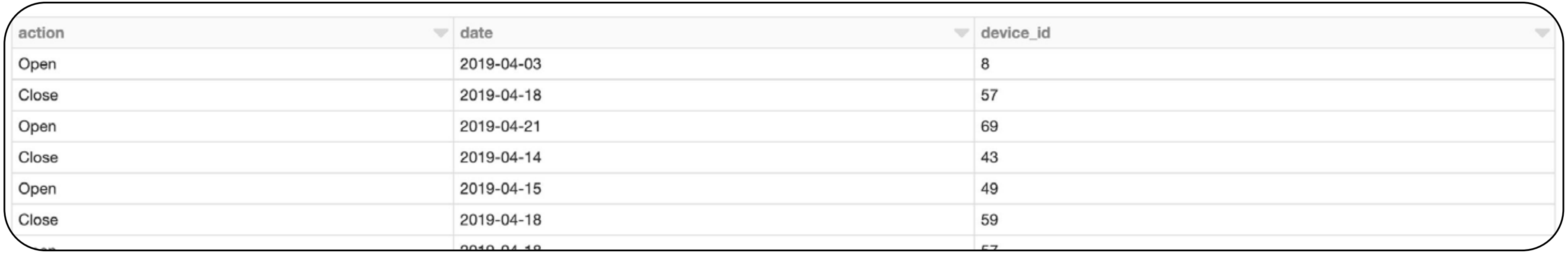
```
fname , lnam
nancy, davo
erin  , bora
tony  , rapha
  ⋮
```

Variety of Data Sources



Variety of Data Sources

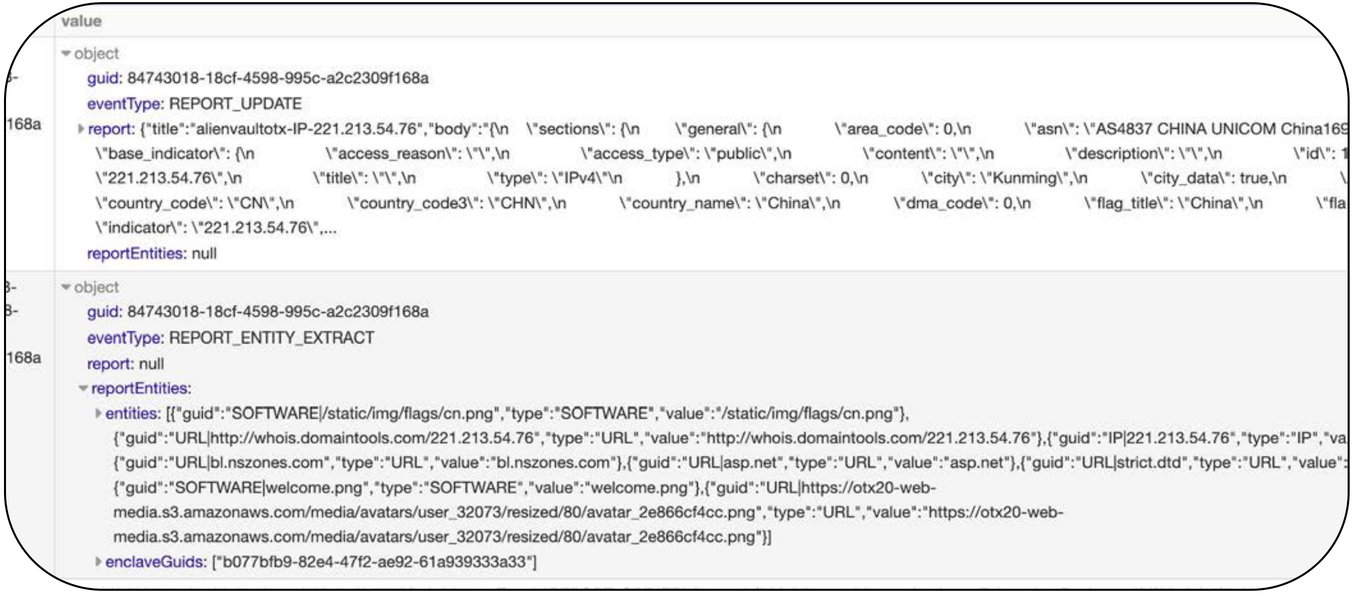
Structured



action	date	device_id
Open	2019-04-03	8
Close	2019-04-18	57
Open	2019-04-21	69
Close	2019-04-14	43
Open	2019-04-15	49
Close	2019-04-18	59

Variety of Data Sources

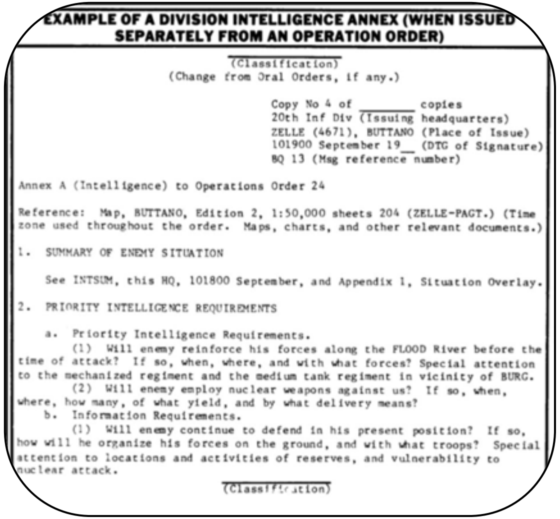
Semi-structured



```
      value
      ▾ object
3-       guid: 84743018-18cf-4598-995c-a2c2309f168a
         eventType: REPORT_UPDATE
168a   ▸ report: {"title":"alienvaultotx-IP-221.213.54.76","body":"{\n   \"sections\": {\n      \"general\": {\n         \"area_code\": 0,\n         \"asn\": \"AS4837 CHINA UNICOM China169
          \"base_indicator\": {\n            \"access_reason\": \"\",\n            \"access_type\": \"public\",\n            \"content\": \"\",\n            \"description\": \"\",\n            \"id\": 1
          \"221.213.54.76\",\n            \"title\": \"\",\n            \"type\": \"IPv4\"\n         },\n         \"charset\": 0,\n         \"city\": \"Kunming\",\n         \"city_data\": true,\n         \
          \"country_code\": \"CN\",\n         \"country_code3\": \"CHN\",\n         \"country_name\": \"China\",\n         \"dma_code\": 0,\n         \"flag_title\": \"China\",\n         \"fla
          \"indicator\": \"221.213.54.76\",...
         reportEntities: null
3-    ▾ object
3-       guid: 84743018-18cf-4598-995c-a2c2309f168a
         eventType: REPORT_ENTITY_EXTRACT
168a     report: null
       ▾ reportEntities:
         ▸ entities: [{"guid":"SOFTWARE|/static/img/flags/cn.png","type":"SOFTWARE","value":"/static/img/flags/cn.png"},
             {"guid":"URL|http://whois.domaintools.com/221.213.54.76","type":"URL","value":"http://whois.domaintools.com/221.213.54.76"},{"guid":"IP|221.213.54.76","type":"IP","va
             {"guid":"URL|bl.nszones.com","type":"URL","value":"bl.nszones.com"},{"guid":"URL|asp.net","type":"URL","value":"asp.net"},{"guid":"URL|strict.dtd","type":"URL","value":
             {"guid":"SOFTWARE|welcome.png","type":"SOFTWARE","value":"welcome.png"},{"guid":"URL|https://otx20-web-
             media.s3.amazonaws.com/media/avatars/user_32073/resized/80/avatar_2e866cf4cc.png","type":"URL","value":"https://otx20-web-
             media.s3.amazonaws.com/media/avatars/user_32073/resized/80/avatar_2e866cf4cc.png"}]
         ▸ enclaveGuids: ["b077bfb9-82e4-47f2-ae92-61a939333a33"]
```

Variety of Data Sources

Unstructured



EXAMPLE OF A DIVISION INTELLIGENCE ANNEX (WHEN ISSUED SEPARATELY FROM AN OPERATION ORDER)

(Classification)
(Change from Oral Orders, if any.)

Copy No 4 of ________ copies
20th Inf Div (Issuing headquarters)
ZELLE (4671), BUTTANO (Place of Issue)
101900 September 19__ (DTG of Signature)
BQ 13 (Msg reference number)

Annex A (Intelligence) to Operations Order 24

Reference: Map, BUTTANO, Edition 2, 1:50,000 sheets 204 (ZELLE-PAGT.) (Time zone used throughout the order. Maps, charts, and other relevant documents.)

1. SUMMARY OF ENEMY SITUATION

See INTSUM, this HQ, 101800 September, and Appendix 1, Situation Overlay.

2. PRIORITY INTELLIGENCE REQUIREMENTS

a. Priority Intelligence Requirements.

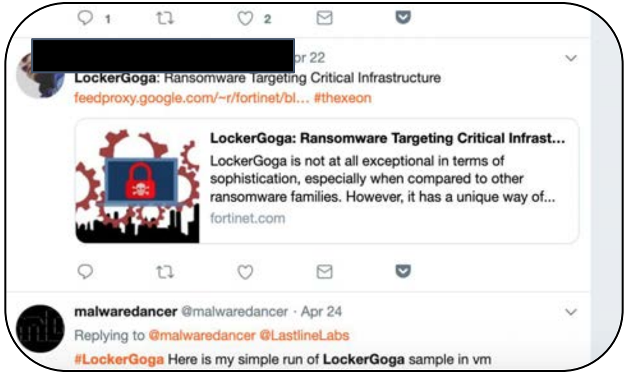
(1) Will enemy reinforce his forces along the FLOOD River before the time of attack? If so, when, where, and with what forces? Special attention to the mechanized regiment and the medium tank regiment in vicinity of BURG.

(2) Will enemy employ nuclear weapons against us? If so, when, where, how many, of what yield, and by what delivery means?

b. Information Requirements.

(1) Will enemy continue to defend in his present position? If so, how will he organize his forces on the ground, and with what troops? Special attention to locations and activities of reserves, and vulnerability to nuclear attack.

(Classification)



[redacted]r 22

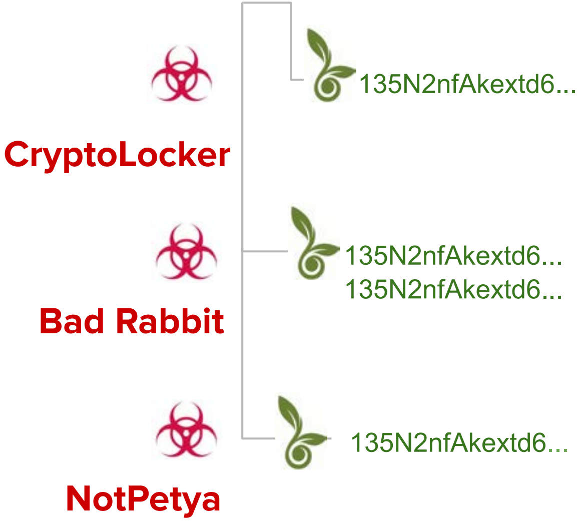
LockerGoga: Ransomware Targeting Critical Infrastructure
feedproxy.google.com/~r/fortinet/bl... #thexeon

LockerGoga: Ransomware Targeting Critical Infrast...
LockerGoga is not at all exceptional in terms of sophistication, especially when compared to other ransomware families. However, it has a unique way of...
fortinet.com

malwaredancer @malwaredancer · Apr 24
Replying to @malwaredancer @LastlineLabs
#LockerGoga Here is my simple run of **LockerGoga** sample in vm

Extraction Challenges

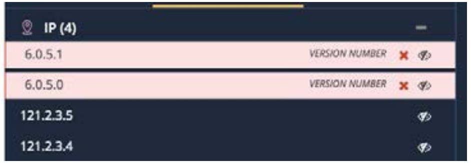
1. Extract



2. Disambiguate & Normalize

***Nuclear** is an Exploit Kit*!

*Germany's 17 **nuclear** power plants will be shut down in 2022.*

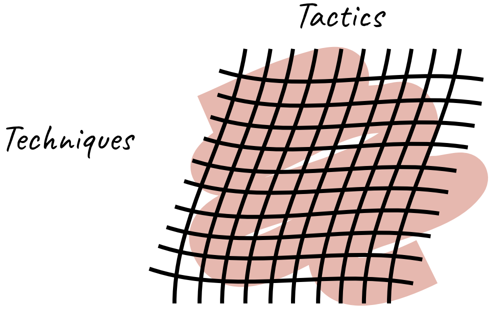


IP (4)

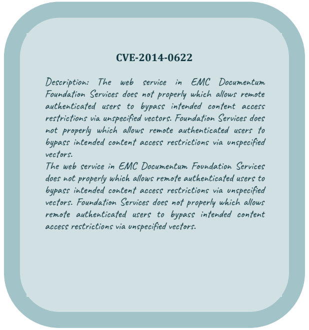
6.0.5.1	VERSION NUMBER
6.0.5.0	VERSION NUMBER
121.2.3.5	
121.2.3.4	

Inferring Relationships / Categorization

MITRE Att&ck Framework



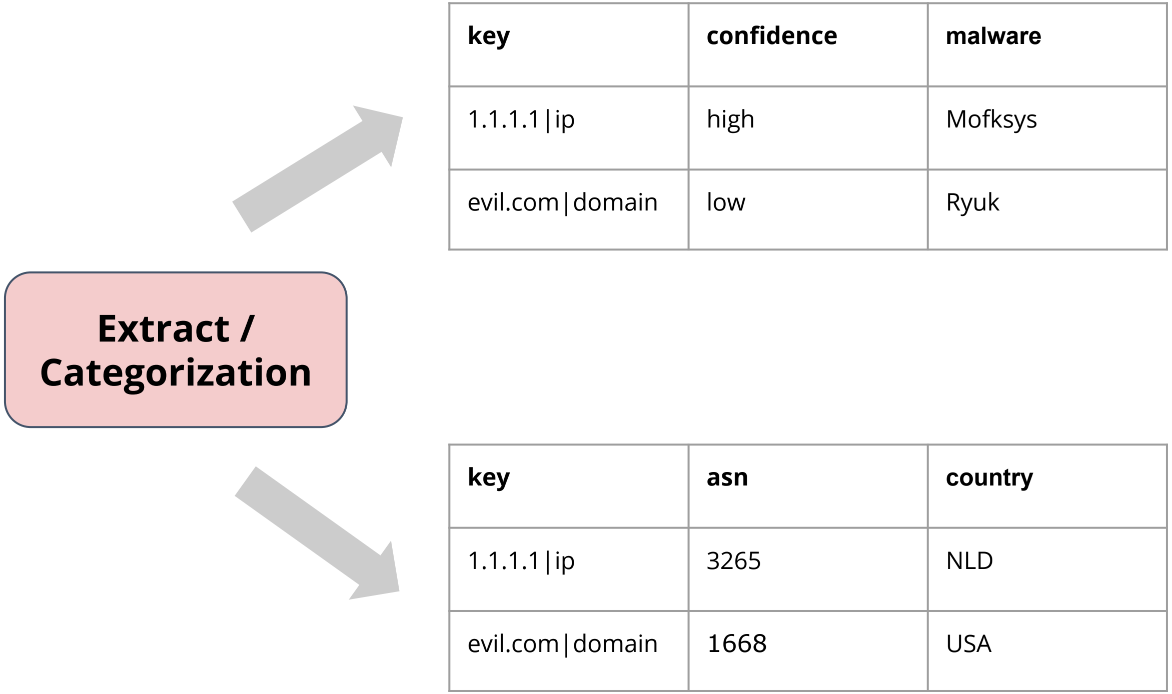
NIST Vulnerability Data



CVE-2014-0622

Description: The web service in EMC Documentum Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors. Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors.
The web service in EMC Documentum Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors. Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors.

Merging Sources into 1/N Standard Languages

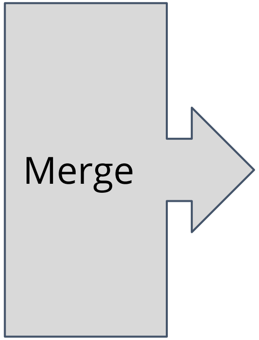


Extract / Categorization

key	confidence	malware
1.1.1.1|ip	high	Mofksys
evil.com|domain	low	Ryuk

key	asn	country
1.1.1.1|ip	3265	NLD
evil.com|domain	1668	USA

Merging Sources into 1/N Standard Languages

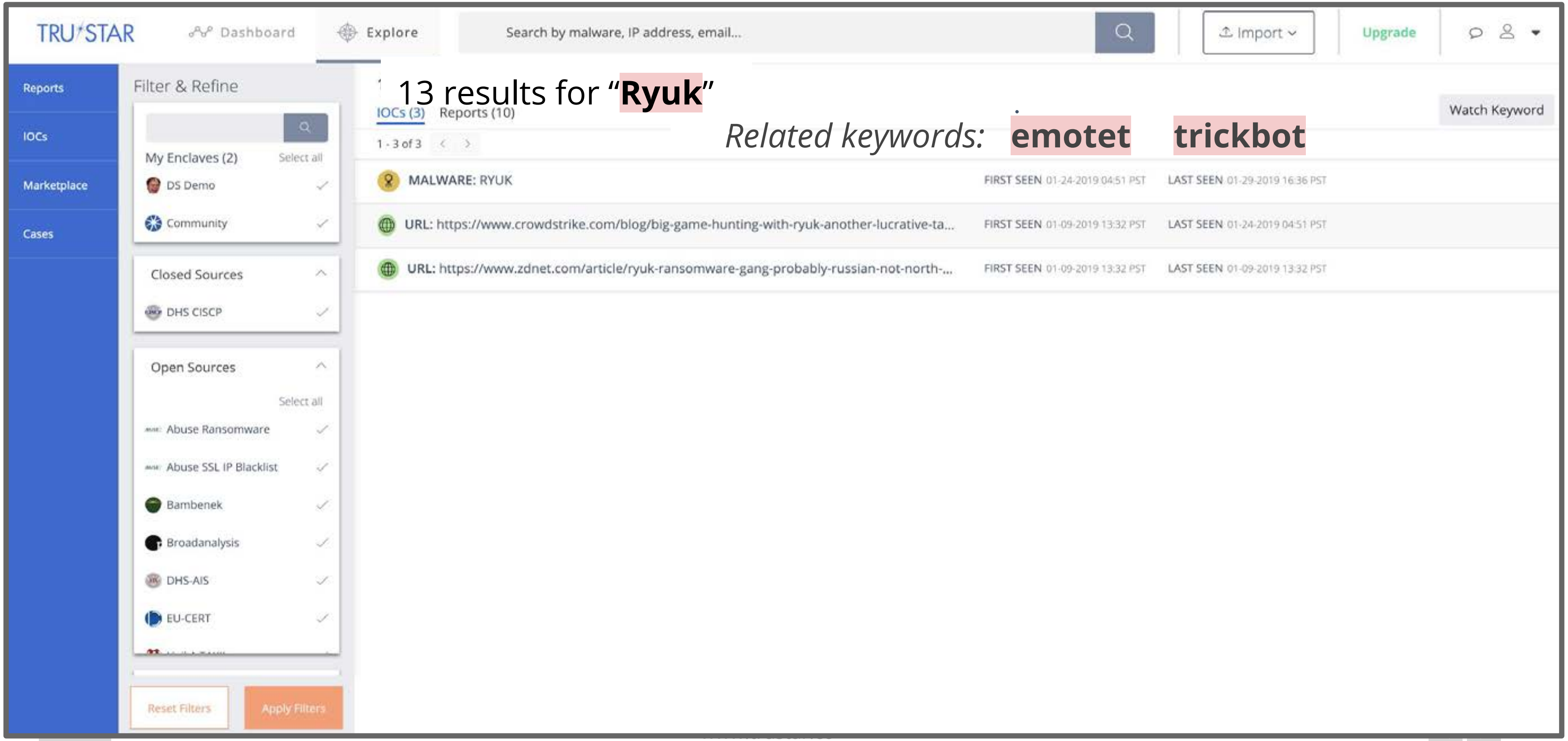


Merge

<table>
<tr><th>key</th><th>confidence</th><th>malware</th><th>asn</th><th>country</th></tr>
<tr><td>1.1.1.1|ip</td><td>high</td><td>Mofksys</td><td>3265</td><td>NLD</td></tr>
<tr><td>evil.com|domain</td><td>low</td><td>Ryuk</td><td>1668</td><td>USA</td></tr>
</table>

II. Why do we want to solve these challenges

Information Retrieval: Search & Querying



13 results for “**Ryuk**”

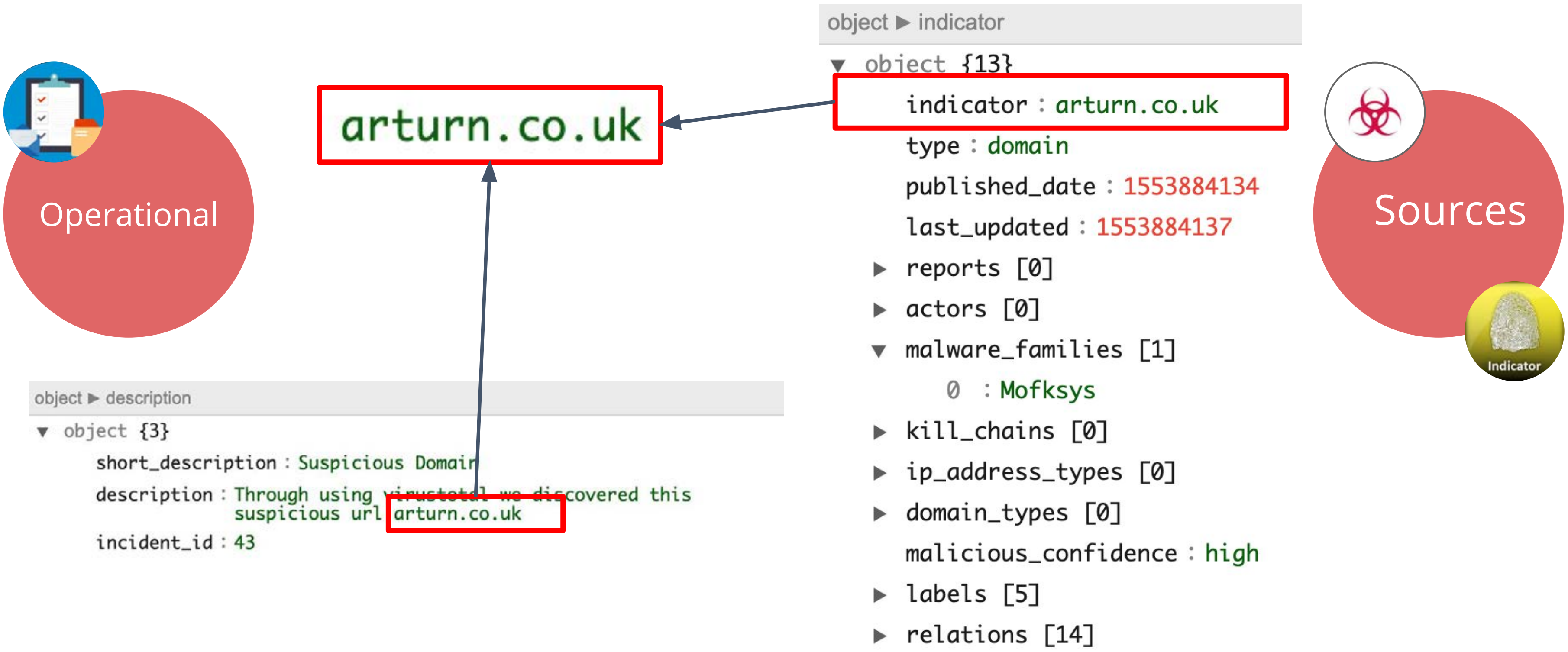
Related keywords: **emotet** **trickbot**

MALWARE: RYUK FIRST SEEN 01-24-2019 04:51 PST LAST SEEN 01-29-2019 16:36 PST

URL: https://www.crowdstrike.com/blog/big-game-hunting-with-ryuk-another-lucrative-ta... FIRST SEEN 01-09-2019 13:32 PST LAST SEEN 01-24-2019 04:51 PST

URL: https://www.zdnet.com/article/ryuk-ransomware-gang-probably-russian-not-north-... FIRST SEEN 01-09-2019 13:32 PST LAST SEEN 01-09-2019 13:32 PST

Information Retrieval: Link Analysis



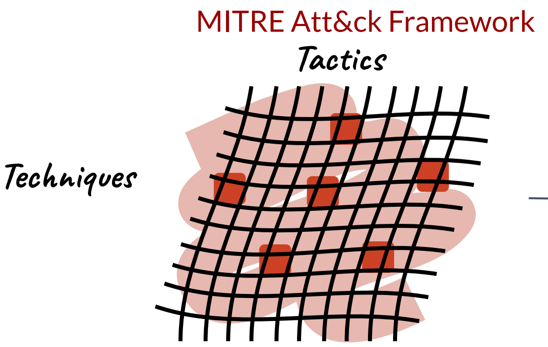
object ▶ indicator

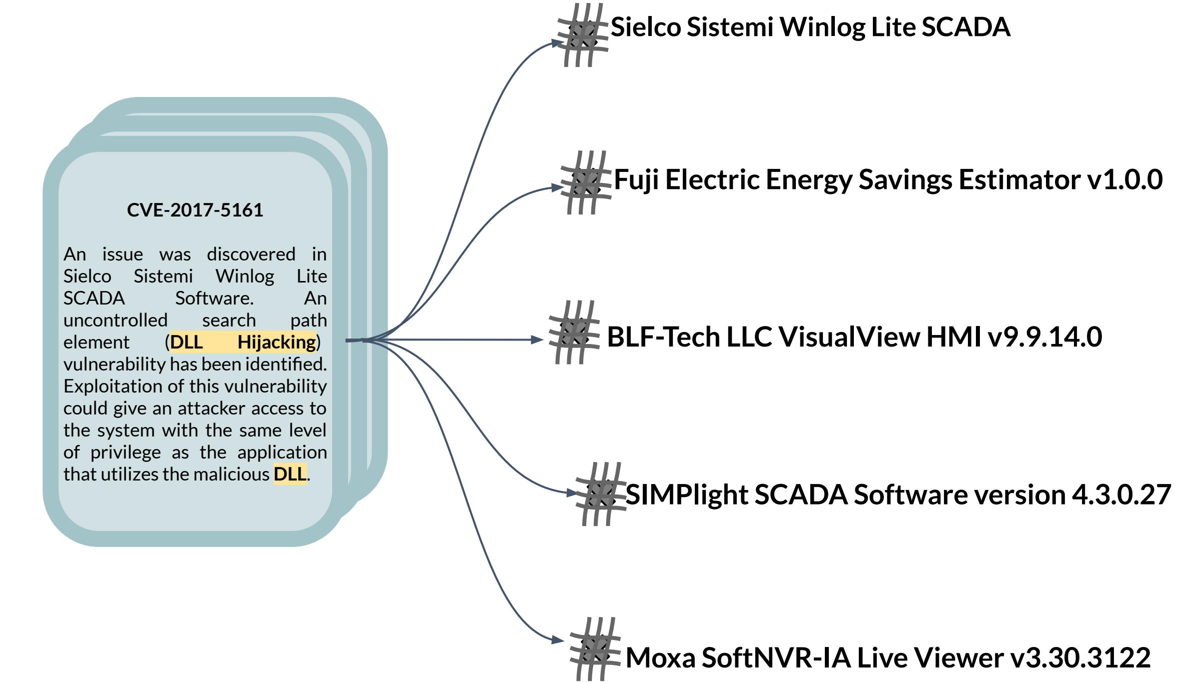
```
▼ object {13}
      indicator : arturn.co.uk
      type : domain
      published_date : 1553884134
      last_updated : 1553884137
    ▶ reports [0]
    ▶ actors [0]
    ▼ malware_families [1]
          0  : Mofksys
    ▶ kill_chains [0]
    ▶ ip_address_types [0]
    ▶ domain_types [0]
      malicious_confidence : high
    ▶ labels [5]
    ▶ relations [14]
```

object ▶ description

```
▼ object {3}
      short_description : Suspicious Domain
      description : Through using virustotal we discovered this
                    suspicious url arturn.co.uk
      incident_id : 43
```

Prioritization and Triage





CVE-2017-5161

An issue was discovered in Sielco Sistemi Winlog Lite SCADA Software. An uncontrolled search path element (**DLL Hijacking**) vulnerability has been identified. Exploitation of this vulnerability could give an attacker access to the system with the same level of privilege as the application that utilizes the malicious **DLL**.

- **Sielco Sistemi Winlog Lite SCADA**
- **Fuji Electric Energy Savings Estimator v1.0.0**
- **BLF-Tech LLC VisualView HMI v9.9.14.0**
- **SIMPlight SCADA Software version 4.3.0.27**
- **Moxa SoftNVR-IA Live Viewer v3.30.3122**

🟥 Weak posture

▨ Strong posture

III. How are we solving for these challenges

Using regex for entity extraction

I start with a pattern to extract specific entities

```
\b\d{1,3}\.\d{1,3}\.\d{1,3}\.\d{1,3}\b
```

Upside:

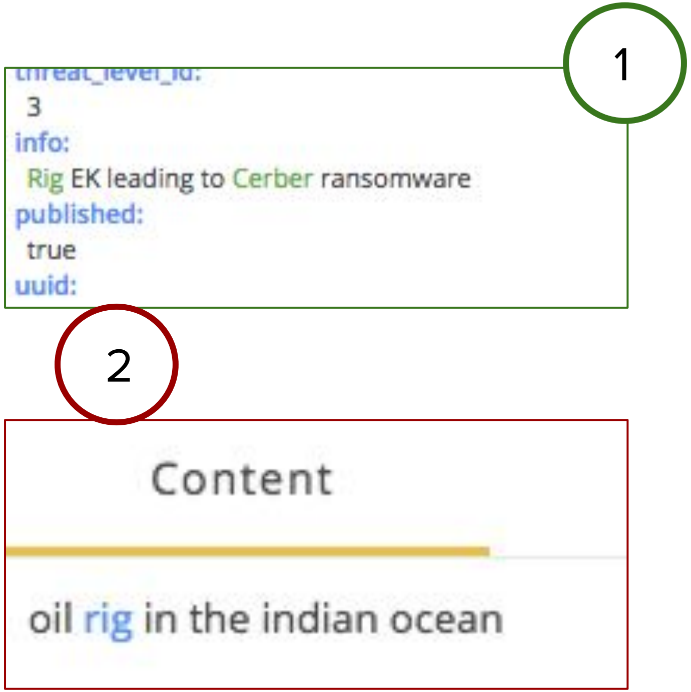
Easy to implement...

Downside:

Low precision due to a high number of false positives

Requires a priori knowledge

ML to the rescue



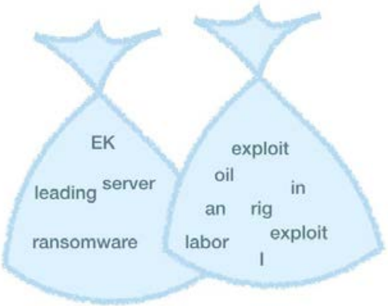
```
threat_level_id:
 3
info:
 Rig EK leading to Cerber ransomware
published:
 true
uuid:
```

Content

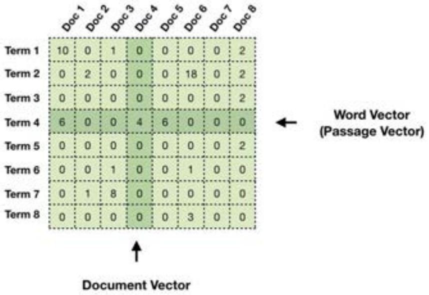
oil rig in the indian ocean

ML to the rescue

1. **Transform content to Contextual bag of words**



2. **Vectorize word counts and compute TF-IDF**

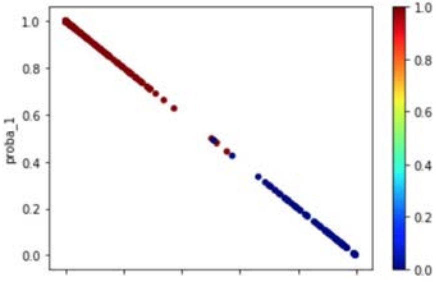


	Doc 1	Doc 2	Doc 3	Doc 4	Doc 5	Doc 6	Doc 7	Doc 8
Term 1	10	0	1	0	0	0	0	2
Term 2	0	2	0	0	0	18	0	2
Term 3	0	0	0	0	0	0	0	2
Term 4	6	0	0	4	6	0	0	0
Term 5	0	0	0	0	0	0	0	2
Term 6	0	0	1	0	0	1	0	0
Term 7	0	1	8	0	0	0	0	0
Term 8	0	0	0	0	0	3	0	0

Word Vector (Passage Vector)

Document Vector

3. **Feed into a simple model**



Likelihood

Class Prior Probability

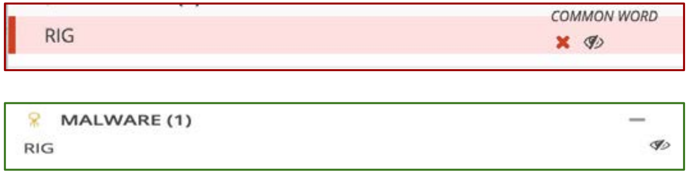
$$P(c \mid x) = \frac{P(x \mid c)\,P(c)}{P(x)}$$

Posterior Probability

Predictor Prior Probability

$$P(c \mid X) = P(x_1 \mid c) \times P(x_2 \mid c) \times \cdots \times P(x_n \mid c) \times P(c)$$

4. **Predict on production**



RIG

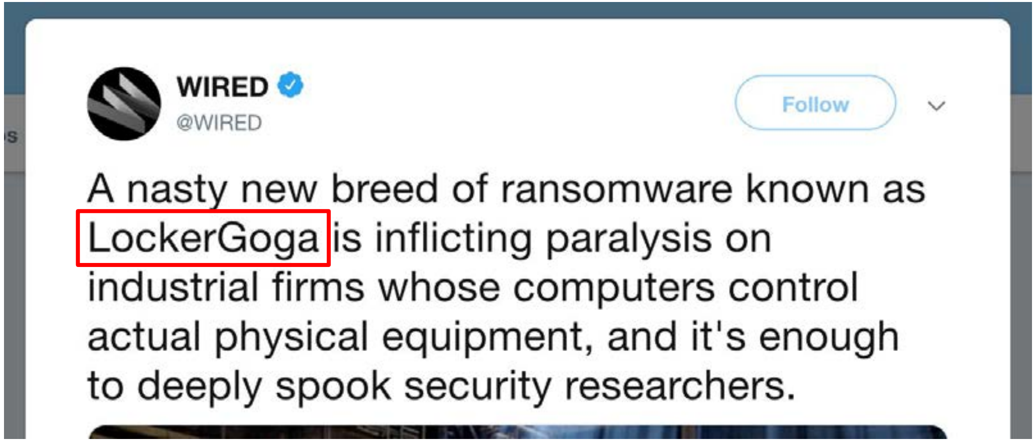
COMMON WORD

MALWARE (1)

RIG

But it’s not always enough!

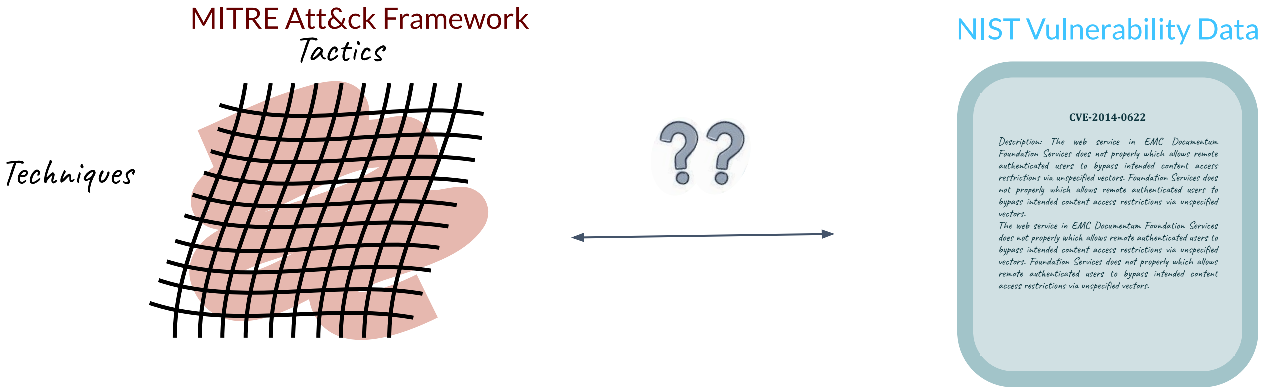
New Malware names



WIRED
@WIRED

A nasty new breed of ransomware known as LockerGoga is inflicting paralysis on industrial firms whose computers control actual physical equipment, and it's enough to deeply spook security researchers.

But it's not always enough!



CVE-2014-0622

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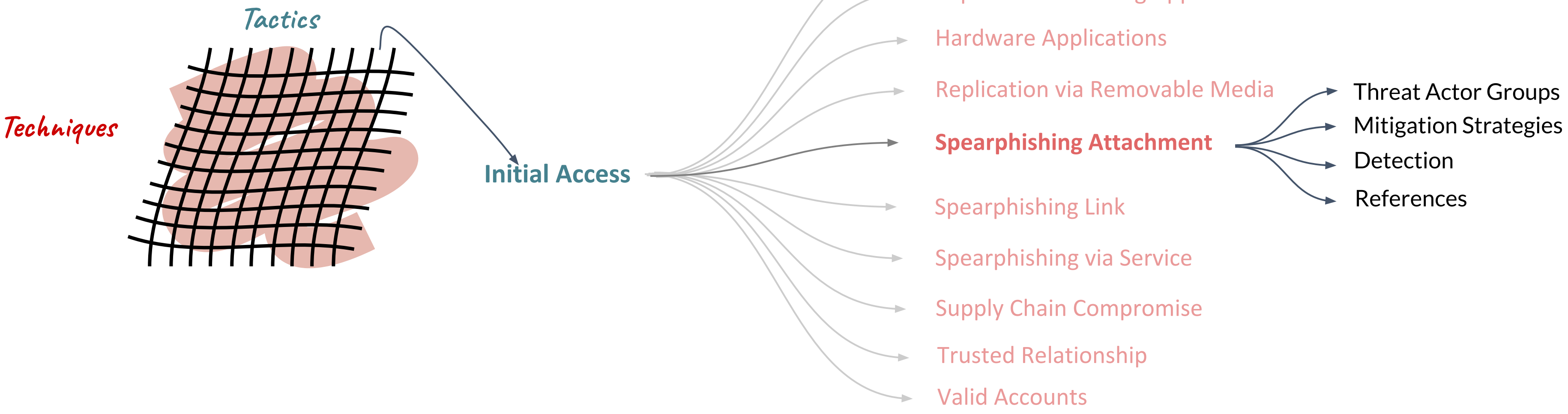
IV. Which brings us to NLP...

Work by **Zainab Danish** (zdanish@trustar.co)

Mitre ATT&CK Framework

- Tactic = Why?
- Technique = How?

Mitre ATT&CK Framework



Tactics

Techniques

Initial Access

Drive-by Compromise

Exploit Public-Facing Application

Hardware Applications

Replication via Removable Media

Spearphishing Attachment

Spearphishing Link

Spearphishing via Service

Supply Chain Compromise

Trusted Relationship

Valid Accounts

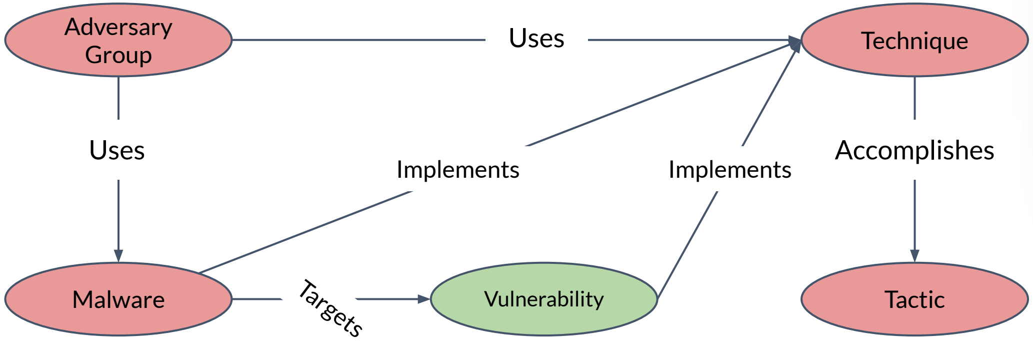
Threat Actor Groups

Mitigation Strategies

Detection

References

Consider the following...



Adversary Group

Uses

Technique

Uses

Implements

Implements

Accomplishes

Malware

Targets

Vulnerability

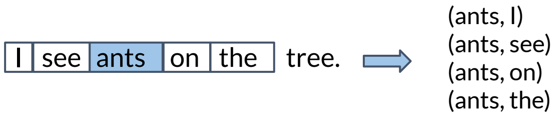
Tactic

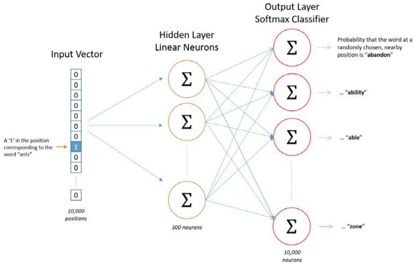
Word2Vec

What? NLP technique that seeks to teach the computer to understand, interpret and manipulate human language.

Why? Translate words into vectors for mathematical manipulation.

How? By leveraging context and calculating probabilities.





ants = $[a_1\ a_2\ a_3\ a_4\ a_5 \ldots\ldots\ldots\ldots\ a_d]$

Doc2Vec

What? NLP technique that seeks to teach the computer to understand, interpret and manipulate human language.

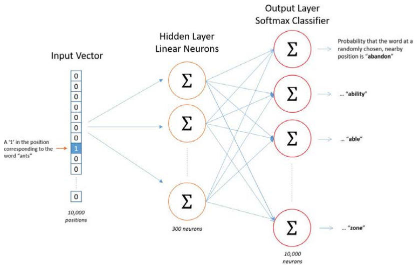
Why? Translate words and documents into vectors for mathematical manipulation.

How? By leveraging context and calculating probabilities.

CVE-2014-0622
Description: The web service in EMC Documentum Foundation Services does not properly implement content uploading, which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors.

→

CVE-2014-0622
['the', 'web', 'service', 'in', 'emc', 'documentum', 'foundation', 'services', 'does', 'not', 'properly', 'implement', 'content', 'uploading', 'which', 'allows', 'remote', 'authenticated', 'users', 'to', 'bypass', 'intended', 'content', 'access', 'restrictions', 'via', 'unspecified', 'vectors']



CVE-2014-0622 = $[a_1\, a_2\, a_3\, a_4\, a_5 \ldots\ldots\ldots\, a_d]$

Process

CVE-2014-0622

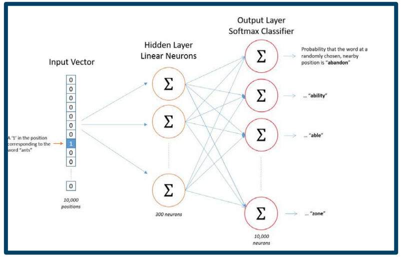
Description: The web service in EMC Documentum Foundation Services does not properly implement content uploading, which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors.

Data Cleaning

CVE-2014-0622

['the', 'web', 'service', 'in', 'emc', 'documentum', 'foundation', 'services', 'does', 'not', 'properly', 'implement', 'content', 'uploading', 'which', ‘allows', 'remote', 'authenticated', 'users', ‘to', 'bypass', 'intended', 'content', ‘access', 'restrictions', 'via', 'unspecified', 'vectors']

Tokenization


Input Vector
0
0
0
0
0
0
0
1
0
0
0
10,000 positions
A '1' in the position corresponding to the word "ants"
Hidden Layer Linear Neurons
Σ
Σ
Σ
300 neurons
Output Layer Softmax Classifier
Σ
Σ
Σ
Σ
10,000 neurons
Probability that the word at a randomly chosen, nearby position is "abandon"
... "ability"
... "able"
... "zone"

Model Training

CVE-2014-0622 $[a_1\ a_2\ a_3\ a_4\ a_5 \ldots\ldots\ldots\ a_d]$
CVE-2015-0765 $[a_1\ a_2\ a_3\ a_4\ a_5 \ldots\ldots\ldots\ a_d]$
...
attack-pattern12 $[a_1\ a_2\ a_3\ a_4\ a_5 \ldots\ldots\ldots\ a_d]$

Numeric Vectors

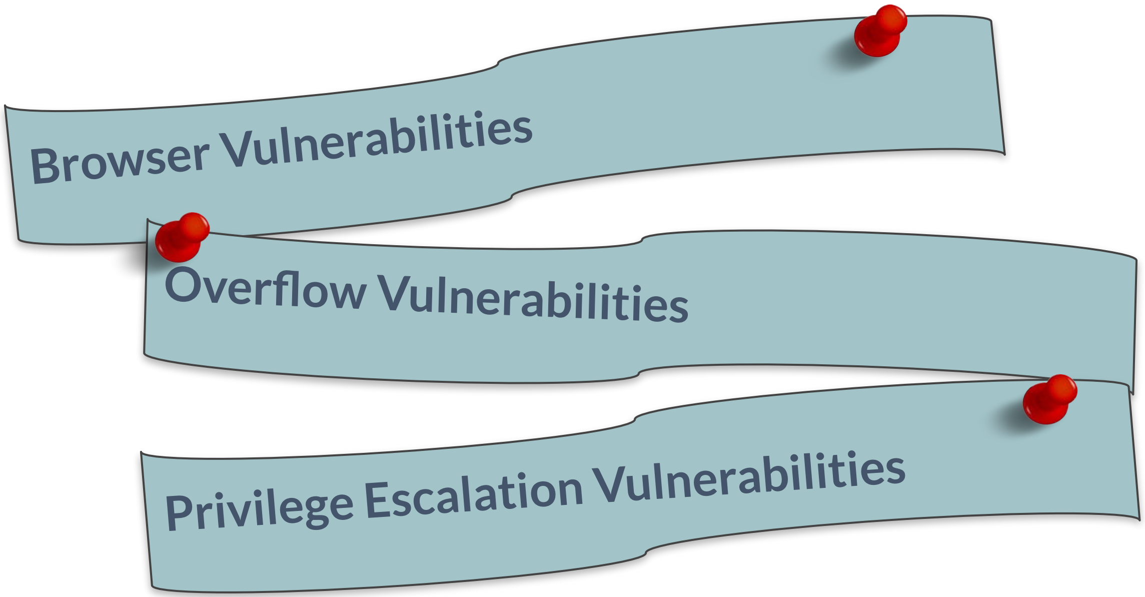
CVE Clusters: Data Categorization / Tagging

Initial number of docs:

NIST ~100,000

Total discovered clusters:

~100

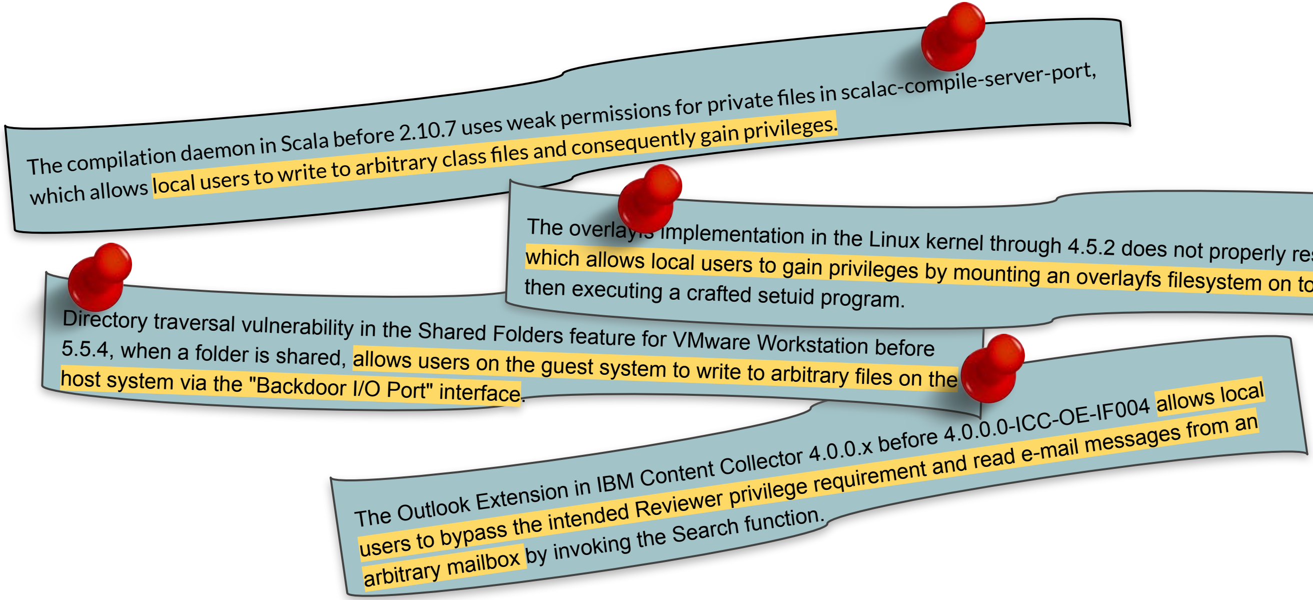


Browser Vulnerabilities

Overflow Vulnerabilities

Privilege Escalation Vulnerabilities

CVE Clusters: Privilege Escalation



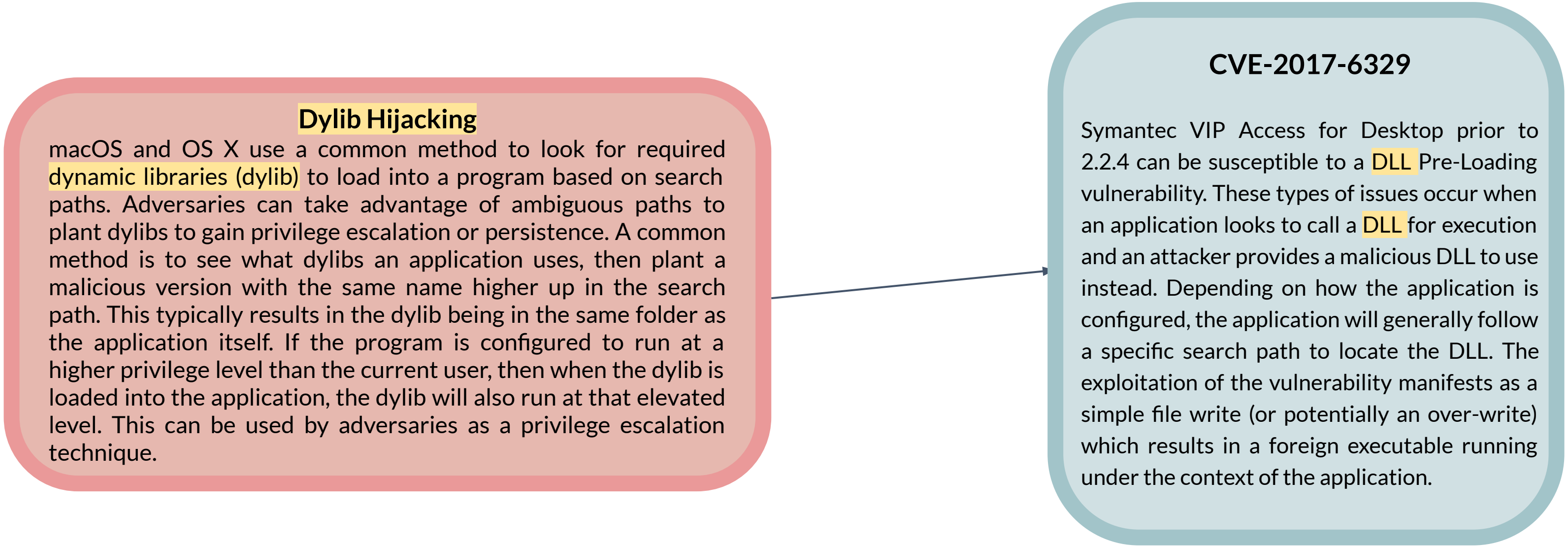
The compilation daemon in Scala before 2.10.7 uses weak permissions for private files in scalac-compile-server-port, which allows local users to write to arbitrary class files and consequently gain privileges.

The overlayfs implementation in the Linux kernel through 4.5.2 does not properly restrict the mount namespace, which allows local users to gain privileges by mounting an overlayfs filesystem on top of a FUSE filesystem, and then executing a crafted setuid program.

Directory traversal vulnerability in the Shared Folders feature for VMware Workstation before 5.5.4, when a folder is shared, allows users on the guest system to write to arbitrary files on the host system via the "Backdoor I/O Port" interface.

The Outlook Extension in IBM Content Collector 4.0.0.x before 4.0.0.0-ICC-OE-IF004 allows local users to bypass the intended Reviewer privilege requirement and read e-mail messages from an arbitrary mailbox by invoking the Search function.

Connecting the two worlds...



Dylib Hijacking

macOS and OS X use a common method to look for required dynamic libraries (dylib) to load into a program based on search paths. Adversaries can take advantage of ambiguous paths to plant dylibs to gain privilege escalation or persistence. A common method is to see what dylibs an application uses, then plant a malicious version with the same name higher up in the search path. This typically results in the dylib being in the same folder as the application itself. If the program is configured to run at a higher privilege level than the current user, then when the dylib is loaded into the application, the dylib will also run at that elevated level. This can be used by adversaries as a privilege escalation technique.

CVE-2017-6329

Symantec VIP Access for Desktop prior to 2.2.4 can be susceptible to a DLL Pre-Loading vulnerability. These types of issues occur when an application looks to call a DLL for execution and an attacker provides a malicious DLL to use instead. Depending on how the application is configured, the application will generally follow a specific search path to locate the DLL. The exploitation of the vulnerability manifests as a simple file write (or potentially an over-write) which results in a foreign executable running under the context of the application.

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\| \|\mathbf{B}\|} > 0.5$$

Evaluation

100 naturally forming clusters

1/100 chance of getting it right at random

1% accurate associations

50% accurate associations

What next...

Limitations:

- Language and schema differences deteriorate the quality of the models.
- Hard to scale for many to many relationships.

Potential solutions:

- Investigate training models on recent data only.
- Investigate more sophisticated Neural Networks algorithms (RadialGANs).

QUESTIONS?

TRUSTAR

Access Our Codebase & Resources Here:

TRUSTAR.CO / NLP

Nicolas Kseib

Twitter: @NKseib
Email: nkseib@trustar.co

Zainab Danish

Email: zdanish@trustar.co

THANK YOU!

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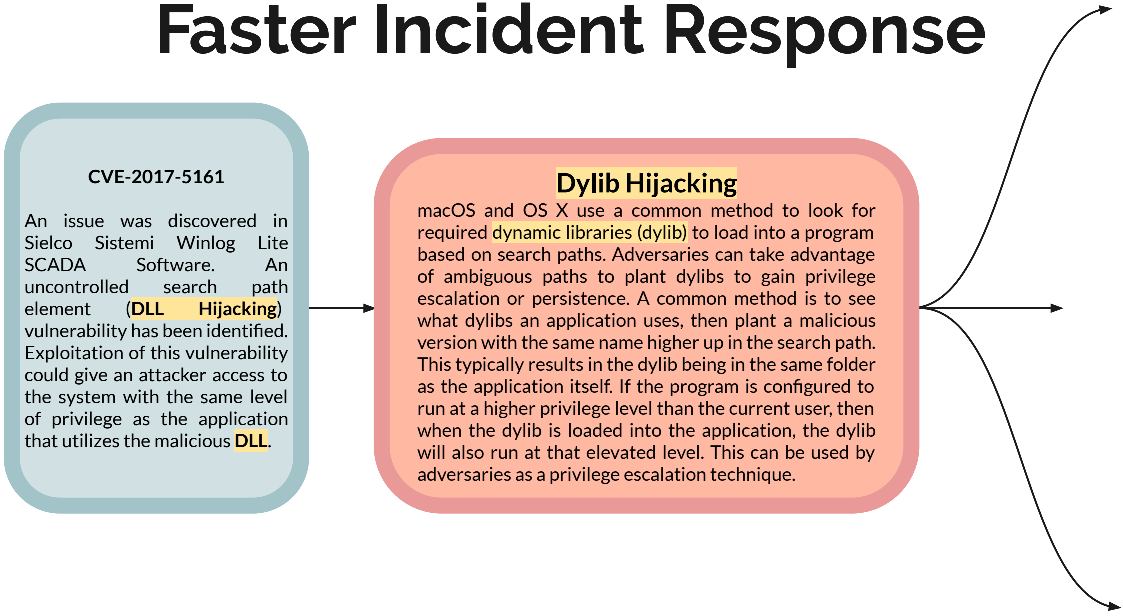
Extra

Faster Incident Response



CVE-2017-5161

An issue was discovered in Sielco Sistemi Winlog Lite SCADA Software. An uncontrolled search path element (**DLL Hijacking**) vulnerability has been identified. Exploitation of this vulnerability could give an attacker access to the system with the same level of privilege as the application that utilizes the malicious **DLL**.

Dylib Hijacking

macOS and OS X use a common method to look for required dynamic libraries (dylib) to load into a program based on search paths. Adversaries can take advantage of ambiguous paths to plant dylibs to gain privilege escalation or persistence. A common method is to see what dylibs an application uses, then plant a malicious version with the same name higher up in the search path. This typically results in the dylib being in the same folder as the application itself. If the program is configured to run at a higher privilege level than the current user, then when the dylib is loaded into the application, the dylib will also run at that elevated level. This can be used by adversaries as a privilege escalation technique.

DETECTION

Objective-See's Dylib Hijacking Scanner can be used to detect potential cases of dylib hijacking. Monitor file systems for moving, renaming, replacing, or modifying dylibs. Changes in the set of dylibs that are loaded by a process (compared to past behavior) that do not correlate with known software, patches, etc., are suspicious. Check the system for multiple dylibs with the same name and monitor which versions have historically been loaded into a process.

MITIGATION

Prevent users from being able to write files to the search paths for applications, both in the folders where applications are run from and the standard dylib folders. If users can't write to these directories, then they can't intercept the search path.

REFERENCES

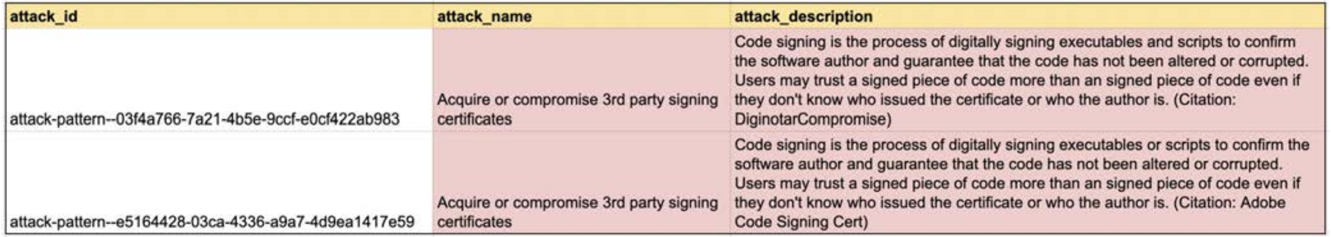
Malware Persistence on OS X :
https://www.rsaconference.com/writable/presentations/file_upload/ht-r03-malware-persistence-on-os-x-yosemite_final.pdf

Writing Bad Malware for OS X:
https://www.blackhat.com/docs/us-15/materials/us-15-Wardle-Writing-Bad-A-Malware-For-OS-X.pdf

Mitre-attack:
https://attack.mitre.org/techniques/T1157

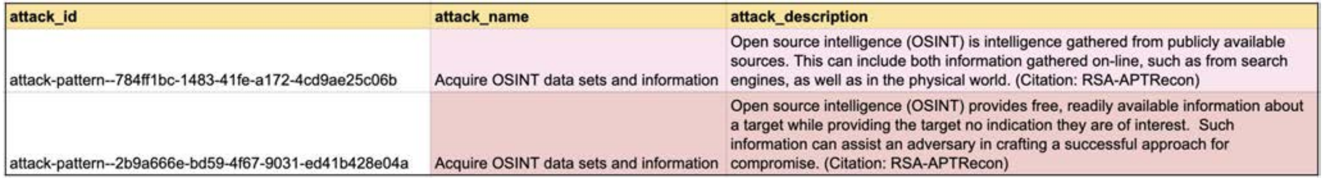
MITRE Att&ck Framework: Possible Improvements

Exact match



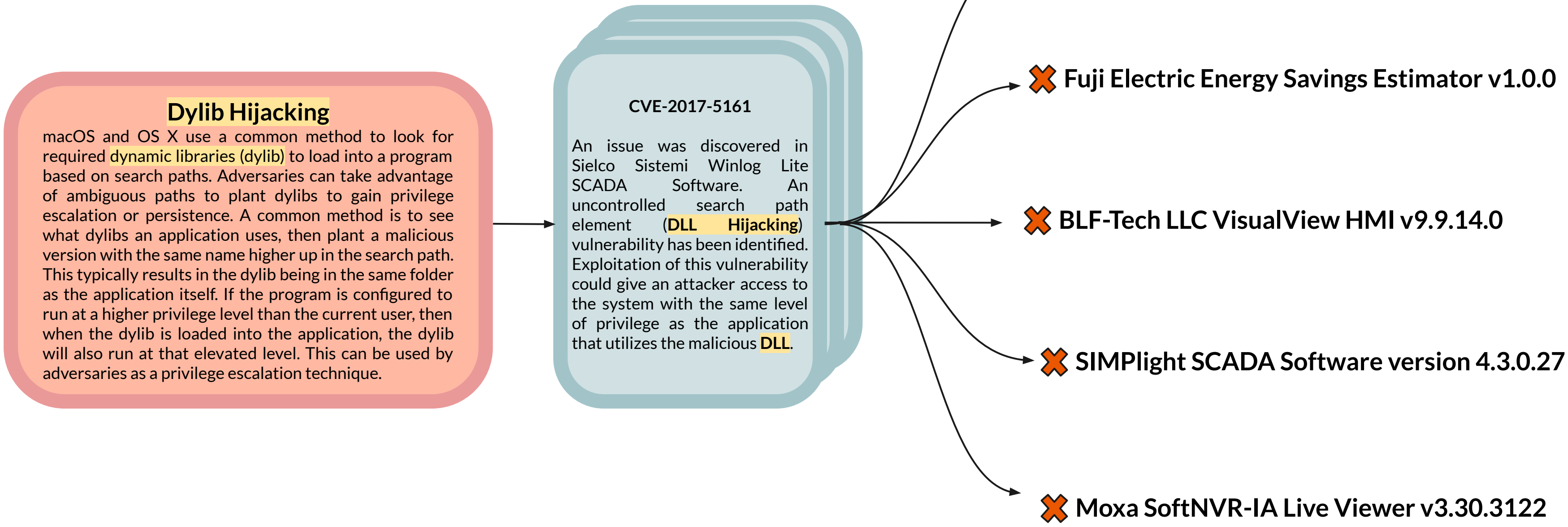
attack_id	attack_name	attack_description
attack-pattern--03f4a766-7a21-4b5e-9ccf-e0cf422ab983	Acquire or compromise 3rd party signing certificates	Code signing is the process of digitally signing executables and scripts to confirm the software author and guarantee that the code has not been altered or corrupted. Users may trust a signed piece of code more than an signed piece of code even if they don't know who issued the certificate or who the author is. (Citation: DiginotarCompromise)
attack-pattern--e5164428-03ca-4336-a9a7-4d9ea1417e59	Acquire or compromise 3rd party signing certificates	Code signing is the process of digitally signing executables or scripts to confirm the software author and guarantee that the code has not been altered or corrupted. Users may trust a signed piece of code more than an signed piece of code even if they don't know who issued the certificate or who the author is. (Citation: Adobe Code Signing Cert)

Similar meaning



attack_id	attack_name	attack_description
attack-pattern--784ff1bc-1483-41fe-a172-4cd9ae25c06b	Acquire OSINT data sets and information	Open source intelligence (OSINT) is intelligence gathered from publicly available sources. This can include both information gathered on-line, such as from search engines, as well as in the physical world. (Citation: RSA-APTRecon)
attack-pattern--2b9a666e-bd59-4f67-9031-ed41b428e04a	Acquire OSINT data sets and information	Open source intelligence (OSINT) provides free, readily available information about a target while providing the target no indication they are of interest. Such information can assist an adversary in crafting a successful approach for compromise. (Citation: RSA-APTRecon)

Organizational Prioritization



Dylib Hijacking

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- ✗ **Sielco Sistemi Winlog Lite SCADA**
- ✗ **Fuji Electric Energy Savings Estimator v1.0.0**
- ✗ **BLF-Tech LLC VisualView HMI v9.9.14.0**
- ✗ **SIMPlight SCADA Software version 4.3.0.27**
- ✗ **Moxa SoftNVR-IA Live Viewer v3.30.3122**

Improvement Strategies

- Heuristics used

Unexpected (but cool) outcomes

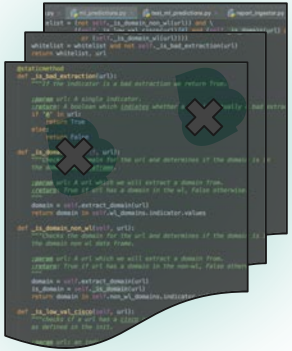
Evaluation

Human evaluation

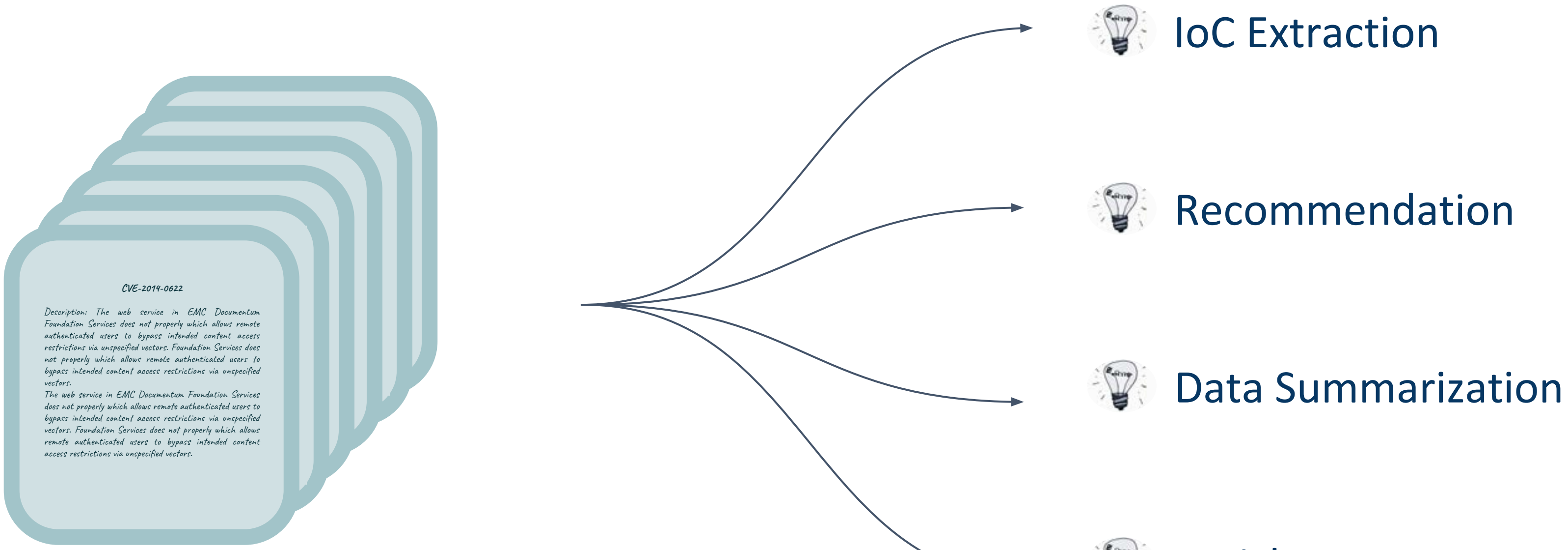
- On CVE similarity
- On technique relationship

Vulnerability Data: NIST NVD

"A weakness in the computational logic (e.g., code) found in software and hardware components that, when exploited, results in a negative impact to confidentiality, integrity, or availability. Mitigation of the vulnerabilities in this context typically involves coding changes, but could also include specification changes or even specification deprecations (e.g., removal of affected protocols or functionality in their entirety)."



Speaking of NLP



CVE-2014-0622

Description: The web service in EMC Documentum Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors. Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors.

The web service in EMC Documentum Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors. Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors.

- IoC Extraction
- Recommendation
- Data Summarization
- Enrichment

Method to the madness?

CVE-2014-0622

Description: The web service in EMC Documentum Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors. Foundation Services does not properly which allows remote authenticated users to bypass intended content access restrictions via unspecified vectors.

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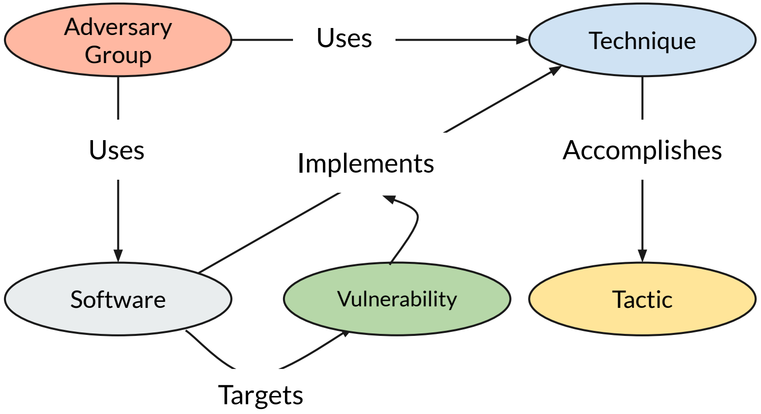
Unstructured Threat Intel

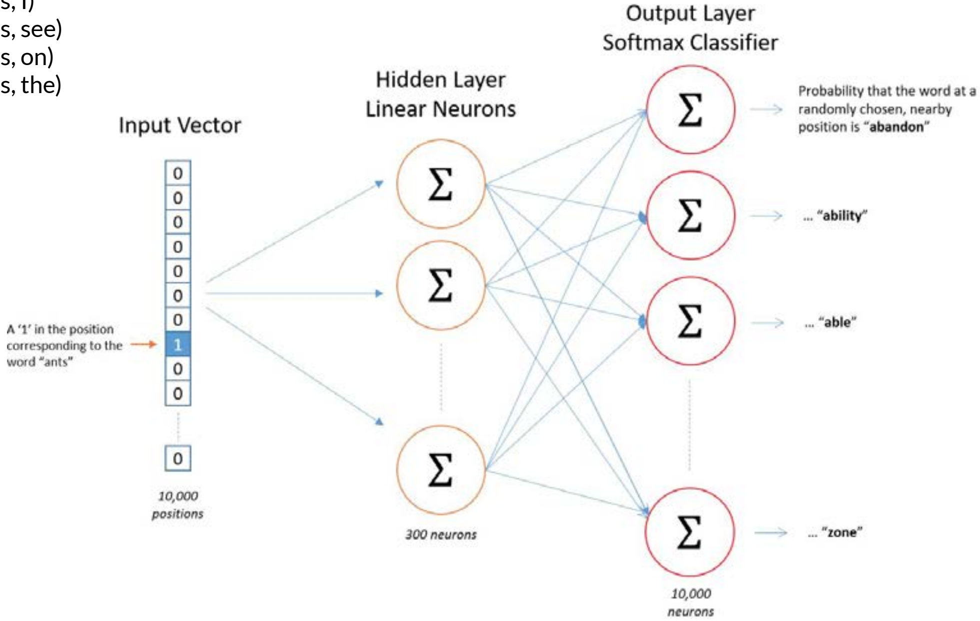
STIX - Structured Threat Intelligence Expression is **language and serialization format** used to exchange cyber threat intelligence (**CTI**).



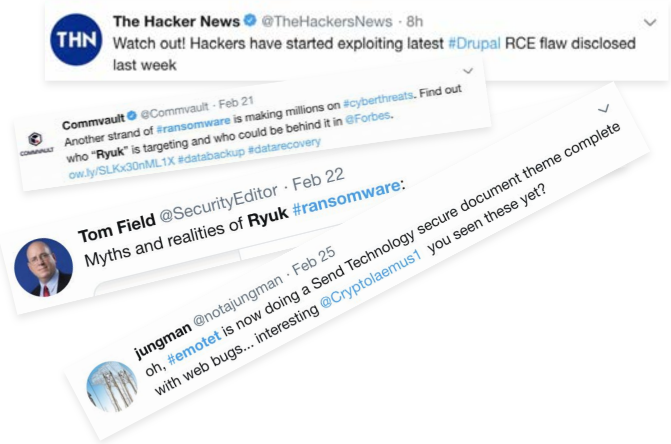
Word2Vec

I see **ants** on the tree. ⇨

(ants, I)
(ants, see)
(ants, on)
(ants, the)



Word2Vec: Malware Example



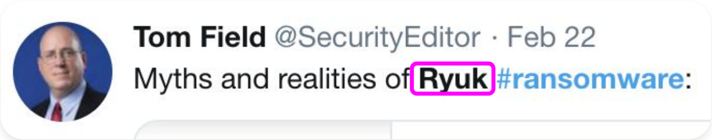
The Hacker News @TheHackersNews · 8h
Watch out! Hackers have started exploiting latest #Drupal RCE flaw disclosed last week

Commvault @Commvault · Feb 21
Another strand of #ransomware is making millions on #cyberthreats. Find out who "Ryuk" is targeting and who could be behind it in @Forbes.
ow.ly/SLKx30nML1X #databackup #datarecovery

Tom Field @SecurityEditor · Feb 22
Myths and realities of **Ryuk** #ransomware:

jungman @notajungman · Feb 25
oh, #emotet is now doing a Send Technology secure document theme complete with web bugs... interesting @Cryptolaemus1 you seen these yet?

Entity Extraction



Tom Field @SecurityEditor · Feb 22
Myths and realities of **Ryuk** #ransomware:

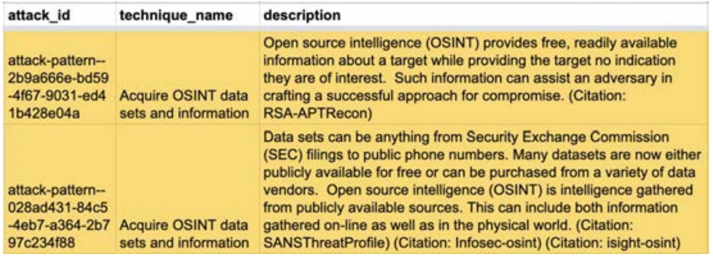
Related Trends

Trends related to "**Ryuk**"
- Emotet
- Trickbot

MITRE Att&ck Framework: Possible Improvements

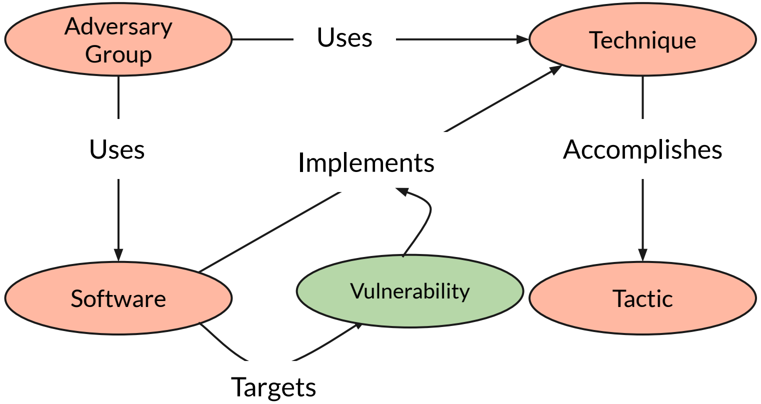
Clustering shows:

- Overlapping ATT&CK techniques
  - Exact matches
  - Conveying the same meaning
- Overarching categories for some techniques



attack_id	technique_name	description
attack-pattern--2b9a666e-bd59-4f67-9031-ed41b428e04a	Acquire OSINT data sets and information	Open source intelligence (OSINT) provides free, readily available information about a target while providing the target no indication they are of interest. Such information can assist an adversary in crafting a successful approach for compromise. (Citation: RSA-APTRecon)
attack-pattern--028ad431-84c5-4eb7-a364-2b797c234f88	Acquire OSINT data sets and information	Data sets can be anything from Security Exchange Commission (SEC) filings to public phone numbers. Many datasets are now either publicly available for free or can be purchased from a variety of data vendors. Open source intelligence (OSINT) is intelligence gathered from publicly available sources. This can include both information gathered on-line as well as in the physical world. (Citation: SANSThreatProfile) (Citation: Infosec-osint) (Citation: isight-osint)

Method to the madness?



Adversary Group

Uses

Technique

Uses

Implements

Accomplishes

Software

Vulnerability

Tactic

Targets