Operational return of experience

DNS Resolution Traffic Analysis Applied to Bot Detection

or how to detect even more infected computers on a big company network only with a PoC, a Co-op Engineering Student, some lines of codes and a lot of coffee…

…for about 10 000€

DZKSJEGGACJHPGFHACDGBGOGACCHFGBGEGACEHIGJGDHMCACHHFGACNGBGJHACIG
BGGHFGACDHPGNGFGACDGPGNGNGPGOGACJGOGEHFGCHFGDHEHBCACCHPGOGBGO
GOCNGPGFHDGIGPGFHIHAEDGJHCGFGCHBGDGEHJGPGOGMGBGCGOCOGFGEHDZJS

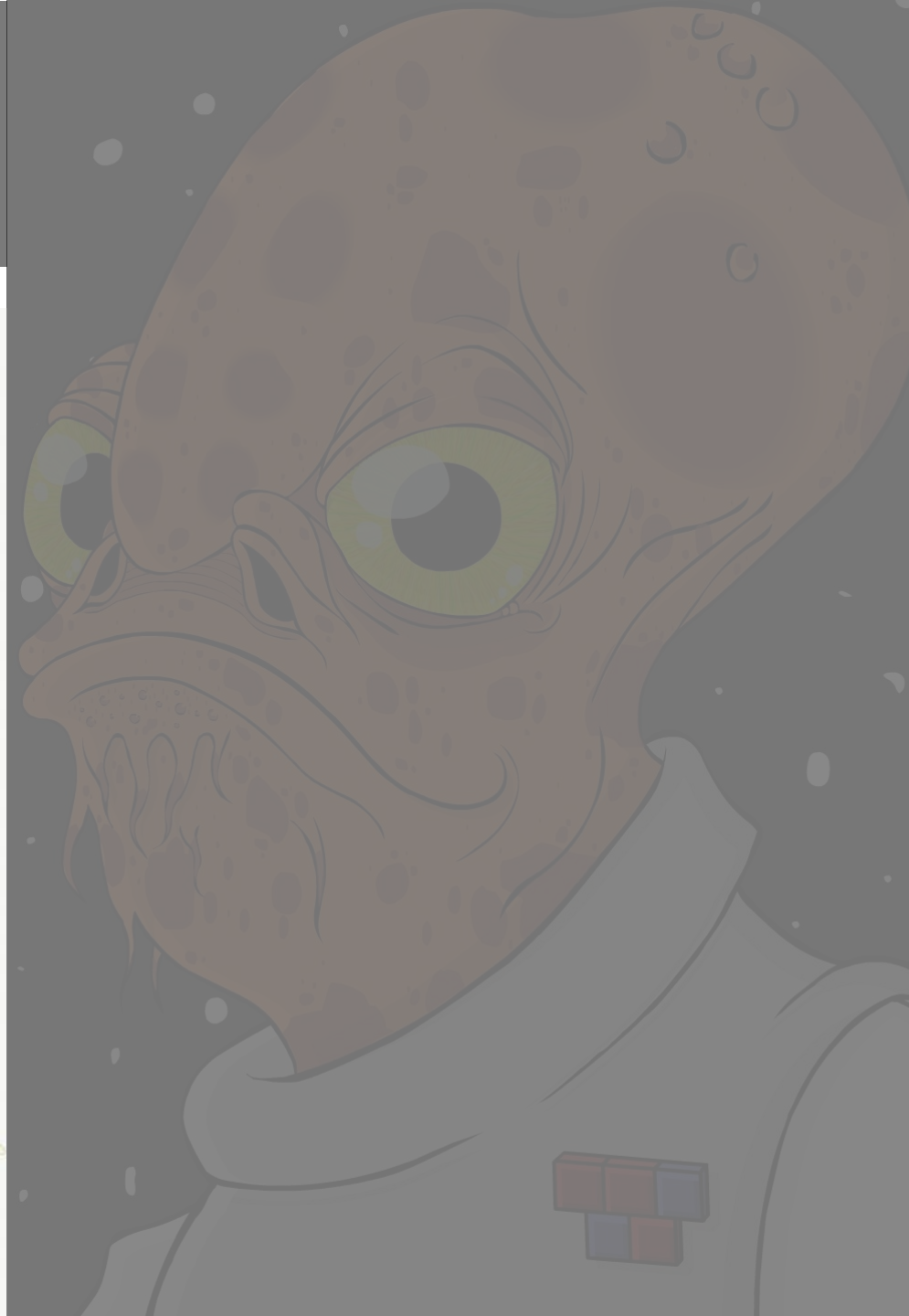
DISCLAIMER

- Not a formal approach
- Response to a contextual problem
- Reinventing the wheel (for educational purpose only!)
- Some success, some mistakes, a bit of troll but a lot of fun

I'm a Security Kid, so I ask kid's questions and provide kid's responses

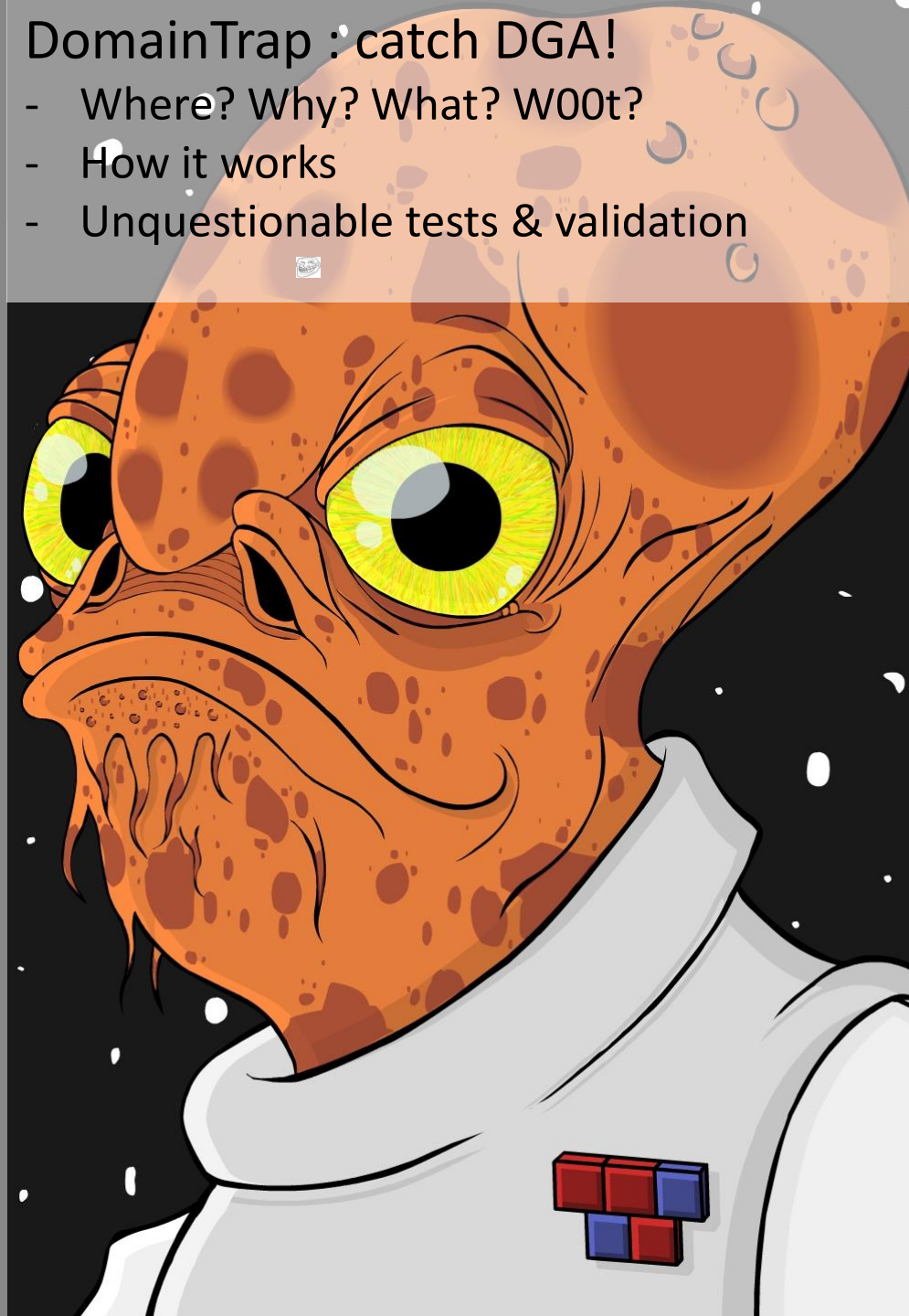
MalwareTrap : catch zombies!

- Where? Why? What? W00t?
- First PoC &Need of improvment
- MalwareTrapNG



DomainTrap : catch DGA!

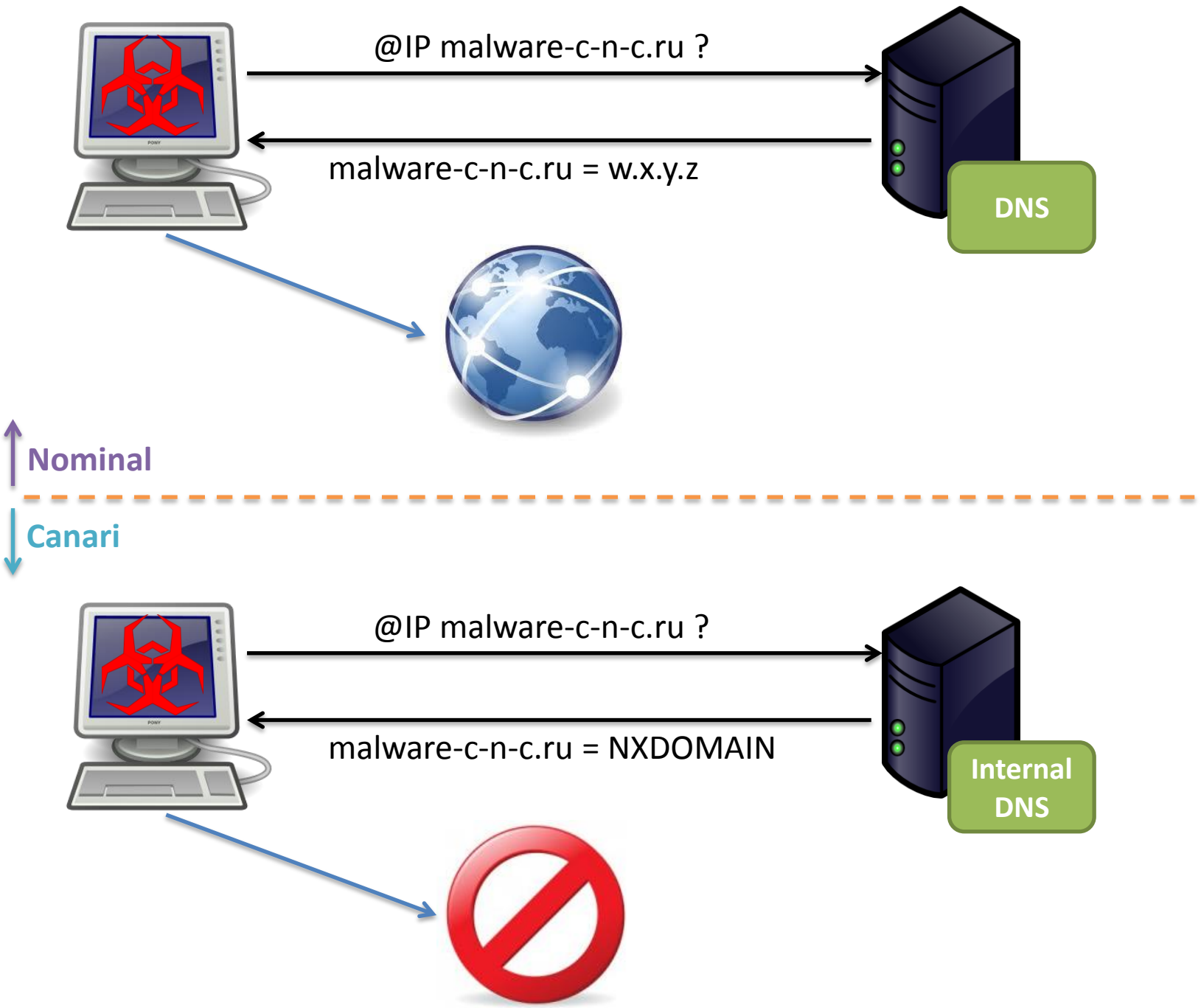
- Where? Why? What? W00t?
- How it works
- Unquestionable tests & validation

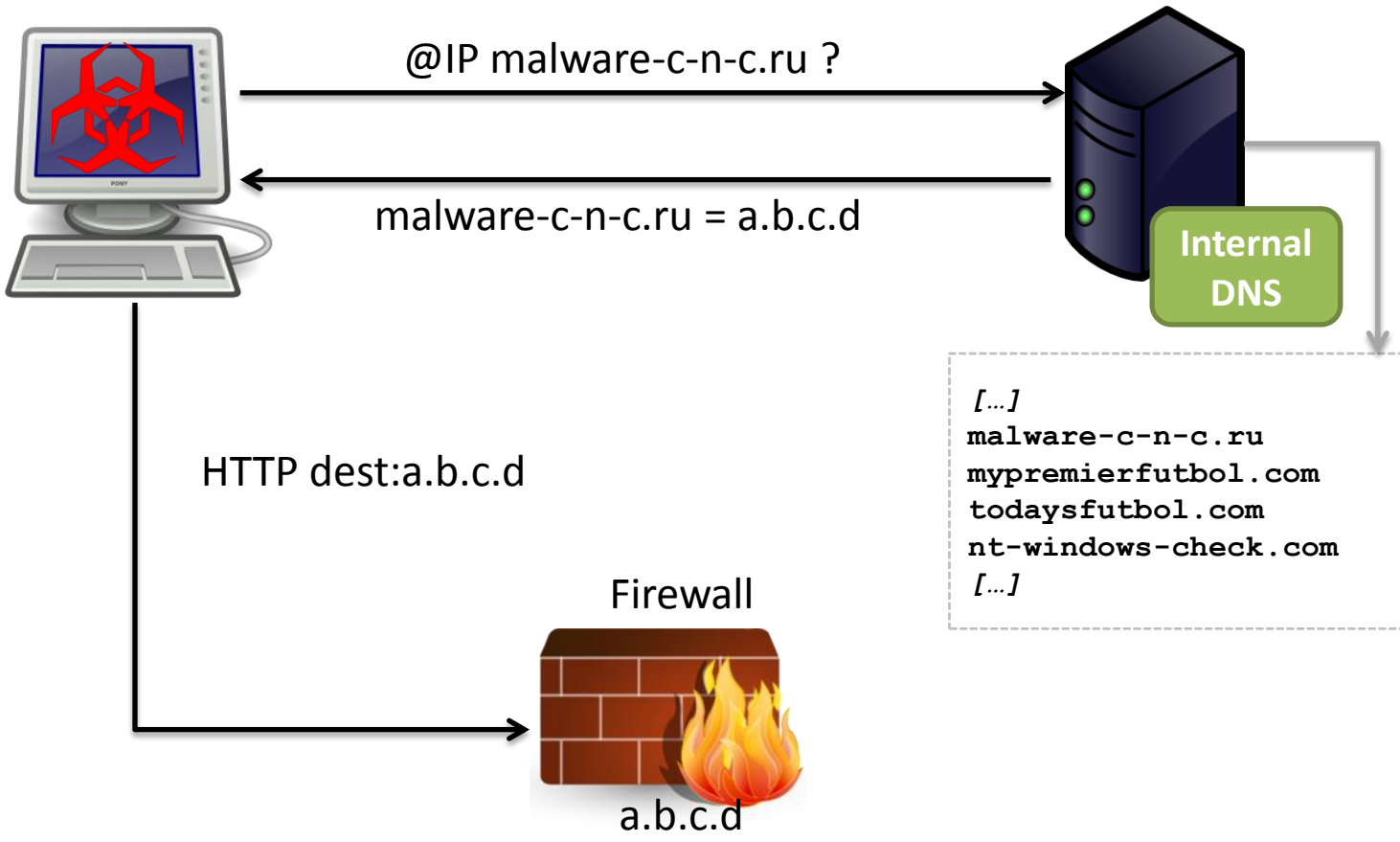


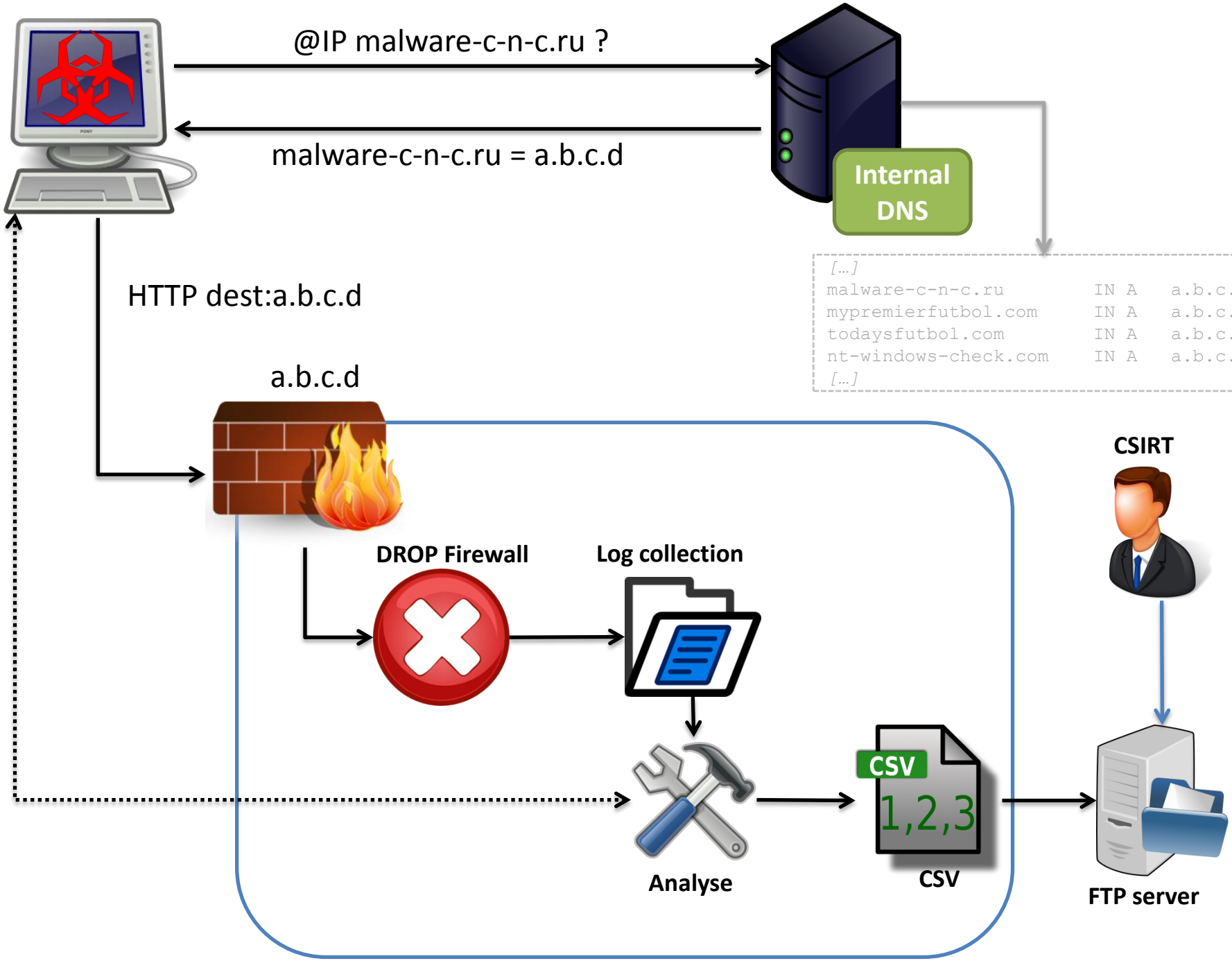
MalwareTrap

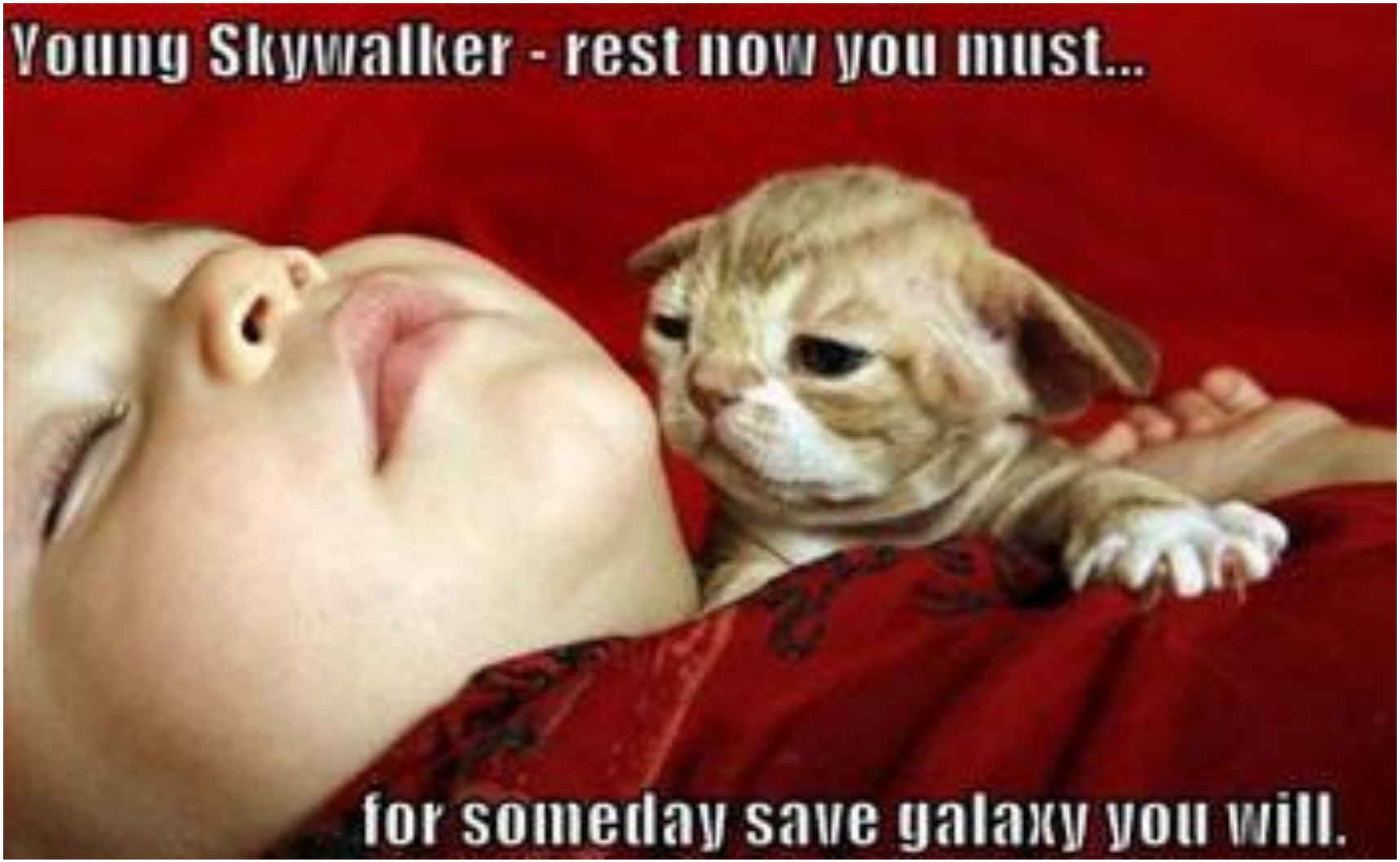
Where : major French company (called *Canari* here)
nothing to do with security, IT or computer stuff
in small CSIRTeam with everything to do with security, IT or computer stuff
a very big network (~17 000 routers, 160 000 desktop units)

What : Late 2010, discovering of a Mariposa epidemic (3% of the machine)
AV support unable to contain the pollution (from detection to cleaning)
AV updates sample by sample…coming from Canari's CSIRT
Idea to internaly sinkhole C&C to locate the source
2 days of development
Unprecedent decrease of infected computer in one month


@IP malware-c-n-c.ru ?
malware-c-n-c.ru = w.x.y.z
DNS
Nominal
Canari
@IP malware-c-n-c.ru ?
malware-c-n-c.ru = NXDOMAIN
Internal DNS


@IP malware-c-n-c.ru ?
malware-c-n-c.ru = a.b.c.d
Internal DNS
[…]
malware-c-n-c.ru IN A a.b.c.d
mypremierfutbol.com IN A a.b.c.d
todaysfutbol.com IN A a.b.c.d
nt-windows-check.com IN A a.b.c.d
[…]
HTTP dest:a.b.c.d
Firewall
a.b.c.d


@IP malware-c-n-c.ru ?
malware-c-n-c.ru = a.b.c.d
Internal DNS
[…]
malware-c-n-c.ru IN A a.b.c.d
mypremierfutbol.com IN A a.b.c.d
todaysfutbol.com IN A a.b.c.d
nt-windows-check.com IN A a.b.c.d
[…]
HTTP dest:a.b.c.d
a.b.c.d
DROP Firewall
Log collection
CSIRT
Analyse
CSV
1,2,3
CSV
FTP server


Young Skywalker - rest now you must...
for someday save galaxy you will.

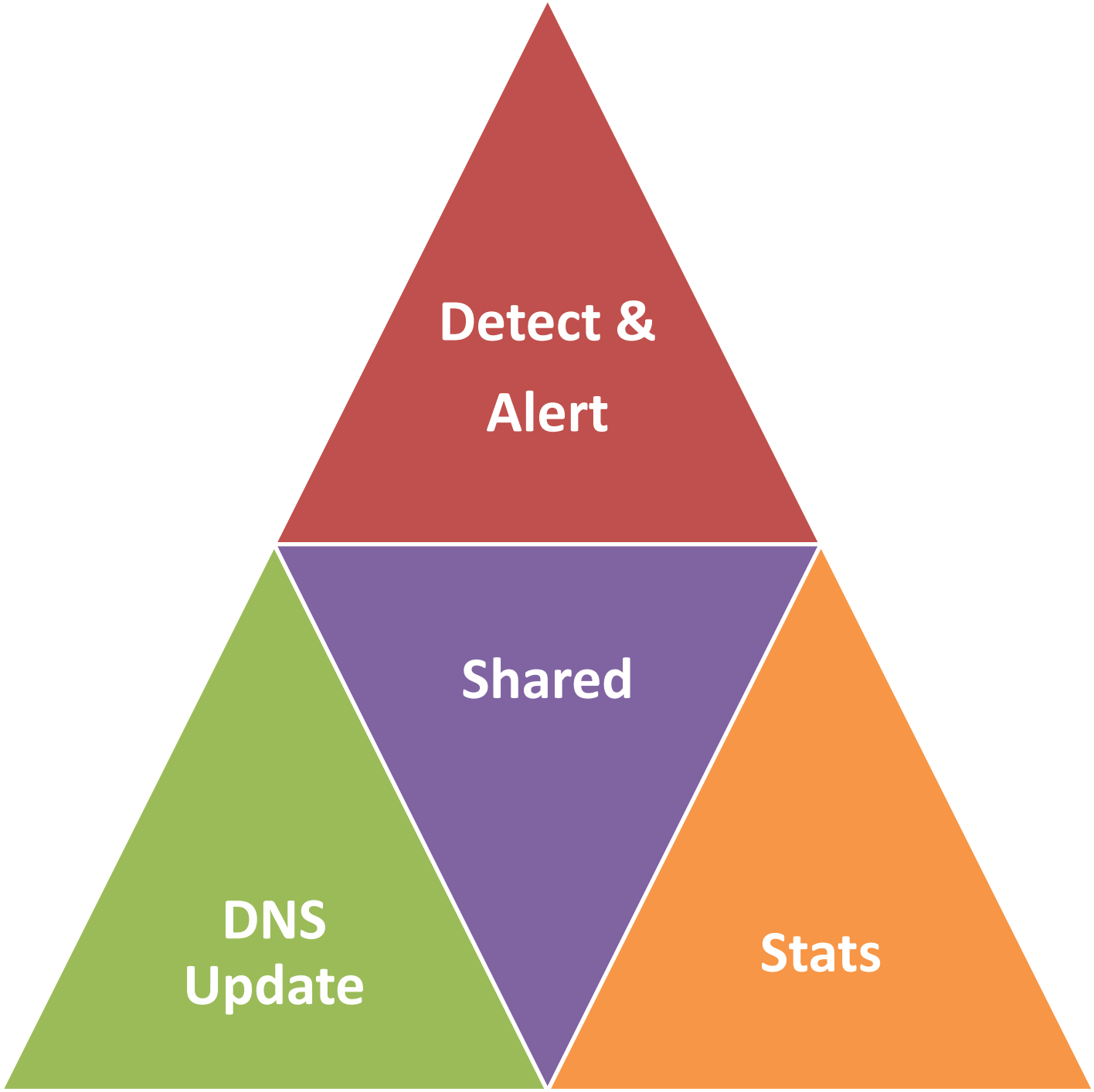
MalwareTrap’s needs of improvment

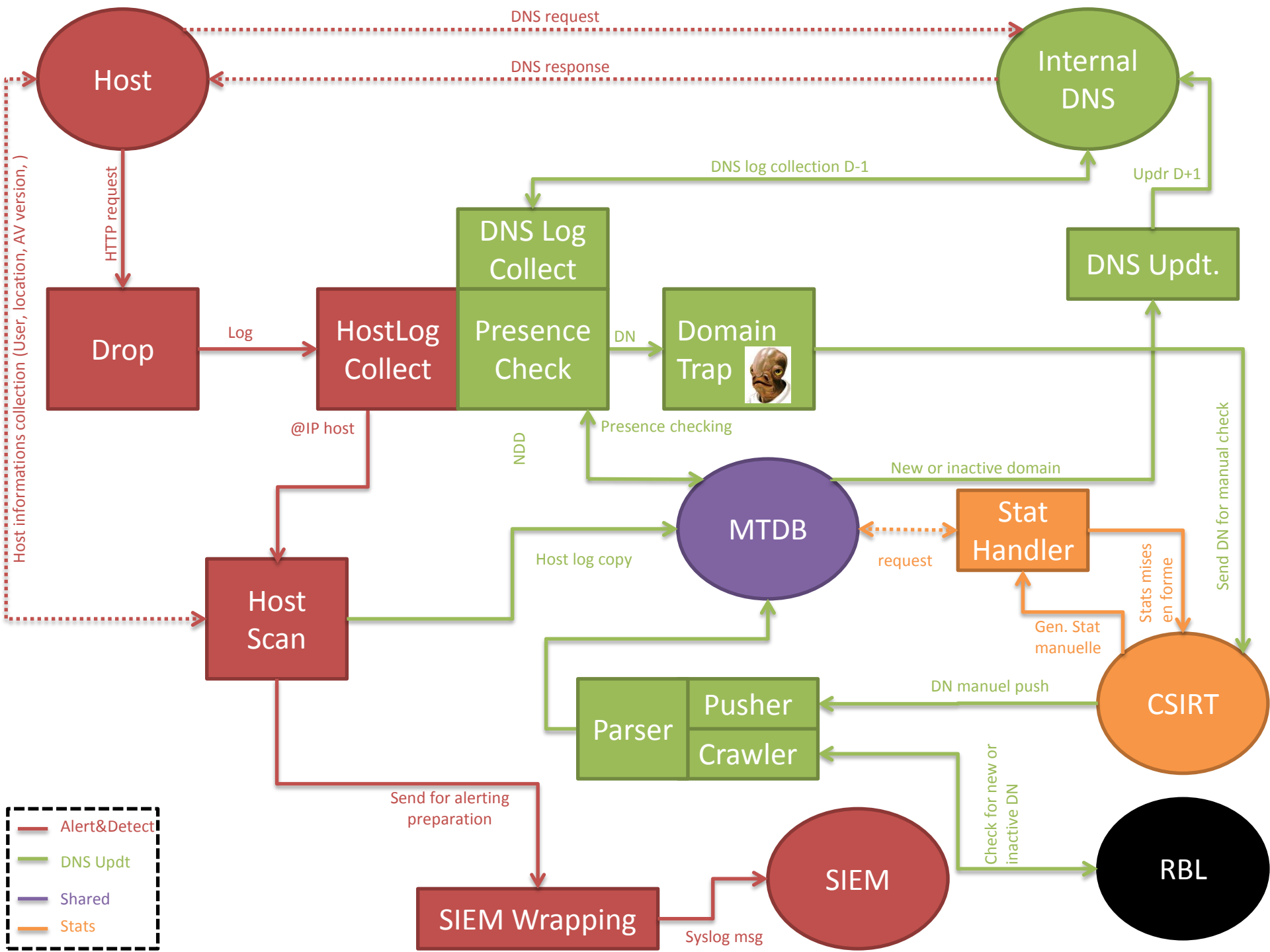
- Report on a monthly basis
- Polluting a production firewall’s logs
- CSV format not very handy for quick incident assesment
- No check if FQDN were still malicious
- A single threat supervised

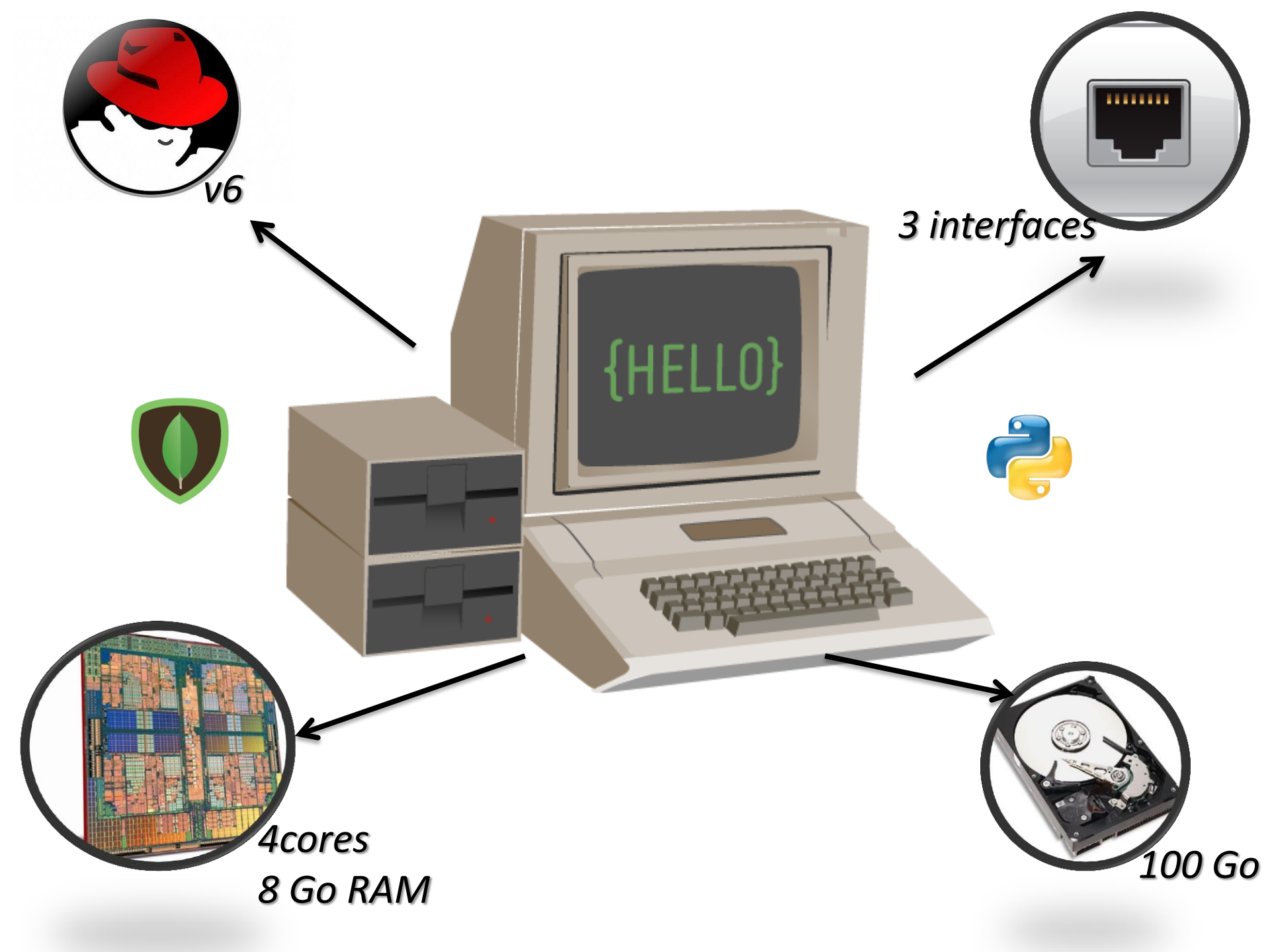
I WANT YOU TO

- Detect bot and notify the supervision team
- Identify currently used C&C for various threats
- Update DNS entries
- Wanna stats! (for my hierarchy you know …)

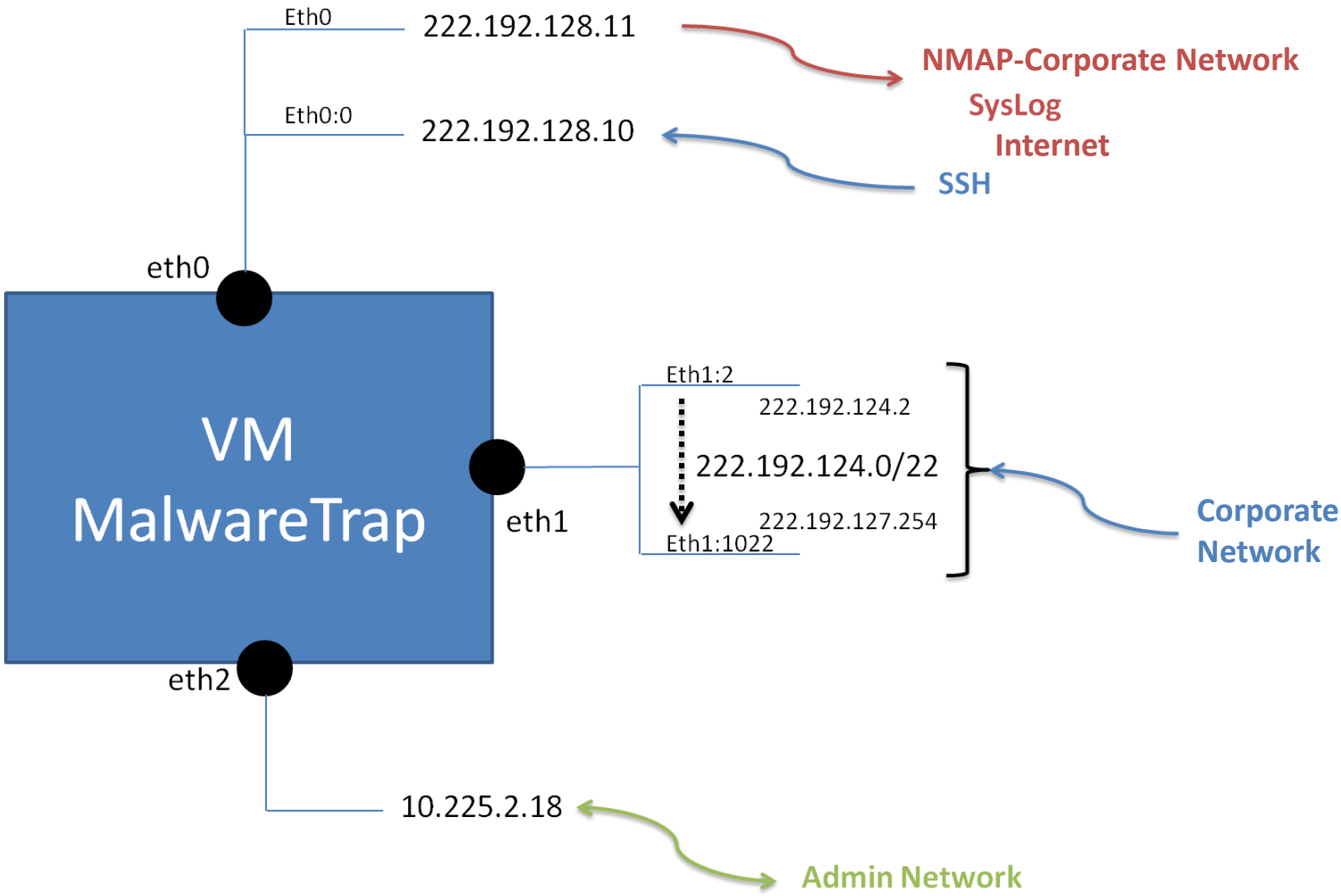

TRUST ME,
I'M AN
ENGINEER!


Detect &
Alert
Shared
DNS
Update
Stats

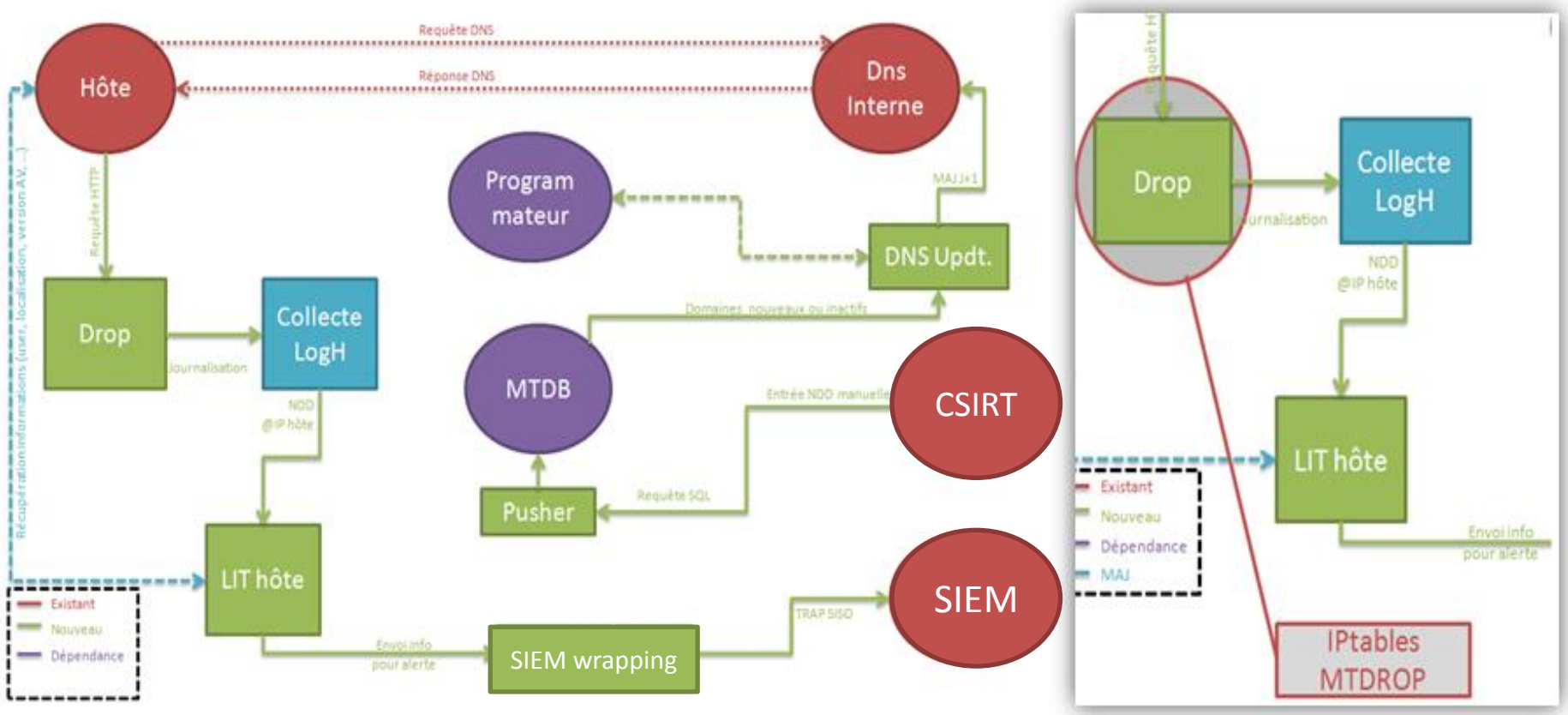

Host
DNS request
DNS response
Internal DNS
HTTP request
Host informations collection (User, location, AV version,)
DNS log collection D-1
Updr D+1
DNS Log Collect
DNS Updt.
Drop
Log
HostLog Collect
Presence Check
DN
Domain Trap
@IP host
NDD
Presence checking
New or inactive domain
Send DN for manual check
MTDB
Stat Handler
request
Host log copy
Host Scan
Stats mises en forme
Gen. Stat manuelle
DN manuel push
CSIRT
Parser
Pusher
Crawler
Send for alerting preparation
Check for new or inactive DN
RBL
SIEM
SIEM Wrapping
Syslog msg
Alert&Detect
DNS Updt
Shared
Stats


v6
3 interfaces
{HELLO}
4cores
8 Go RAM
100 Go


ROUND
1
whitecollarboxing.ie
whitecollarboxing.ie


Eth0
222.192.128.11
NMAP-Corporate Network
SysLog
Eth0:0
222.192.128.10
Internet
SSH
eth0
VM
MalwareTrap
eth1
Eth1:2
222.192.124.2
222.192.124.0/22
222.192.127.254
Eth1:1022
Corporate
Network
eth2
10.225.2.18
Admin Network

IPtables MTDROP

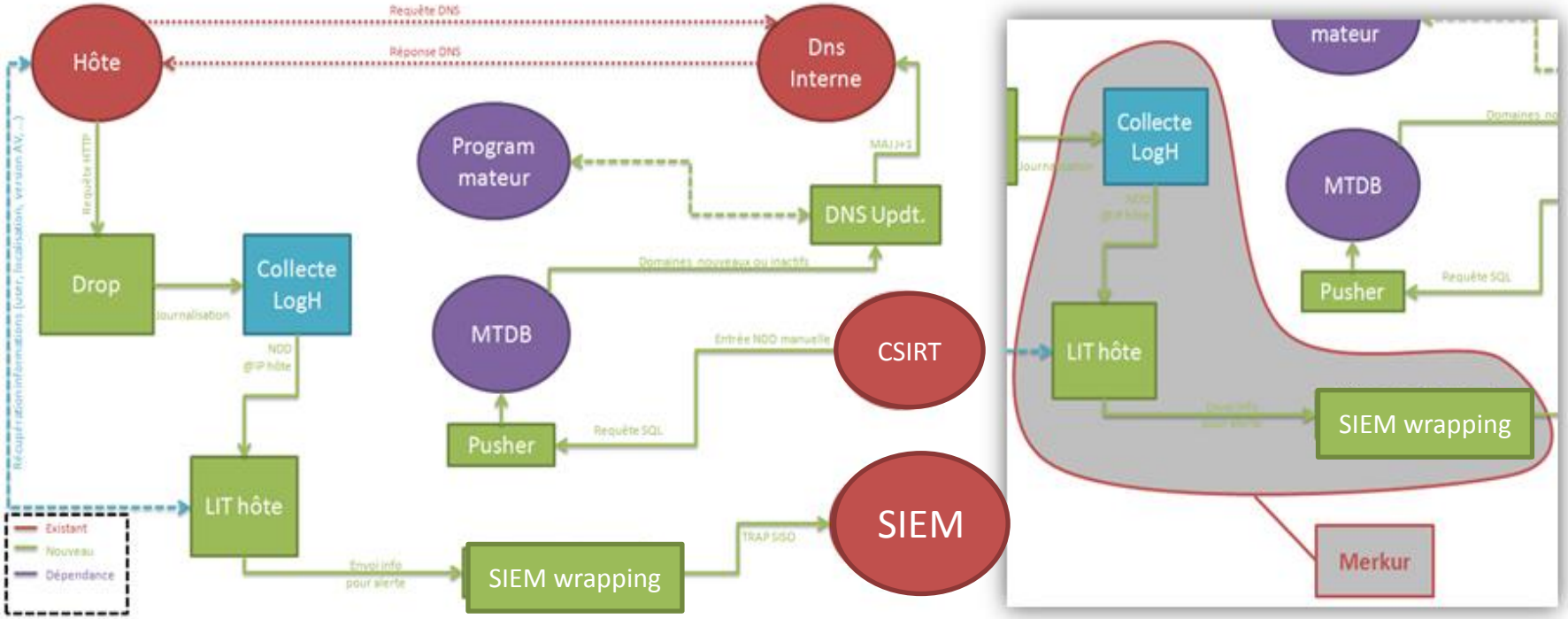


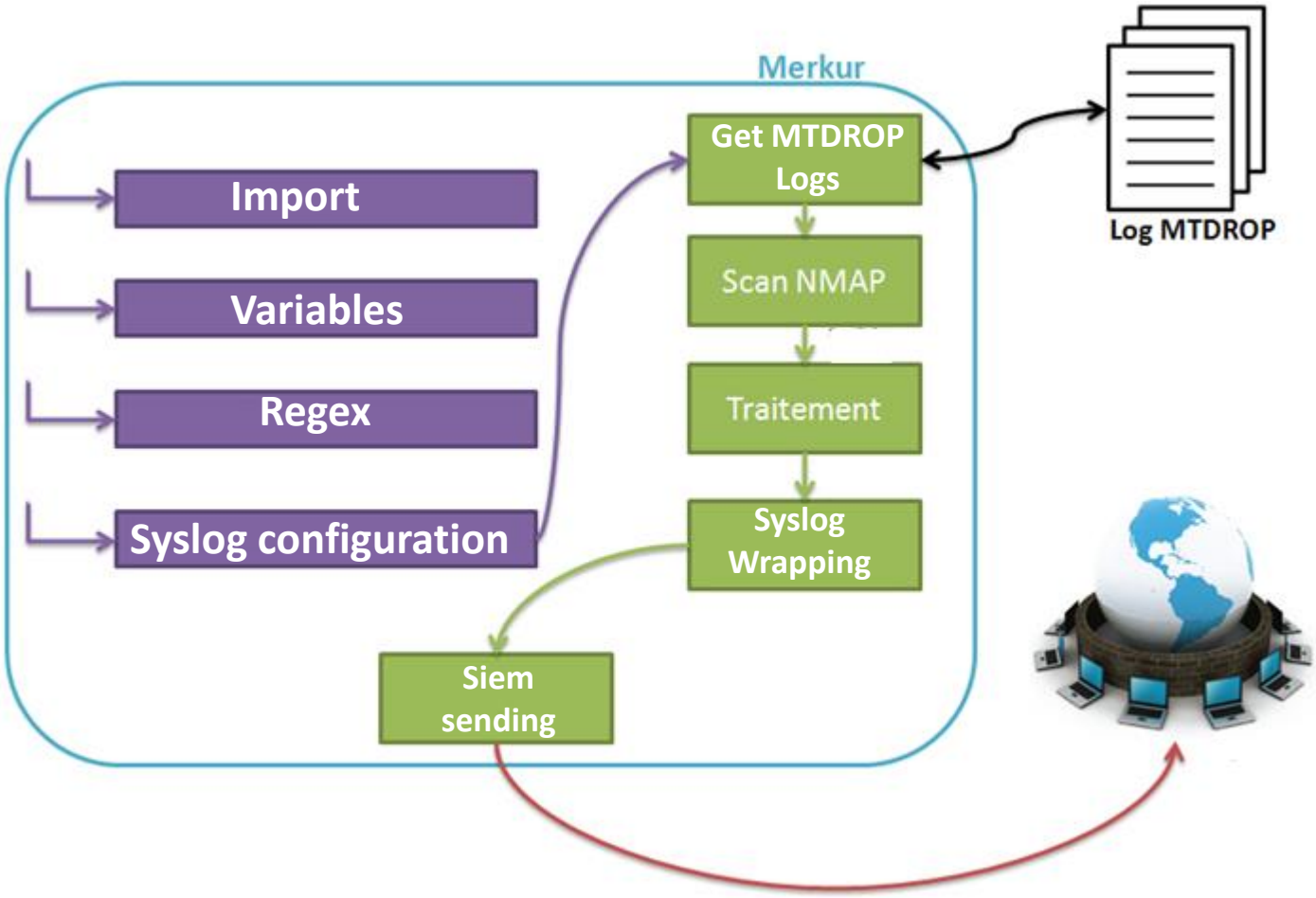
IPtable

```
# Creation d'une chaine de LOG&DROP (denomme MT-log-n-drop) d'une connexion
iptables -N MT-log-n-drop #cree une nouvelle chaine
iptables -A MT-log-n-drop -j LOG --log-prefix "MTDETECT : " --log-level warning
iptables -A MT-log-n-drop -j ACCEPT

# ------------------------------------ #
# ------ MT RULES : Regles metiers ------ #
# ------------------------------------ #
# Regle LOG&DROP appliquee aux connexions entrantes
# Dans notre cas, les connexions ECRIN arrivent sur l'eth1
iptables -A INPUT -i eth1 -d 222.192.124.0/22 -j MT-log-n-drop
```


```
[root@           Stat]# cat /etc/rsyslog.conf
#### RULES ####
# --- START MalwareTrap LOGnDROP forwarding rule --- #
:msg, startswith, "MTDETECT :" /MalwareTrap/LOG/drop.log
& ~
# --- STOP MalwareTrap LOGnDROP forwarding rule --- #

# --- START MalwareTrap GENERICDROPIN forwarding rule --- #
:msg, startswith, "MTGENERICIN :" /MalwareTrap/LOG/generic-in.log
& ~
# --- STOP MalwareTrap GENERICDROPIN forwarding rule --- #

# --- START MalwareTrap GENERICDROPOUT forwarding rule --- #
:msg, startswith, "MTGENERICOUT :" /MalwareTrap/LOG/generic-out.log
& ~
# --- STOP MalwareTrap GENERICDROPOUT forwarding rule --- #
```

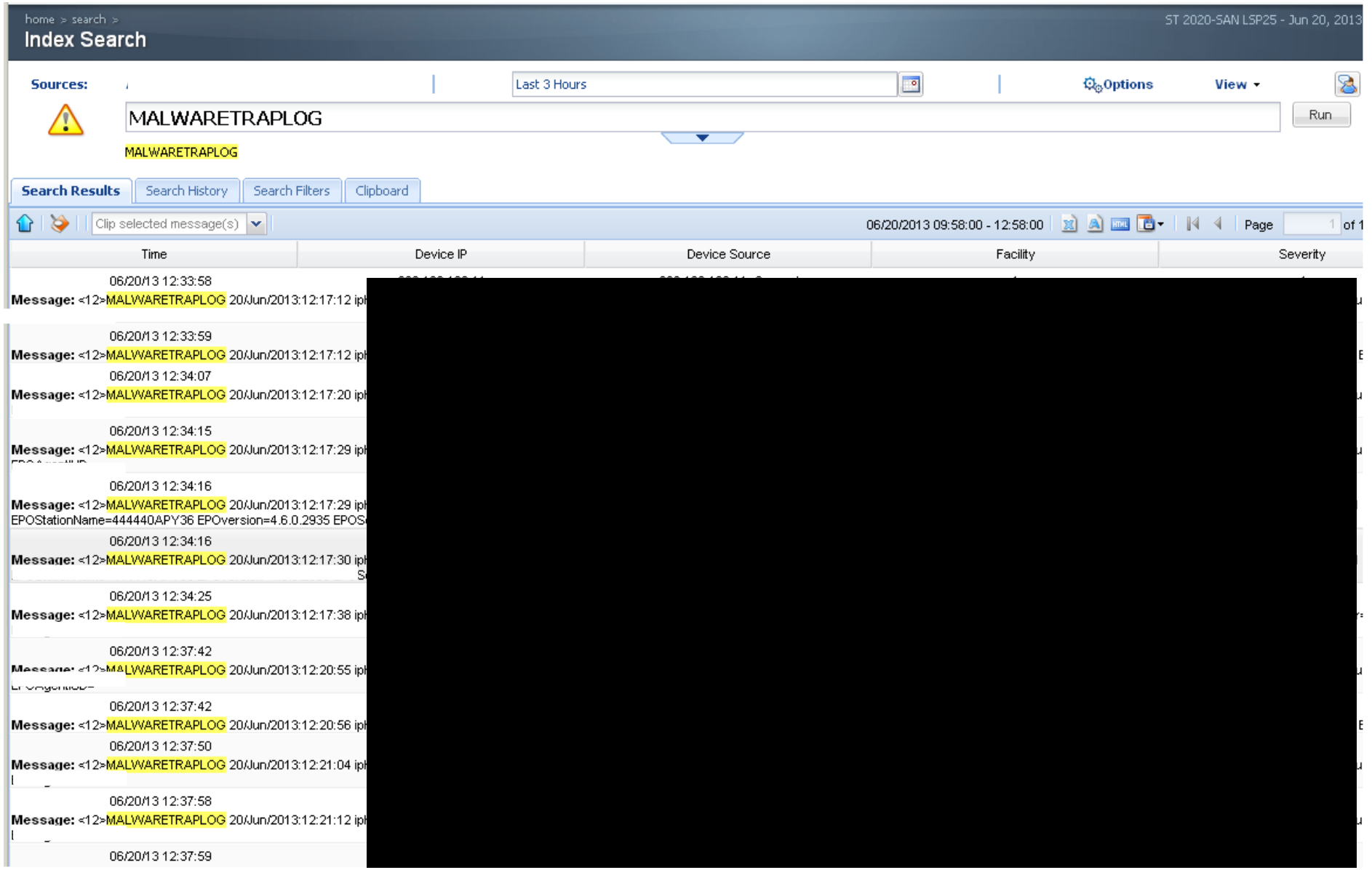
Merkur


Hôte
Requête DNS
Réponse DNS
Dns Interne
Program mateur
MAJ J+1
DNS Updt.
Drop
Collecte LogH
Journalisation
MTDB
Domaines nouveaux ou inactifs
CSIRT
Entrée NDD manuelle
Pusher
Requête SQL
LIT hôte
SIEM
TRAP SISO
SIEM wrapping
Existant
Nouveau
Dépendance
mateur
Collecte LogH
MTDB
Pusher
Requête SQL
LIT hôte
SIEM wrapping
Merkur


Merkur
Import
Variables
Regex
Syslog configuration
Get MTDROP Logs
Scan NMAP
Traitement
Syslog Wrapping
Siem sending
Log MTDROP

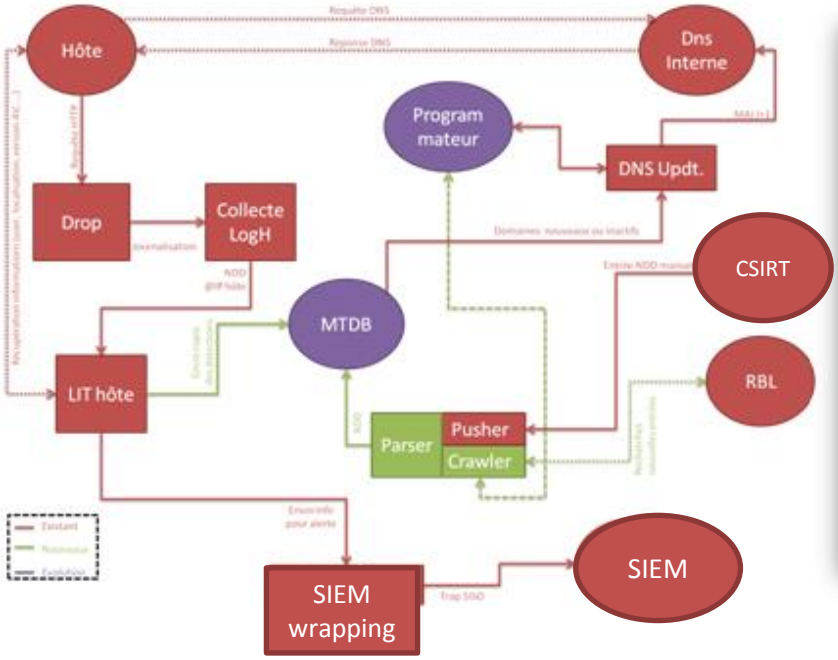
Scheduler

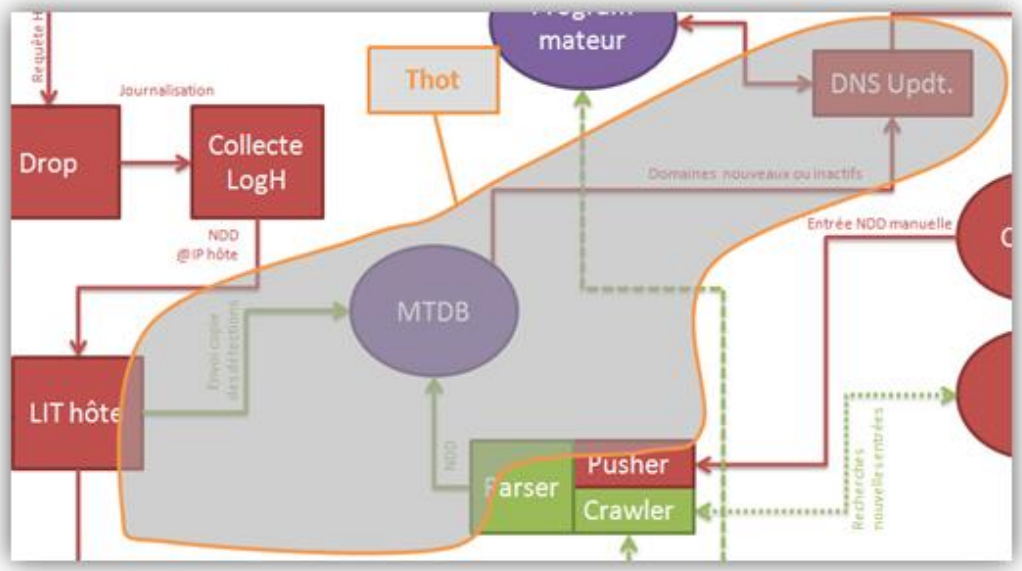
```
[root@xxxxxxxxx Stat]# crontab -l
*/5 * * * * /MalwareTrap/script/DetectnAlert/merkur-2-2.py &> /tmp/mttest.log
```

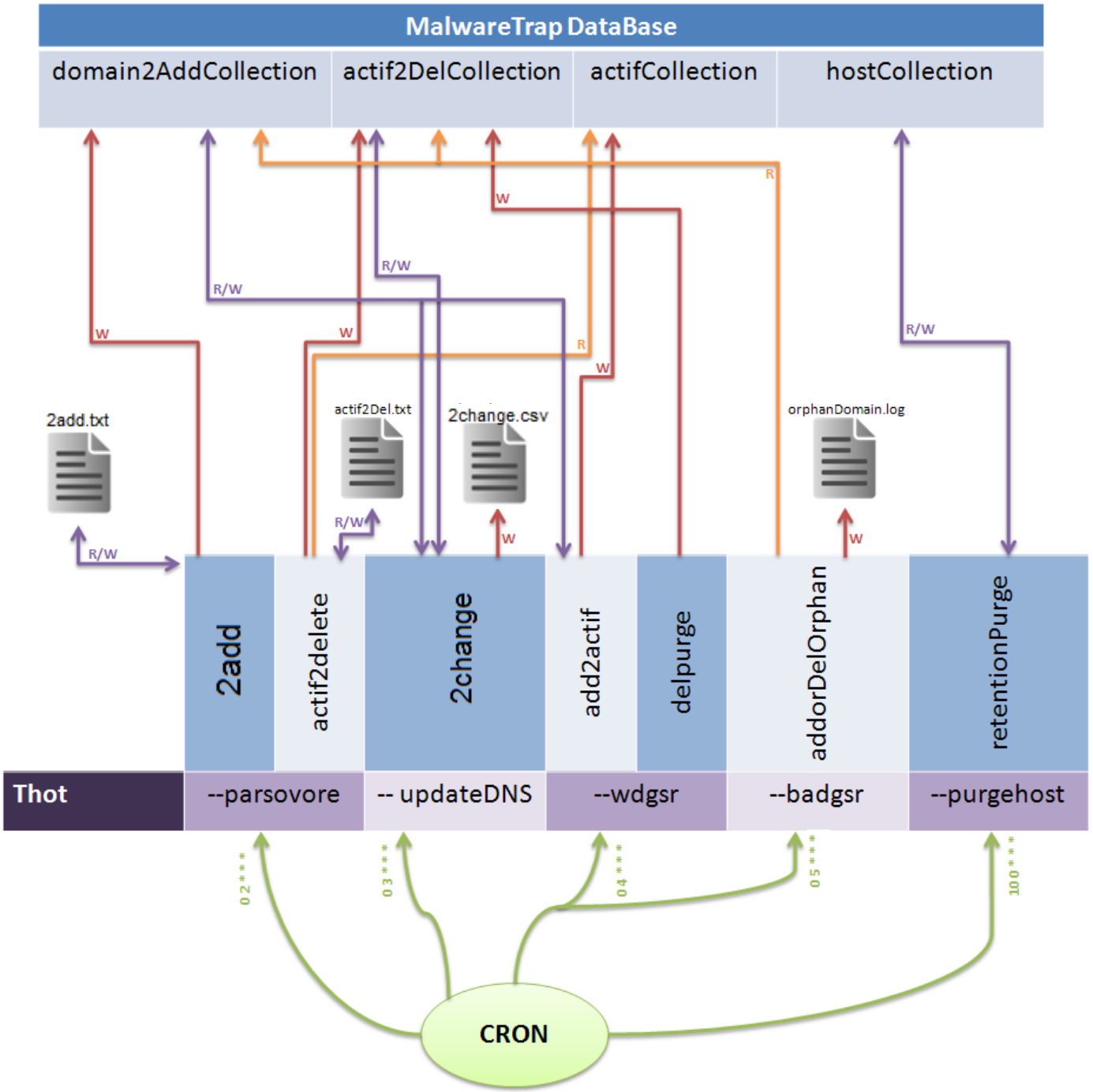

home > search >
Index Search
ST 2020-SAN L5P25 - Jun 20, 2013
Sources:
Last 3 Hours
Options
View
MALWARETRAPLOG
Run
MALWARETRAPLOG
Search Results
Search History
Search Filters
Clipboard
Clip selected message(s)
06/20/2013 09:58:00 - 12:58:00
Page 1 of 1
Time
Device IP
Device Source
Facility
Severity
06/20/13 12:33:58
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:17:12 ip
06/20/13 12:33:59
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:17:12 ip
06/20/13 12:34:07
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:17:20 ip
06/20/13 12:34:15
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:17:29 ip
06/20/13 12:34:16
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:17:29 ip
EPOStationName=444440APY36 EPOversion=4.6.0.2935 EPOS
06/20/13 12:34:16
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:17:30 ip
06/20/13 12:34:25
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:17:38 ip
06/20/13 12:37:42
06/20/13 12:37:42
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:20:56 ip
06/20/13 12:37:50
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:21:04 ip
06/20/13 12:37:58
Message: <12>MALWARETRAPLOG 20/Jun/2013:12:21:12 ip
06/20/13 12:37:59


2

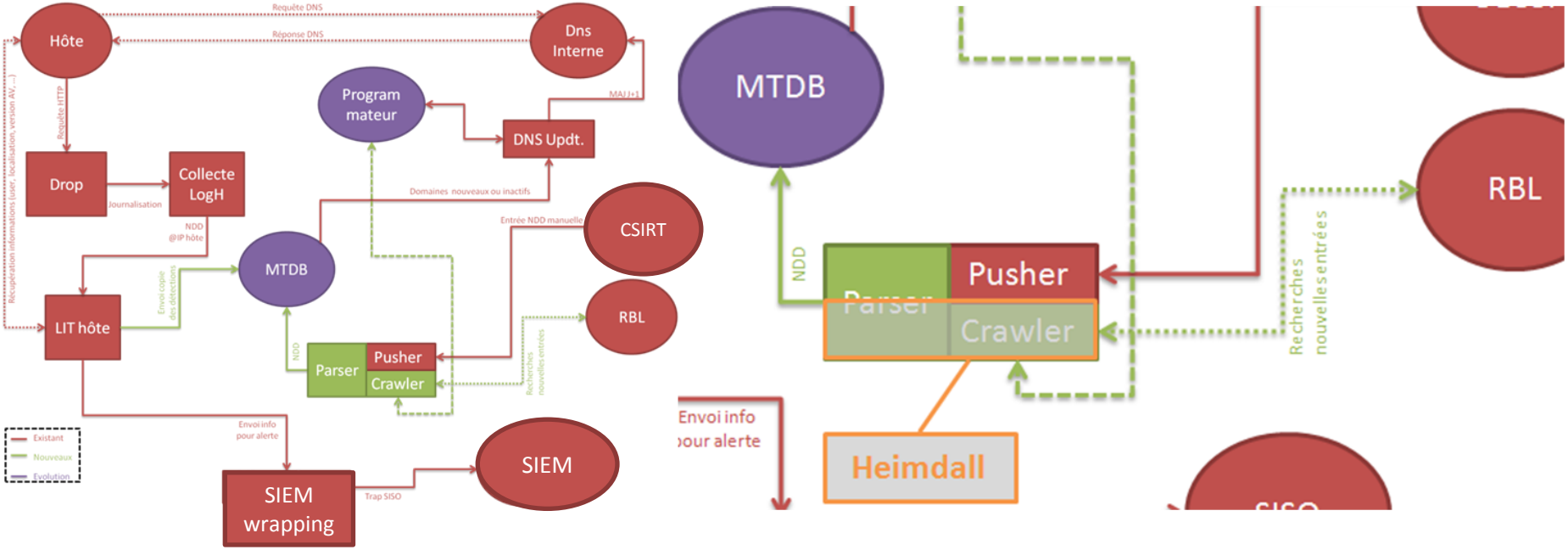
Thot

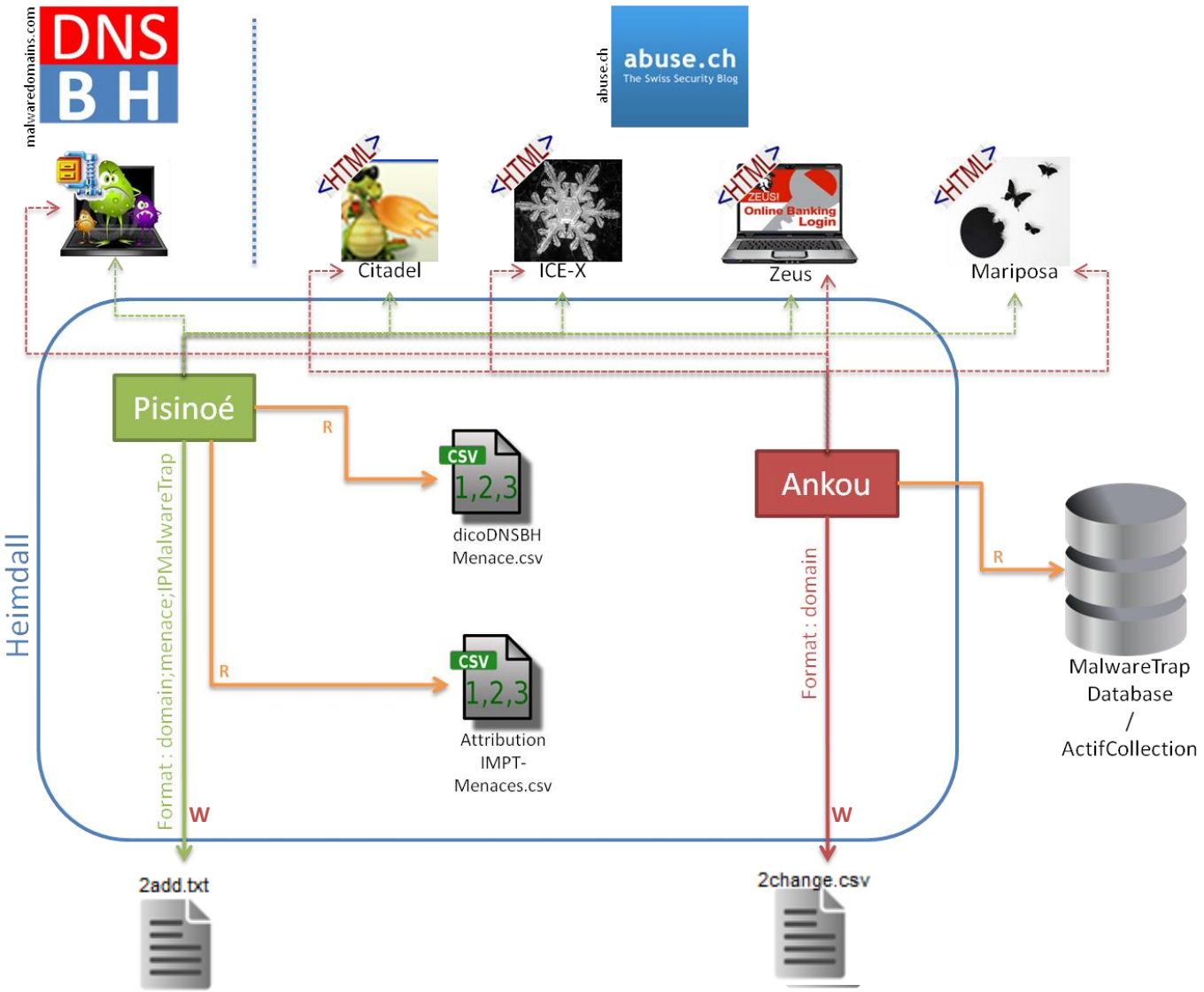

Hôte
Dns Interne
Program mateur
DNS Updt.
Drop
Collecte LogH
CSIRT
MTDB
LIT hôte
RBL
Parser
Pusher
Crawler
SIEM
SIEM wrapping


Thot
mateur
DNS Updt.
Journalisation
Drop
Collecte LogH
NDD @IP hôte
Domaines nouveaux ou inactifs
Entrée NDD manuelle
MTDB
LIT hôte
Parser
Pusher
Crawler


MalwareTrap DataBase
domain2AddCollection
actif2DelCollection
actifCollection
hostCollection
R
W
R/W
R/W
W
W
R
W
R/W
2add.txt
actif2Del.txt
2change.csv
orphanDomain.log
R/W
R/W
W
W
2add
actif2delete
2change
add2actif
delpurge
addorDelOrphan
retentionPurge
Thot
--parsovore
-- updateDNS
--wdgsr
--badgsr
--purgehost
02***
03***
04***
05***
100***
CRON

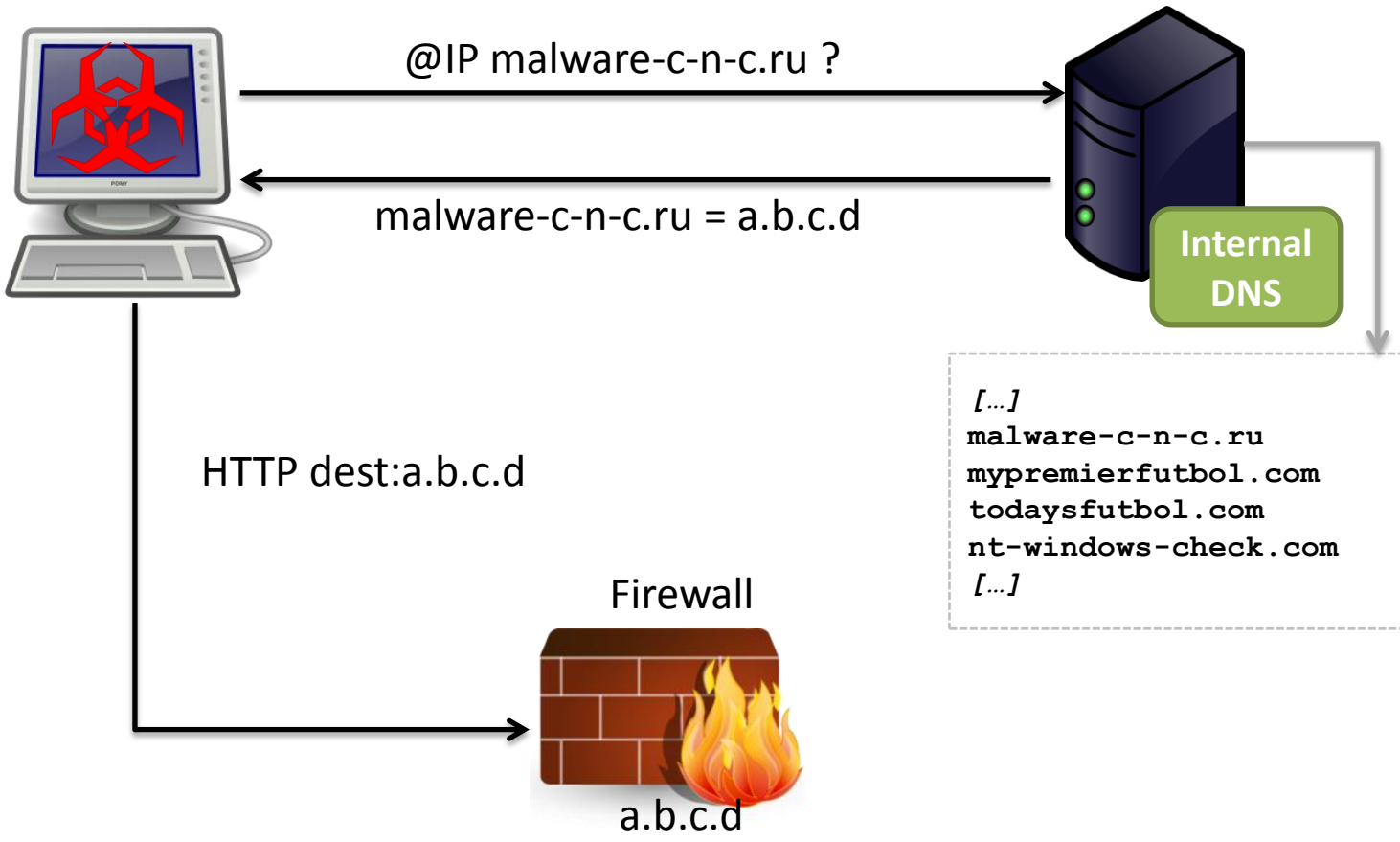
Heimdall

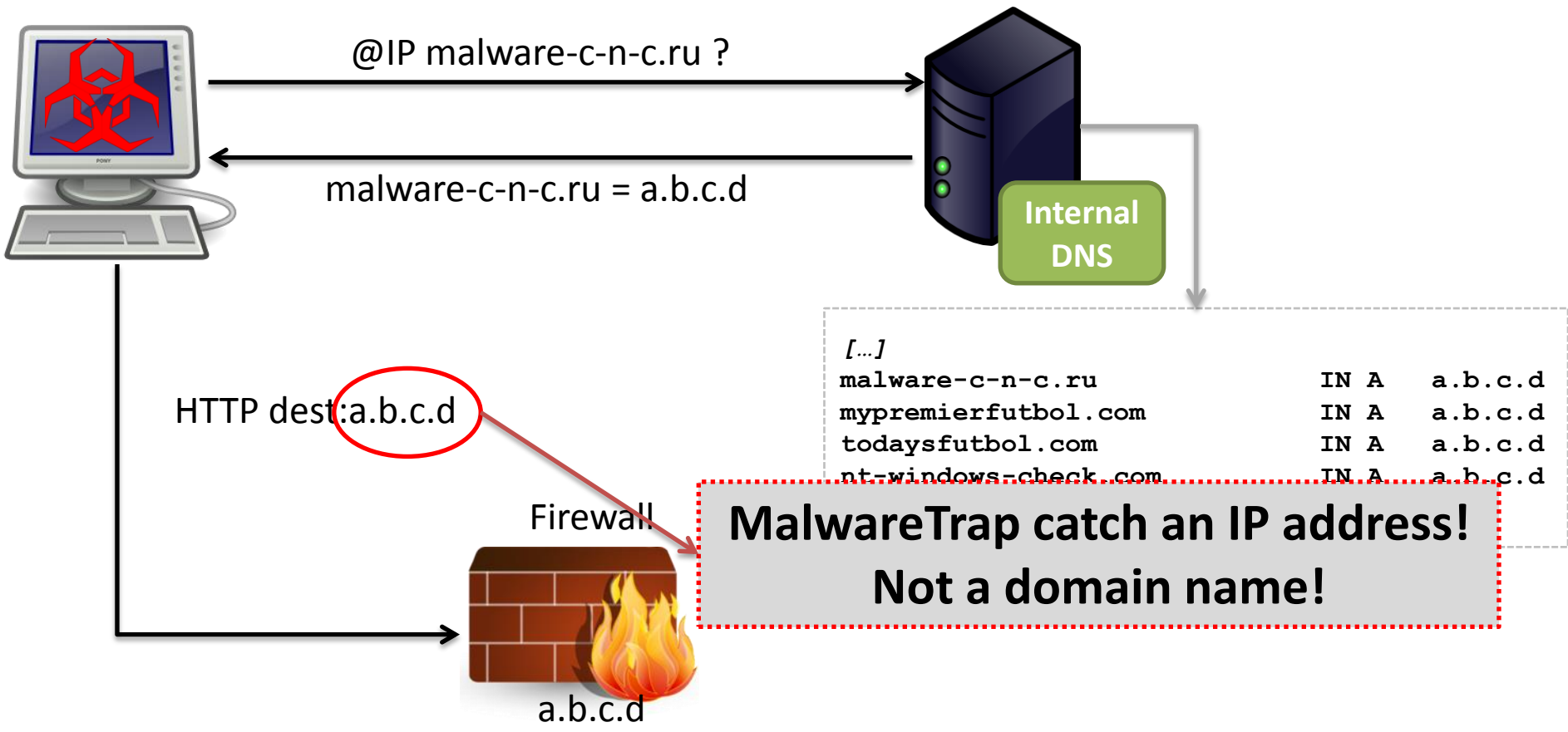

Hôte
Requête DNS
Réponse DNS
Dns Interne
Program mateur
MAJ J+1
DNS Updt.
Drop
Journalisation
Collecte LogH
NDD @IP hôte
Domaines nouveaux ou inactifs
Entrée NDD manuelle
CSIRT
MTDB
RBL
LIT hôte
Envoi copie des détections
NDD
Parser
Pusher
Crawler
Recherches nouvelles entrées
Envoi info pour alerte
Existant
Nouveaux
Evolution
SIEM wrapping
Trap SISO
SIEM
MTDB
NDD
Parser
Pusher
Crawler
Recherches nouvelles entrées
RBL
Envoi info
pour alerte
Heimdall

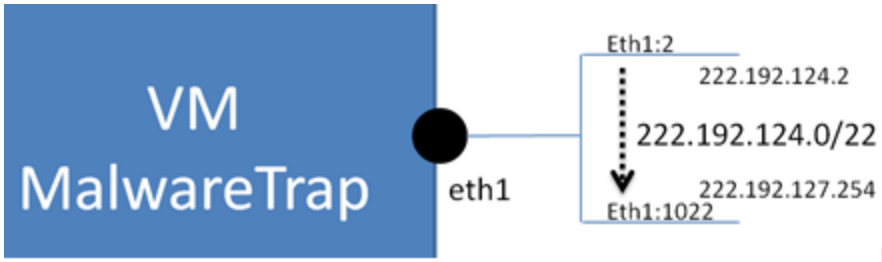

malwaredomains.com
DNS
B H
abuse.ch
abuse.ch
The Swiss Security Blog
Citadel
ICE-X
Zeus
Mariposa
Heimdall
Pisinoé
R
CSV
1,2,3
dicoDNSBH
Menace.csv
R
CSV
1,2,3
Attribution
IMPT-
Menaces.csv
Format : domain;menace;IPMalwareTrap
W
2add.txt
Ankou
Format : domain
W
2change.csv
R
MalwareTrap
Database
/
ActifCollection

ThreatIP-Attribution.csv

?


@IP malware-c-n-c.ru ?
malware-c-n-c.ru = a.b.c.d
Internal DNS
[…]
malware-c-n-c.ru IN A a.b.c.d
mypremierfutbol.com IN A a.b.c.d
todaysfutbol.com IN A a.b.c.d
nt-windows-check.com IN A a.b.c.d
[…]
HTTP dest:a.b.c.d
Firewall
a.b.c.d


@IP malware-c-n-c.ru ?
malware-c-n-c.ru = a.b.c.d
Internal DNS
[…]
malware-c-n-c.ru IN A a.b.c.d
mypremierfutbol.com IN A a.b.c.d
todaysfutbol.com IN A a.b.c.d
nt-windows-check.com IN A a.b.c.d
HTTP dest:a.b.c.d
Firewall
a.b.c.d
MalwareTrap catch an IP address!
Not a domain name!



ThreatIP-Attribution.csv

*.124.0/24 : Cybercrime Threat

*.125.0/24 : Advanced Persistent Threat (APT)

*.12(6|7).0/24 : Free

222.192.124.1	x	222.192.125.1	VARIOUSAPT	222.192.126.1	x	222.192.127.1	x
222.192.124.2	DEFAULT	222.192.125.2	MANDIANT-APT1	222.192.126.2	x	222.192.127.2	x
222.192.124.3	MARIPOSA	222.192.125.3	COMMENTCREW	222.192.126.3	x	222.192.127.3	x
222.192.124.4	ZEUS	222.192.125.4	FINFISHER	222.192.126.4	x	222.192.127.4	x
222.192.124.5	ICE-X	222.192.125.5	GAUSS	222.192.126.5	x	222.192.127.5	x
222.192.124.6	CITADEL	222.192.125.6	KEYBOY	222.192.126.6	x	222.192.127.6	x
222.192.124.7	ZEUSGAMEOVER	222.192.125.7	LADYBOYLE	222.192.126.7	x	222.192.127.7	x
222.192.124.8	FARFLI	222.192.125.8	NETTRAVELER	222.192.126.8	x	222.192.127.8	x
222.192.124.9	BETABOT	222.192.125.9	RBN	222.192.126.9	x	222.192.127.9	x
222.192.124.10	CDORKED	222.192.125.10	x	222.192.126.10	x	222.192.127.10	x
222.192.124.11	COOLWEBSEARCH	222.192.125.11	x	222.192.126.11	x	222.192.127.11	x
222.192.124.12	CRIDEX	222.192.125.12	x	222.192.126.12	x	222.192.127.12	x
222.192.124.13	EXPIROZ	222.192.125.13	x	222.192.126.13	x	222.192.127.13	x
222.192.124.14	GATAK	222.192.125.14	x	222.192.126.14	x	222.192.127.14	x
222.192.124.15	GEINIMI	222.192.125.15	x	222.192.126.15	x	222.192.127.15	x
222.192.124.16	GHOSTRAT	222.192.125.16	x	222.192.126.16	x	222.192.127.16	x
222.192.124.17	SHIZINFOSTEALER	222.192.125.17	x	222.192.126.17	x	222.192.127.17	x
222.192.124.18	KELIHOS	222.192.125.18	x	222.192.126.18	x	222.192.127.18	x
222.192.124.19	ZEUSKNEBER	222.192.125.19	x	222.192.126.19	x	222.192.127.19	x
222.192.124.20	KOOBFACE	222.192.125.20	x	222.192.126.20	x	222.192.127.20	x
222.192.124.21	KULUOZ	222.192.125.21	x	222.192.126.21	x	222.192.127.21	x
222.192.124.22	MEDFOS	222.192.125.22	x	222.192.126.22	x	222.192.127.22	x
222.192.124.23	NAIKON	222.192.125.23	x	222.192.126.23	x	222.192.127.23	x
222.192.124.24	PONY	222.192.125.24	x	222.192.126.24	x	222.192.127.24	x
222.192.124.25	PONMOCUP	222.192.125.25	x	222.192.126.25	x	222.192.127.25	x
222.192.124.26	PUSHDO	222.192.125.26	x	222.192.126.26	x	222.192.127.26	x
222.192.124.27	RANBYUS	222.192.125.27	x	222.192.126.27	x	222.192.127.27	x
222.192.124.28	PWS	222.192.125.28	x	222.192.126.28	x	222.192.127.28	x
222.192.124.29	RAWIN	222.192.125.29	x	222.192.126.29	x	222.192.127.29	x
222.192.124.30	ZEROACCESS	222.192.125.30	x	222.192.126.30	x	222.192.127.30	x
222.192.124.31	RUB080	222.192.125.31	x	222.192.126.31	x	222.192.127.31	x
222.192.124.32	SINOWAL	222.192.125.32	x	222.192.126.32	x	222.192.127.32	x
222.192.124.33	SUTRATDS	222.192.125.33	x	222.192.126.33	x	222.192.127.33	x
222.192.124.34	TDSS	222.192.125.34	x	222.192.126.34	x	222.192.127.34	x
222.192.124.35	TRAVNET	222.192.125.35	x	222.192.126.35	x	222.192.127.35	x
222.192.124.36	KRYPT	222.192.125.36	x	222.192.126.36	x	222.192.127.36	x
222.192.124.37	ZEGOST	222.192.125.37	x	222.192.126.37	x	222.192.127.37	x
222.192.124.38	ZBOT	222.192.125.38	x	222.192.126.38	x	222.192.127.38	x
222.192.124.39	RUNFORESTRUN	222.192.125.39	x	222.192.126.39	x	222.192.127.39	x


3
www.ONEFC.com

634 056

100

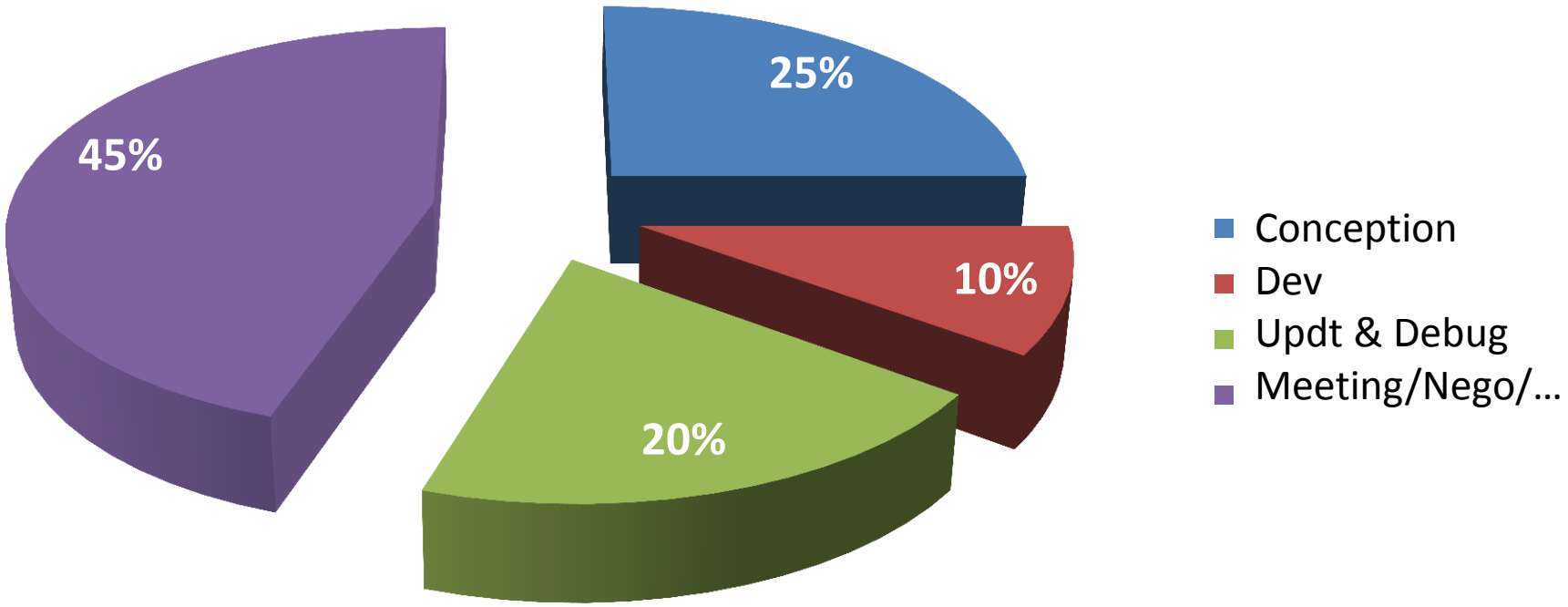
1

08/07/2013 -> 08/08/2013

~90%

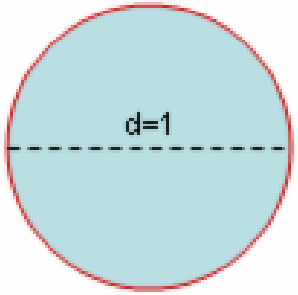
Adresse IP	Events	Moy/j
[redacted].106	174167	5 618
[redacted].19	169542	5 469
[redacted].45	39658	1 279
[redacted].229	34502	1 113
[redacted].134	34276	1 106
[redacted]72	25435	820
[redacted].52	23971	773
[redacted].29	23819	768
[redacted].28	20742	669
[redacted].29	14775	477
TOTAL	560887	18 093

470h of work over 5 months

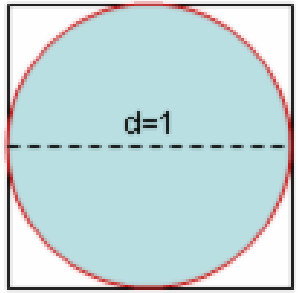



It’s time to talk a bit about me

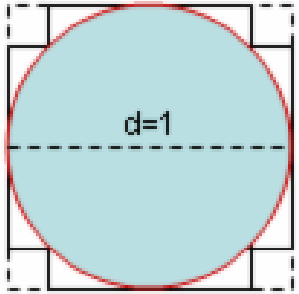
Draw a circle



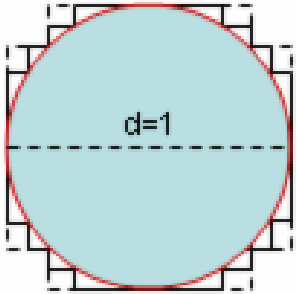
Draw a square around it
Perimeter = 4



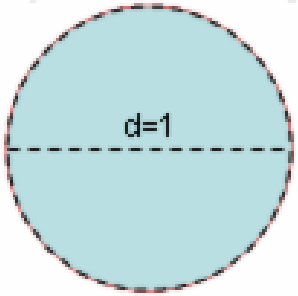
Remove corners.
Perimeter is still 4!



Remove more corners.
Perimeter is still 4!



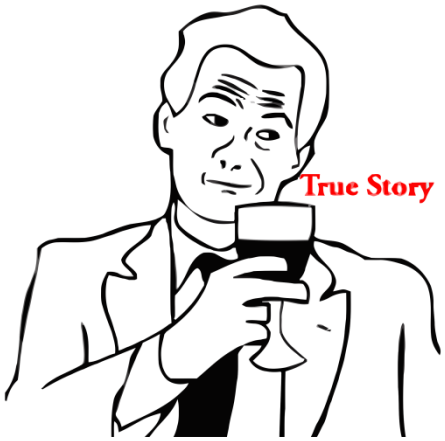
Repeat to infinity



$\pi = 4!$

Problem Archimedes?

xyjvufatvwjrviw[.biz]



Cryptolocker

---

jyyfmnefedjogsh.biz
dxejhopldgymgld.com
oiokidamwjythao.info
qayuttfyvdsufol.net
bgtyvxkyemflyjo.co.uk
ujtohypxdfvrtor.org
fposjduxloiiurh.net
srjeviklelcqdbl.biz
hhydutakkicjusf.ru
ngxdvwiwmlfxegs.info

RunForestRun

---

*.qxpmhnrvrkqewurq.waw.pl (Sat Jul 21 2012 00:00)
*.keefqnfsgqxrzlru.waw.pl (Sat Jul 21 2012 01:00)
*.ekkugeunekaxqolz.waw.pl (Sat Jul 21 2012 07:00)
*.svndeqsqughepaye.waw.pl (Sat Jul 21 2012 13:00)
*.aksfkuuozvfqprms.waw.pl (Sat Jul 21 2012 19:00)
*.zpqkervzziqffvas.waw.pl (Sun Jul 22 2012 00:00)
*.uiuxumxroflzpfxr.waw.pl (Sun Jul 22 2012 01:00)

type	time dependent	deterministic	example
TID	no	yes	Kraken
TDD	yes	yes	Conficker
TDN	yes	no	Torpig

Not a word!

jyyfmnefedjogsh
dxejhopldgymgld
oiokidamwjythao
qayuttfyvdsufol
bgtyvxkyemflyjo
ujtohypxdfvrtor
fposjduxloiiurh
srjeviklelcqdbl
hhydutakkicjusf
ngxdvwiwmlfxegs

- Identical letter or number series
- Consonant series
- Too many ‘-’
- Too many numbers
- Too many ‘.’
- Too many rares letters

- Not closed to a french word
- Not closed to an english word
- Too much characters diversity

- This tld is know to be evil
- This domain is know to be evil

- Identical letter or number series
- Consonant series
- Too many ‘-’
- Too many numbers
- Too many ‘.’
- Too many rares letters

Sashav1 :

- Group 9 infractions
- Constant or percentage trigger
- One afternoon for the PoC
- Detected 65% of DGA
- 10% of FP

- **Not closed to a french word**
- **Not closed to an english word**
- **Too much characters diversity**

Shannonv1 :

- 2 algorithms
  - Levenshtein
  - Shannon
- 15 000 random English words
- 15 000 random French words
- One day for the PoC
- TP : 50%
- FP : 20%

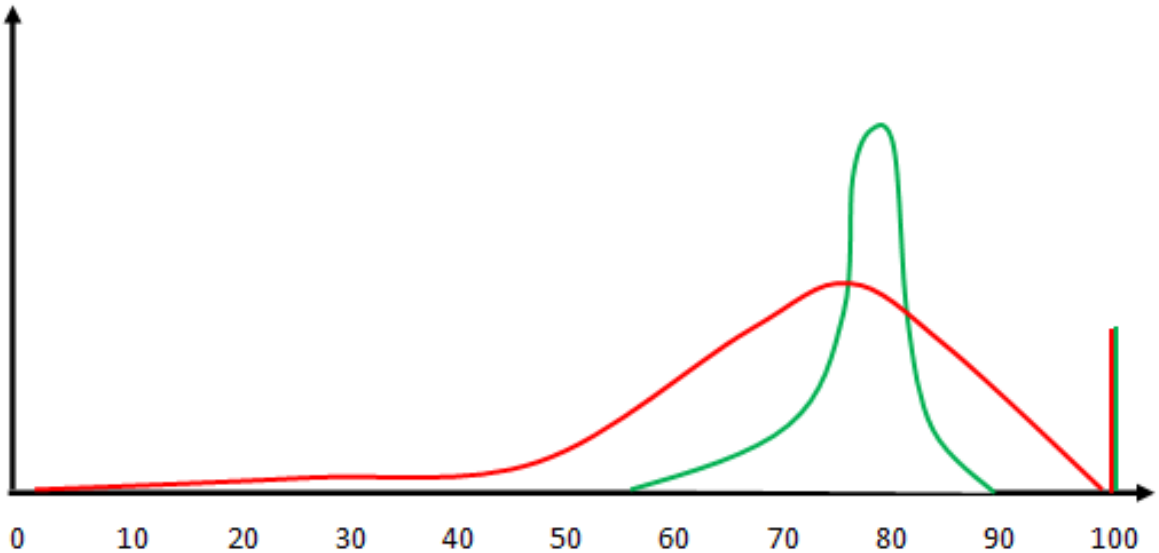
Shannon entropy

Quantity of information contain in a message :

- toto -> {o,t} -> 2 informations
- len(toto) = message size = 4
- entropy : 2/4 = 0,5

Low entropy : redondancy

High entropy : equiprobable random generation



Levenshtein distance

Number of modifications to go to one string to another

toto -> tatao = ?

t / t = 0

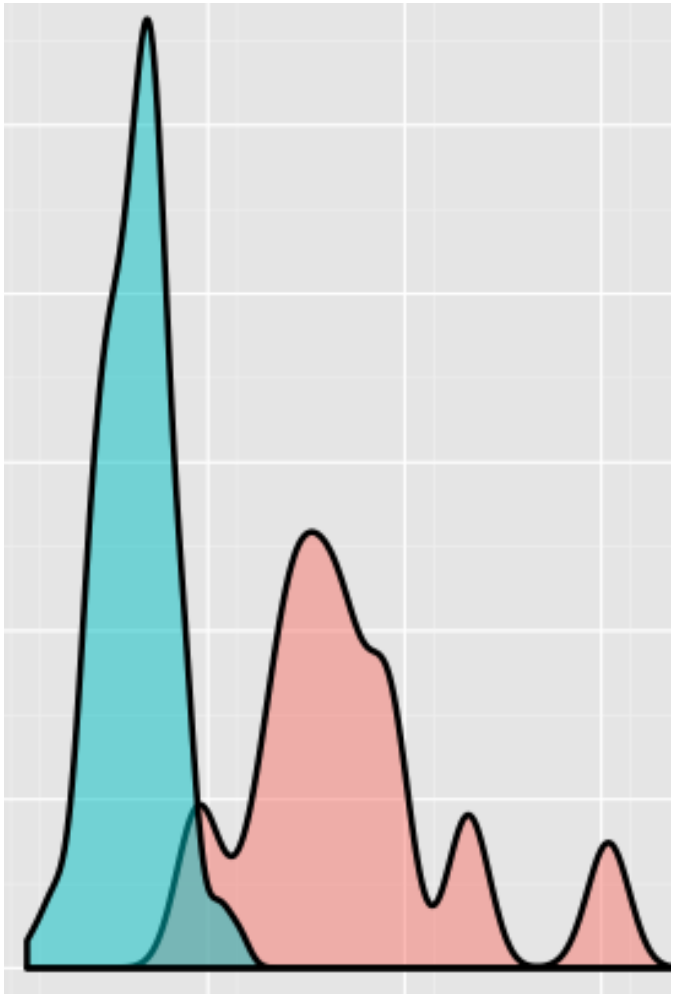
to / t[a->o] = 1

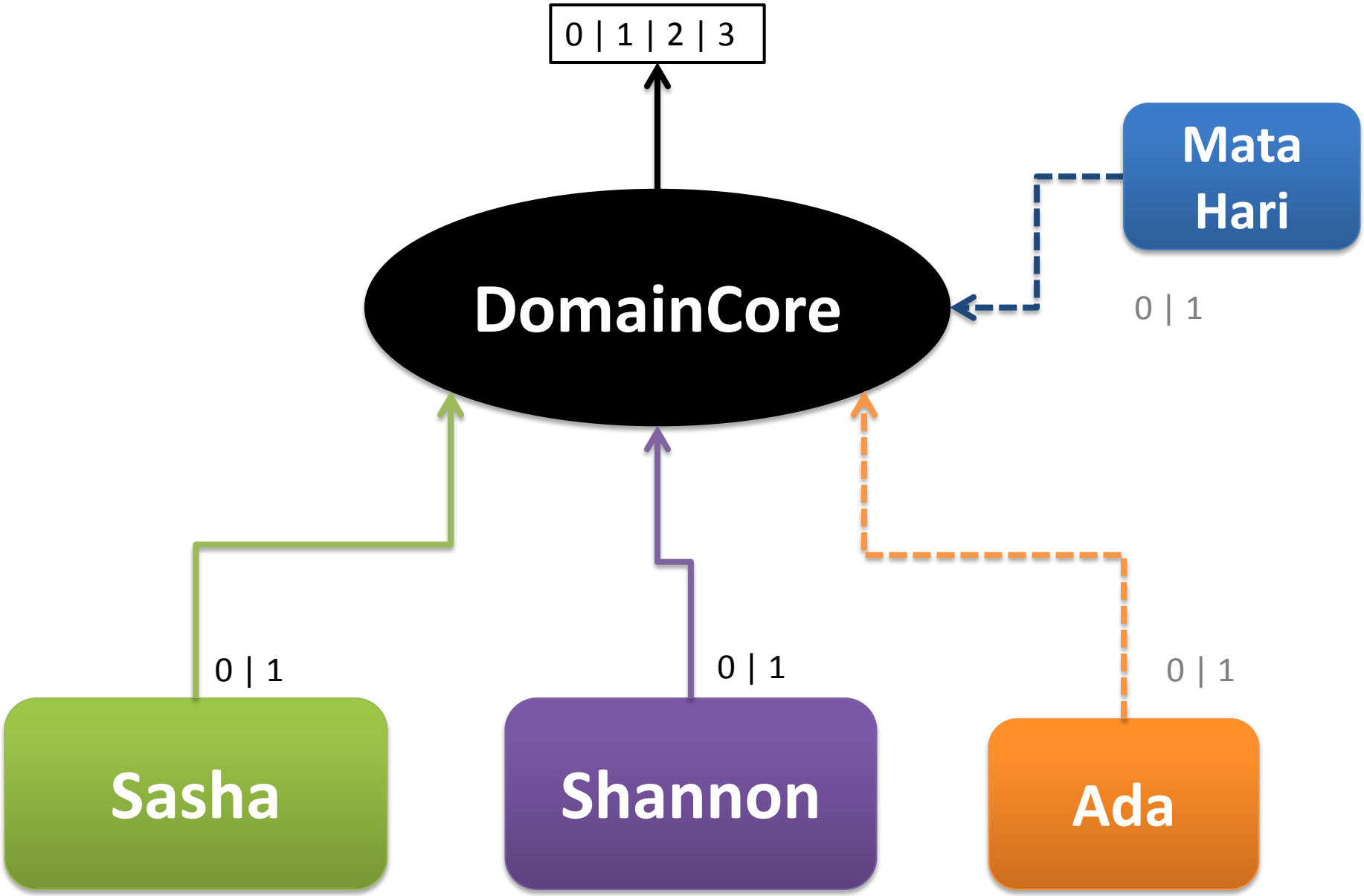
tot / tot = 1

toto / tot[a->o] = 2

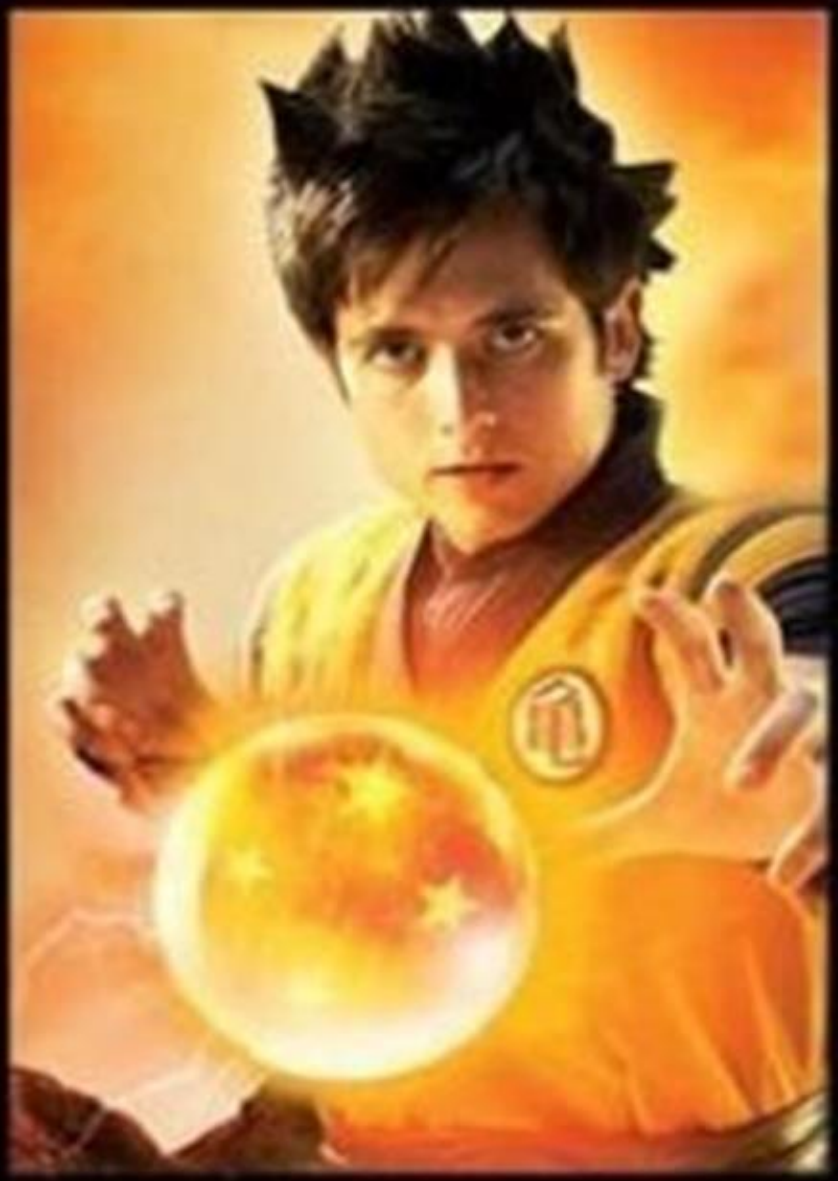
toto / toto[+o] = 3

Levenshtein(toto, tatao) = 3




0 | 1 | 2 | 3
Mata Hari
DomainCore
0 | 1
0 | 1
0 | 1
0 | 1
Sasha
Shannon
Ada

V1



V2

- This tld is know to be evil
- This domain is know to be evil

Ada :

$$P(S|M) = \frac{P(M|S)}{P(M|S) + P(M|H)}$$

Example: The probability for a domain to be malicious (S), knowing that its tld is '.fr' (M) equals to **the probability that '.fr' is malicious** divided by **the probability that '.fr ' is malicious** plus the **probability that '.fr' is legit (H)**

TLD	Hit Spam	Hit Ham
.fr	3	7
.co.cc	9	1
.edu	0	10
.com	5	5

Calculs:

$$(\text{`.fr'} = \text{spam}) = \frac{\frac{3}{3+9+0+5}}{\frac{3}{3+9+0+5} + \frac{7}{7+1+10+5}} = \frac{0.17}{0.47} = 0.36$$

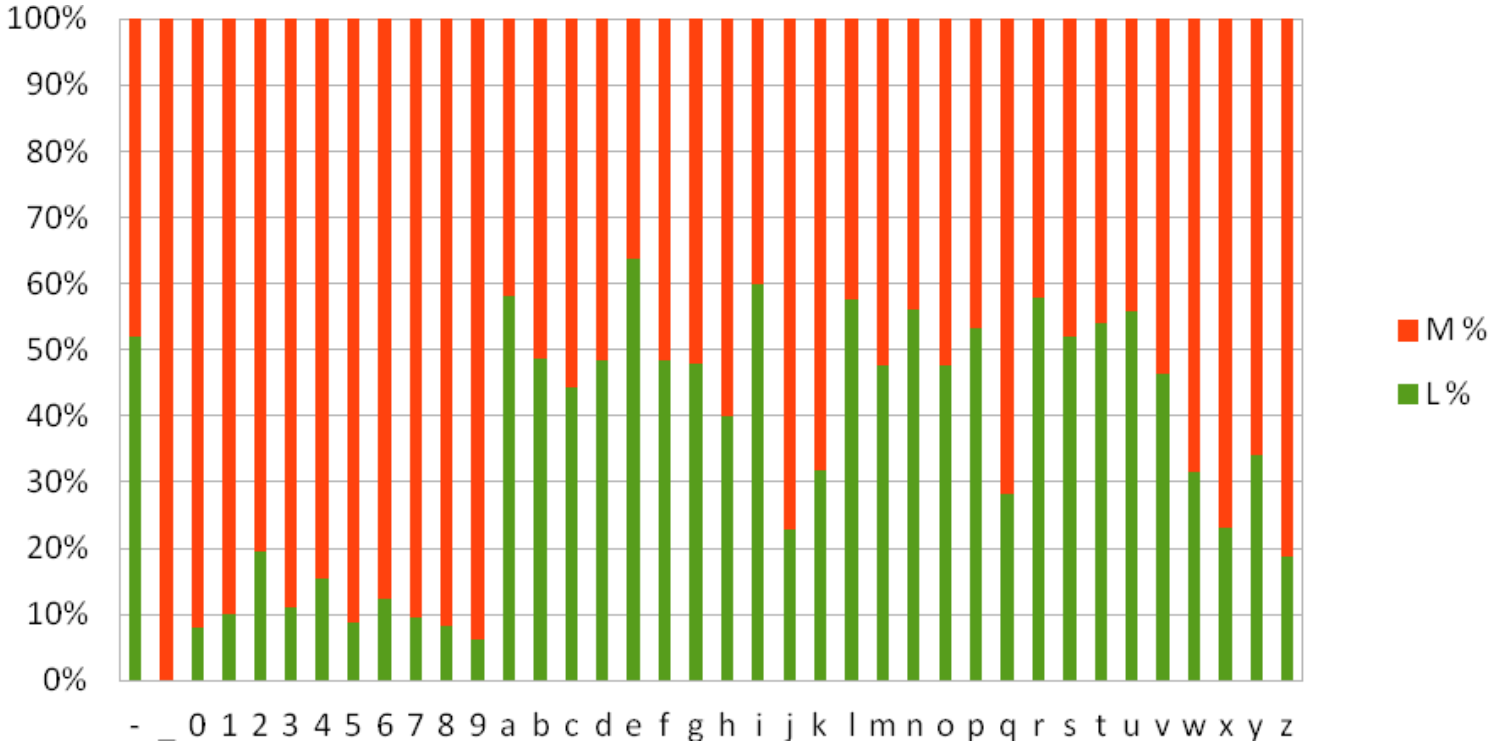
According to the internal Knowledge Base, a '.fr' tld has 36% chance of beeing malicious

DomainCleaner

- Remove the ‘www’ subdomain
- Transform IDN into latin string
  - xn--pp-bjab.fr > pépé.fr > pepe.fr
- Remove the TLD

Sasha v2

- Speed improvment
  - From 300 ms/FQDN -> 175 ms/FQDN
- Trigger improvment

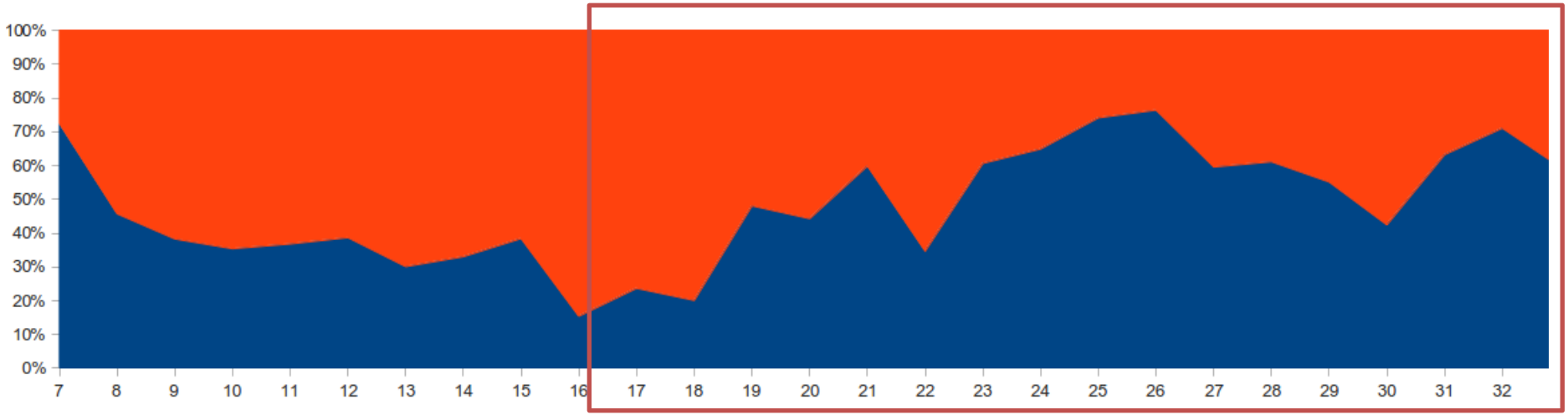


Shannon v2

1/ Levenshtein

Shannon v2

1/ Levenshtein …. Hum



Shannon v2

2/ Looking for new algorithms

- *Levenshtein Distance*
- *Damerau-Levenshtein Distance*
- *Jaro Distance*
- *Jaro-Winkler Distance*
- *Match Rating Approach Comparison*
- *Hamming Distance*

- *American Soundex*
- *Metaphone*
- *NYSIIS (New York State Identification and Intelligence System)*
- *Match Rating Codex*

Shannon v2

3/ Dictionnary Approach improvment

- *Take a string*
- *Split it into bigrams*
- *If bigrams match score >xx% with a dict word*
  - *Append dict word to a shortlist*

*stexankmpplex > **st**,te,**ex**,**xa**,**an**,nk,km,**mp**,pp,**pl**,**le**,**ex** (len : 12)*
*justanexample > ju,us,**st**,ta,**an**,ne,**ex**,**xa**,am,**mp**,**pl**,**le***
*match : **st**, **ex**, **xa**, **an**, **mp**, **pl**, **le**, **ex** (match = 8)*
*66%*12 = 8; 8 >= match*
justanexample append to the shortList

Shannon v2

3/ Dictionnary Approach improvment

- len(shortlist) = 0? -> suspicious!

Shannon v2

4/ The One(s)

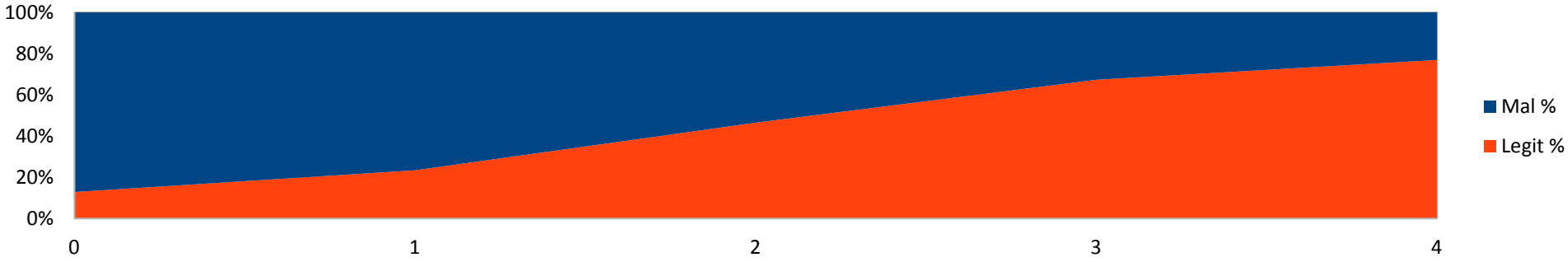
- Damerau Levenshtein (Bigram)
- Jaro + MRC

MRC(stexankmpplex) = STXPLX

MRC(justanexample) = JSTMPL

jaro(stexankmpplex, justanexample) = 80%

jaro(STXPLX, JSTMPL) = 77%



Shannon v2

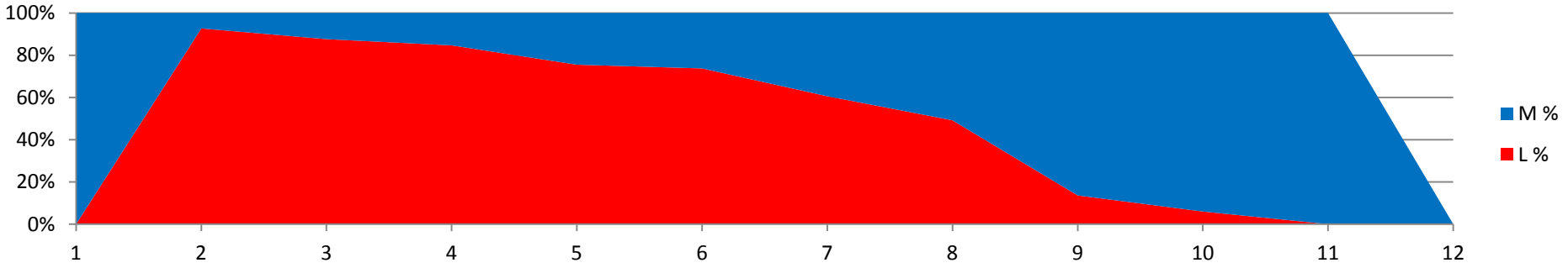
4/ The One(s)

- Jaro (Bigram)

- Match Rating Comparaison (Bigram)

```
match_rating_comparison(money,maunnie)                 = True
match_rating_comparison(stexankmpplex,justanexample)   = False
```

- Jaccard (Bigram)



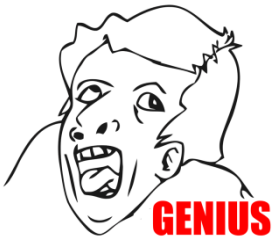
Results

- In Canari's context :
  - 100% DGA
  - 80% overall malicious domain name
  - 10% False positive
    - Hash in subdomain
    - 118712.fr

- European network traffic dump :
  - 40% False Positive
    - East European domain name

- Post development test (RunForestRun 2) :
  - 100% of detection

Looking back …



- Use stat dataset for validation …
- Too much improvment -> forget the target (DGA)
  - ADA useless in DGA's case
- But :
  - RunForestRun 2 detection
  - Not a lot of work in 2012(open source PoC, research, technical paper, …)

Some leads

- Data Mining
- Multi-Criteria Decision Analysis
- Nothing powerfull as *Common Sense*

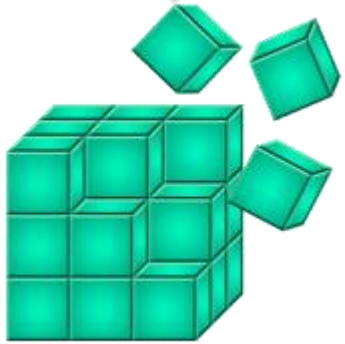
  -> Lessons learned from Robotics applied to CyberSecurity

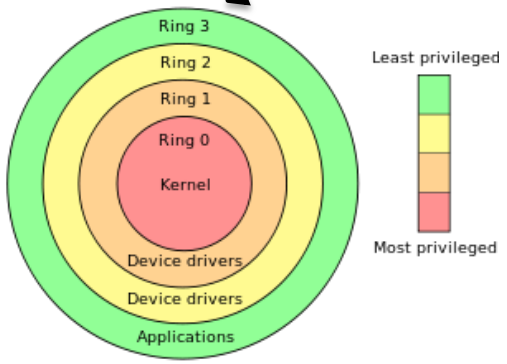
  by Teresa Escrig (Jaume University) & Sam Chung (University of Washington)
  International Journal of Computer Applications – vol 74 n°8 – July 2013

- Don’t be blinded by technics, thrill, … aim your target!
- Take a look at Wordstats (Splunk’s Add -on)

HOW


Hash
Function

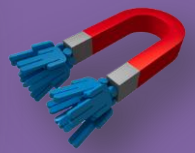



Ring 3
Ring 2
Ring 1
Ring 0
Kernel
Device drivers
Device drivers
Applications
Least privileged
Most privileged

Intelligence

Why?

How?



Why?

How?

Network

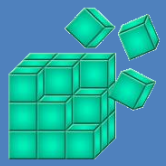
Why?

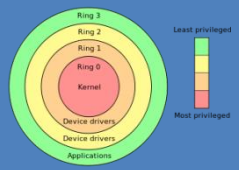
How?

Why?

How?

System





Criminology

Botconf

Intelligence

Why?

How?

Network

Why?

How?

Why?

How?

System

Why?

How?

Thank you!

Contact :

DZKSJEGGACJHPGFHACDGBGOGACCHFGBGEGACEHIGJGDHMCACHHFGACNGBGJHACIG
BGGHFGACDHPGNGFGACDGPGNGNGPGOGACJGOGEHFGCHFGDHEHBCACCHPGOGBGO
GOCNGPGFHDGIGPGFHIHAEDGJHCGFGCHBGDGEHJGPGOGMGBGCGOCOGFGEHDZJS

Votre adversaire n'est pas le malware,
mais la personne qui est derrière