Fighting DDoS attacks together on a national scale

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Amersfoort, The Netherlands

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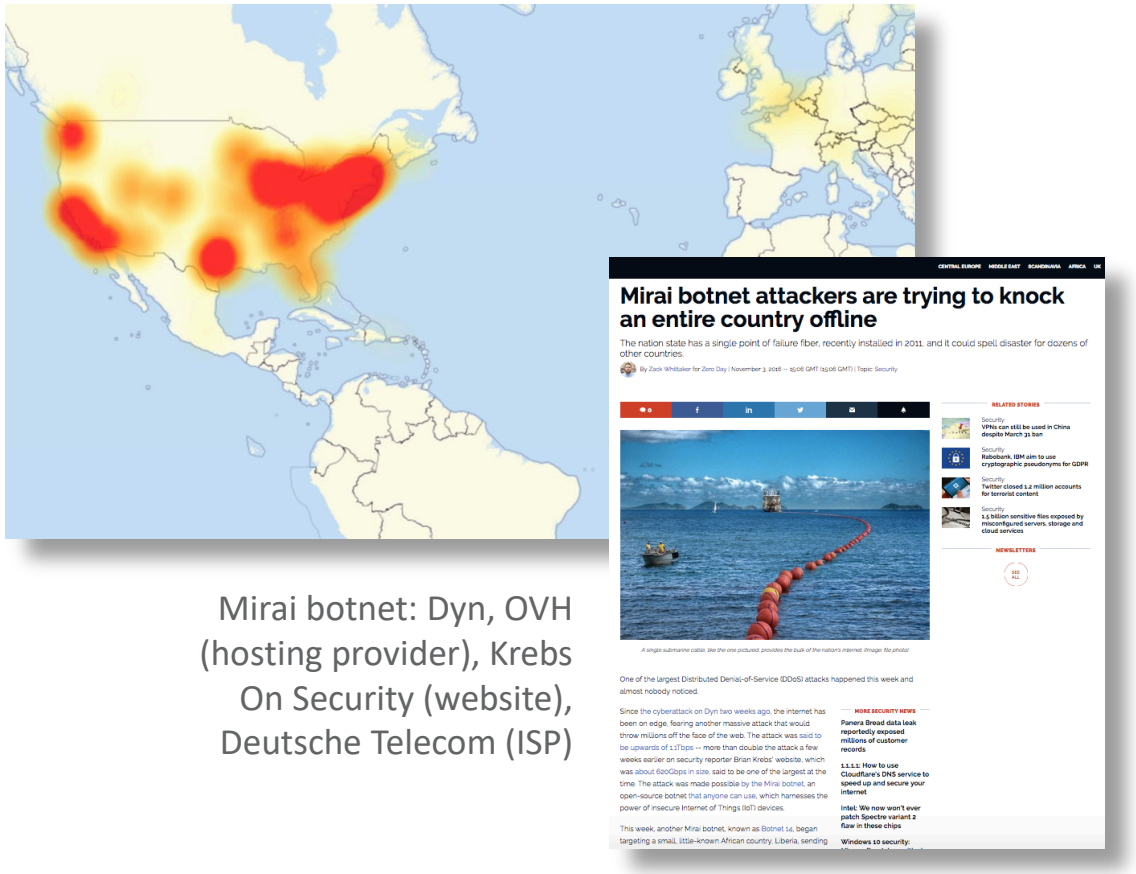
DDoS examples



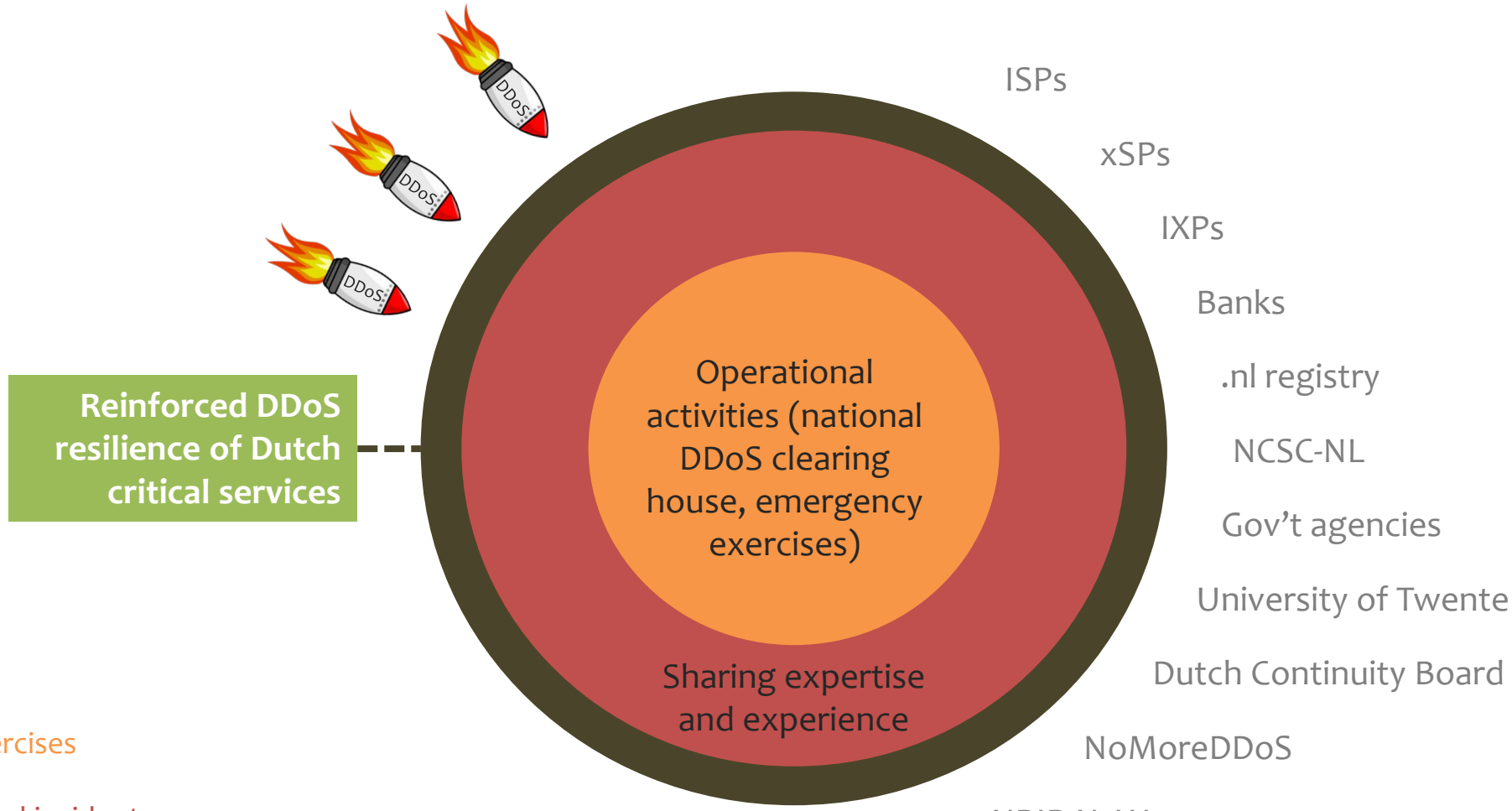
Mirai botnet: Dyn, OVH (hosting provider), Krebs On Security (website), Deutsche Telecom (ISP)

January 2018

https://en.wikipedia.org/wiki/2016_Dyn_cyberattack
https://www.zdnet.com/article/mirai-botnet-attack-briefly-knocked-an-entire-country-offline/

Dutch anti-DDoS coalition

Objective: further improve the protection of Dutch critical services by sharing expertise, experiences, and operational data on DDoS attacks



Working groups:

- Clearing house
- Emergency exercises
- Outreach
- Ground rules and incident response
- Sustainable collaboration

Status and next steps

- Pilot in the Netherlands (short-term)
  - Approach: start small and iteratively scale up to more partners
  - Key challenge: data sharing agreement clearing house

- DDoS clearing house for Europe
  - Part of CONCORDIA project (www.concordia-h2020.eu)
  - Development of a clearing house "cookbook"
  - Second pilot in Italy

CONCORDIA
Cyber security cOmpeteNCe fOr Research anD InnovAtion

- Envisioned long-term growth paths
  - Netherlands → Europe → global
  - Extend to "non-critical" service providers

Technical (and scientific) challenges

Classification
Reduction
Anonymization
Conversion
Distribution

Demo ahead!

Jair Santanna

bit.ly/2wWiM43

https://github.com/ddos-clearing-house

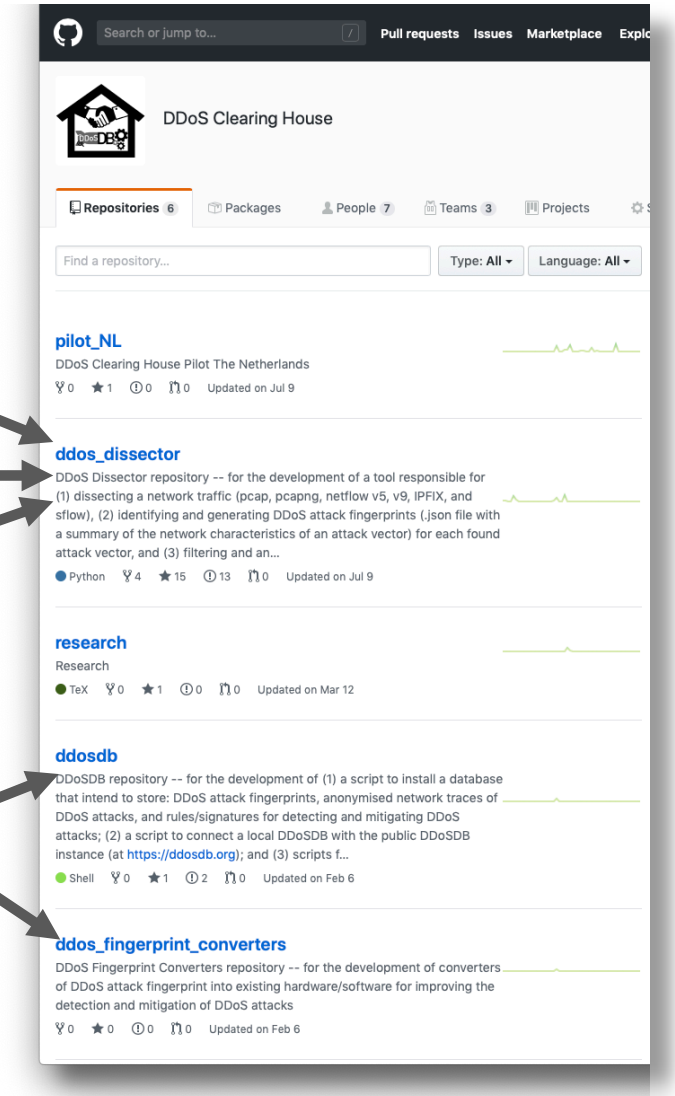
Classification

Reduction

Anonymization

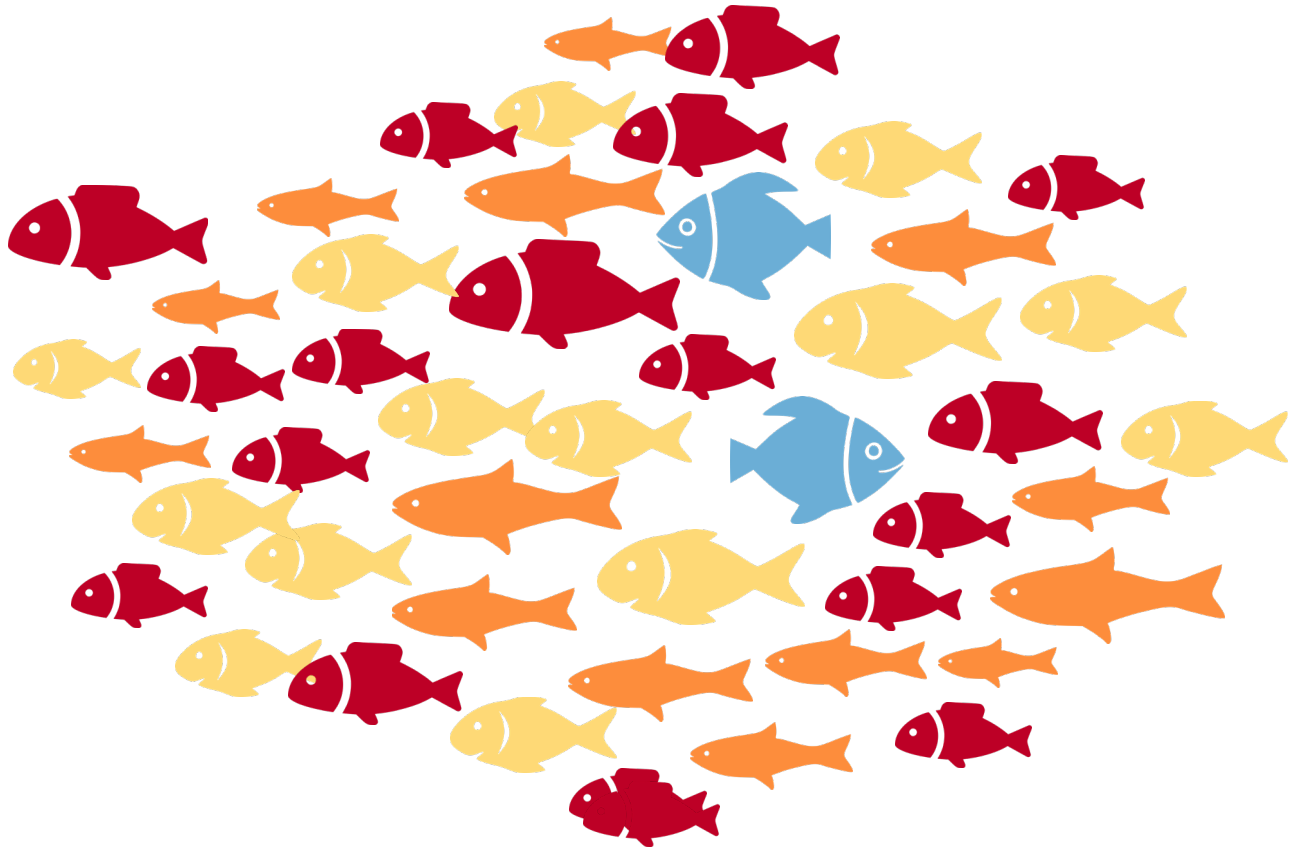
Conversion

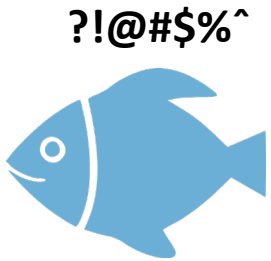
Distribution



bit.ly/2wWiM43

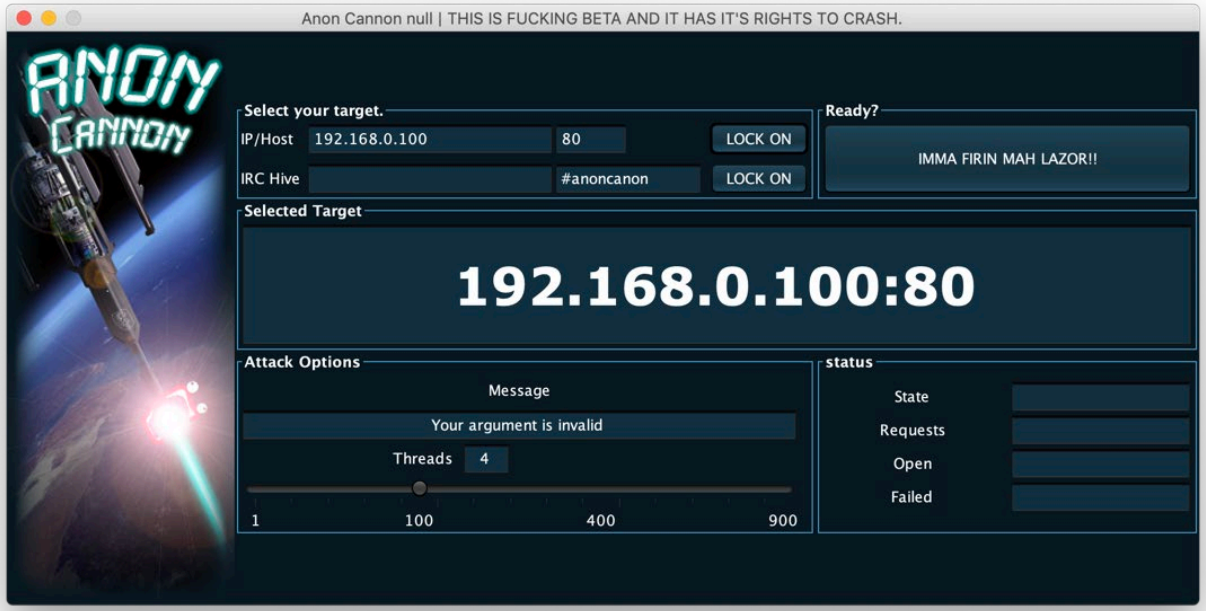
Definition of DDoS attack





LARGE/ABNORMAL **frequency** of incoming network traffic with **same characteristics** aiming to deny legitimate users to access a computational/network resource.

bit.ly/2wWiM43

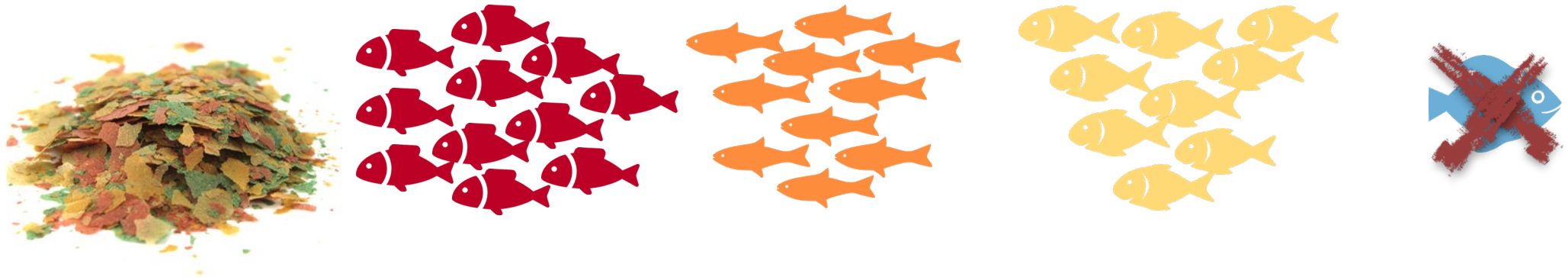


ssid: ddos_handson

pwd: ***jairsantanna.com***

The Classification Challenge

"The DDoS Dissector"



DDoS Dissector is tool for identifying (multi)vectors of attack
in **post-mortem** network trace
[meant for after an anomaly-based detection tool]

DDoS Dissector is based on a **ranking algorithm**

DDoS Dissector is **NOT** an anomaly-based detection tool!

PROBLEMS?
Encrypted Traffic!
Flash crowd!

The Reduction Challenge

“The DDoS Dissector”

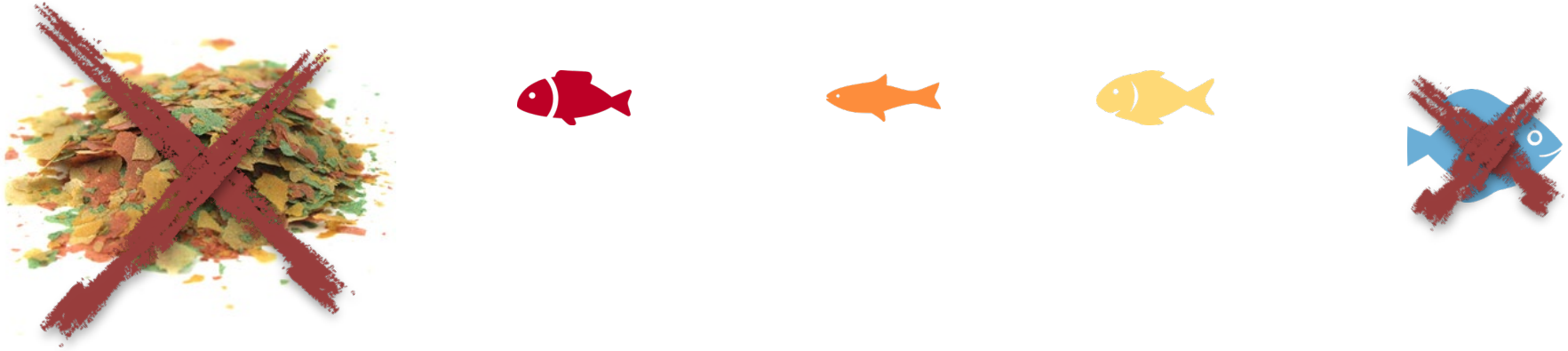
The **main** output of the DDoS Dissector is
a **summary** of the characteristics of a DDoS attack,
called ***DDoS fingerprint***

Each attack vector is **one** DDoS fingerprint (with one **“key"**)

Multiple attack vectors in a network trace are linked (“**multivector_key")**

The Anonymization Challenge

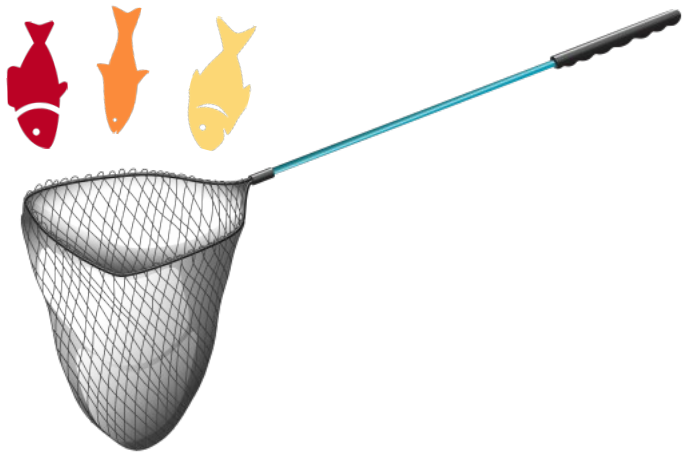
“The DDoS Dissector”



The DDoS Dissector removes **ANY** information related to the **attack target,** remaining ONLY source IP add. information

The Conversion Challenge

“The DDoS Fingerprint Converters”



EMPTY??

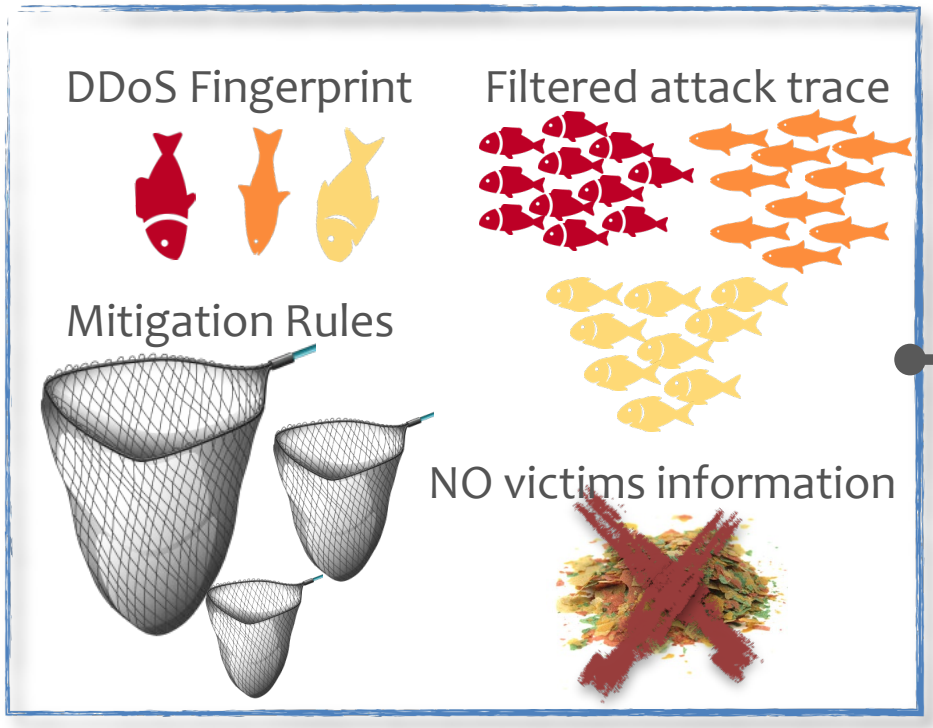
DDoS Fingerprints are converted to detection/mitigation **specific “boxes"**

Candidates: NetFilter/IPTables, SNORT, SURICATA, BRO/ZEEK, MODSECURITY, BGP Flowspec, XDP+eBPF, IETF DDoS Open Threat Signaling (DOTS),
<what else do YOU consider important?>

Check the impact of a mitigation rule (to YOUR network) **BEFORE** deploying it!

The Distribution Challenge

"DDoSDB"



What?
Public? Private?
Open? Closed?
With whom?
Automatic? Manual?

NOSQL database (Elasticsearch) + "FileSystem"

Feed? To CERTs/CSIRTs?

Malware Information Sharing Platform (MISP)?

Common Attack Pattern Enumeration and Classification (CAPEC)?

https://github.com/ddos-clearing-house

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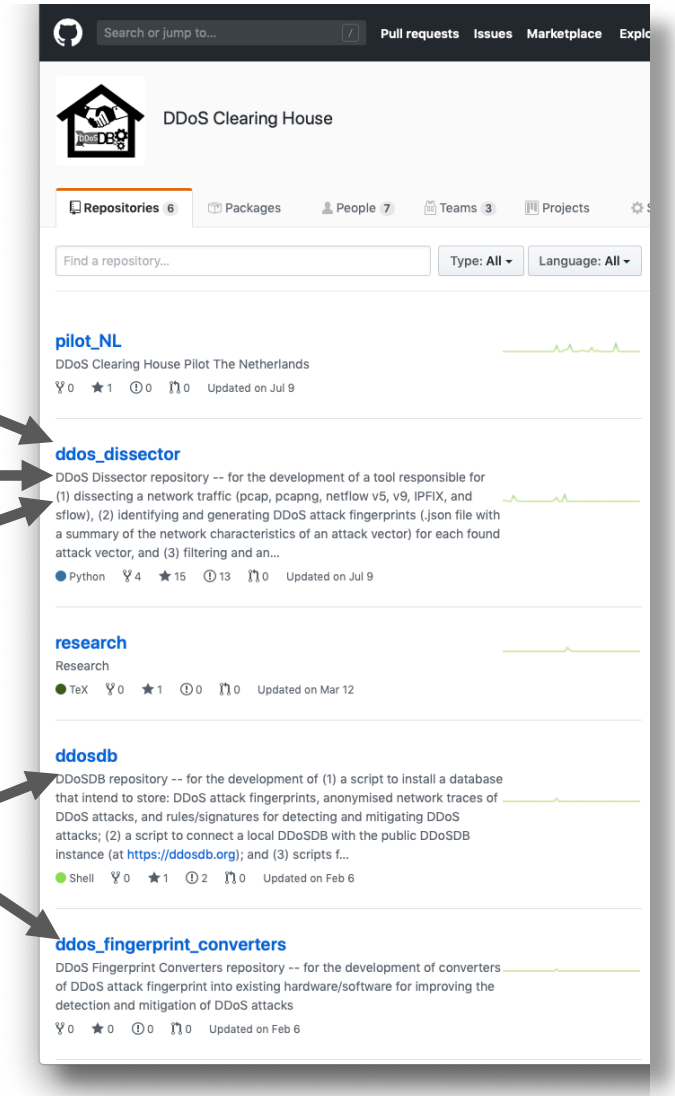

M.Sc. graduation projects on Internet security!

UNIVERSITY OF TWENTE.

Research challenges: DNS security and resilience, detection of domain name-related abuse, DDoS mitigation and IoT device security, Internet evolution, open networking, emerging types of internets

Facilities: real-world data sets, measurement and data analysis tools, lab network for prototyping, operational expertise

Questions and discussion

amsix

kpn

POLITIE

SURF

DeNederlandscheBank
EUROSYSTEEM

SIDN

National Cyber Security Centre
Ministry of Justice and Security

Betaalvereniging
Nederland

UNIVERSITY
OF TWENTE.

NLIX
The Interconnect Exchange

Belastingdienst

Agentschap Telecom
Ministerie van Economische Zaken
en Klimaat

DINL
Stichting
Digitale Infrastructuur
Nederland

NBIP
nationale
beheersorganisatie
internet
providers

vodafone ziggo

Plus NoMoreDDoS and Dutch Continuity Board

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