DDoS Clearing House for Europe (Task 3.2)

T2.1 Workshop on DDoS attacks and 5G networks

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(SIDN Labs)

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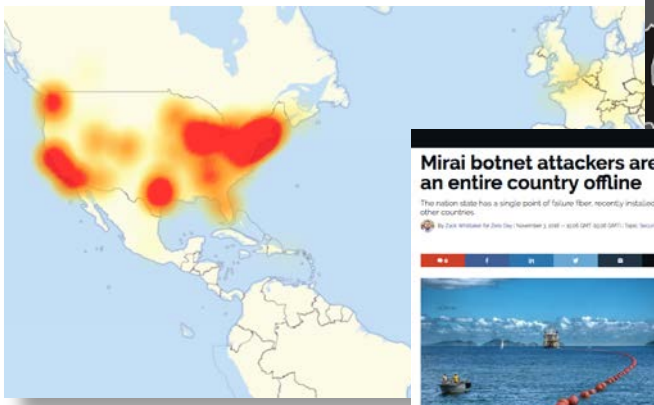
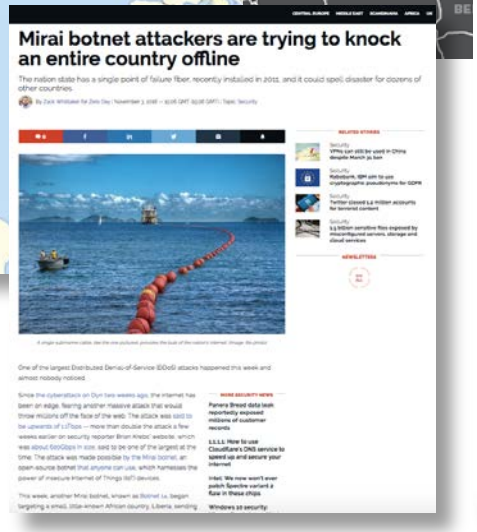
High-impact DDoS Examples

Mirai botnet, 2016: Dyn, OVH (hosting provider), Krebs On Security (website), Deutsche Telecom (ISP)

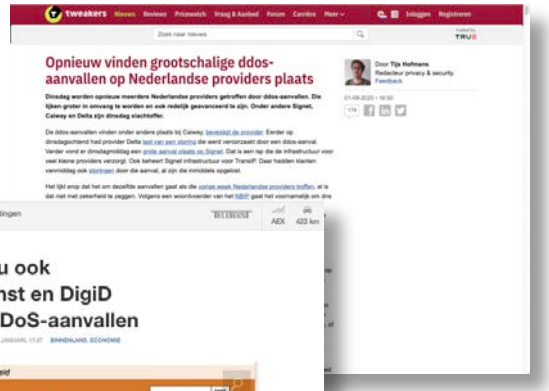


Estonia, 2007

Liberia, 2016



The Netherlands, September 2020



The Netherlands, January 2018

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

T3.2 objective

- Pilot a DDoS Clearing House with European industry for Europe to proactively and collaboratively protect European critical infrastructure against DDoS attacks

- Contributes to **increased European digital sovereignty** thru better insight in and control over DDoS attacks

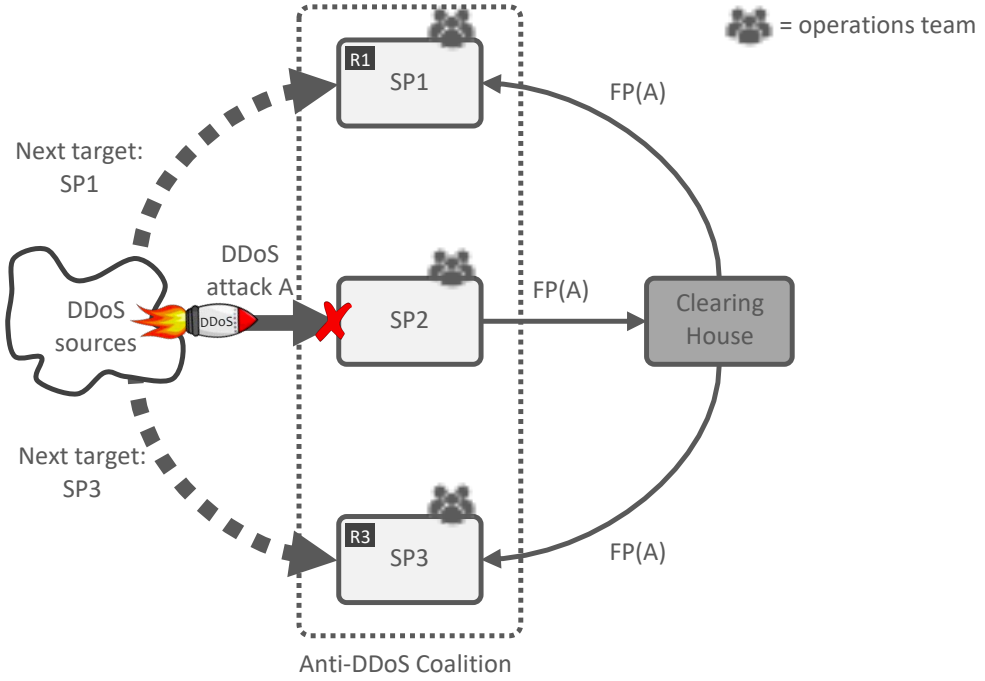
Key challenge: increase to TRL 5-7 and grow deployment

NL IT ... EU

- Key outputs: **pilots** in NL >> IT, DDoS clearing house **blueprint**

DDoS Clearing House Concept

- Continuous and automatic sharing of “DDoS fingerprints”, buys providers time (proactive)
- Extends DDoS protection services that critical service providers use and does not replace them
- Generic concept: per Member State, per sector, per business unit, etc.

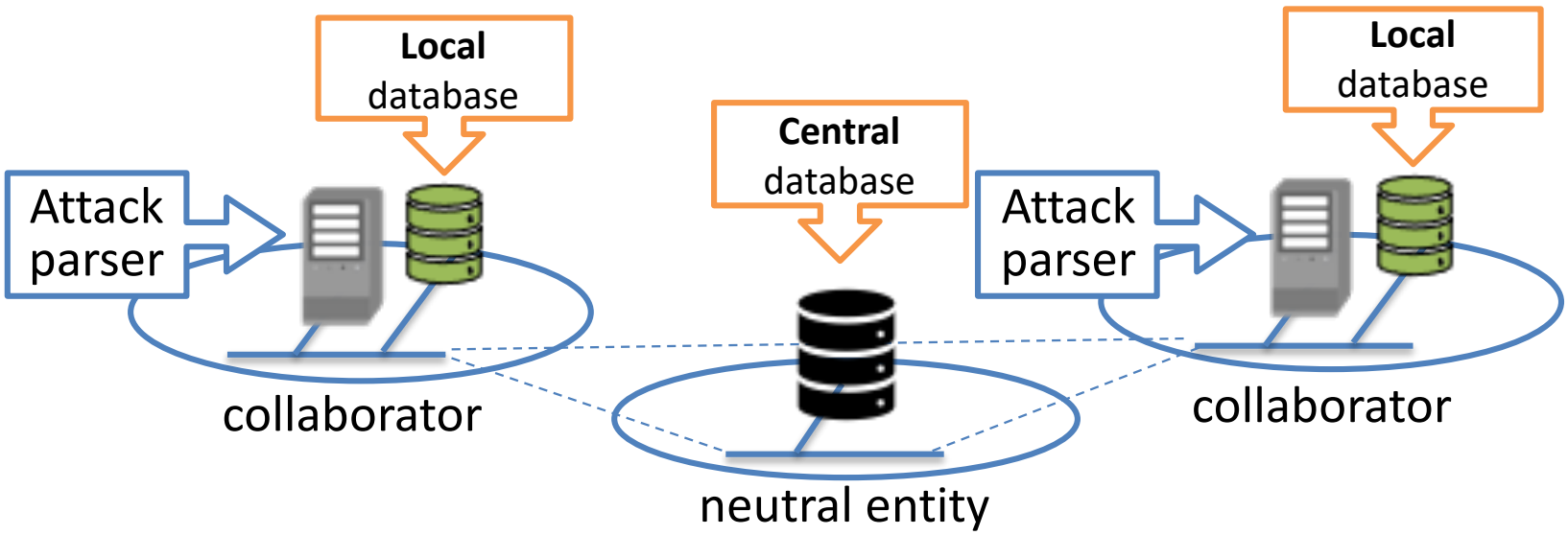


Fingerprint Example

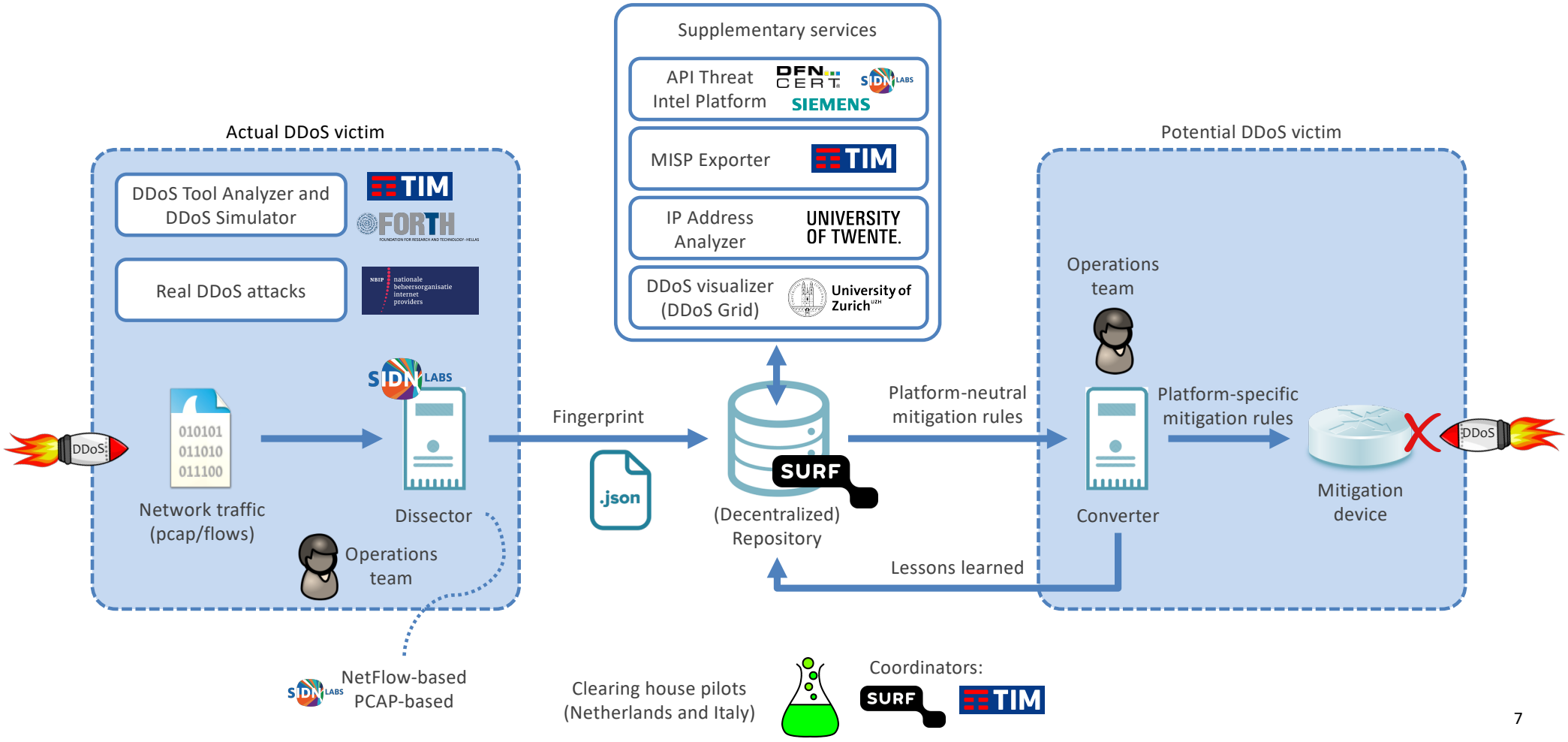

```
{
 "multivector_key": "fa0a8f21a1816a6531acb543743124ec",
 "key": "fa0a8f21a1816a6531acb543743124ec",
 "src_ips": [
  "109.26.226.136",
  ... ],
 "dst_ports": [80],
 "src_ports": [123 ],
 "ip_protocol": "17",
 "service": "NTP",
 "additional": {"ntp_reqcode": 42 },


 "total_src_ips": 1798,
 "total_packets": 2387741,
 "duration_sec": 120.32017302513123,
 "start_time": "2014-12-22 11:12:56",
 "avg_bps": 9545941.59169052,
 "avg_pps": 19844.893337223457,
 "start_timestamp": 1419243176.663222
}
```

DDoS Clearing House-in-a-box



Main Components and Data Flow



Component Maturity Indication

Name	Function	Maturity	T3.2 experts (owner)
Dissector	Generate DDoS fingerprints based on PCAP files and flows data	High	João
DDoSDB	Insert, update, search, and retrieve DDoS fingerprints	High	Remco, João
Converter	Generate mitigation rules based on DDoS fingerprints	Low	João, Marco, Paolo
DDoS Grid	Dashboard for the visualization of DDoS fingerprints	High	Bruno, Muriel
IP Address Analyzer	Enriches fingerprints with details about IP addresses involved in an attack, based on measurements	Low	Ramin, Mattijs
DDoS Tool Analyzer	Generate DDoS fingerprints of tools used to launch DDoS attacks	Low	Christos
MISP Exporter	Generate MISP events based on DDoS fingerprints	Low	Madalina, Marco
Synthetic traffic generator	Generation of DDoS fingerprints using a TIM's DDoS traffic simulator	Low	Paolo

Pilot in the Netherlands

amsix

kpn

POLITIE

SURF
CONCORDIA partner

DNB

SIDN
CONCORDIA partner

National Cyber Security Centre
Ministry of Justice and Security

Betaalvereniging Nederland

UNIVERSITY OF TWENTE.
CONCORDIA partner

NLIX
The Interconnect Exchange

Belastingdienst

Agentschap Telecom
Ministerie van Economische Zaken en Klimaat

Stichting Digitale Infrastructuur Nederland

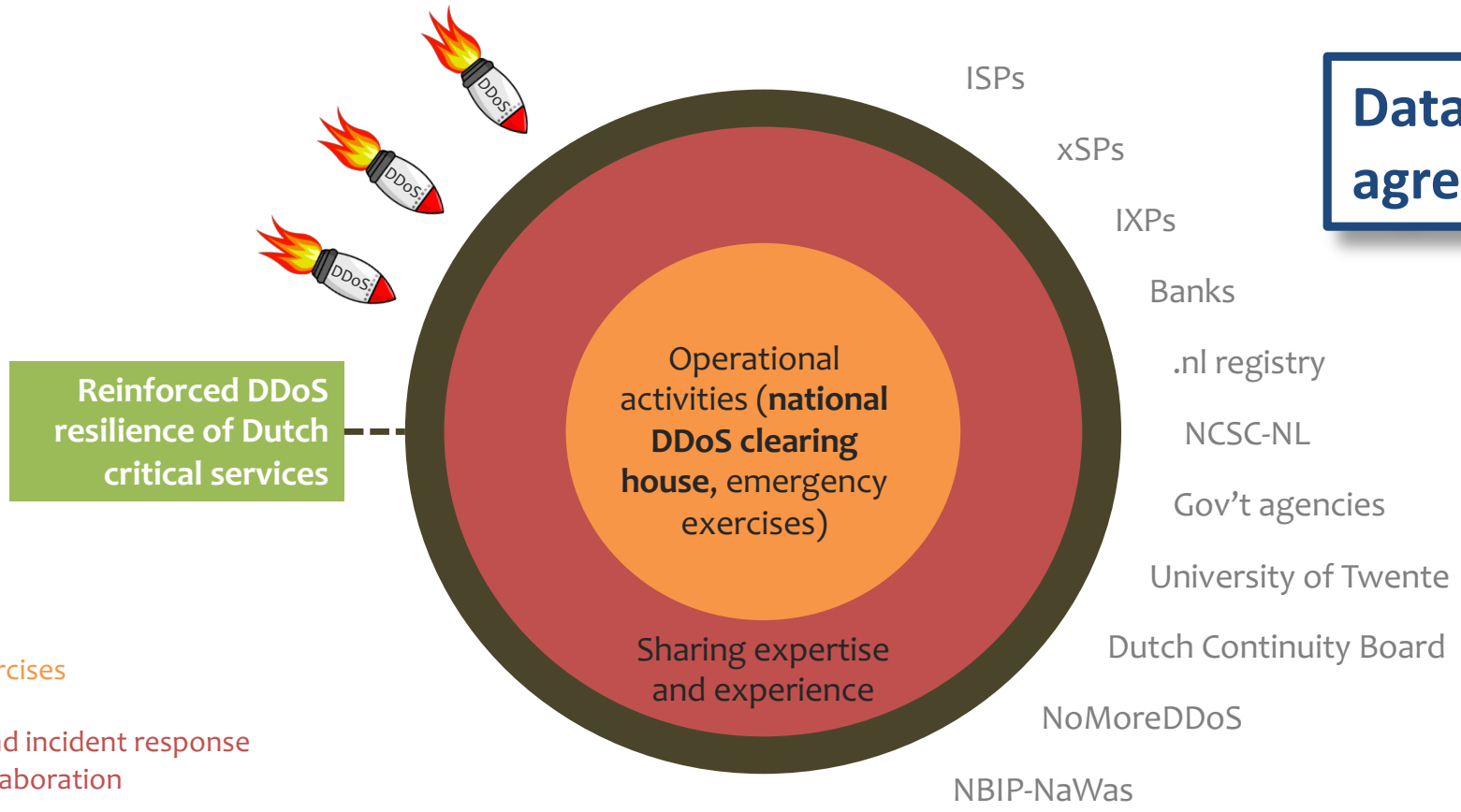
nbip nationale beheersorganisatie internet providers

vodafone Ziggo

Website: nomoreddos.org

Broader view: Dutch anti-DDoS coalition

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



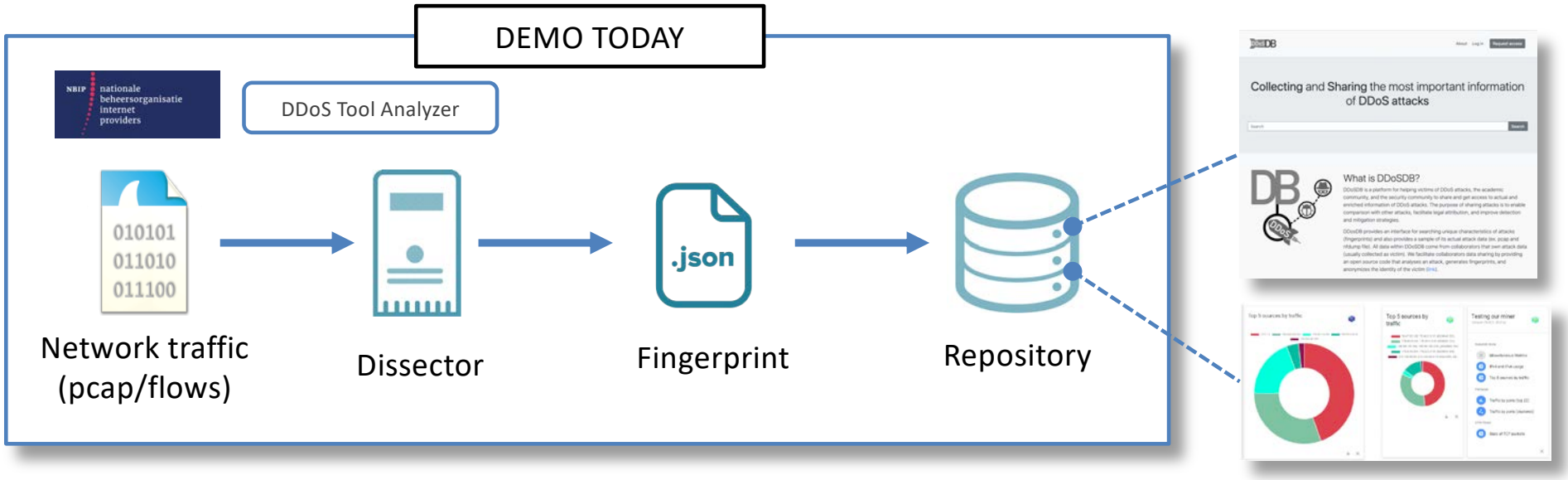
Reinforced DDoS resilience of Dutch critical services

Data sharing agreement!

Working groups:

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

Today's Demo

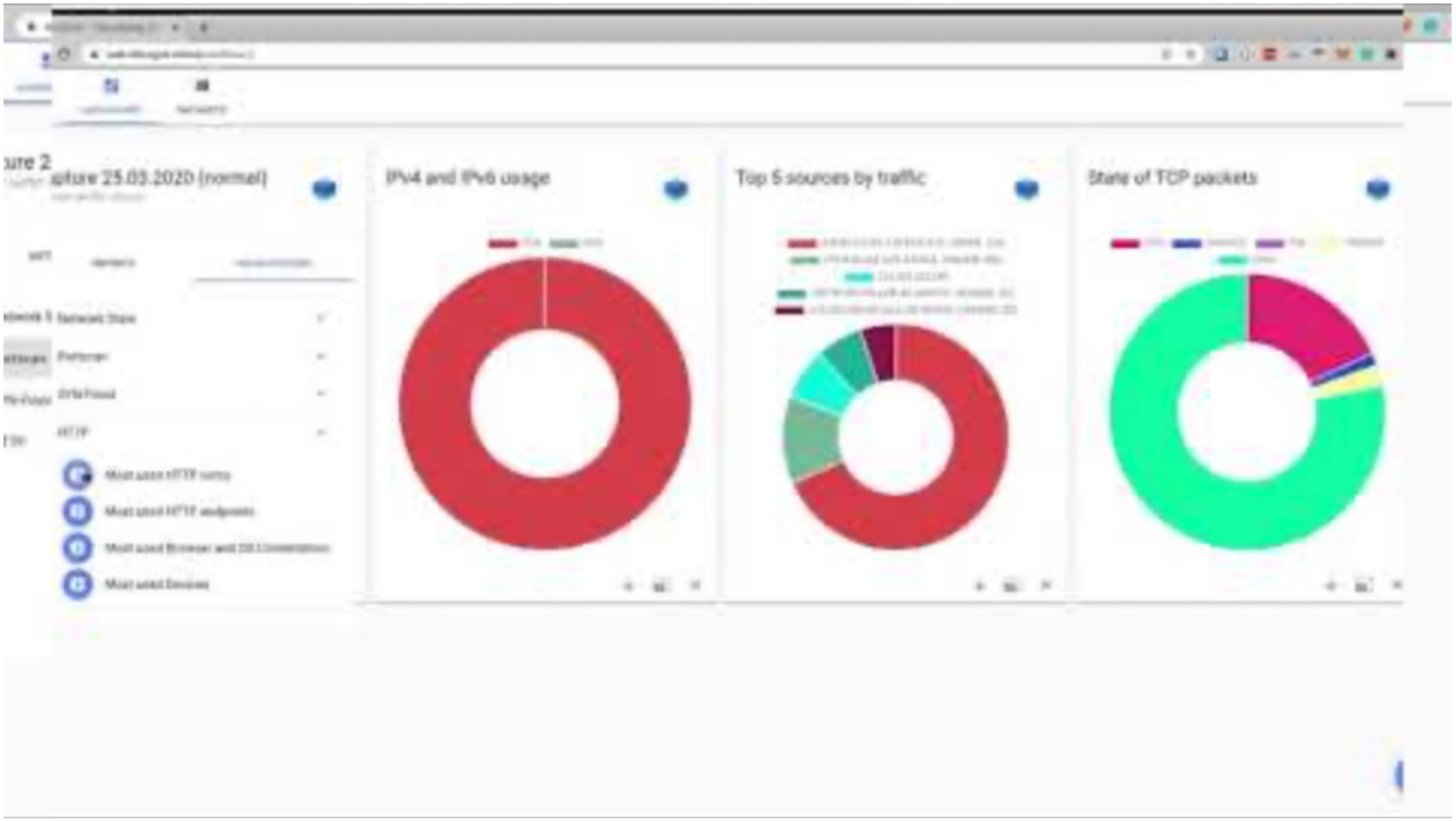


1. Full cycle process (generation, upload, storage)
2. Dashboard for fingerprint visualization
3. Fingerprint enrichment
4. DDoS Tool Analyzer automatically uploads fingerprints

Fingerprint generation, storage, enrichment

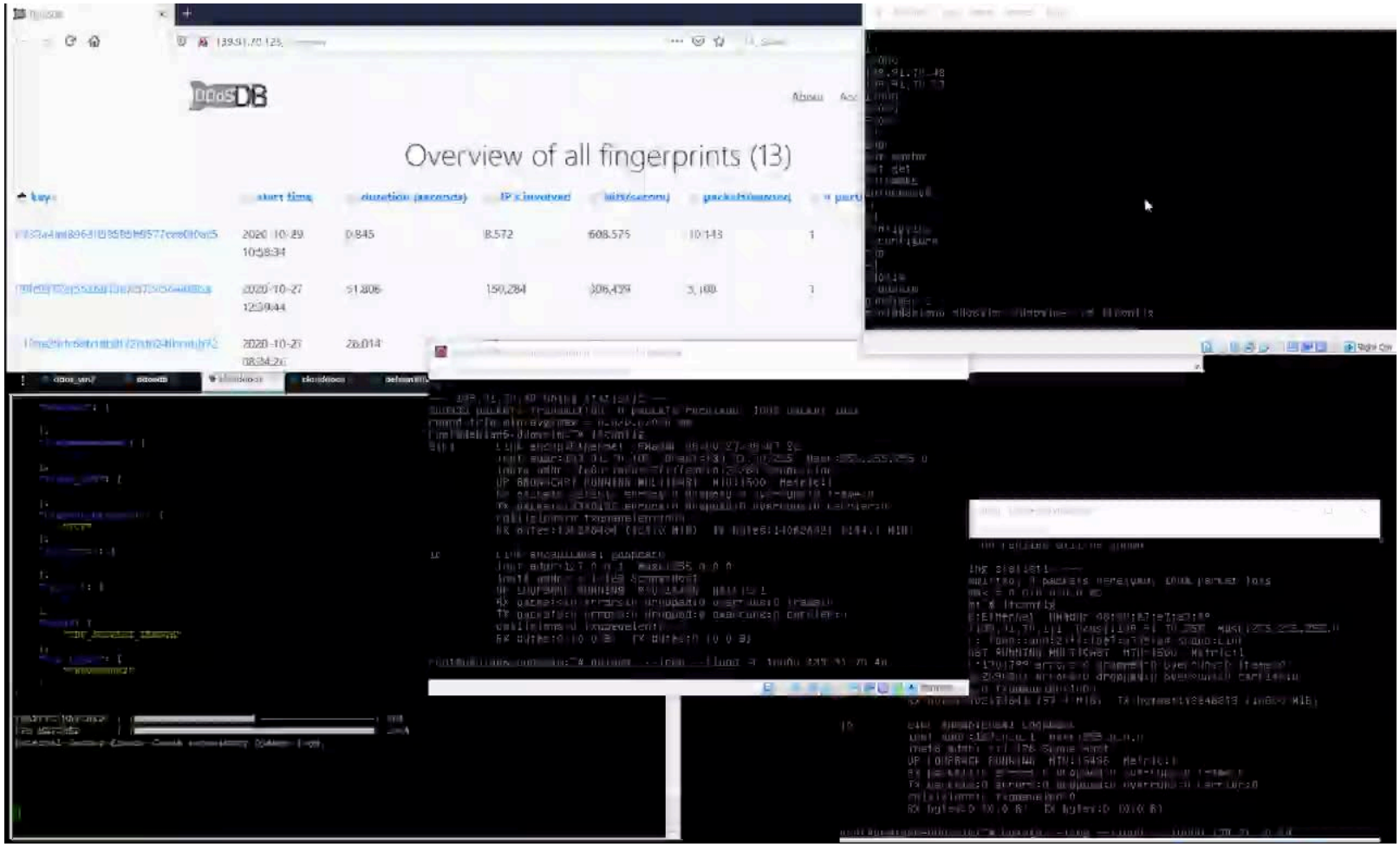
https://www.youtube.com/watch?feature=oembed&v=1QlC3SwwYAU

Fingerprint visualization (not integrated yet)



https://www.youtube.com/watch?feature=oembed&v=5OiCStFuerg

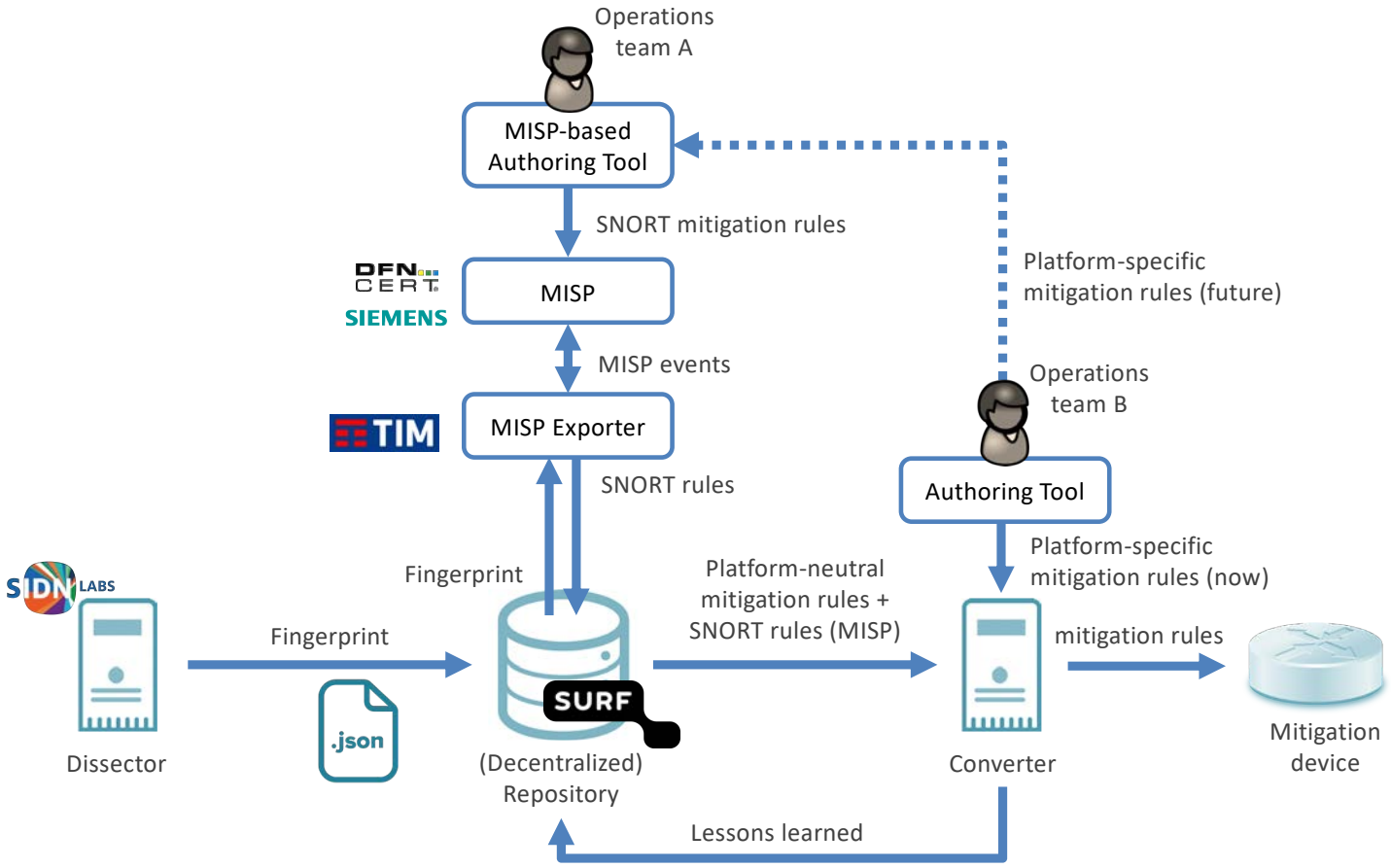
DDoS Tool Analyzer (not integrated yet)



Demo v2.3 (Dec 31, 2020)

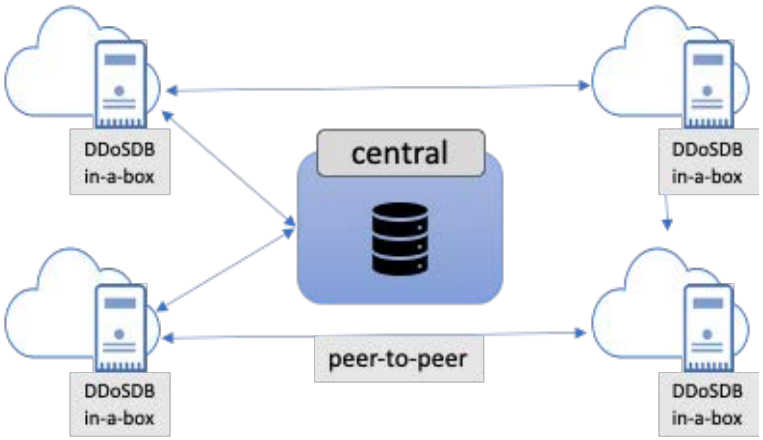
Name	Objective
Dissector	Dissector provides better APIs to other components (P2P communication, interface to supplementary services)
DDoSDB	DDoSDB provides APIs for DDoS Grid and other supplementary services.
Converter	Converter uses a MISP module to convert DDoS fingerprints from DDoSDB into mitigation rules (to be discussed on Oct 9)
DDoS Grid	Grid supports new kinds of fingerprint visualization, interworks with DDoSDB to add/get fingerprints
IP Address Analyzer	Analyzer reads fingerprints from DDoSDB, adds metadata based on measurements (e.g., host's network capacity and connection type), writes back to DDoSDB
DDoS Tool Analyzer	Profiler automatically and continually profiles DDoS tools and automatically uploads fingerprints to DDoS-DB
MISP Exporter	Exporter takes a fingerprint from DDoSDB and injects it into MISP as a MISP event. Detailed scenario description), based on Sep 2020 blog
Synthetic traffic generator	To be provided by mid Nov

MISP Interaction (work in progress)



Next steps

- Advance clearing house pilot in NL
- Improve and integrate components
- DDoS clearing house long-term roadmap
- Continue demo-driven approach
- Future challenge: get fingerprints from production systems



Further reading

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Dutch Anti-DDoS Coalition:
https://www.nomoreddos.org/en/

Clearing house on GitHub:
https://github.com/ddos-clearing-house/

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