CONCORDIA

Cyber security cOmpeteNCe fOr Research anD InnovAtion

Collaborative DDoS Mitigation & The DDoS Clearing House

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Partners: SIDN, University of Twente, Telecom Italia, FORTH, University of Zurich, SURF, University of Lancaster, CODE, Siemens

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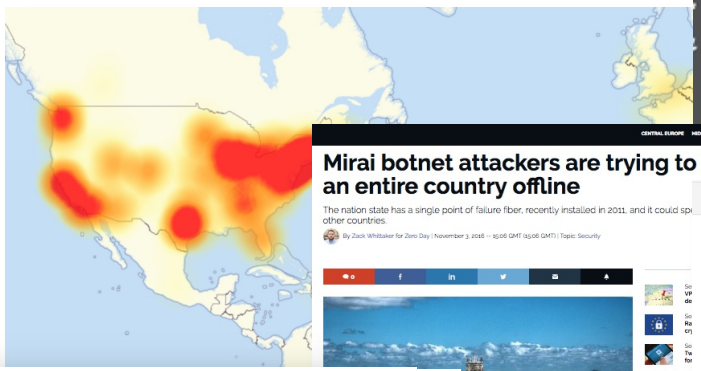
DDoS remains relevant

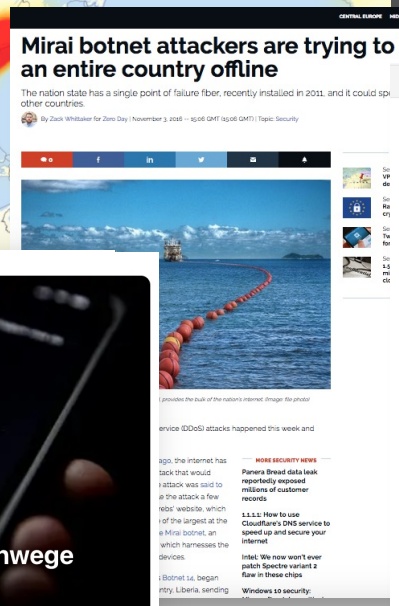
Estonia, 2007

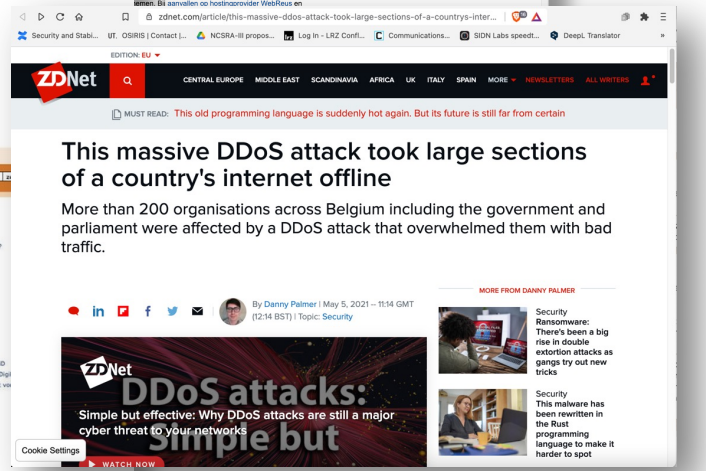
The Netherlands, September 2020

House of Representatives of The Netherlands, Oct 2020

Mirai botnet, 2016







Belgium, May 2021

The Netherlands, 3 days ago!

Liberia, 2016

The Netherlands, January 2018

Problem

- Mature DDoS mitigation services (e.g., scrubbing), routinely handling large numbers of DDoS attacks

- BUT no sharing of DDoS data and expertise between organizations
  - Increases response time and prevents learning because of limited view
  - Reduces innovation of mitigation processes and systems at ecosystem level
  - DDoS data “stuck” in systems of DDoS mitigation providers

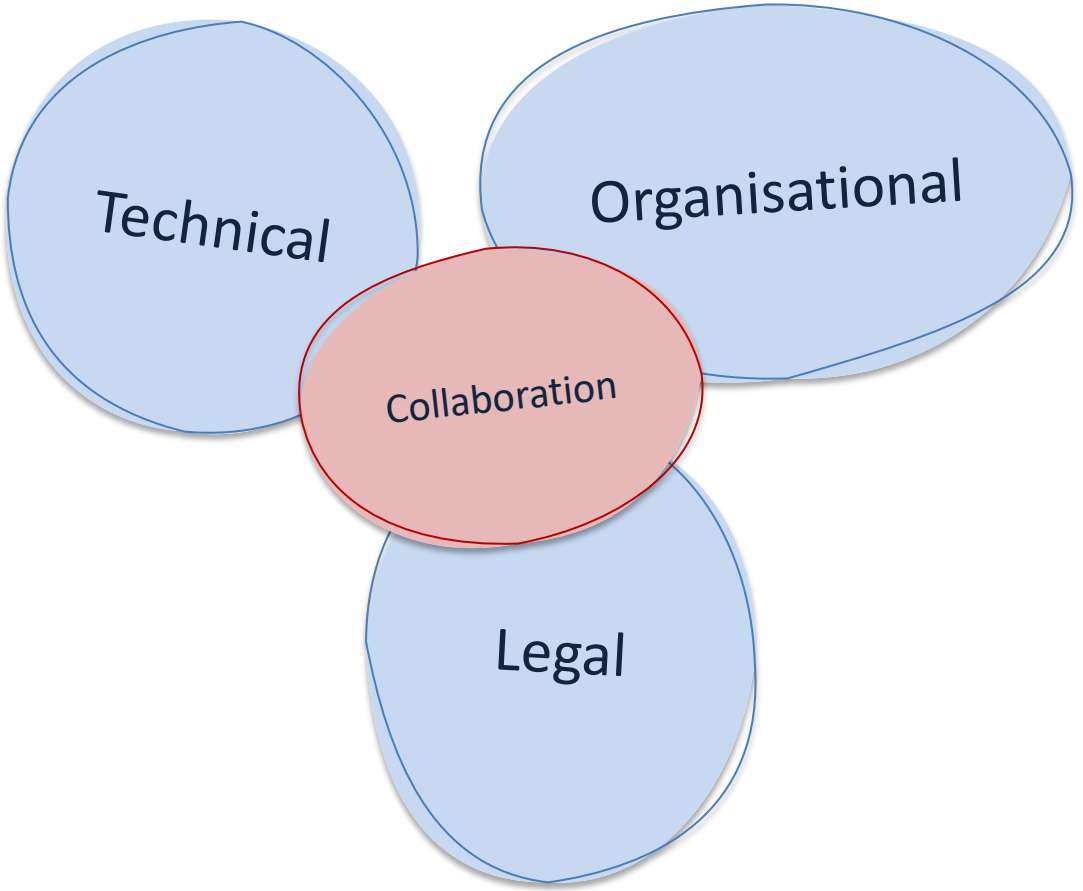
- Increases probability of societal disruptions through online services

Collaborative DDoS Mitigation

Goal: Improve collective DDoS resilience with additional activities

+ Sharing
  - DDoS metadata
  - Mitigation strategies
  - Tools and services

+ Practice together
  - DDoS drills
  - Cyber ranges



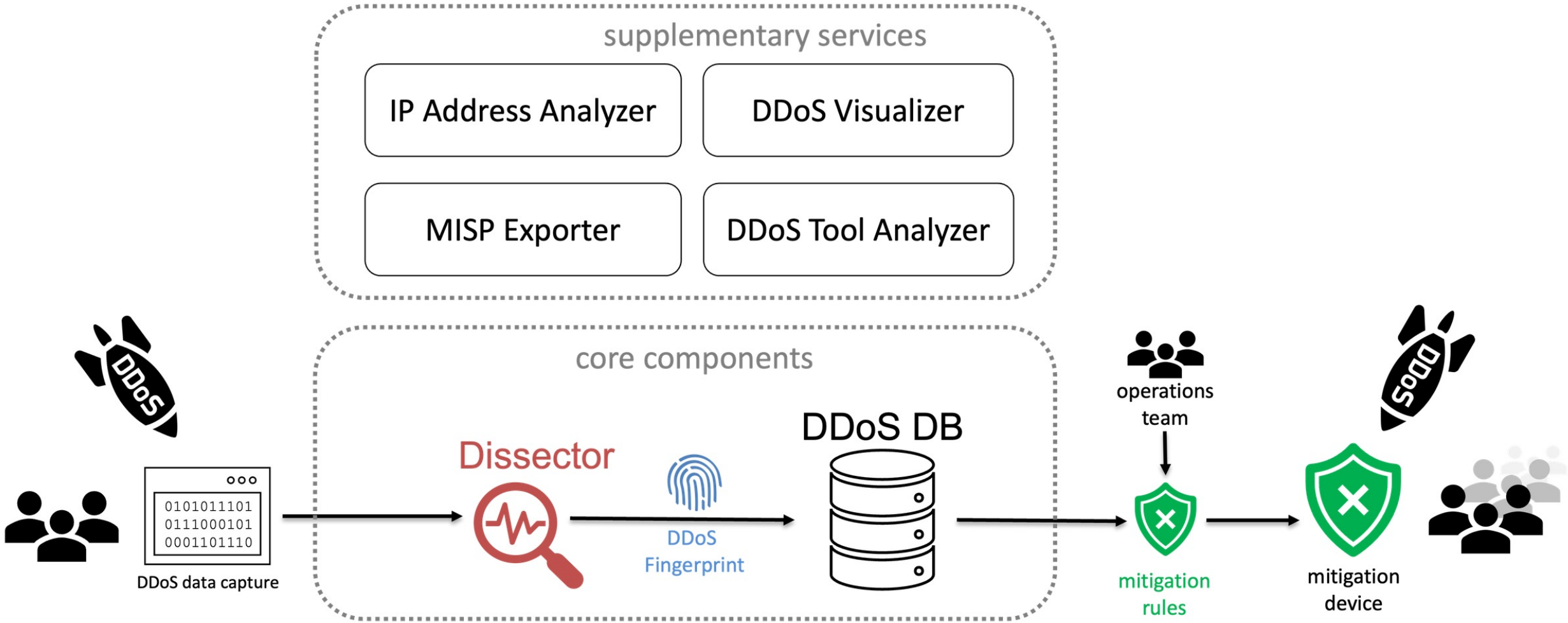
Examples

- Network playbook sharing for DNS Anycast (Tech talk II)
- IXP scrubber (Tech talk III)
- MANRS (Mutually Agreed Norms for Routing Security)
- DDoS Clearing House

DDoS Clearing House

- Sharing of **DDoS fingerprints** between organizations
- Generic concept: **Anti-DDoS Coalitions** across sectors, Member States, business units, etc.
- **Extends DDoS protection services** that service providers use and does not replace them

DDoS Clearing House



DDoS Fingerprint Example

fingerprint a38e5062b69fd7b8c5194fa7698398a7


```
{
  attack_vectors: [
    {
      service: "HTTP"
      protocol: "TCP"
      source_port: 80
      fraction_of_attack: 1.0
      destination_ports: "random"
      TCP_flags: {
        ...A....: 0.989
      }
      nr_flows: 5077
      nr_packets: 20308000
      nr_megabytes: 30599
      time_start: "2022-01-23 01:28:00"
      time_end: "2022-01-23 01:29:56"
      duration_seconds: 116
      source_ips: [
        "[redacted]"
        "[redacted]"
        "[redacted]"
        "[redacted]"
      ]
    }
  ]
  target: "Anonymous"
  tags: [
    "TCP"
    "TCP ACK flag attack"
  ]
  key: "a38e5062b69fd7b8c5194fa7698398a7"
  time_start: "2022-01-23 01:28:00"
  duration_seconds: 116
  total_flows: 5077
  total_megabytes: 30599
  total_packets: 20308000
  total_ips: 4
  avg_bps: 2110318068
  avg_pps: 175068
  avg_Bpp: 1506
  submitter: "thijs"
  submit_timestamp: "2022-01-25T13:50:13.818348"
  shareable: False
}
```

Key innovations

- Bridge **multidisciplinary gap** to deployment, more than tech!
- **Opensource design** that we make available through a “cookbook”
  - Technology, legal, organizational, lessons learned based on pilots
  - Enable federations of organizations to set up their own anti-DDoS coalition
  - Main use case is the Dutch Anti-DDoS Coalition (NL-ADC)
- Operates across **heterogeneous networks** and offers rich set of services

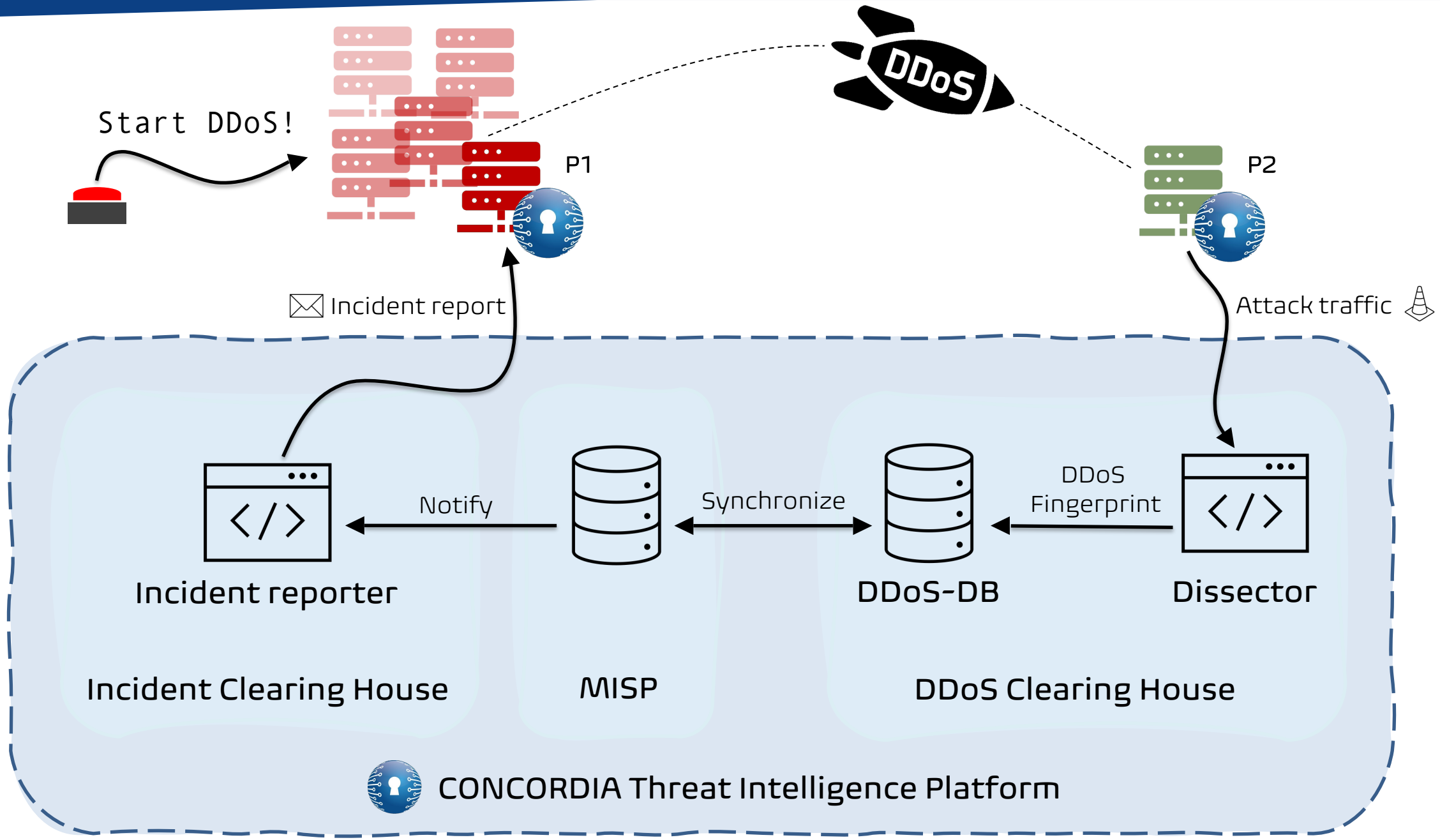
DDoS Clearing House pilots

- The Netherlands
  - In the existing Dutch Anti-DDoS Coalition (17 partners)
  - Cross-sectoral
  - One producer of fingerprints
- Italy
  - Smaller scale: Telecom Italia SOC & Security Lab + University of Turin
  - Intra-organizational
  - MISP

DDoS Testbed

- Representative environment used to
  - Test the technical developments of the Clearing House
  - Demonstrate our work
  - Cyber range for practicing DDoS

- DDoS traffic simulator
  - Small scale
  - Dashboard for attack customization


Start DDoS!
DDoS
P1
P2
Incident report
Attack traffic
Notify
Synchronize
DDoS
Fingerprint
Incident reporter
DDoS-DB
Dissector
Incident Clearing House
MISP
DDoS Clearing House
CONCORDIA Threat Intelligence Platform

What's next?

- DDoS Clearing House Cookbook
- Production phase at the NL-ADC
- Wrap up CONCORDIA with demonstration & reports

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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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