# Multi-Domain Autonomous mitigation of Cyber Attacks

## Demonstration at Ciena booth #1281

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### SARNET

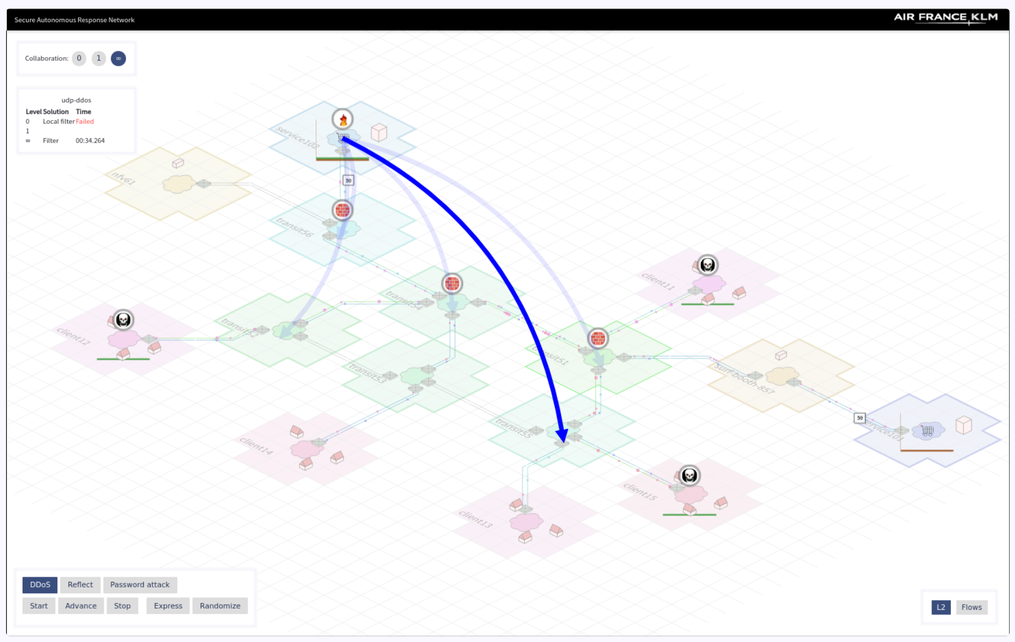
SARNET, Secure Autonomous Response NETworks, is a project funded by the Dutch Research Foundation. The University of Amsterdam, TNO, KLM, and Ciena conduct research on **automated methods against attacks** on computer **network infrastructure**.

### Multi-Domain Autonomous Response

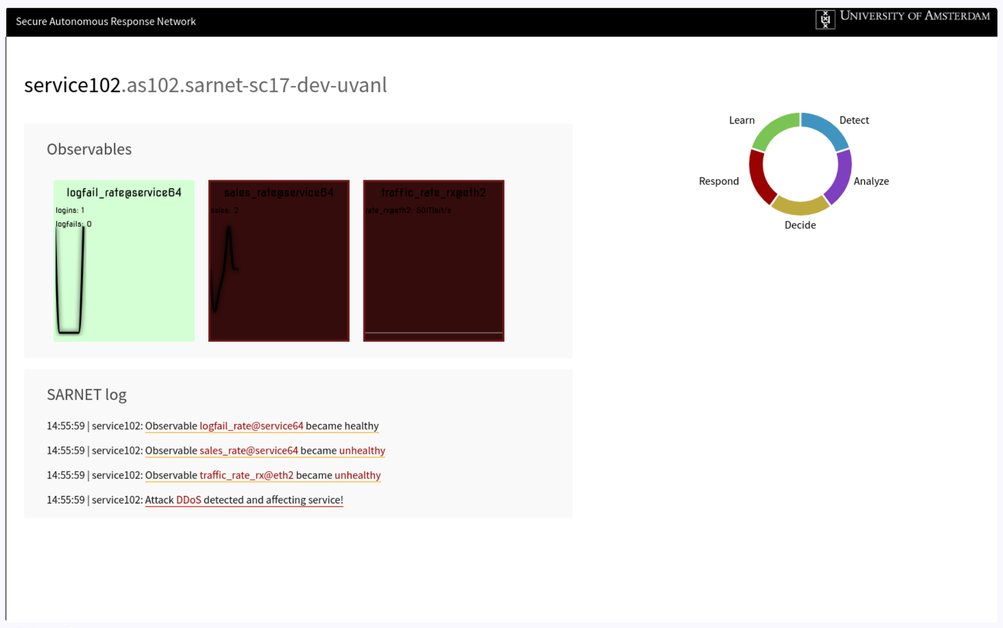
In this demonstration we let the viewers **initiate one of the pre-implemented attacks**. The touch interface shows a multi domain **network** and services. Each domain is **autonomous** and implements the SARNET **control loop** to that maintains is own **security** state. Additionally, domains can **collaborate** with each other by allowing certain **remote actions** that fellow collaborators can invoke.

By adjusting **levels of collaboration** we demonstrate the **effect on response capabilities** and **response** times.

**Autonomy** is achieved by **invoking** informational requests and defensive actions from the **victim**. This gives the **victim** the **autonomy** to make **decisions** over **its** destined **traffic** and it gives the **collaborators** the **autonomy** to decide on **how to handle** the requests.




**Touch interface**
The user can execute several attacks on the webservices who will try to defend the attack with the resources at their disposal. Increasing the collaboration level will increase the available resources and the defense capabilities.




**Metrics screen**
The graphs show the current state of a domain. When an observable becomes unhealthy the background of the graph becomes red. The log shows the defense actions that the domain applies, and whether they are successful.

### Key takeaways:

- Domains can collaborate **and** maintain **autonomy**.
- Different **levels of collaboration** influence attack response times; more collaboration does not necessarily mean faster response times.
- **Collaborative defence strategies** are better in defending against heavy attacks.

### Infrastructure

In this demo we use small scale but **realistic** attacks that are executed and contained inside **ExoGENI,** an international federated cloud testbed. A **Ciena 8700** switch is used at the UvA and Ciena sites to provide additional traffic isolation. We also implemented a SARNET on a **physical domain** that is part of the automation demo at **SURF booth #857**.

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