Autonomous mitigation of Cyber Attacks
Demonstration at Ciena booth #2523
Ralph Koning, Ben de Graaff, Paola Grosso, Robert Meijer, Cees de Laat

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.

Autonomous Attack Mitigation

In this demonstration we let the viewers initiate one of the pre-implemented attacks. The touch interface shows the virtual network to attack and attack controls. An additional metrics screen provides various metrics of the network and displays a simplified SARNET control loop. When these metrics violate certain observables the network responds autonomously.

The defences are implemented by deploying Virtual Network Functions (VNF) between attackers and the service. When a defence is initiated, a VNF is started as a container, the underlying Software Defined Network then directs the attack traffic to the VNF that can apply additional monitoring or mitigate the effects of the attack traffic on the service.

Key takeaways:

• A single attack can be addressed at different network layers, the preferred defence layer is dictated by policies of the network.
• SDNs can insert VNFs in the path that can be used for monitoring and traffic manipulation.
• DDoS attacks require actions from upstream, therefore response requires multi-domain coordination.

Infrastructure

For the 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 extended the testbed to include a link to via a Ciena 8700 at SuperComputing to allow live traffic manipulation from the Ciena booth.