Bringhenti Daniele
Open-source software projects

VEREFOO
VEREFOO (VErified REFinement and Optimized Orchestration) is an open-source Java framework that can automatically generate the optimal configuration of network security functions in a provably correct way, by modeling and solving the configuration problem as a Maximum Satisfiability Modulo Theories problem. At the moment, the tool can fully support the configuration of packet filtering firewalls and VPN gateways. Future works envisions the extension to other functions, as web-application firewalls and intrusion detection systems.
Github repository: https://github.com/netgroup-polito/verefoo
Demo (Youtube link): https://www.youtube.com/watch?v=QCFNLE2gHgE
Publications related to this project:
- "Automated firewall configuration in virtual networks". Bringhenti, D., Marchetto, G., Sisto, R., Valenza, F., & Yusupov, J. In IEEE Transactions on Dependable and Secure Computing, pages 1–18, 2022. IEEE
- "A novel approach for security function graph configuration and deployment", Bringhenti, D., Marchetto, G., Sisto, R., & Valenza, F., In Proceedings of the 7th IEEE Conference on Network Softwarization (NetSoft 2021), pages 1–8, 2021. IEEE
- "Automated optimal firewall orchestration and configuration in virtualized networks", Bringhenti, D., Marchetto, G., Sisto, R., Valenza, F., & Yusupov, J., In Proceedings of the IEEE/IFIP Network Operations and Management Symposium (NOMS 2020), pages 1–7, 2020. IEEE
- "Introducing programmability and automation in the synthesis of virtual firewall rules", Bringhenti, D., Marchetto, G., Sisto, R., Valenza, F., & Yusupov, J., In Proceedings of the 6th IEEE Conference on Network Softwarization (NetSoft 2020), pages 473-478, 2020.
- "Short Paper: Automatic Configuration for an Optimal Channel Protection in Virtualized Networks", Bringhenti, D., Marchetto, G., Sisto, R., & Valenza, F., In Proceedings of the 2nd AMC CCS Workshop on Cyber-Security Arms Race (CYSARM 2020), pages 25-30, 2020.
- "Towards a fully automated and optimized network security functions orchestration", Bringhenti, D., Marchetto, G., Sisto, R., Valenza, F., & Yusupov, J., In Proceedings of the 4th International Conference on Computing, Communications and Security (ICCCS 2019), pages 1–7, 2019. IEEE

VERIGRAPH

VERIGRAPH is an open-source Java framework that can formally verify the compliance of user-specified connectivity policies (i.e., reachability and isolation policies) with respect to the configuration of the network and security functions composing a virtual computer network. It supports a large pool of functions, e.g., firewalls, network address translators, load balancers.

Github repository: https://github.com/netgroup-polito/verigraph

Publications related to this project:

- "Improving the Formal Verification of Reachability Policies in Virtualized Networks", Bringhenti, D., Marchetto, G., Sisto, R., Spinoso, S., Valenza, F., & Yusupov, J., In IEEE Transactions on Network and Service Management, 18(1): 713-728. 2021. IEEE