Newsletter

SMARTNESS

No. 4 – Sep/24

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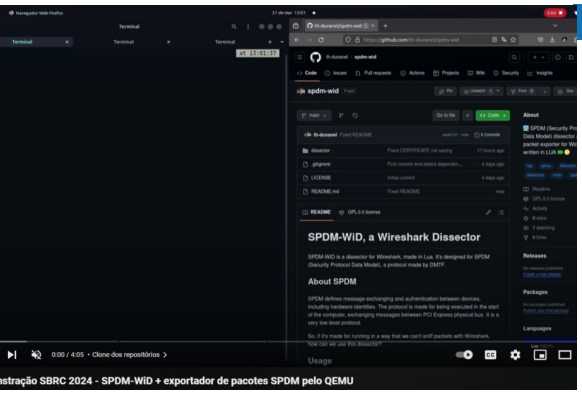
Software publication: SPDM-WiD Security Inspection Tool



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Check out the SW repository!

SMARTNESS researchers Thiago D. Ferreira, Otavio Felipe de Freitas, Renan C. A. Alves, Bruno C. Albertini, Marcos A. Simplicio Jr, and Daniel M. Batista, published an article about software entitled: “SPDM-WiD: Uma Ferramenta para Inspeção de Pacotes do Security Protocol Data Model (SPDM)”, in the Simpósio Brasileiro de Redes de Computadores e Sistemas Distribuídos (SBRC), 2024. This article presents the SPDM-WiD (SPDM Wireshark Dissector) tool, a packet inspection dissector for the Security Protocol Data Model (SPDM), an open communication standard for hardware and firmware authentication. Experiments prove the effectiveness of the tool and its usefulness in test scenarios for an SPDM implementation. After the SBRC, the paper will be published in the open-access proceedings of the event.

Participation at Campinas Innovation Week 2024

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SMARTNESS was present at the Campinas Innovation Week, held from June 10 to 14, 2024. This event brings together the business community, the most dynamic sectors of the economy, and leaders in innovation to explore new frontiers and drive digital transformation.

Thanks to the Agência de Inovação da UNICAMP (INOVA) and the Universidade Estadual de Campinas (UNICAMP), researchers from SMARTNESS had the opportunity to show the importance of our research center for the entire community, and demonstrated the use of AR/VR technology through a showroom operating in the Meta Quest 3.

Showcases at Key Event (EuCNC) & Dutch Universities

Prof. Christian Rothenberg, Principal Investigator of SMARTNESS, showcased the vision of the center and ongoing 6G research at EuCNC 2024 and engaged with key collaborators. During visits to TU Delft and the University of Amsterdam, he explored collaboration opportunities in programmable data planes and networked systems, including discussions on student exchanges for 2025. These engagements contribute to the global research network expansion of SMARTNESS.

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PHD Defense of Fabricio Rodriguez

SMARTNESS and INTRIG member Fabricio Rodriguez successfully defended his PhD titled “Low-latency in-network applications through programmable data planes” on July 10th, 2024, under the guidance of INTRIG’s leader, Prof. Christian Esteve Rothenberg.

Thesis Committee (From left to right): Prof. Rodolfo Da Silva Villaça (UFES), Prof. Christian Rothenberg (FEEC/UNICAMP), Dr. Fabricio Rodriguez, Prof. Carlos Alberto Astudillo Trujillo (IC/UNICAMP), Prof. Magnos Martinello (UFES), Prof. Juliano Araújo Wickboldt (UFRGS).

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Lab demos at UNICAMP UPA (Universidade Portas Abertas)

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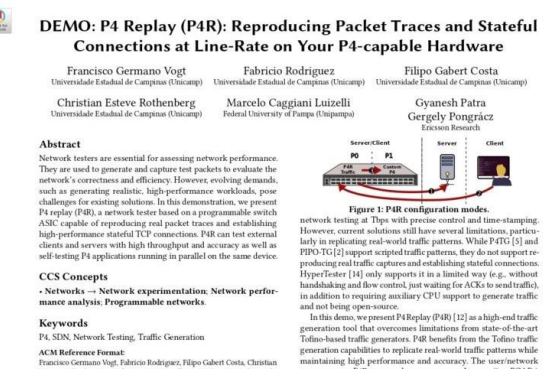
The Universidade de Portas Abertas (UPA) event at UNICAMP opened its doors to curious minds eager to explore cutting-edge advancements in engineering and technology. Held at the Faculty of Electrical and Computer Engineering (FEEC), the event offered visitors an immersive experience of the university's state-of-the-art research facilities and ongoing projects, particularly spotlighting the SMARTNESS 2030 initiative within the LCA of the INTRIG Research Group.

The event was characterized by a vibrant and interactive atmosphere, where students, educators, and visitors actively engaged with advanced technological demonstrations and research presentations.

Demo awarded at SIGCOMM 2024



DEMO: P4 Replay (P4R): Reproducing Packet Traces and Stateful Connections at Line-Rate on Your P4-capable Hardware

Francisco Germano Vogt, Universidade Estadual de Campinas (Unicamp)
Fabricio Rodriguez, Universidade Estadual de Campinas (Unicamp)
Filipo Gabert Costa, Universidade Estadual de Campinas (Unicamp)
Christian Esteve Rothenberg, Universidade Estadual de Campinas (Unicamp)
Marcelo Caggiani Luizelli, Federal University of Pampa (Unipampa)
Gyanesh Patra, Gergely Pongrácz, Ericsson Research

Abstract

Network testers are essential for assessing network performance. They are used to generate and capture test packets to evaluate the network's correctness and efficiency. However, evolving demands, such as generating realistic, high-performance workloads, pose challenges for existing solutions. In this demonstration, we present P4 replay (P4R), a network tester based on a programmable switch ASIC capable of reproducing real packet traces and establishing high-performance stateful TCP connections. P4R can test external clients and servers with high throughput and accuracy as well as self-testing P4 applications running in parallel on the same device.

CCS Concepts

• **Networks** → **Network experimentation**; **Network performance analysis**; **Programmable networks**.

Keywords

P4, SDN, Network Testing, Traffic Generation

ACM Reference Format:

Francisco Germano Vogt, Fabricio Rodriguez, Filipo Gabert Costa, Christian

Server/Client, Server, Client, P0, P1

Figure 1: P4R configuration modes.

network testing at Tbps with precise control and time-stamping. However, current solutions still have several limitations, particularly in replicating real-world traffic patterns. While P4TG [5] and PIPO-TG [2] support scripted traffic patterns, they do not support reproducing real traffic captures and establishing stateful connections. HyperTester [14] only supports it in a limited way (e.g., without handshaking and flow control, just waiting for ACKs to send traffic), in addition to requiring auxiliary CPU support to generate traffic and not being open-source.

In this demo, we present P4 Replay (P4R) [12] as a high-end traffic generation tool that overcomes limitations from state-of-the-art Tofino-based traffic generators. P4R benefits from the Tofino traffic generation capabilities to replicate real-world traffic patterns while maintaining high performance and accuracy. The user/network

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Check out the SW repository!

Christian Esteve Rothenberg, SMARTNESS PI and Director, Francisco G. Vogt, Fabricio Rodríguez Cesen and Filipo Gabert Costa (UNICAMP), Marcelo Caggiani Luizelli (UNIPAMPA), Gyanesh Patra and Gergely Pongrácz (Ericsson Research) have a new publication in the ACM Special Interest Group on Data Communication (ACM SIGCOMM) held in Sydney, Australia, August 4 – 8, 2024.

The Demo"P4 Replay (P4R): Reproducing Packet Traces and Stateful Connections at Line-Rate on Your P4-capable Hardware", was selected as one of the semifinalists in the Student Research Competition (SRC) and won the second-place award: Student Research Competition (SRC) award runner-up. Congratulations to the full team of researchers from INTRIG/UNICAMP, UNIPAMPA, and Ericsson Research.

PORVIR-5G members visit to SMARTNESS headquarters

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On July 9th and 10th, professors and researchers of the FAPESP PORVIR-5G thematic project: José Marcos Silva Nogueira and Daniel Macedo (UFMG), Rodolfo Villaça and Magnos Martinello (UFES), Cristiano Both (UNISINOS), and Juliano Wickboldt (UFRGS), visited the headquarters of SMARTNESS at the LCA laboratory of (FEEC/UNICAMP).

On this occasion, Ph.D. students Alan Teixeira and Francisco Vogt, MSc. student Rodrigo Clerici, and postdoctoral researcher Dr. Fabricio Rodriguez conducted a short workshop. Their presentations showcased the main topics their current research on SMARTNESS WPs covers.

The professors also engaged in augmented reality demonstrations using the VR goggles set up at the LCA Showroom.

Visits from Ericsson Research leadership and UFPA team

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On September 3rd, SMARTNESS received two technical visits at its main lab at FEEC/UNICAMP. In the morning, we welcomed a delegation from Ericsson Research, led by Dr Magnus Frodigh, VP and Head of Ericsson Research, to discuss the 6G vision and ongoing research. In the afternoon, SMARTNESS hosted UFPA's research group, led by Prof. Aldebaro, to explore collaborative opportunities, paving the way for impactful joint actions.

Ericsson Research Day in Indaiatuba

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On September 4th, Ericsson Brazil organized the Ericsson Research Day 2024 event at its headquarters in Indaiatuba. Dr. Maria Valéria Marquezini, Coordinator of university collaborations at Ericsson Research Brazil and Deputy Director of ERC SMARTNESS, presented the history of over 25 years and the current landscape of Ericsson's research partnerships in Brazil. Dr. Mateus Santos, Head of Ericsson Research Brazil, highlighted the main areas of focus for the team of researchers based in Indaiatuba.

Among other outcomes, the active participation of CPE SMARTNESS in the Ericsson Research Day 2024 was highlighted with five technical demonstrations, and after the Ericsson Research presentations, Prof. Christian Rothenberg, PI and SMARTNESS director, shared the vision and progress of the center's activities.

ACKNOWLEDGMENTS & DISCLAIMER

This work has been performed within the framework of the FAPESP Engineering Research Center (ERC) Program under FAPESP grant agreement #2021/00199-8 (SMARTNESS).