

CECS LECTURE ANNOUNCEMENT

Operating system kernel as a building block for scalable and fast network topology emulation

by

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Abstract

While traditional network protocol simulation tools are designed for flexibility and extensibility, as long as they target simulation of networked environments entirely decoupled from any external systems, they typically do not need to operate in real time. Moreover, scaling network emulation to large topologies was always a challenge, as was the question on how to couple the simulated environments to real networks and traffic.

In this talk we will describe how an operating system kernel can be extended to serve as a highly scalable network topology emulation engine, as opposed to the traditional model of running network emulators as standalone user-space processes. The approach of shifting the entire packet forwarding path of a network emulator into an OS kernel has several key advantages, such as incurring very low per-packet processing overhead and efficient use of overall system resources. Furthermore, existing UNIX applications or tools ranging from traffic generators or analyzers to routing protocol daemons or web servers can work unmodified on top of the kernel-level emulator, making it suitable for a wide range of experimentation scenarios. If time permits, we will briefly demonstrate how the described approach works in our prototype implementation called IMUNES, an integrated multi-protocol network emulator / simulator.

Biography

Marko Zec is a graduate student/ research assistant at the University of Zagreb. His main interests are in operating systems and computer networks. The projects he's been working on recently include XORP - the eXtensible Open Router Platform (with ICSI Berkeley), and IMUNES which he started at the University of Zagreb.

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