

**TELCOM 2011: Telecommunications Seminar**

**NetPiler: Detection of Router Misconfigurations  
through Program Flow Graph**

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**Abstract:** Configuring a network is a tedious and error-prone task. In particular, configuring routing policies for a network is complex as it involves subtle dependencies in multiple routers across the network. Misconfigurations are common and certain misconfigurations can bring the Internet down. In 2005, a misconfigured router in AS 9121 blackholed traffic for tens of thousands of networks in the Internet. We present NetPiler, a system that detects router misconfigurations. NetPiler consists of a routing policy configuration model and a misconfiguration detection algorithm. As opposed to other syntactic configuration checkers, NetPiler accurately models the behavior of network configurations in a similar fashion to that of a compiler in a programming language. The model presents the way that routes flow and are processed across a network. Using the model, NetPiler verifies both routing policies configured on a single router as well as network-wide configuration. We have implemented NetPiler in C++ code, and evaluated it on the configurations of four production networks. NetPiler discovers nearly a hundred misconfigurations. Some of these misconfigurations can result in loss of connectivity, access to protected networks, and financial implications by providing free transit services. We believe NetPiler can help networks to significantly reduce misconfigurations.

*Brief Bio of Speaker:* Sihyung Lee is a Ph.D. candidate in Electrical and Computer Engineering Department, Carnegie Mellon University. His work is in network management, network measurement, internet routing and routing security. During his Ph.D., he spent time with the Network Management group at Cisco, San Jose, CA. His work is supported by Samsung Scholarship Foundation, ICTI and NSF. He received the B.S. and M.S. degrees in electrical engineering from Korea Advanced Institute of Science and Technology (KAIST).