Verification of Network Security Properties with NetKAT

Networks have received widespread attention in recent years as a target for domain-specific language design. The recent emergence of software-defined networking (SDN) has led to the appearance of a number of programming languages that seek to provide high-level abstractions to simplify the task of specifying the packet-processing behavior of a network.

NetKAT is a recently developed programming/specification language and logic designed for reasoning about packet-switching networks. NetKAT provides general-purpose programming constructs along with special purpose networking primitives for specifying routing behavior and encoding network topologies. In this talk I will introduce the NetKAT language and show how it can be used to specify and automatically verify network security properties such as access control, non-interference, waypointing, loop freedom, and other correctness properties, along with a verified compiler for translating NetKAT programs to hardware instructions for SDN switches.