中央研究院 資訊科學研究所
Institute of Information Science, Academia Sinica

Distinguished Lecture Series

Revisiting control/data plane separation in Software Defined Networking

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Abstract

As defined in Wikipedia, Software Defined Networking (SDN) is about "decoupling the system that makes decisions about where traffic is sent (the control plane) from the underlying systems that forward traffic to the selected destination (the data plane)". Such decoupling is very frequently meant to imply the physical separation between a smart (logically) centralized controller in charge of taking and enforcing decisions, and dumb network switches and devices which are completely driven by the controller in terms of forwarding rules install/update commands. We believe that this rigid, physical, separation is by no means a conceptual principle, but it is just the consequence of the inability to emerge, so far, with pragmatic device-level programming interfaces more expressive than OpenFlow, i.e., which permit to program, inside the switch itself, more complex and dynamic "flow behavior models", rather than static forwarding rules. In the talk, we discuss technical ways to formally describe stateful per flow behavior while retaining pragmatism (and some level of compatibility with today's OpenFlow), platform independency, and portability across different network devices and nodes. Taking stocks, we posit that the unprecedented ability to locally deploy, in each network switch, third-party programmed platform-agnostic control functions, not only questions the rigid control/data plane separation that so far has driven SDN efforts, but rather might even pave the road towards the viable return of some "active networking" ideas in the SDN arena.

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