

SDN

Fad or Phenom?

David Meyer
HOTI Industrial Panel
dmm@1-4-5.net

So What Exactly is SDN?

Recently Described SDN Architecture

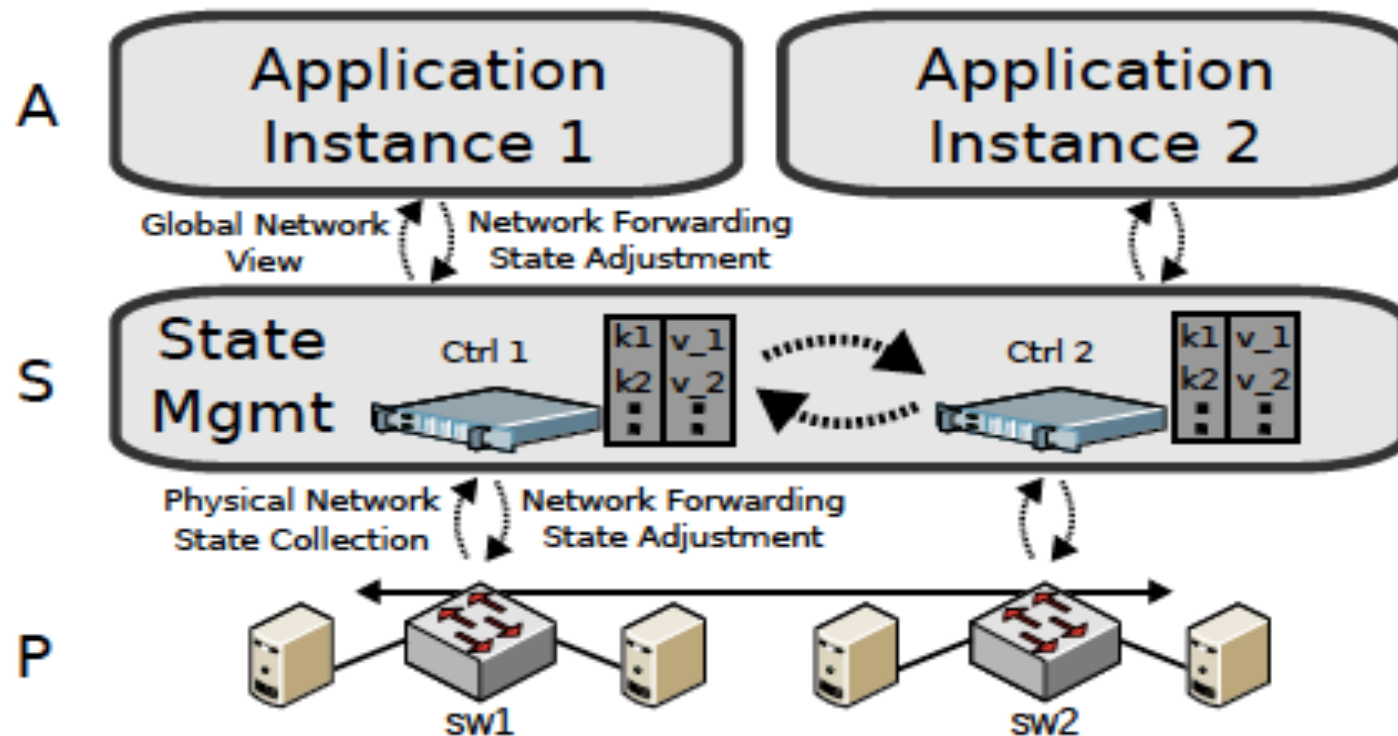


Figure 1: SDN state distribution and management conceptualized in layers: (A)pplication, (S)tate Management, (P)hysical Network

Model Enables, Among Other Things...

- **Rapid innovation**
 - new control planes
 - forwarding planes
 - applications
- **New ability to reason**
 - about control planes and other applications
 - NPLs, “network compilers”, ...
- **Tracking of Moore’s law**
- **New network economics**
- **Straight forward data center use cases**
 - And new enterprise and SP use cases emerging almost daily
- **All goodness, but....**

Danger Will Robinson!!!

- There are still open questions
 - **Logical centralization**
 - State distribution
 - Control plane reactivity
 - **Scalability**
 - Flow setup
 - Controller transaction
 - **Abstractions**
 - OF's "simplicity" appealing, however...
 - Too simple → Information Loss/Leakage
 - ASIC forwarding targets
 - "Northbound APIs"
 - ...

The good news is that steady progress is being made on these and many of the other hard problems. See for example, SIGCOM 2012



“SDN-hard” Problems

- **Technology**
 - Control Plane Scalability and Resilience
 - Logical Centralization
 - Flow Setup Scalability and Performance
 - “intent templates”?
 - Abstractions
 - *Sweet spot*: Leverage ideas from distributed systems, programming languages, and other areas to bridge the gap between the centralized controller abstraction and the distributed/hierarchical reality
 - Simple Switch/Programming Model
 - How long until TCAMs are power efficient, have hundreds of thousands of entries with multiple tables?
 - “Northbound” APIs
 - Reasoning Systems
 - headerspace analysis, NPLs, network compilers...
 - Operational Models
 - And how to you build/operate/debug these networks?
- **Sociology**
 - OF/SDN approach challenges much of our *central dogma*
 - Not the least of which are
 - Circuits vs. Hop-by-hop forwarding
 - Centralized vs. Distributed control planes
 - Shift in influence bases from NetOps → DevOps
- **Economics**
 - Well...

That Said...



The SDN genie is out of the bottle...

Thanks!