OpenFlow: Enabling Innovation in Campus Networks

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Why Open Flow?

- OpenFlow a way for researchers to run experimental protocols in the network with **open-source** and **free** implementations for commercial and non-commercial use
- A new switch feature that can help extend programmability into the wiring closet of college campuses
- Would allow researchers to run experiments on heterogeneous switches and routers in a uniform way
- A few open software platforms already exist, but do not have the performance or port-density we need
- Existing platforms with specialized hardware for line-rate processing not quite suitable for college wiring closet
- Commercial solutions too closed and inflexible, and Research solutions have insufficient performance or fanout or too expensive

Basic Idea

- Provides an open protocol to program the flowtable in different switches and routers
- All traffic over the OpenFlow network will be production traffic and experimental traffic isolated on different VLANs under the control of network administrators.
- Researchers would control their own traffic, and add/remove flow-entries
- An OpenFlow Switch consists of at least three parts:
  - A **Flow Table-**to tell the switch how to process the flow
  - A **Secure Channel**-connects the switch to a remote control process allowing commands and packets to be sent between a controller and the switch using OpenFlow Protocol
  - The **OpenFlow Protocol-**provides an open and standard way for a controller to communicate with a switch

What is the Future of Open Flow?

- The OpenFlow Consortium aims to popularize OpenFlow and maintain the OpenFlow Switch Specification because they believe their research mission will be enhanced if OpenFlow-enabled switches are installed in their network
- OpenFlow will gradually catch on in other universities, increasing the number of networks that support experiments.
- A new generation of control software will emerge, allowing researchers to re-use controllers and experiments, and build on the work of others.
- OpenFlow networks at different universities will be interconnected by tunnels and overlay networks
- New OpenFlow networks will be running in the backbone networks that connect universities to each other.
- OpenFlow could serve as a useful campus component in proposed large-scale testbeds like GENI