Enterprise-GENI

Milestones achieved / Deliverables made

As this is the first 3 month period and SOW has not been signed yet, no milestones from the draft SOW have been achieved and no deliverables have been made in this period.

<proposal related information deleted by HDempsey>

Activities and findings

The main activity has been development of the Network Virtualization Software that is the foundation for allowing experimental use of production networking infrastructure. The basic components of this infrastructure is a Hypervisor and the Aggregate Manager.

The OpenFlow Hypervisor (OFH) virtualizes a physical OpenFlow switch into multiple logical OpenFlow switches, which can be owned and operated by different experimenters. The OFH appears to a network of OpenFlow switches as a single controller running as open-source software on a Linux-PC - the switches run the unmodified OpenFlow Protocol (currently Version 0.8.9). The OFH is critical to allowing multiple experimenters to run independent experiments simultaneously in one physical campus network. The OFH consists of two main parts: (1) A policy engine that defines the logical switches (e.g. "all http traffic", "Aaron's traffic", "Network administrator's experimental traffic between 12midnight and 3am"), and (2) An OpenFlow mux/demux that implements the policy by directing OpenFlow commands to/from an OpenFlow controller and its network of logical OpenFlow switches.

Current implementation status: Version 0 of the OFH passes most of the test cases when virtualizing an NEC IP 8800 OpenFlow-enabled switch. A basic test infrastructure has been set up and currently multiple experiments from different Stanford teams run on top of a virtualized network set up in the lab. The OFH provides complete separation of traffic between virtual switches and gives each experimenter full control over L2 or L3 forwarding for "their" logical switch.

The Aggregate Manager will build on top of the OFH -- essentially, the Aggregate Manager is an OpenFlow controller that controls a subset of the network resources, as defined by the local administrator. We have not yet determined the precise architecture of the Aggregate Manager as this will depend on the results of benchmarking the OFH. We have started the definition of a proposed API between the Aggregate Manager and clearing house.

Project participants

Rob Sherwood (Hypervisor Design)
Srini Seetharaman (Aggregate Manager)

Kk Yap (Hypervisor Testing)
Glen Gibb (Hypervisor Testing)
Guido Appenzeller (Project Manager)

Publications (individual and organizational)

No publications this quarter. We are working on a SIGCOMM submission for February.

Collaborations

<Proposal-related information deleted by H. Dempsey.>

We started discussions with Jon Turner about a joint demonstration at a GEC in Q3/Q4.