

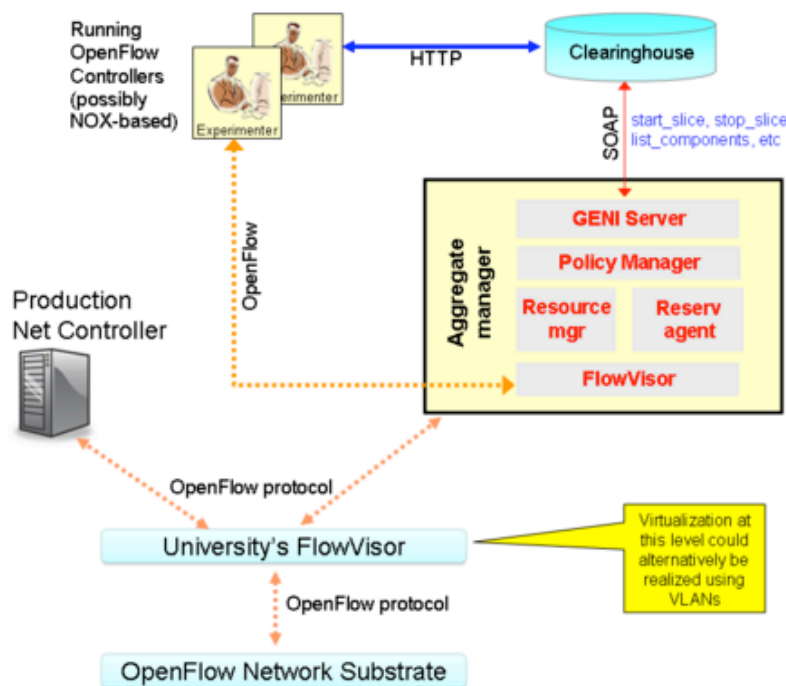
Enterprise-GENI Status Report

Report Q2 2009

Overview

Enterprise-GENI is composed of three main entities to achieve the GENI vision of multiple experiments coexisting over the same substrate:

- *OpenFlow-based Substrate*: The switches that communicate using the OpenFlow protocol to a controller application
- *FlowVisor*: A custom-build OpenFlow controller that slices the network by isolating control traffic of individual experiments.
- *Aggregate Manager*: The application which mediates between the Clearinghouse and the E-GENI FlowVisor, over a SOAP-based GENILight protocol.



Milestones achieved / Deliverables made

Our work is currently focused on designing and implementing our Enterprise GENI aggregate manager and integrating it with other aggregates. The aggregate manager is responsible for resource discovery and slice reservations. It mediates between the ClearingHouse and the E-GENI FlowVisor. The Aggregate Manager code, was recently published online. It has two main modules:

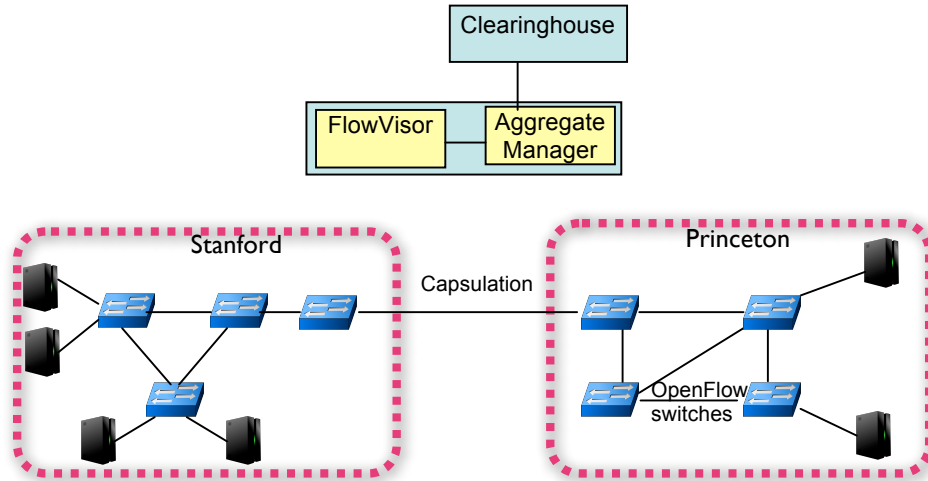
- NOX-based user-level controller application that interacts with the FlowVisor.
- CherryPy-based GENILight server that interacts with the ClearingHouse.

The E-GENI FlowVisor we released performs network slicing of OpenFlow switches. We have successfully achieved "multi-layer" network slicing, i.e., virtual network slices that defined by any combination of physical layer (L1), link layer (L2), network layer (L3), and transport layer (L4). This FlowVisor slices a physical OpenFlow switch into multiple logical OpenFlow switches, which can be owned and operated by different experimenters. This was demonstrated as part of a SIGCOMM demo,

which won the Best Demonstration award.

Integration between EntGENI and GENI PlanetLab (Ticket #142, #144, #177)

We are in the process of integrating PL-GENI substrate having computing resources, with E-GENI substrate having networking resources. The integration will feature 3 PL nodes connected to the OpenFlow network at Stanford, as well as a 2 PL nodes tunneled in from Princeton using a Soekris box. All switches at Princeton, and Stanford will communicate with the same FlowVisor at Stanford University. The slices in the FlowVisor will be created by the Aggregate Manager after each call from the ClearingHouse. The protocol between the ClearingHouse and the Aggregate Manager uses the SFA interface defined by PlanetLab consortium.



Following is the tentative exact timeline for the integration in September 2009:

Week 1	<ul style="list-style-type: none"> • Complete coding of new SFA interface in E-GENI Aggregate Manager • Update RSpec to support latest FlowVisor • Local testing with PL nodes
Week 2	<ul style="list-style-type: none"> • Connect PlanetLab nodes to VLAN 374 of Stanford deployment • Create tunnel endpoints for merging traffic from Princeton
Week 3	<ul style="list-style-type: none"> • Visit Princeton and setup OpenFlow island at Princeton • External connectivity to E-GENI Aggregate Manager • Discuss plans to identify connection between PL and E-GENI
Week 4	<ul style="list-style-type: none"> • Complete end-to-end integration demo with SFI created slices • Two slices with TCP traffic on different ports sent to different expt controllers

Publications (individual and organizational)

- N. Handigol, S. Seetharaman, M. Flajslik, N. McKeown, R. Johari, “Plug-n-Serve: Load-Balancing Web Traffic using OpenFlow,” ACM SIGCOMM Demo, Barcelona, Spain, August, 2009
- R. Sherwood et al. “Carving research slices out of your production networks with OpenFlow,” In Proceedings of ACM SIGCOMM Demo, Barcelona, Spain, August 2009.