GENI
OpenFlow Update - FOAM

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Kansas City, Missouri November 2, 2011
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- **F**lowVisor **O**penFlow **A**ggregate **M**anager
  - Replaces the AM and OIM parts of Expedient
  - Only an AM so far – no end-user opt-in (yet)
  - GENI AM API interface for experimenters
  - JSON API interface for management
  - `foamctl` command-line interface to the JSON API
  - Lightweight nginx front-end provides HTTPS
  - Runs on Ubuntu 10.04 LTS now, Red Hat 6 soon
  - 0.4 running at BBN now (for the past few weeks)
  - 0.6 release Nov 21st for widespread deployment

https://openflow.stanford.edu/display/DOCS/FOAM

- ## Data mapping:
  - Hard to link FlowVisor slices, GENI slivers, GENI slices, and experimenter identities
  - FOAM stores (and shows) these relationships

- ## Auto-approve:
  - "Opting in" Expedient slivers is hard
  - FOAM has an engine for automating approval decisions
    - 0.4 only has a default policy setting
    - 0.6 will have hooks for other more complicated policies

- ## Flowspace explosion:
  - Hundreds of flowspace rules per sliver
  - FOAM's algorithm for turning rspecs into flowspace is more succinct

- Slivers can be Approved, Pending, or Rejected
  - Approved: An admin thinks this should be enabled
  - Pending: Awaiting admin consideration
  - Rejected: An Admin thinks this should not be enabled
- `foamctl` CLI to manage slivers
  - `foamctl list-slivers -s Pending`
  - `foamctl show-sliver -u $sliver_urn`
  - `foamctl approve-sliver -u $sliver_urn`
  - `foamctl disable-sliver -u $sliver_urn`
  - `foamctl reject-sliver -u $sliver_urn`
  - `foamctl delete-sliver -u $sliver_urn`
- And you can do this all via a JSON API as well

https://openflow.stanford.edu/display/DOCS/foamctl+Guide

Deployment roadmap

- Version 0.4.0 released in early October
  - Only deployed at BBN, to avoid ONS / GEC 12 / SC11
  - Hit the minimal target of "as good as Expedient"
    - i.e. has all the features of the Expedient AM
    - …but doesn't address many of the concerns

- Version 0.6 scheduled for release on Nov 21st
  - Auto-approve
  - E-mail notification
  - Expiration
  - UI improvements

- Bugs and fixes are tracked in JIRA – bug reports welcome!

https://openflow.stanford.edu/bugs/browse/FOAM

- FOAM 0.4 deployed at BBN on October 4th
  - …and turned off Expedient, which left orphan FV slices
  - Traffic still flowed, but no more GENI AM API access
- Worked with experimenters to migrate slivers
  - Updated rspecs, and created new FOAM slivers
  - Manually removed old slices, and approved new slivers
- This all went very smoothly
  - …but make backups of your config file just in case
  - It's been running fine since then
  - The Omni tutorial on Friday also uses FOAM 0.4

http://groups.geni.net/geni/wiki/GeniAggregate/GpoLabOpenFlow

- Stanford is finishing FOAM 0.6 in the next two weeks
- After SC 11, BBN and Stanford will schedule deployment with campus and core admins
- Can be a drop-in replacement for Expedient
  - …or run on a different system, if desired
  - …but can't run on the same system alongside Expedient
- Sites can then help experimenters migrate as needed
  - Not all sites have to update at once
  - Not all experimenters have to migrate at once
  - Advantageous to get things done quickly for consistency
- More details to come after SC 11