



Mid-Atlantic Crossroads
**Advanced Regional Internetworking for
Higher Education and Research**

**8400 Baltimore Avenue
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June 30, 2009

To: GPO
From: Chris Tracy, Jarda Flidr, Peter O'Neil (MAX)

Re: Quarterly Status Report

Major Accomplishments

- **Milestones achieved**
 - Milestone: Extend DRAGON's open-source GMPLS-based control plane implementation to include edge compute resources and support network virtualization [of PlanetLab per our participation in Cluster B]
 - Milestone: Integrate DRAGON/GRMS with candidate GENI control framework
 - Milestone: Integrate DRAGON/GENI control framework with DRAGON testbed
 - Milestone: Make a working prototype (tested) GENI (substrate and control framework) available for limited external research (**early achievement**)

- **Deliverables made:**
 - Continue as co-chair of the Substrate WG
 - Designed and developed a working implementation of a SOAP based Aggregate Manager
 - JAVA based reference implementation that provides a web services API (WSDL) to clients, including the ability to communicate with a Clearing House
 - Code base is public and available for others to use
 - API capable of controlling multiple component resources within MAX GENI infrastructure, including
 - PlanetLab nodes
 - Dynamic e2e bandwidth VLANs
 - Eucalyptus virtualization nodes (example of API capability)
 - PASTA wireless nodes (example of API capability)
 - NetFPGA based OpenFlow switches

We believe this to be a significant step for Cluster B geniwrapper integration and Aggregate Manager interoperability within the Cluster B control framework.

Description of work performed during last quarter

- **Activities and findings**
- Primary efforts this quarter focused on the following MAX deliverable:
 - Designed and developed a working implementation of a SOAP based Aggregate Manager

Focus Next Quarter:

- Ticketing and authentication is still a work in progress
 - HTTPS could be used for encryption
 - Signed SOAP messages for authentication
- Back-end hooks to provisioning systems is still under development
 - will interface to OSCARS/DRAGON via Web Services API
 - will interface to PlanetLab via XMLRPC directly to PLCAPI, or XMLRPC (or SOAP) to PlanetLab GENIWrapper AM
 - will be extended to find OpenFlow controllers or other technologies
- Extend our existing SOAP-based Aggregate Manager component to interoperate with other GENI Cluster B participants
- Reach further consensus within Cluster B on most effective way to interoperate with PlanetLab and create an effective aggregate manager
- End-to-end slices across AM's will require something very similar to the inter-domain interaction used to create inter-domain dynamic circuits in networks like DRAGON, Internet2 DCN, ESnet, etc.
- For example:
 - calculate the end-to-end slice (multi-AM slice) first, see if it is achievable
 - then go from AM to AM and try to provision all of the resources
- We believe this will look something like our Path Computation Element (PCE) now but will be more like a Resource Computation Engine (RCE) where Path will be just one of the constraints
- Explore interoperability issues with another Control Framework, i.e, ProtoGENI once the ProtoGENI switch and SPP switch are installed in McLean, VA August 17-19th that MAX will be assisting with.
- Delivery of preliminary (aggregate manager) design documentation to GPO

Project participants

- Chris Tracy, Jarda Flidr, and Peter O'Neil

Publications (individual and organizational)

- None

Outreach activities

- **Collaborations**

- Attended the RSpec Workshop in Chicago and the Cluster B meeting in Cambridge.
<http://groups.geni.net/geni/wiki/NetworkRSpecMiniWorkshop>
- Attended and presented at the February 13th Cluster B Integration meeting at DIA (<http://groups.geni.net/geni/wiki/ClusterB>)
- Engaged with USC ISI-East in Arlington, VA to bring up PlanetLab node and begin debugging early efforts to reserve Gigabit slices of bandwidth between ISI and MAX PlanetLab nodes.
- Regular communication and ongoing support with GpENI: Great Plains Environment for Network Innovation on installing and running:
 - the DRAGON software suite and configuration support for the Ciena CoreDirector platform
 - a private PlanetLab central deployment
- Planning for physically interconnecting to the ProtoGENI switch to be installed in McLean, VA during August
- Provided beta testing results and deployment experiences of Princeton geniwrapper code to the planetlab-devel mailing list. MAX efforts led to the addition of some very limited notion of Ethernet VLANs to their RSpec, so that you can specify a resource request consisting of not only VMs but also some links which connect those VMs.
- There is also been some progress on making it possible for users (who are SSH'ing into planetlab slices) to setup the tagged VLAN interfaces (and the IP addresses on those interfaces) themselves without involving administrator assistance. This information is put into the RSpec, and when the slice is setup on PlanetLab, attributes are added to the nodes which specify that tagged VLAN may be created and also limit the range of IP addresses that can be assigned by that user. This is all accomplished by something that PlanetLab called 'vsys' script, which is basically a generic mechanism to allow PlanetLab users to run a limited subset of commands on the primary host that runs all of the VMs.
- We have also worked with Adva to upgrade the software release (and firmware) on all of the DRAGON optical equipment. In the next quarter, the MEMS cards will be brought up to the latest manufacturing standards and FPGA/CPLDs upgraded.
- Participated in coordination calls with Cluster B participants
- Discussions with Jon Turner continue about locating one of his SPP nodes at the McLean, VA Level 3 PoP where Internet2, MAX, and NLR all have suites and tie-fibers.
- In discussions with IU's Meta-Operations Center on a data comparison of ops info from MAX as compared to the ops info available from PlanetLab.
- Continuing discussions with EnterpriseGENI/Stanford discussions for experimentation with OpenFlow and SOAP/WSDL efforts to effectively interoperate with PlanetLab

- **Other Contributions**

- Updated and further documented our GENI web page to summarize our efforts installing MYPLC PlanetLab Central v4.3 and presentations to date on the MAX GENI site:
- <https://geni.maxgigapop.net/twiki/bin/view/GENI/Deploying-MyPLC-v43>
- <https://geni.maxgigapop.net/twiki/bin/view/GENI/Publications>
- <https://geni.maxgigapop.net/twiki/bin/view/GENI/WebHome>