

GENI MAX Project Status Report

Period: November 6 2010 - March 18, 2011

The reporting period covers the time period November 6, 2010 - March 18, 2011. For Spiral 3, Project Status Reports are due after each GEC. This is the status report following GEC 10.

I. Major accomplishments

A. Milestones achieved

The milestones due during this reporting period are listed below:

MAX.S3.b: White paper on network stitching in GENI (Due 02/18/11)

- Develop a document and associated set of web pages which describe the MAX GENI AM approach for network stitching in GENI. This document should also include a discussion on the broader topic of network stitching in terms of design tradeoffs and decision points as it applies to the larger GENI community.
- Participate in review discussion of this document via telecon and/or at GEC meetings.

Status:

We generated extensive documentation on stitching in general and on a specific GENI Stitching Architecture. This included the following documents:

- GENI Network Stitching Architecture - Overview
This document provides an overview of a proposed stitching architecture.
- GENI Network Stitching Architecture - Example
This document provides an example of the proposed architecture base on Use Cases.
- GENI Network Stitching Component Design - Example
This document provides an example of a specific design for each of the architecture components. The intent is to convince ourselves that a detailed design can be develop to support the proposed architecture, not necessarily to define the final design details.
- GENI Network Stitching Schema Example
This is an xsd file of an example Common Stitching Topology Schema.
- GENI Network Stitching RSPEC Instance Example
The is an example instantiation of a Stitching Resource Element (Stitching RSPEC info) that an Aggregate would use to describe an external link to another aggregate. In this example, the MAX Aggregate is describing an external link to the ProtoGENI Aggregate. This Stitching RSPEC is in accordance with the above schema.
- The same Stitching RSPEC instance as above was also formatted in accordance with the ProtoGENI RSPEC v2 schema.

All of these documents and additional information on stitching is available at the web site below:

- <https://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitching>

We also organized multiple teleconferences with various organizations and groups including ProtoGENI, OpenFlow, and ORCA/BEN.

MAX.S3.c: Demonstration and outreach at GEC10 (Due 3/18)

- Demonstrate updated MAX Aggregate Manager design, functions, and user interface. This demonstration should include instantiation of GENI Experiment Topologies which crosses multiple GENI Aggregates.
- Organize a workshop on network stitching in GENI. The objective of this workshop will be to discuss architecture and design alternatives for multi-aggregate network stitching in GENI. The target participation group is the GENI design and development community. The specific topics will be determined in consultation with the GPO and the larger community. The anticipated topics include: what is the GENI Network Stitching architecture and design? should this service be integrated natively into GENI AMs or as a higher level service built on top of the control framework? Who is responsible for implementing this service? How do users access the stitching services? What is the operational model for this service in terms of monitoring and troubleshooting? What is the current state of network stitching in GENI, and how do we evolve to a broadly available and supportable GENI network stitching service from here?

Status:

We completed the first item of this milestone via our demonstration at GEC10. This demonstration showed how the PlanetLab SFI/SFA can be used to submit requests to the Mid-Atlantic Crossroads (MAX) GENI Aggregate Manager (AM) for the purpose of dynamic instantiation of an experiment topology. The dynamically instantiated topologies were constructed from a diverse set of resources including PlanetLab slices, dynamically provisioned network paths across the MAX network, and dynamically provisioned network paths across ProtoGENI and Internet2 ION. Details on this demo and the associated MAX AM Functionality are available here:

- <http://geni.maxgigapop.net/twiki/bin/view/GENI/Publications> ==> GEC10

This includes slides, the Demonstration Poster, Slice RSpecs, and commands which can be used to provision resources on MAX, ProtoGENI, and Internet2 ION.

We also took advantage of the GEC10 to conduct outreach and coordination with users

for the MAX GENI Substrate. This included planning sessions and discussions with the following groups:

- ERM Project, Columbia University, Lightwave Research Laboratory
A collaboration is planned which includes placement of instrumentation device in the MAX network by the ERM project as part of GENI experiment and development activity
- iGENI Project
A collaboration is planned between the MAX and iGENI projects to interconnect our aggregates. This will include a 10 Gbps connection (across NLR) between the MREN facilities in Chicago and the MAX node in McLean Virginia
- Capital College
Initial discussions were held with a researcher from Capital College who is interested in using GENI. This college is within the MAX regional footprint in Washington D.C. Further conversations are planned to see how to best make MAX GENI and the larger GENI infrastructure available for their use.

We plan to follow up with these projects and individuals as part of future GENI experimentation activities.

For the second item we organized a GENI Stitching Workshop which was held at GEC10. This included many pre-GEC10 activities including document preparation, teleconferences, and other workshop planning activities. The following web sites contain additional information about the workshop preparation and workshop event.

- Pre-Workshop Preparations:
<https://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitching>
- GEC10 Stitching Workshop:
<http://groups.geni.net/geni/wiki/GEC10Stitching>

B. Deliverables made

During this reporting period we completed our deliverables for the GENI Network Stitching paper development, Stitching Workshop, and GEC10 Demonstration an Outreach. These are documented at the following web sites:

- Network Stitching Papers:
<https://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitching>
- Network Stitching Workshop:
<http://groups.geni.net/geni/wiki/GEC10Stitching>

- GEC10 Demonstration and Outreach:
<http://geni.maxgigapop.net/twiki/bin/view/GENI/Publications> ==> GEC10

II Description of work performed during last quarter

A. Activities and findings

As a result of our initial stitching implementation in the MAX Aggregate Manager users now have the ability to include stitching across ProtoGENI and Internet2 ION infrastructures as part of MAX GENI Slices. We leveraged this work to develop a proposed GENI Stitching Architecture and held multiple conversations with interested parties. Our key finding is that the proposed stitching architecture provides a point from which we can move forward on the development of the general GENI stitching capability.

B. Project participants

Tom Lehman (USC/ISI)
Xi Yang (USC/ISI)
Abdella Battou (MAX)
Balasubramania Pillai (MAX)

C. Publications (individual and organizational)

We have produced several internal documents as part of our stitching work:

- Network Stitching Papers:
<https://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitching>

D. Outreach activities

We are continuing to reach out to potential GENI users as part of our collaborations with other GENI community members as described in our milestone status above and collaborations section below.

E. Collaborations

In addition to the outreach and collaboration activities described in the milestone section above, below are collaborations which were initiated during previous reporting periods. We will maintain this list here as we expect additional collaborations in the future.

GpENI, UNL: We have had collaborations with the GpENI project. In particular we have been working with the University of Nebraska Lincoln (UNL) to build GENI Experiment topologies which span our Aggregates. This has involved interconnection of our substrates across ProtoGENI and Internet ION network infrastructures. We expect that this collaboration will continue to expand in the future.

JGN2, CoreLab: We have had initial discussion and conducted initial testing with the JGN2 and CoreLab (Japan Research Network and PlanetLab deployment) team. We have plans to build GENI Experiment topologies which will include resources from MAX

AM and JGN2/CoreLab as part of future activities.

F. Other Contributions

none.