GENI MAX Project Status Report
Period: March 19 2011 - August 20, 2011

The reporting period covers the time period March 19, 2011 - August 20, 2011. For Spiral 3, Project Status Reports are due after each GEC. This is the status report following GEC 11.

I. Major accomplishments

A. Milestones achieved

The milestones due during this reporting period are listed below:

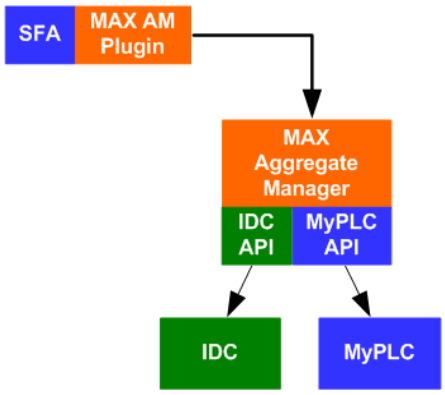
MAX.S3.d: MAX is an operational aggregate (complete)

- Transition MAX GENI to an operational aggregate status. This should include:
  - Implementation of the latest GENI AM API
  - Trust at least two GENI clearinghouses
  - Export status information to GMOC
  - Operations support to GMOC as it relates to MAX GENI aggregate

Status:
The MAX GENI Aggregate has now transitioned to operational aggregate status. This includes the following capabilities and features:

- Compliant with the latest GENI AM API
- Federated with Princeton PlanetLab and ProtoGENI allowing for User and Slice Credential Exchange
- Exports Status to GMOC via the MyPLC based Plastic Slices monitoring capability
  a. Plastic Slices Monitoring information is available here: http://groups.geni.net/geni/wiki/PlasticSlices/MonitoringRecommendations/MyplcConfiguration
  b. MAX site is selectable here: https://gmoc-db.grnoc.iu.edu/api-demo
- Prepared to support GMOC as required for MAX GENI operations

A high level diagram of the MAX Aggregate Manager architecture is show below.



MAX.S3.e: Demonstration and Outreach at GEC11 (complete)

- Demonstrate updated MAX Aggregate Manager design, functions, and user interface. This should include demonstration of an operational workflow showing how a GENI researcher goes from initial request, to experiment topology instantiation, to operational support functions, to experiment termination.
- Demonstrate trust of all four GENI clearinghouses
- Organize workshop on network stitching (if the community feels a need for such a workshop). This workshop would be similar in focus and objectives to the GEC10 workshop.

Status:
We completed the first and second items of this milestone via our poster at the GEC11 Poster and Networking Session (there was no Demonstration Session at this GEC). We also demonstrated the MAX Aggregate Manager (AM) as part of a demonstration during the Network Stitching Session. This poster and demonstration showed how the MAX AM supports the standard GENI AM API and is federated with PlanetLab Central and ProtoGENI. OMNI Client requests were used to submit requests to the MAX AM Manager as part of a three aggregate slice instantiation operation including the MAX, Internet2 ION, and ProtoGENI Aggregate. The Internet2 ION AM was a second instantiation of the MAX AM software which was responsible for provision of dynamic VLAN circuits on Internet2 ION. Details on this demo and the associated MAX AM Functionality are available here:

- http://geni.maxgigapop.net/twiki/bin/view/GENI/Publications ===> GEC11

This includes slides, the Demonstration Poster, Slice RSpecs, and description of using OMNI client to instantiate a slice which includes resources on three aggregates - MAX, ProtoGENI, and Internet2 ION.

For the third item we organized a GENI Stitching Workshop which was held at GEC11. This included many pre-GEC11 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/NetworkStitchingOverview

- GEC11 Stitching Workshop:
  http://groups.geni.net/geni/wiki/GEC11Stitching

MAX.S3.f: Updated white paper on network stitching in GENI (complete)

- Provide an updated white paper on network stitching
- Document via web pages the various options and techniques for network stitching

- Participate in review discussion of this information via telecon.
- Provide assistance to others who are interested in applying or using network stitching as part of their activities.

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

- GENI Stitching Description and Examples
  - https://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitchingOverview
- 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.

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

B. Deliverables made
During this reporting period we completed our deliverables for the GENI Network Stitching paper development, Stitching Workshop, and GEC11 Demonstration an Outreach. These are documented at the following web sites:

- Network Stitching Information:
  - http://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitchingOverview
  - http://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitchingRpecsandWorkFlow

    - http://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitchingWorkFlowExamples

- Network Stitching Documents:
  http://geni.maxgigapop.net/twiki/bin/view/GENI/NetworkStitching
    - GENI Network Stitching Architecture - Overview
    - GENI Network Stitching Architecture - Example
    - GENI Network Stitching Component Design - Example
    - GENI Network Stitching AM Extension Design Proposal
    - GENI Network Stitching Schema Example
    - GENI Network Stitching RSPEC Instance Example

- Network Stitching Workshop:
  http://groups.geni.net/geni/wiki/GEC11Stitching

- GEC11 Demonstration and Outreach:
  http://geni.maxgigapop.net/twiki/bin/view/GENI/Publications ===> GEC11

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/NetworkStitchingOverview

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

As part of the activities and milestones described here, we have had extensive collaborations with many in the GENI community. This includes ProtoGENI, PlanetLab, and GPO developers. A large focus of our milestones during this reporting period revolved around network stitching architecture, design, and software development. These activities required collaborations with other GENI aggregate manager developers.

F. Other Contributions

none.