GENI: Slivers and Slices in a Diverse, Outdoor, Mobile Network Environment (DOME) Testbed

Quarterly Status Report, Q4 September 2009

Project Number 1599
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Major Accomplishments

The major accomplishments for July 2009 through September 2009 are summarized below.

- DOME Version 1 has been completed; it's available for external access.
- The software has been deployed on the buses.
- The DOME web site is up.
    - The management functions are fully operational.
    - Documentation has been written and made available on the site.
    - Software and examples has been posted.
- Completed our Year 1 milestones.
- Demonstrated DOME's capabilities and ORCA integration at GEC5.
- Agreed to an MOU with UMass IT regarding Internet2 and VLANs; ports were installed in the CS building.

Milestones Achieved, Deliverables Made

DOME completed its year-end milestones. These have been summarized in a separate document submitted to the GPO on September 25, 2009.

The DOME web site is available:

http://geni.cs.umass.edu/dome/

The DOME manual is located at:

http://geni.cs.umass.edu/dome/docs/DOME-Manual.pdf

Further documentation is available at:

http://geni.cs.umass.edu/dome/docs.php

The software is available at:

http://geni.cs.umass.edu/dome/software.php

Description of Work Performed During Last Quarter, Activities and Findings

The primary effort of the project was to complete the DOME Year 1 deliverables and deploy the new DOME GENI on the buses. The objectives were met. A summary of DOME's Q4 activities follows.

- The DOME software was completed. This includes:
  - Final testing of the ability to run user-defined experiments in a virtual environment on the bricks (computers on the buses).
  - The completion of the DOME portal. The portal allows users to upload files (VM partitions), create experiments, schedule experiments and perform maintenance tasks.
  - Field verification of the disruption tolerant interface between the buses and the portal for downloading experiments and communicating leases.
  - The addition of a logging facility with persistent storage and an export facility, integrated with the portal.
  - A workaround to allow the canceling of leases was implemented in the DieselNet Controller, and an interface was provided via the DOME portal.
- The DOME GENI software was distributed to all buses in August. This involved re-imaging and re-installing the hard drives on all bricks.
- DOME completed its integration with ORCA. The ability to distribute actors between UMass and RENCI was verified.
- We have announced the availability of DOME to external GENI researchers.
- We implemented DOLPHIN, a lightweight scheduler that allows us to temporarily take ORCA offline to perform maintenance and install ORCA updates without disrupting DOME on the buses.
- Documentation and software was posted to the portal.
  - Various utilities to reduce the size of partitions, test the launching of experiments, generate log files, etc. were made available.
  - Examples of experiments, methods to access devices, etc. were posted on the portal.
  - Documentation was written and placed to the portal. This included documentation so that users can have their own development bricks.
- DOME's virtualization capabilities were demonstrated at GEC5. We showed the ability to schedule and launch experiments on a DOME brick. This was done using ORCA as the framework.
- An MOU was agreed upon with the UMass Office of Information Technology (OIT) regarding connecting Internet2 to the DOME and ViSE servers, along with VLAN access.
  - Subsequent to the Milestone Document delivered to the GPO on September 25, OIT installed Inernet2 ports in the CS building.

- A revised Statement of Work was agreed upon between the GPO and the DOME project for Year 2.
- A document was written and distributed to the cluster regarding DOME's perspective on federated testbeds.

Project Participants

The project participants are Brian Levine (PI), Mark Corner (PI) and Brian Lynn (engineer).

Outreach Activities

We have hired an undergraduate as part of the GENI REU program. The student will initially focus on developing DOME-based experiments.

We continue to use DOME to offer Internet access on the UMass buses, and our data shows increased usage of the service. We have developed, in partnership with the UMass Pioneer Valley Transit Authority (UMass PVTA), a prototype of a service to provide bus riders, via their cell phones, information on when buses will be arriving at a stop.

Collaborations

As always, we work very closely with the GENI ViSE project. We are using a single instance of ORCA for the two projects.

We are working with ViSE and UMass OIT to get an Internet2 connection with VLAN support for use with our GENI testbeds. The DOME and ViSE projects have aligned their Year 2 Internet2-related milestones.

There continues to be a lot of good interaction among the Cluster D participants. We have recently distributed comments on substrate federation to the participants.

We continue to work closely with the UMass PVTA, planning joint projects and working to ensure symbiotic collaboration.

We also continue to work with UMass OIT and the Town of Amherst in order to have access to the campus and town WiFi networks. We recently discussed GENI-related access of the UMass mesh with OIT.

We have done some experimentation of running the University of Washington's seattle (a.k.a. million node GENI) on the buses. Our contact is Justin Cappos.

Diagram of a DOME Brick