ViSE Project Status Report
November 5, 2010 – March 17, 2011

Prashant Shenoy, Michael Zink, Jim Kurose, Deepak Ganesan, and David Irwin
{shenoy,zink,kurose,dganesan,irwin}@cs.umass.edu

University of Massachusetts, Amherst
140 Governors Drive
Amherst, MA 01003-9264

I. Major accomplishments

The previous quarter of the ViSE project includes the following major accomplishments:

- We released software for our GENI Alpha demonstration as publicly available Amazon Virtual Machine Images (AMIs) that are stored in S3. Within each image there are instructions on how to execute the demonstration code. Additionally, the DiCloud code used as part of the radar demonstration is available on the DiCloud website. The AMIs for the two images are amibad621d3 and ami-a4d720cd. The former image includes the code that processes Nowcast forecasts, and the latter image includes the machine that feeds data into the system.
- Our joint demonstration with DiCloud showcases the use of these pre-packed AMIs with OpenVPN and integration with Eucalyptus clusters. These were key elements, along with OpenVPN support and RENCI's Eucalyptus release, of our demonstration.

II. Milestones Achieved

We achieved the demonstration and code release milestones associated with each GEC. We satisfied our GEC10 demo milestone early, by including the functionality as part of our GENI Alpha demonstration.

- **November 5, 2010 (deadline S3.a):** The following is our abstract for our GENI Alpha demonstration: *The foundation of better weather forecasting is better data. Scientists in CASA, an NSF Engineering Research Center, are studying experimental radar systems that comprise dense networks of small, controllable radars. These networks supplement and enhance NEXRAD by accurately sensing conditions close to ground where inclement weather often occurs. As a driving example, we show data from CASA's off-the-grid student testbed in Mayaguez, Puerto Rico. Last July, the testbed successfully detected the severe windstorms that delayed the Central American Games earlier than otherwise possible, which also enabled earlier warnings. As a result of their accuracy, these systems produce vast amounts of streaming data from a multitude of geographically disparate sites. To be useful at scale, especially in time-critical situations, this data must quickly flow to processing centers that merge it to execute complex forecasting algorithms that predict the movements of weather patterns in real-time. Since inclement weather is rare, maintaining dedicated network/computing resources is a significant barrier to deployment at scale. This demonstration highlights an array of GENI technologies to remove this barrier, by experimenting with the execution of radar*

workflows and forecasting algorithms, developed by CASA scientists, on GENI and cloud networks that also include computing and sensing resources reserved on-demand.

- **November 18, 2011 (deadline S3.b):** We released code for our demonstration as publicly available Amazon Virtual Machine Images, as discussed above. Users are able to start these images as live VMs on Amazon's infrastructure.
- **March 5, 2011 (deadline S3.c):** Our GENI Alpha demonstration satisfied the proposed demonstration, which focused on using a set of pre-packaged Amazon Images with OpenVPN and integration with Eucalyptus clusters. In effect, we did this demonstration early as part of the GENI Alpha effort.

III. Milestones in Progress

- Code release (deadline S3.d) including new Amazon AMIs for GENI experimenters.

IV. Deliverables Made

Deliverable S3.a, S3.b, and S3.c have all been made available on time or early through the ViSE wiki.

The software releases include code for our demonstrations packaged as AMIs.

V. Description of Work Performed During Last Quarter

V.A. Activities and Findings

Our primary activities centered around hardware maintenance of our testbed hardware and release of our demonstration APIs. Since our radar nodes are field-deployed they require routine maintenance to ensure that they are operational. We also upgraded our control framework to keep pace with the latest Orca releases, as well as maintained our experimental NEucalyptus cluster. Finally, Mike Zink participated in software track demonstrations at the latest GEC and co chaired a doctoral consortium.

V.B. Project Participants

The primary PI is Prashant Shenoy. Co-PIs are Michael Zink, Jim Kurose, and Deepak Ganesan. Research Staff is David Irwin.

V.C. Publications (individual and organizational)

No publications this quarter

V.D. Outreach Activities

Michael Zink co-chaired the first DFG/GENI Doctoral Consortium at GEC 10.

V.E. Collaborations

We collaborated with other Cluster D projects during the quarter. First, we provided feedback and participated to discussions on the mailing. Second, we worked with the CASA and DiCloud projects to prepare the GEC9 and GEC10 demo.