Technical Status Report for Million Node GENI project (proposal 1645, NSF Grant CNS-0834243), for October through December 2008

PI: Professor Thomas Anderson
Key Personnel: Justin Cappos

Major accomplishments

Milestones achieved

1a) Design document for end-host VM API (3mo)
   Sent to Dr. Vicraj Thomas on 11 Dec, 2008

1b) Design document for end-host VM techniques (3mo)
   Sent to Dr. Vicraj Thomas on 11 Dec, 2008

Deliverables made

Not applicable for this time period.

Description of work performed during last quarter

Activities and findings

We examined system call interposition, OSVMs and programming language VMs to find the right balance of security, portability, and performance for our environment. We discovered that none of the existing techniques provide the right balance of factors and determined that building a lightweight programming language VM with a narrow API was the ideal solution. We have had success prototyping such a system to indicate that this technique is feasible to implement and support.   Our preliminary experience with the prototype has indicated a lightweight programming language VM with a narrow API is well suited to a highly secure and portable environment with acceptable performance.   Our experience has also indicated it will be tractible to develop this prototype into a secure and robust execution environment.

Project participants

Tom Anderson (PI)
Arvind Krishnamurthy (Senior Personnel)
Justin Cappos (Post Doc)
Ivan Beschastnikh (Ph. D. student)
Andreas Sekine (Undergraduate)
Armon Dadger (Undergraduate)

Brent Couvrette (Undergraduate)
Carter Butaud (Undergraduate)
Cosmin Barsan (Undergraduate)
Kyungil Kim (Undergraduate)
Peter Lipay (Undergraduate)
Sean Ren (Undergraduate)
Michael Moshofsky (Undergraduate)
Jeff Flatten (Undergraduate)
Alper Sarikaya (Undergraduate)
Yih Sun Khoo (Undergraduate)

Publications (individual and organizational)

J. Cappos, I. Beschastnikh, A. Krishnamurthy, T. Anderson. "Seattle: The Internet as a Testbed." To appear in *The 40th Technical Symposium of the ACM Special Interest Group for Computer Science Education (SIGCSE '09)*, Chattanooga, TN USA, March 2009

Outreach activities

Justin Cappos gave a presentation on the use of the Million-node GENI system for educational purposes at the fall 2008 meeting of the *Pacific Northwest - American Society of Engineering Education* and *Washington Council for Engineering and Related Technical Education* (PN-ASEE/WCERTE).   The focus was how to allow researchers at community colleges to improve their networking classes by using our platform as a vehicle for students experimentation with the Internet.

Collaborations

We are exploring the possibility of collaboration with the MobileASL project (http://mobileasl.cs.washington.edu/).   The fundamental idea is that we would port our platform to their mobile architecture and provide them with services such as locality and NAT traversal to simplify much of their programming.   In exchange, they would allow researchers to run code using a small percentage of the resources available on the mobile phones.   This will provide us with practical experience supporting real users and will provide researchers using our platform a test environment that is very different from existing systems.

Other Contributions

None.