Williams College and UC San Diego

PI: Jeannie Albrecht (Williams) and Amin Vahdat (UCSD)

Staff: Brian Kantor (UCSD)

Students:

Williams - Danny Huang, Kelsey Levine, Kaylee Weyerhaeuser

UCSD – Ryan Braud

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Project Summary

- The goal of the Gush project is to build a robust and flexible experiment control and management framework

- The framework should ultimately support a range of users (including both novice undergrads and experienced researchers)

- We support three user interfaces
  - Terminal/command line interface
  - Programmatic interface (currently using XML-RPC)
  - Graphical user interface (GUI, called Nebula)

- We initially focused on making the command line interface stable with additional features for simplifying debugging tasks

- We have released the GUI but are still making substantial changes to it to improve its functionality and usability

- We currently provide complete support for running experiments on the PlanetLab control framework using the SFA API

- We also have support for most functions on ProtoGENI

- We plan to support ORCA in the near future (still a work in progress)

- Undergrads at Williams use Gush/Nebula for running code on PlanetLab

Milestone & QSR Status

ID	Milestone	Status	On Time?	On Wiki?	GPO signoff?
S2.a	Gush prototype v0.2 release. Implementation must use PlanetLab GENIWrapper.	Completed. We completed the initial integration with GENIWrapper (now called SFA) last October. As the SFA has changed, we have upgraded Gush to provide continued support.	On Time	Yes	Yes
S2.b	Course development.	Completed. Course materials are available from course webpage or by request. (Also available from SE).	On Time	Yes	Yes
S2.c	Integration with Raven.	Completed. All of the new Gush code has been committed to the svn repository and there is a new example on the Wiki page that explains how to use Stork/ Raven to install software in Gush.	On Time	Yes	Yes
S2.d	GUI 0.1.	Complete. Nebula (Gush GUI) available from Gush svn repo.	On Time	Yes	Yes
S2.e	Support 2 control frameworks.	Mostly complete (due 7/30). Now support PlanetLab and ProtoGENI. Need to commit latest code. Wiki has already been updated with documentation.	Due on 7/30	NA	NA
S2.f	Spiral 2 ID management.	Not complete.	Due 8/31	NA	NA
S2.g	Gush prototype v0.3 release.	Mostly complete. Will be complete as soon as we commit latest ProtoGENI code.	Due 8/31	NA	NA

Milestone & QSR Status

ID	Milestone	Status	On Time?	On Wiki?	GPO signoff?
	QSR: 4Q2009	Complete.	On Time	Yes	Yes
	QSR: 1Q2010	Complete.	On Time	Yes	Yes
	QSR: 2Q2010	Complete.	On Time	Yes	Yes

- Continuous Experimentation – Gush provides a framework for deploying and managing experiments on GENI control frameworks. We have provided support for several new users to help them get Gush up and running. Gush supports both short-lived and long-running experiments.

- Integration – Gush has been integrated with several aggregates within our cluster (PlanetLab, GpENI, MAX). We have also integrated with non-aggregate tools including Raven and NetKarma.

- Instrumentation and Measurement – Although Gush does not provide instrumentation and measurement directly, Gush will provide an interface for connecting experiments to instrumentation and measurement services once these tools are widely deployed.

- Interoperability - We have added experiment management support for ProtoGENI, and are working on support for ORCA. On a related note, Danny Huang (Williams undergrad) is current working with Justin Cappos this summer on the MillionNodeGeni/Seattle project at UW. We hope this will facilitate future collaboration/integration between Gush and MNG.

- Educational benefits – Gush and Nebula were used extensively during the fall semester at Williams College. The PI taught an undergraduate course on Distributed Systems. The students in the class used Gush and Nebula to run and evaluate their final projects on PlanetLab. The entire class was able to get Gush/Nebula up and running within 50 minutes.

- Undergraduate researchers – The majority of the development thus far has been accomplished by undergraduates—including two women—at Williams College (with help from the PI).

- GEC9 demo planning – The PI has been in contact with Mark Berman and Niky Riga regarding the preparation of an education-centric demo at GEC9. The PI has helped create a sample class project that will be used to demonstrate how to involve students in GENI experimentation.

- Experiment Workflow and Services WG – The PI is currently serving as the working group co-chair. A Gush representative has presented something at almost every WG meeting to date.

- TridentCom – The PI and an undergrad from Williams traveled to Berlin in May to present a paper at the TridentCom conference. The paper focused on how Gush is being extended to support three control frameworks (PL, ProtoGENI, and ORCA).

Issues

- We are concerned about the identity management milestone. At this point, we do not know anything about any identity management projects, and we do not anticipate being able to complete this milestone by Aug 31.

- In general, we have found it a bit frustrating to continue to have to modify our code as the APIs change in the control frameworks. While we understand that this is largely unavoidable, it is especially frustrating that the major changes often happen a week or two before GECs (often without much warning). This makes it difficult to fully test our demos in advance. As we continue to integrate with more control frameworks moving forward, we foresee this becoming more of a problem. We also recognize, however, that there is little that can be done to avoid this problem given the scope of the Gush project.

- On a completely personal note, one PI will be on maternity leave in the fall semester (and the other PI is on leave at Google for the year). Thus we do not expect to be able to make much significant progress on Gush in the next 3-4 months. However, we are tentatively planning to have at least one Gush representative at GEC9 to assist with the "alpha" demo.

- What are you plans for the remainder of Spiral 2?
  - We plan to continue updating the Gush code to work with the latest version of the SFA. This is an ongoing process, but we plan to make sure Gush is compatible with the latest working version of the SFA before releasing Gush v0.3 in August.
  - We also plan to make improvements to Nebula. There is an undergrad at Williams currently working on enhancements as part of her summer research project.
  - We need to test our integration with Emulab/ProtoGENI again to make sure there have not been any changes that cause Gush to not work with their API.

- The GPO is starting to formulate goals for Spiral 3. What are your thoughts regarding potential Spiral 3 work?
  - More integration! We plan to finish our integration with ORCA in Spiral 3.
  - More users! One way to "force" people to experiment with GENI is to incorporate GENI experiments into classroom assignments. We have already had some success with this at Williams (using only the PlanetLab control framework).