

GENI Experimentation and Education An Update

GENI Engineering Conference 21

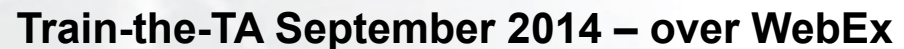
Vicraj Thomas
22 October 2014
GENI Project Office





- Organizers: Brecht, Kaiqi
- 10 US and 15 EU Participants
- 1 team continuing to collaborate
- 1 poster at the demo session

- 25 participants
- 5 projects (SDN, Wireless, Streaming)



- over 25 participants from 17 institutions

Upcoming Events

The 22nd IEEE International Conference on Network Protocols



October 21-24, 2014

The Research Triangle, North Carolina



October 24th 2014

- 6 long papers, 4 short
- Live demos for most papers



Introduction to GENI Workshop
November 6 – 7

organized by
Wole Akpose & Jeannie Albrecht



GENI Winter Camp
January 2015



SIGCSE 2015
March 4 – 7
GENI Pre-symposium
event on education
Organized by
Jay Aikat

Growing use of GENI in the Classroom!

Over 50 classes have used GENI

- Undergrad level
- Graduate level
- Used Internationally

Ready-to-use tutorials assignments

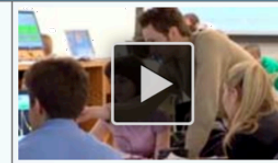
- Teach how to use GENI
- Teach networking concepts
- Teach distributed computing concepts
- Teach programmable networks
- **13 new course modules!**




*Jeannie Albrecht (Williams College) with
students from her Spring 2012
Distributed Systems class*

GENI Based MOOC

The Future of Online Education
now with hands-on lab experiments



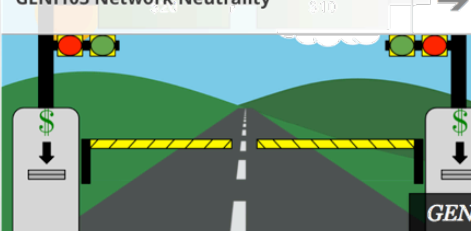
NEW
GENI102 Internet Security and
Cryptography →



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GENI

NEW
GENI103 Network Neutrality →



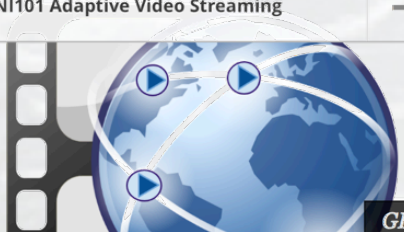
GENI

NEW
GENI104 Bitcoin & Consensus in
Distributed Systems →



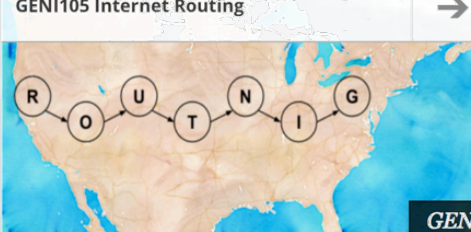
GENI

NEW
GENI101 Adaptive Video Streaming →



GENI

NEW
GENI105 Internet Routing →

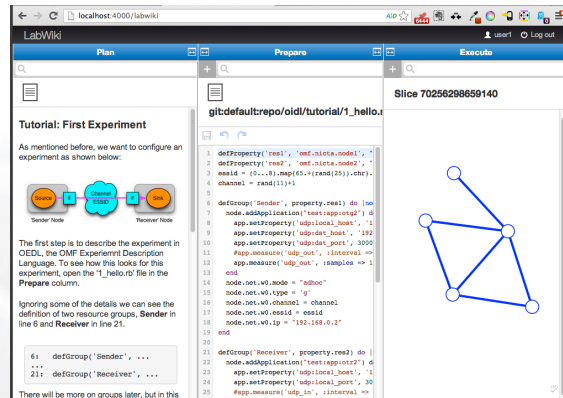


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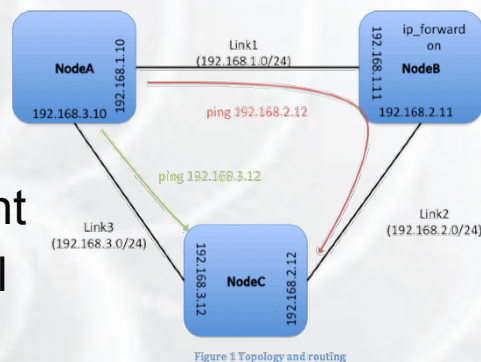
Course on routing opens next week!

Virtual Computer Networks Lab

- Use LabWiki to plan, execute, and document assignments



- IP Routing
 - Static routing assignment
 - Entry-level

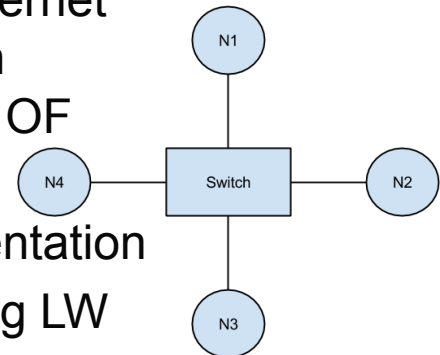


Additional info: <http://groups.geni.net/geni/wiki/sol4/upcomingCourseModules>

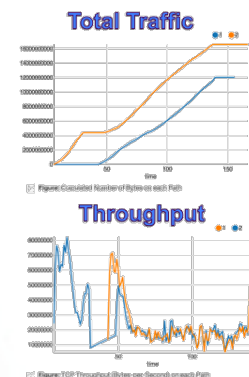
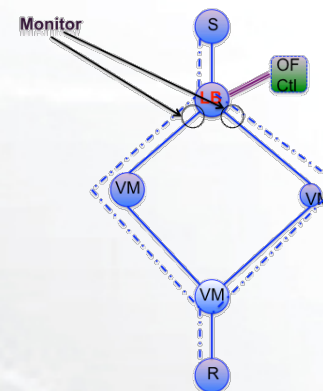
Demo tonight !!

- Learning Switch (advanced)

- Implement Ethernet learning switch functionality in OF controller.
- Verify implementation
- Report resulting LW graphs



- Load balancers for adaptive video and data centers (complex)



Networking Class Modules

Education Modules



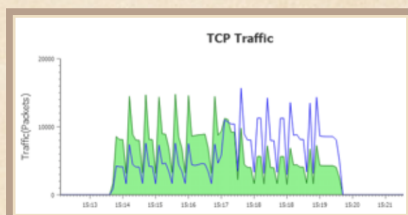
GENI Setup Introduces the basics of GENI Portal, and Flack by walking through the process of creating a slice, designing a network, and adding resources to a slice.



Instrumentation Introduces the basics of GENI Desktop, walking through the process of instrumentizing a slice and opening graphs and SSH sessions for the nodes.



Web Server A hands-on experience installing and interacting with a web server. First, install and start a web server. Then, generate a simple HTML file and retrieve it on a client node.



TCP Traffic Generate and analyze TCP flows. Iperf is used to create a flow and view the sawtooth behavior. Then, a second flow is introduced to show how TCP flows share a link.



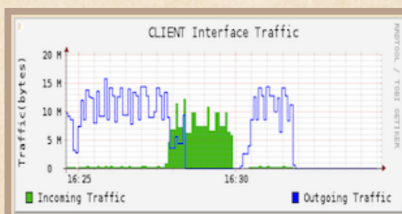
Effect of RTT and Window Size on TCP Throughput Experiment with how RTT and TCP window size affect TCP throughput. Learn how to adjust the RTT of a TCP connection by adding delay, as well as how to adjust the window size of an iperf TCP flow.



Traffic Analysis Introduces key tools for network traffic analysis, featuring ping and tcpdump.



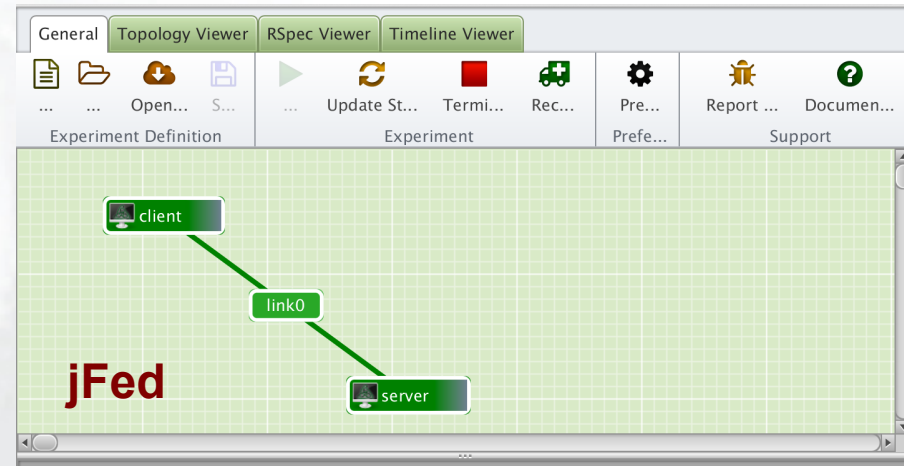
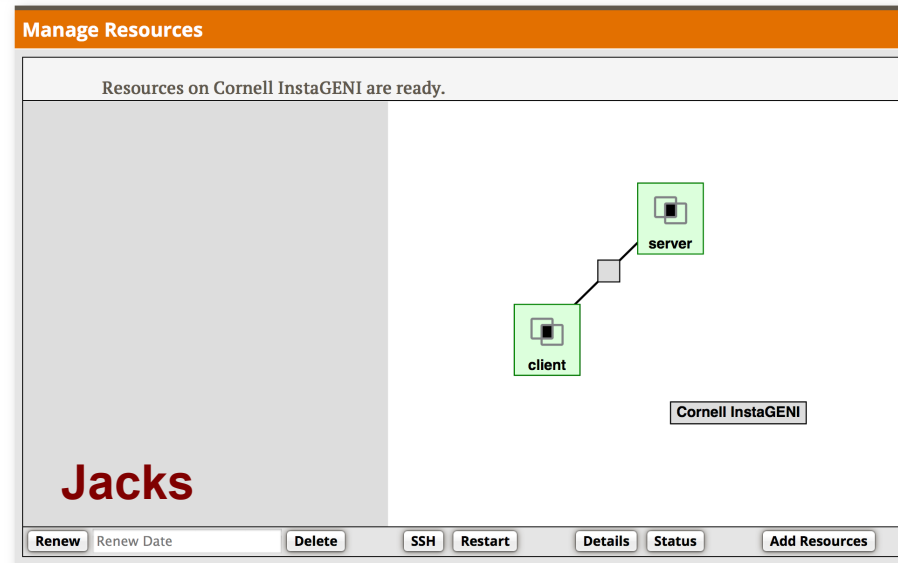
OSPF Use Traceroute to understand how OSPF



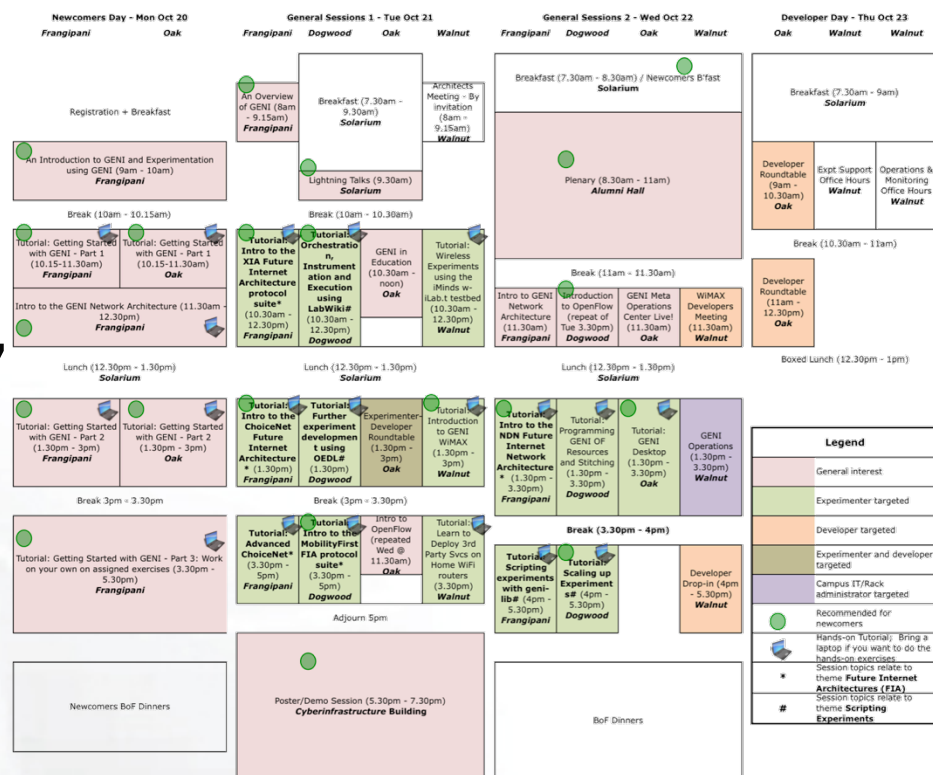
TCP vs. UDP Demonstrates differences in how TCP

New Experimenter Tools

- Jacks (beta) and jFed now available in the Portal!
 - Used in the Getting Started Tutorials
- Flack is no longer supported



- 17 hands-on tutorials + 2 tutorial presentations
 - Most ever for a GEC
- Tutorials themes:
 - FIA: ChoiceNet, MobilityFirst, NDN, XIA
 - Scaling up experiments: LabWiki, OEDL, geni-lib, Scaling up Experiments
 - Wireless: iMinds w-iLab, Services on WiFi Routers, GENI WiMAX



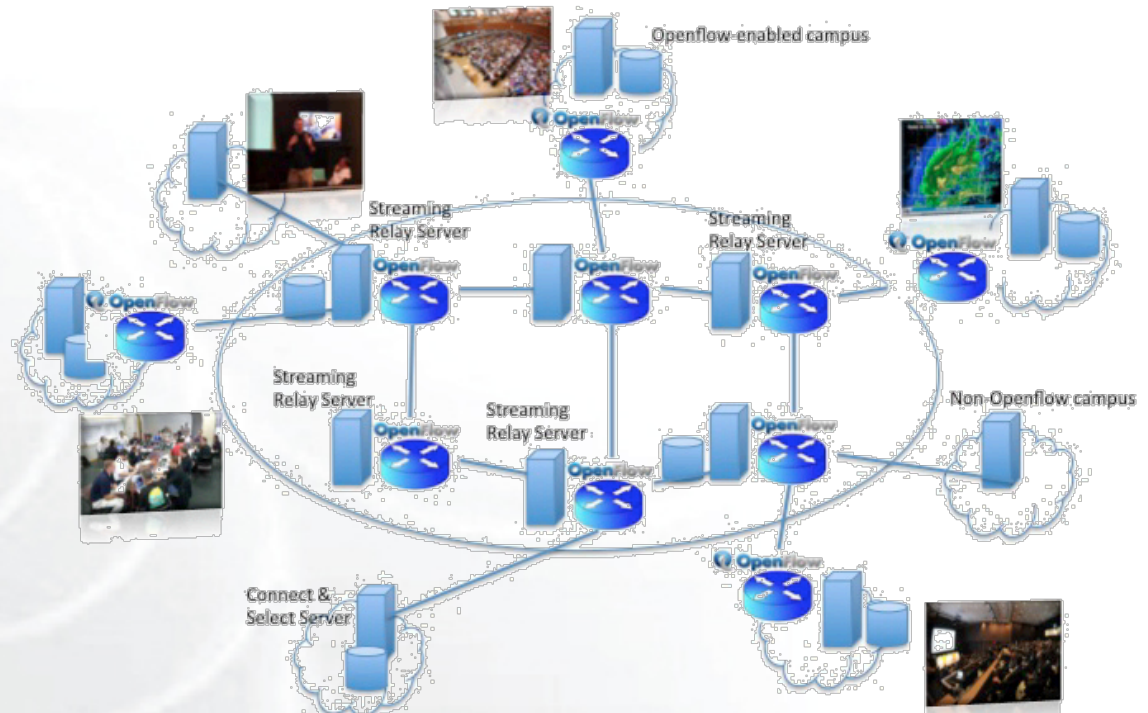
Shakedown Experiment: GENI Cinema

Parmesh Ramanathan
U. Wisconsin

Persistent live video streaming service over GENI
Opt-in users can view and source live streams



KC Wang
U. Clemson



GEC21 Live Stream: <http://tinyurl.com/gec21-stream>

THANK YOU!