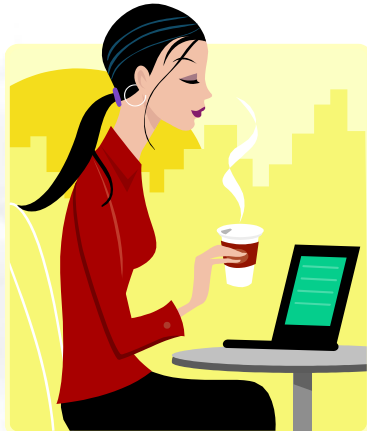# Run a Complete Experiment

Niky Riga, Jeanne Ohren

GENI Project Office

24 October 2012

How can GENI **help** an Experimenter
Run a Complete Experiment
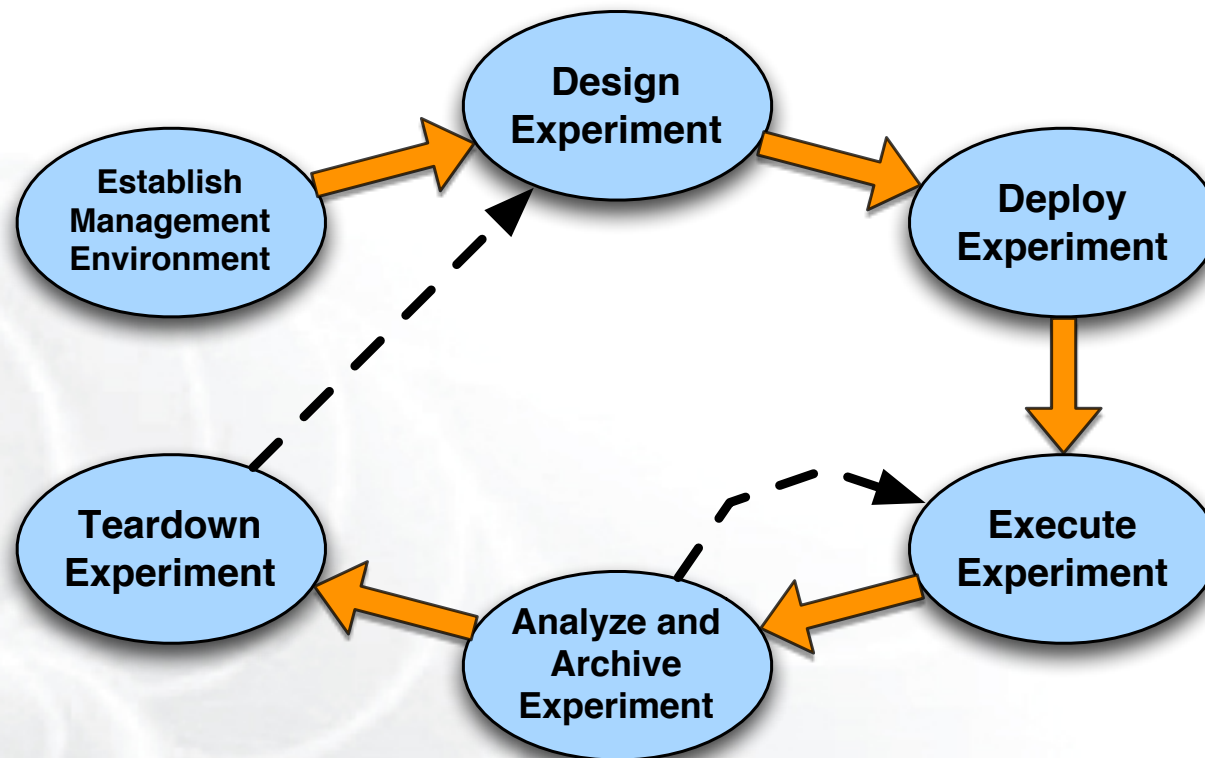
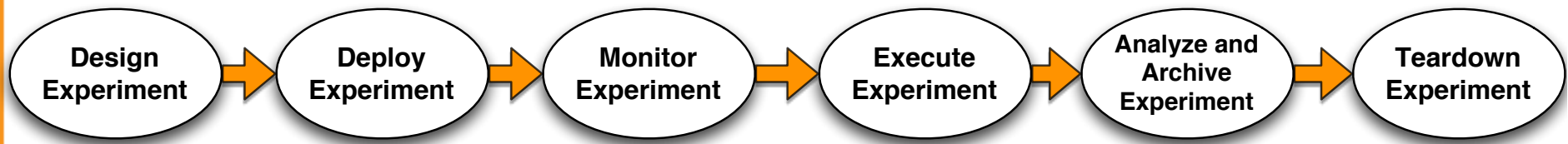All the key pieces for running a complete experiment are in place.

An Experimenter
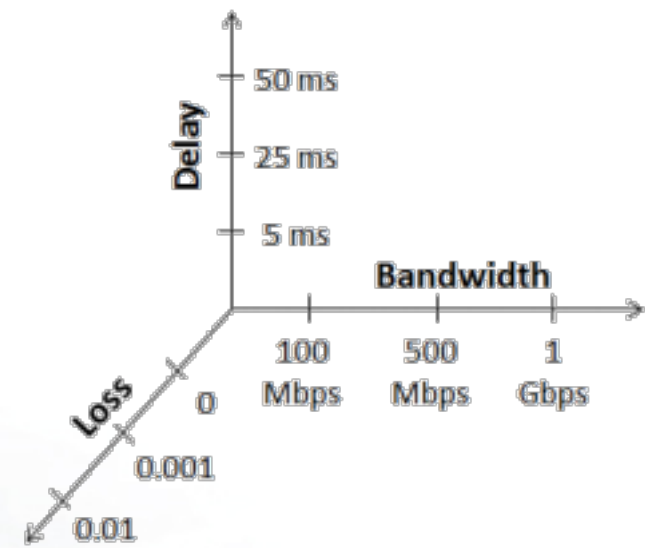
GENI Experimenters, start using them!

Experiment Lifecycle and GENI

Design Experiment → **Deploy Experiment** → **Monitor Experiment** → **Execute Experiment** → **Analyze and Archive Experiment** → **Teardown Experiment**

Explore the effect of **network delay** in the performance of UDP (**UDT**[1]) and TCP (**FTP)** based file transfers.

Test your ideas in GENI!

[1] *UDT: UDP-based Data Transfer for High-Speed Wide Area Networks,*
Yunhong Gu and Robert L. Grossman, Computer Networks (Elsevier). Volume 51, Issue 7. May 2007.

Execute experiment

Starting from the middle since this step will take time!

Omni

- Used Omni scripting to orchestrate the experiment

- Other tools : Gush, OMF/OML

Let's do this live!

Design experiment

Simple experiment:

– a server

– a client

– a link with tunable parameters

– monitor performance

> Resources at ProtoGENI Utah
> GEMINI monitoring software

help@geni.net

server

client

excl. raw-pc
server

excl. raw-pc
monitor

lan0

excl. delay
delay

lan1

excl. raw-pc
clien

<Rspec>

GEC15: October 24, 2012

Let's do this live!

```
geni@geni-VirtualBox: ~/Tutorials/GEMINI/common
geni@geni-VirtualBox:~/Tutorials/GEMINI/common$ ./instrumentize.py -f ~/.ssl/gen
i_cert.pem  -n race2
Got my SA credential

This Slice spans these CMs ['urn:publicid:IDN+emulab.net+authority+cm']

Asking for slice credential for race2

Got the slice credential

Found user record at the SA
Your user account details obtained are:
Username                : inki
UserURN          : urn:publicid:IDN+pgeni.gpolab.bbn.com+user+inki
Email ID               : nriga@bbn.com
Certificate Issuer      : bbn-pgeni

Talking to CM HRN = utahemulab.cm

Checking if Nodes at AM --> https://www.emulab.net:12369/protogeni/xmlrpc
1. Check if Global Node Present
2. Find Nodes to be monitored by GEMINI
3. OS Compatibility of selected Nodes
```

UK UNIVERSITY OF KENTUCKY Instrumentation Tools

race (Live View)

Home › ProtoGeni › PC1 (PC296) › Node Graphs for PC296

inki
- My account
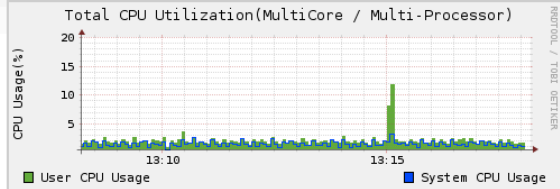- ▽ ProtoGeni
  - ○ ProtoGeni
  - ○ Archive
  - ○ Config
  - ▽ PC1 (PC296)
    - ○ PC1 (PC296)
    - ▽ Graph
      - ○ Graph
      - ▷ Lan0
      - ▷ Node
  - ▷ Table
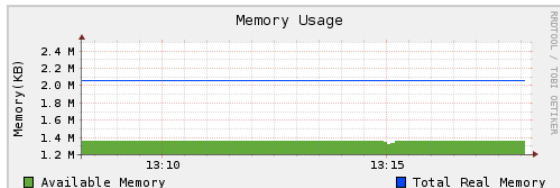 - ○ VNC
- ▷ PC2 (PC302)
- ○ S3

Node Graphs for PC296

Total CPU Utilization(MultiCore / Multi-Processor)
- User CPU Usage
- System CPU Usage

Memory Usage
- Available Memory
- Total Real Memory

Let's do this live!

Starting from the middle since this step will take time!

Omni

```
$ omni.py createsliver aliceslice myRSpec.xml
INFO:omni:Loading config file omni_config
INFO:omni:Using control framework pgeni
INFO:omni:Slice urn:publicid:IDN+pgeni.gpolab.
          expires within 1 day on 2011-07-07
INFO:omni:Creating sliver(s) from rspec file
INFO:omni:Writing result of createsliver for
INFO:omni:Writing to `aliceslice-manifest-rspe
INFO:omni: ---------------------------------
INFO:omni: Completed createsliver:

  Options as run:
              aggregate: https://www.emulab.
              framework: pgeni
              native: True

  Args: createsliver aliceslice myRSpec.xml

  Result Summary: Slice urn:publicid:IDN+pgeni
Reserved resources on https://www.emulab.net/p
  Saved createsliver results to aliceslice-man
INFO:omni: ---------------------------------
```
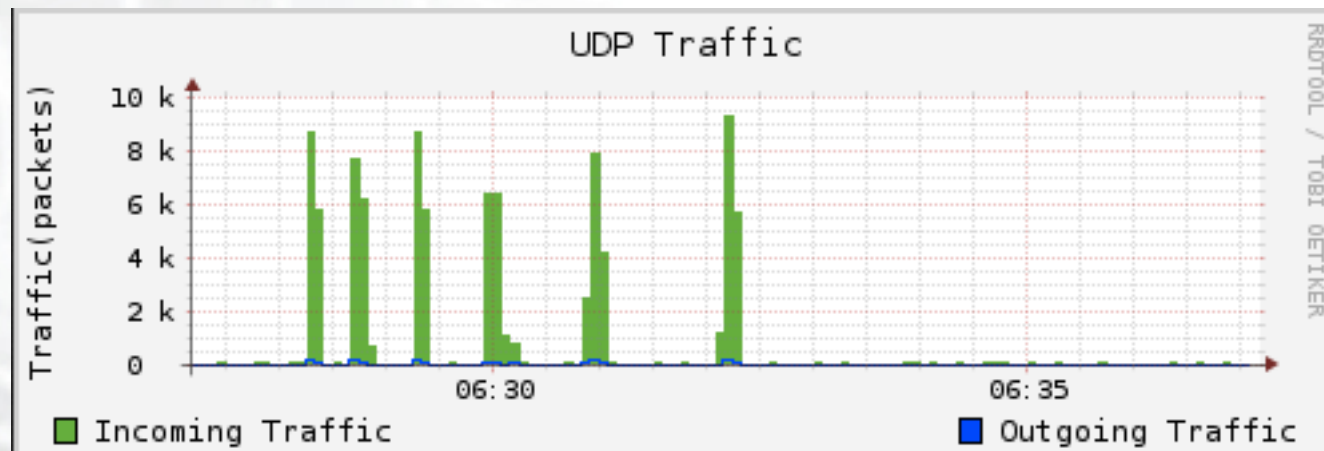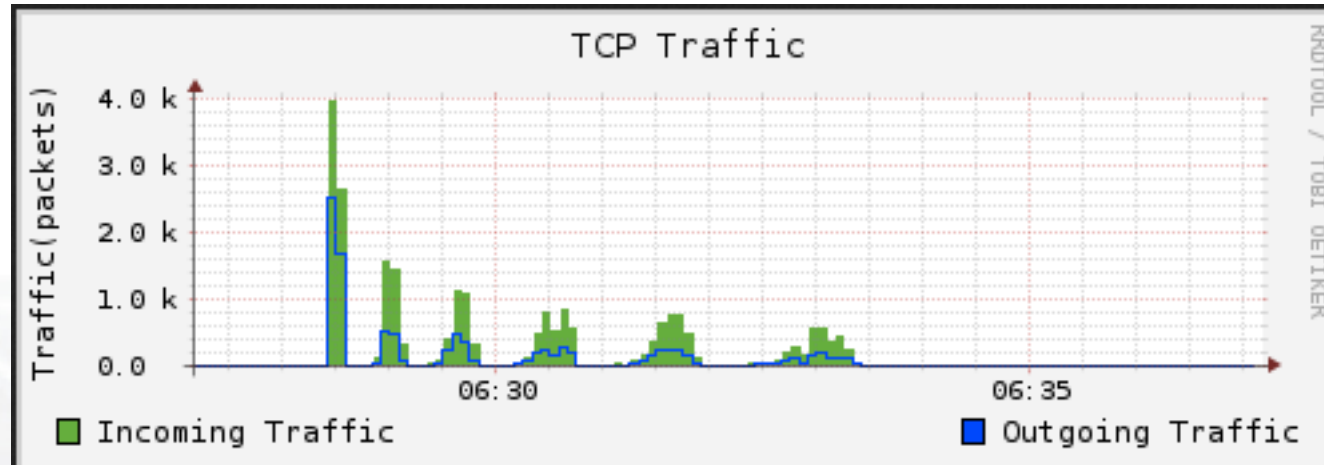
- Used Omni scripting to orchestrate the experiment

- Other tools : Gush, OMF/OML

Let's do this live!

DONE

TCP Traffic

UDP Traffic

Let's watch this live!

Archive Points

If you are creating an archive, check the MC's you want to be archived.

☑ GN - pc297.emulab.net

Press the button for the type of archive you want to create or view.
A new window will be opened to show the results.

Local Archive on the MC controller.
[Archive Locally]   [View Local Archive]

Archive to GMOC. Note that this GMOC archive will be public.
[GMOC Start]   [View GMOC]
[GMOC Stop]
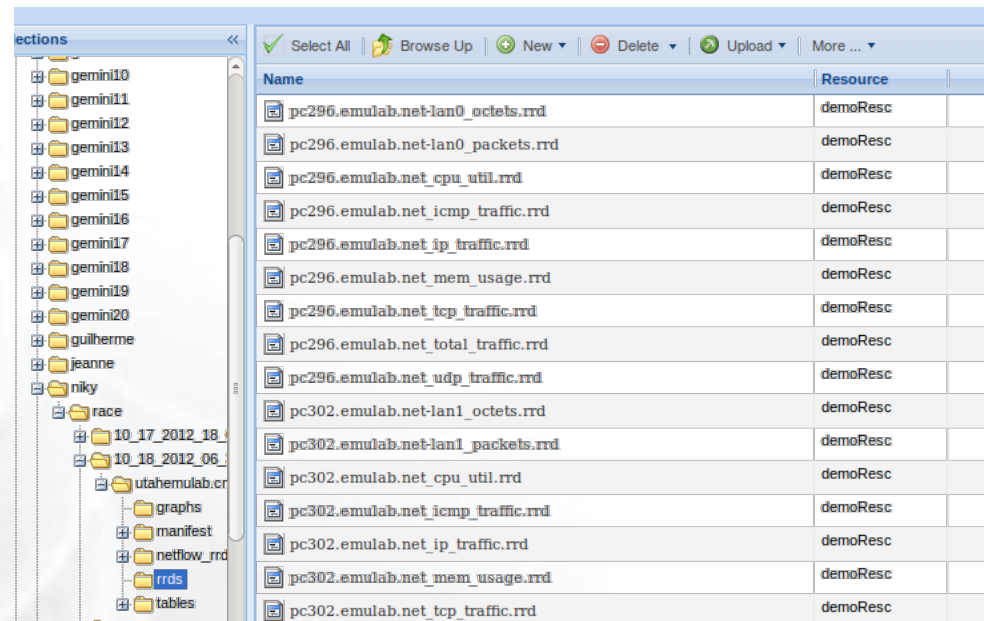
Archive to CNRI.
[Archive To CNRI]   [View CNRI Archive]
Archiving to CNRI requires username and password.
User: [_____] Password:
[_____]

Archive to IRODS.
[Archive To IRODS]   [View IRODS Archive]
Archiving to IRODS requires username and password.
User: [niky]   Password:
[••••••••]

Name	Resource
pc296.emulab.net-lan0_octets.rrd	demoResc
pc296.emulab.net-lan0_packets.rrd	demoResc
pc296.emulab.net_cpu_util.rrd	demoResc
pc296.emulab.net_icmp_traffic.rrd	demoResc
pc296.emulab.net_ip_traffic.rrd	demoResc
pc296.emulab.net_mem_usage.rrd	demoResc
pc296.emulab.net_tcp_traffic.rrd	demoResc
pc296.emulab.net_total_traffic.rrd	demoResc
pc296.emulab.net_udp_traffic.rrd	demoResc
pc302.emulab.net-lan1_octets.rrd	demoResc
pc302.emulab.net-lan1_packets.rrd	demoResc
pc302.emulab.net_cpu_util.rrd	demoResc
pc302.emulab.net_icmp_traffic.rrd	demoResc
pc302.emulab.net_ip_traffic.rrd	demoResc
pc302.emulab.net_mem_usage.rrd	demoResc
pc302.emulab.net_tcp_traffic.rrd	demoResc

Let's do this live!
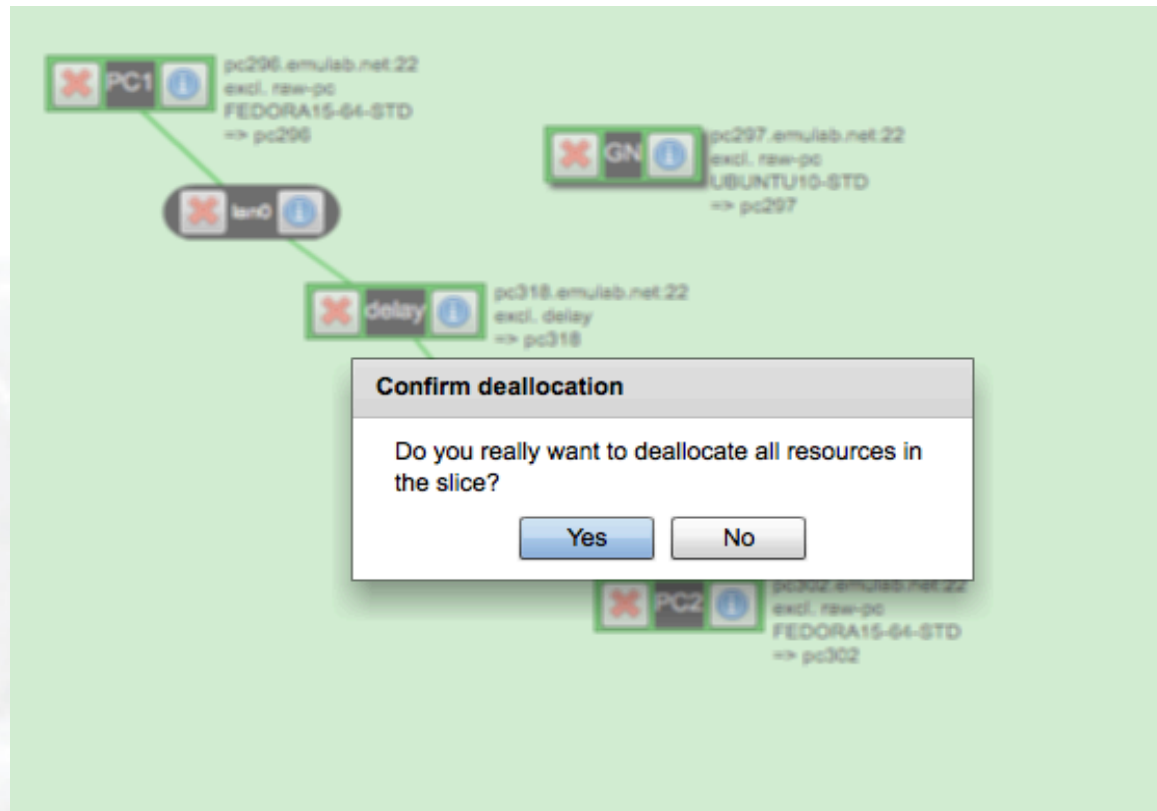
Let's do this live!

GENI Tools for Experiments

	In DEMO	In GENI
Resources	ProtoGENI	ProtoGENI, InstaGENI, ExoGENI, PlanetLab, OpenFlow, Wimax, Orbit, and more
Deploy Experiment	Flack	Flack, Omni
Monitor Experiment	GEMINI	GEMINI, GIMI, OMF/OML
Execute Experiment	Omni	Gush, OMF/OML, Omni
Archive Experiment	irods	iRODS, CNRI-DOR

*Attend **GENI Tutorials** and learn how to use them!*
ExoGENI, Advanced Omni, GIMI, WIMAX

Run GENI, Run!

To run this Experiment :

– 2 accounts (GENI, irods)

– 4 tools (Flack, GEMINI, Omni, iRODS)

  • To configure them

    – 2 files, 3 commands

• Bottom line, you can **do** this **yourself**!

  – http://groups.geni.net/geni/wiki/GEC15Agenda/WednesdayPlenary/RACEDemo

*Come to the **Experimenter Drop-in** session and try it out Today 3-5pm*