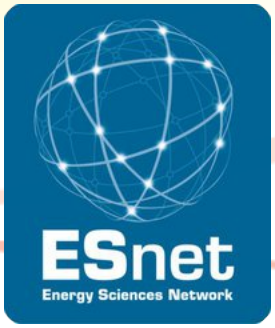

July 22nd 2013, XSEDE Network Performance Tutorial

Jason Zurawski – Internet2/ESnet

Kathy Benninger - Pittsburgh Supercomputing Center

Software Configuration

Outline

- Installation
- Configuration
  - Administrative Information
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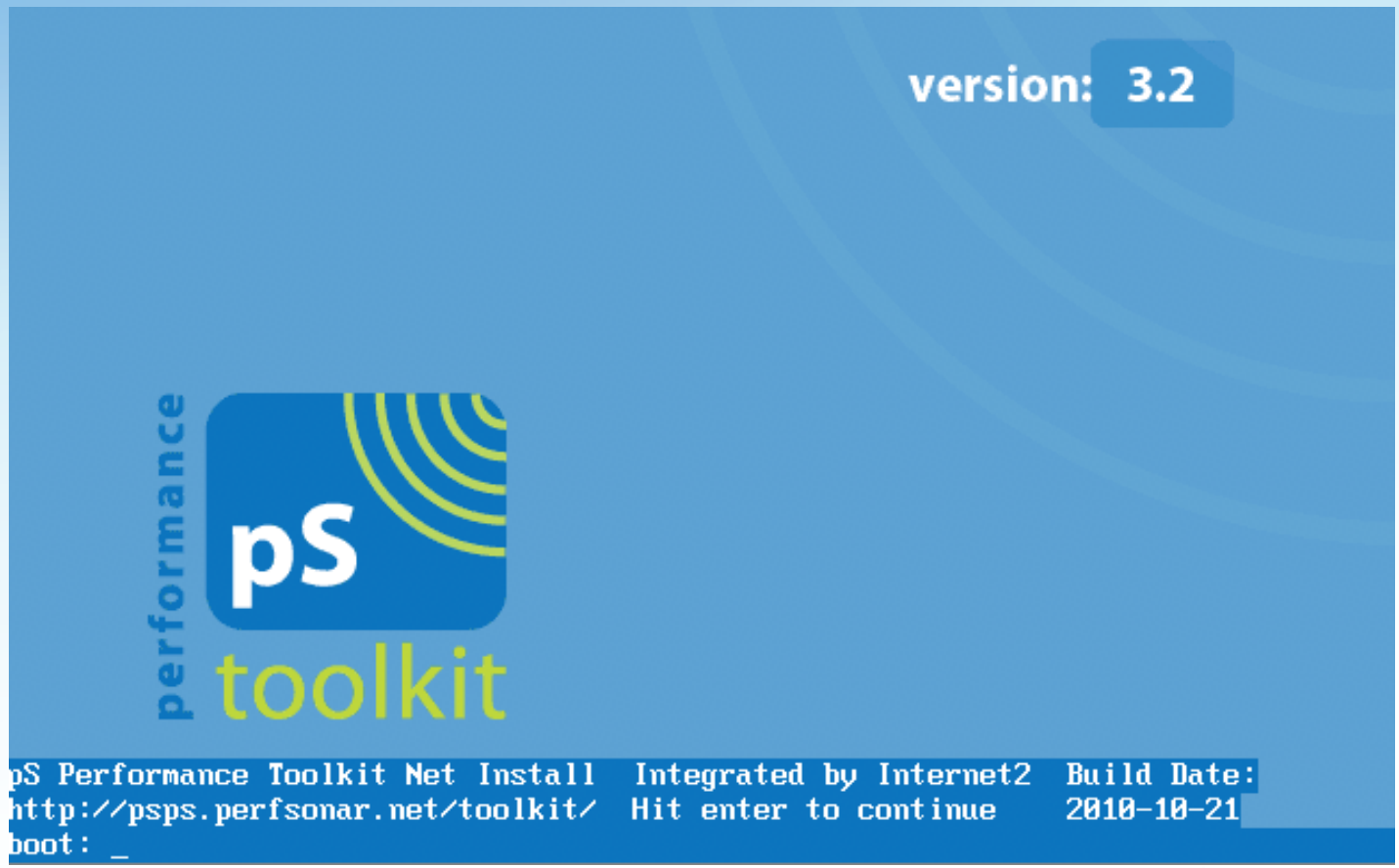
Configuration Based on Use Case

- The best source of information is here:
  - http://code.google.com/p/perfsonar-ps/wiki/pSPerformanceToolkit33
- There are two use cases for configuration:
  - Diagnostic
    - Burn CD, insert, boot, Done!
    - You can't configure regular testing, but you can test to this/log on and test with it
  - Permanent
    - Couple of steps to install the Linux Distro

Configuration - Permanent

- Booting:



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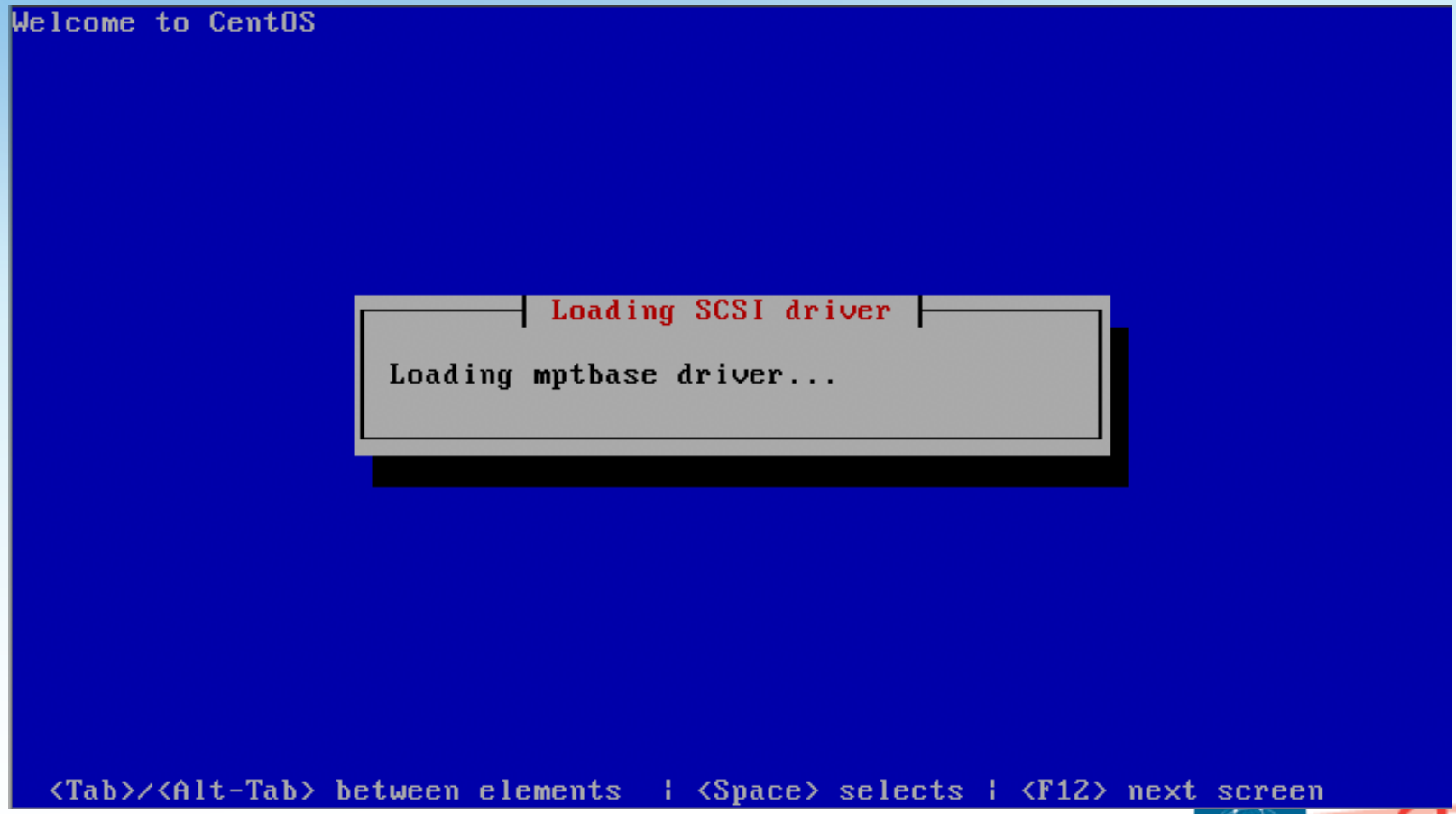
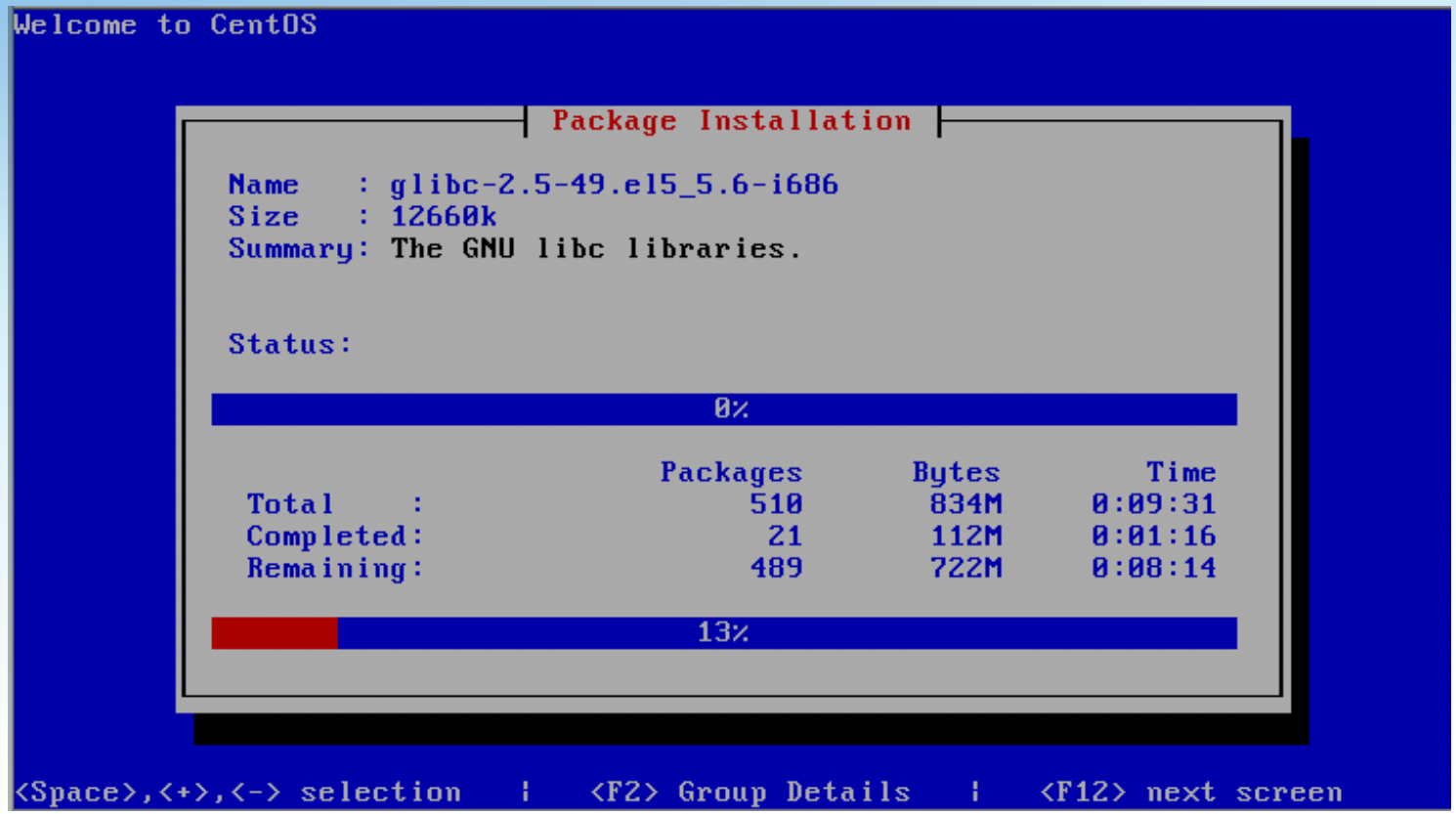
Configuration - Permanent

- Installation through console:



Configuration - Permanent

- Installation through console:



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Configuration - Permanent

- Logging on (first time):

```
CentOS release 5.5 (Final)
Kernel 2.6.18-194.3.1.el5.web100 on an i686

localhost login: root
Password:
You are required to change your password immediately (root enforced)
Changing password for root
(current) UNIX password:
New UNIX password: _
```

Configuration - Permanent

- Console Configuration Menu:

```
[root@localhost ~]# sudo /opt/perfsonar_ps/toolkit/scripts/nptoolkit-configure.p
y

Internet2 Network Performance Toolkit customization script
Options in MAGENTA have yet to be configured
Options in GREEN have already been configured

1. Configure drive to hold data/customizations
2. Set built-in account passwords
3. Configure Networking
4. Manage Users
0. exit

Make a selection: _
```


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Configuration - Permanent

- Main Screen:

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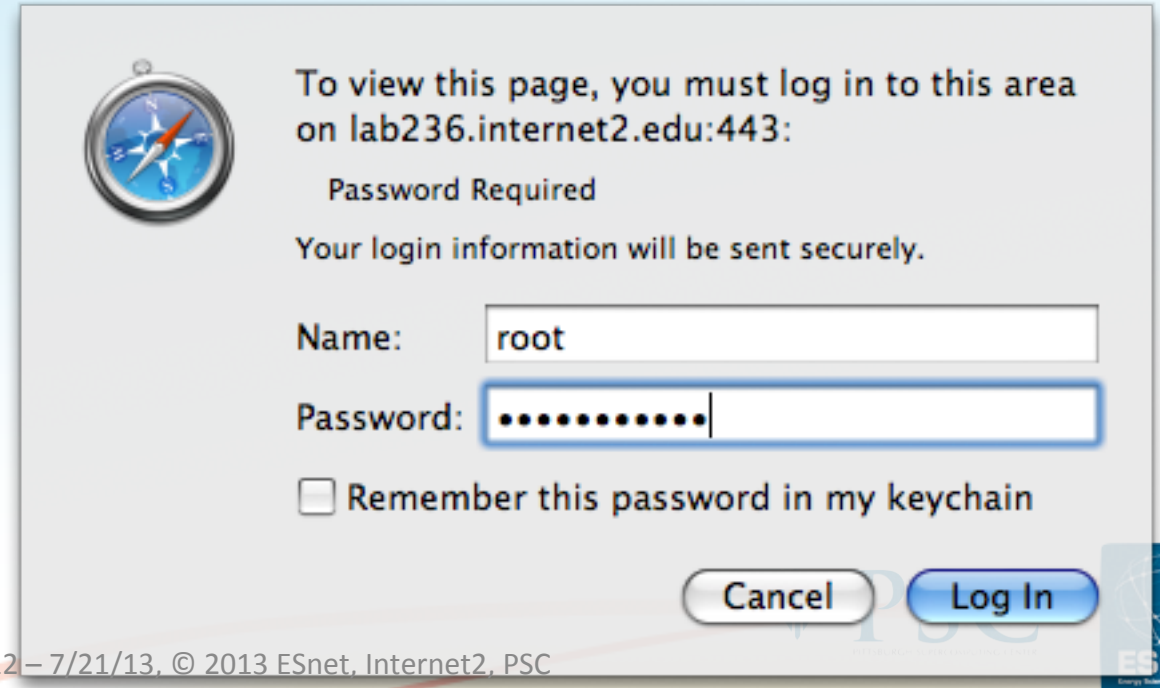
Administrative Info

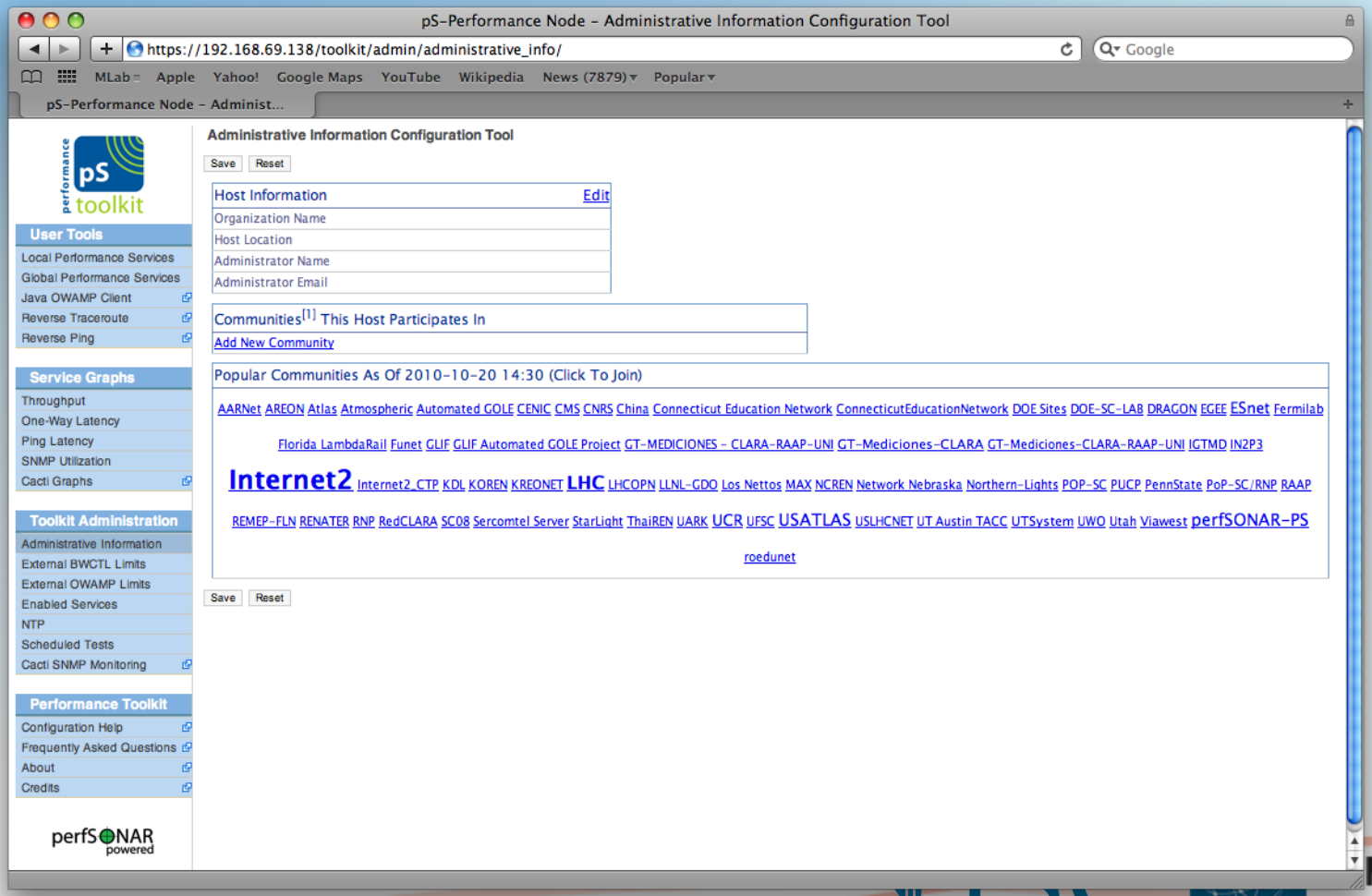
- Do this first, otherwise a lot of other stuff won't work.
- Authentication is required
- Always remember to save when you are done.

Administrative Info



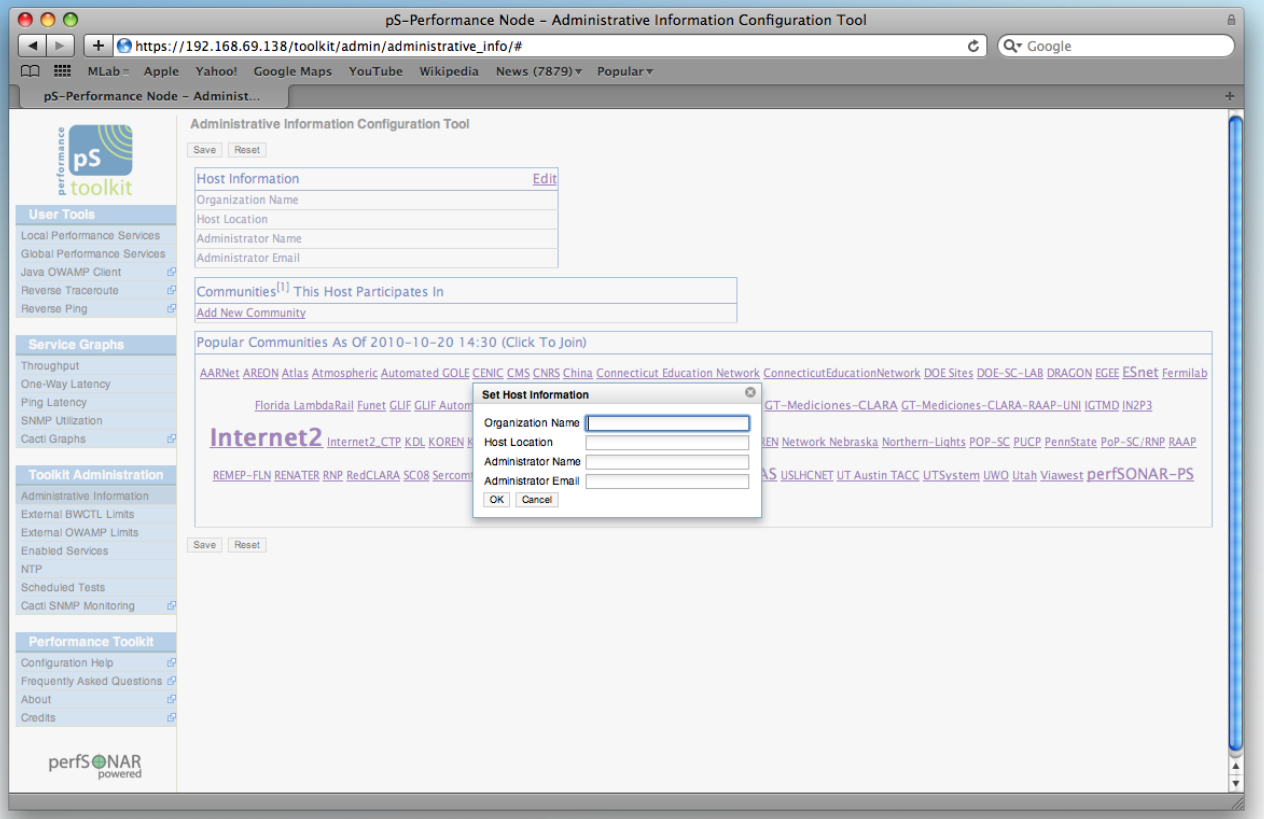
Administrative Info

- Blank Information, click on ‘edit’:



Administrative Info

- Dialog Box, press “ok” and “save” when done:



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NTP

- Do this second. Note that it may take a day to fully stabilize the clock
- Pick 4 – 5 Close servers for NTP
- We have a fast way to do this, or you can manually select
- Can also add your own servers if you don't like ours
- Note: Clocks are stable, no one should 'save', but feel free to play around and select closer ones if you want.

NTP

- The List. Press “select closest“ to run a selection

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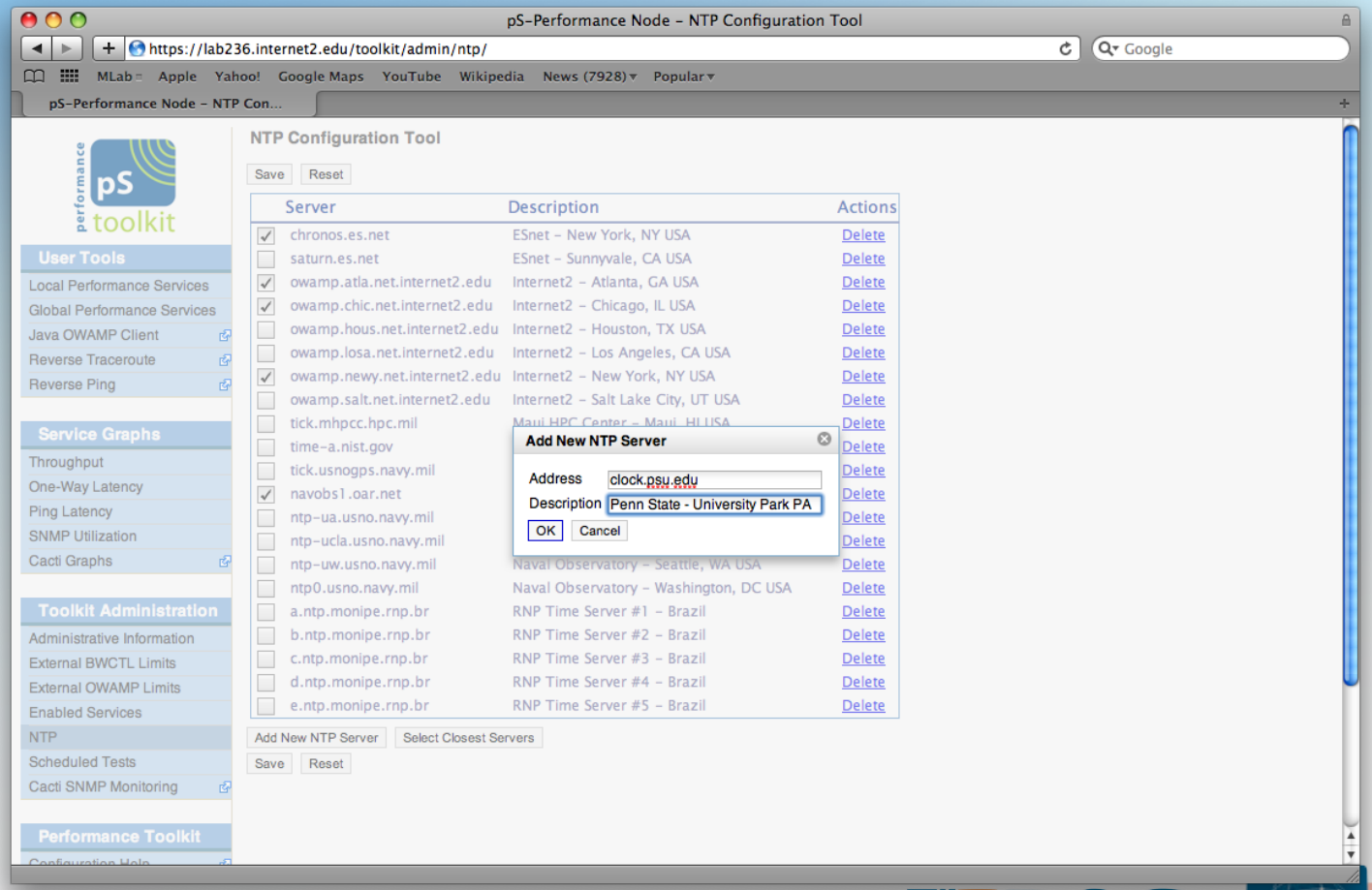
NTP

- Add in a server manually:



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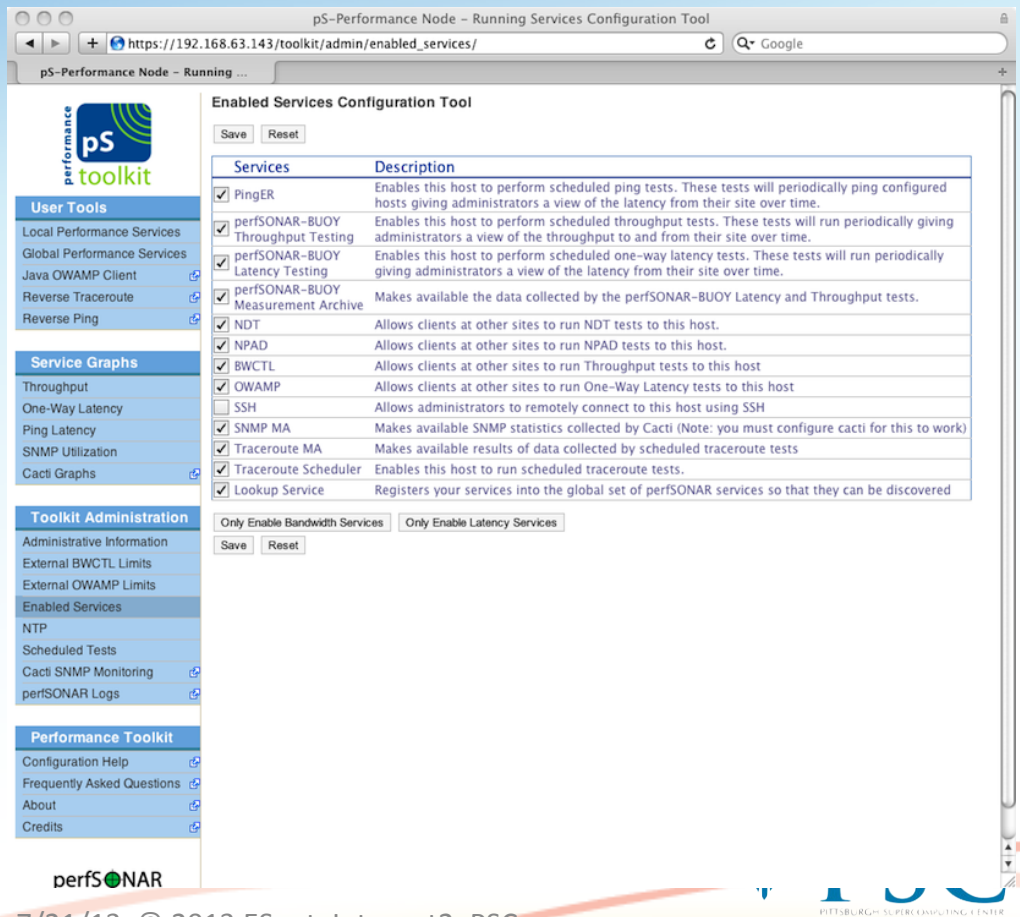
Services

- Services should be enabled/disabled from this screen (don't use chkconfig, we overwrite that with each save…)
- Shortcuts to enable bandwidth only vs latency only
- SSH is disabled by default!
- Note: Don't 'save' after this part either, but feel free to see what the buttons do.

Services

- All services, pressing either of the enable buttons will select/de-select:



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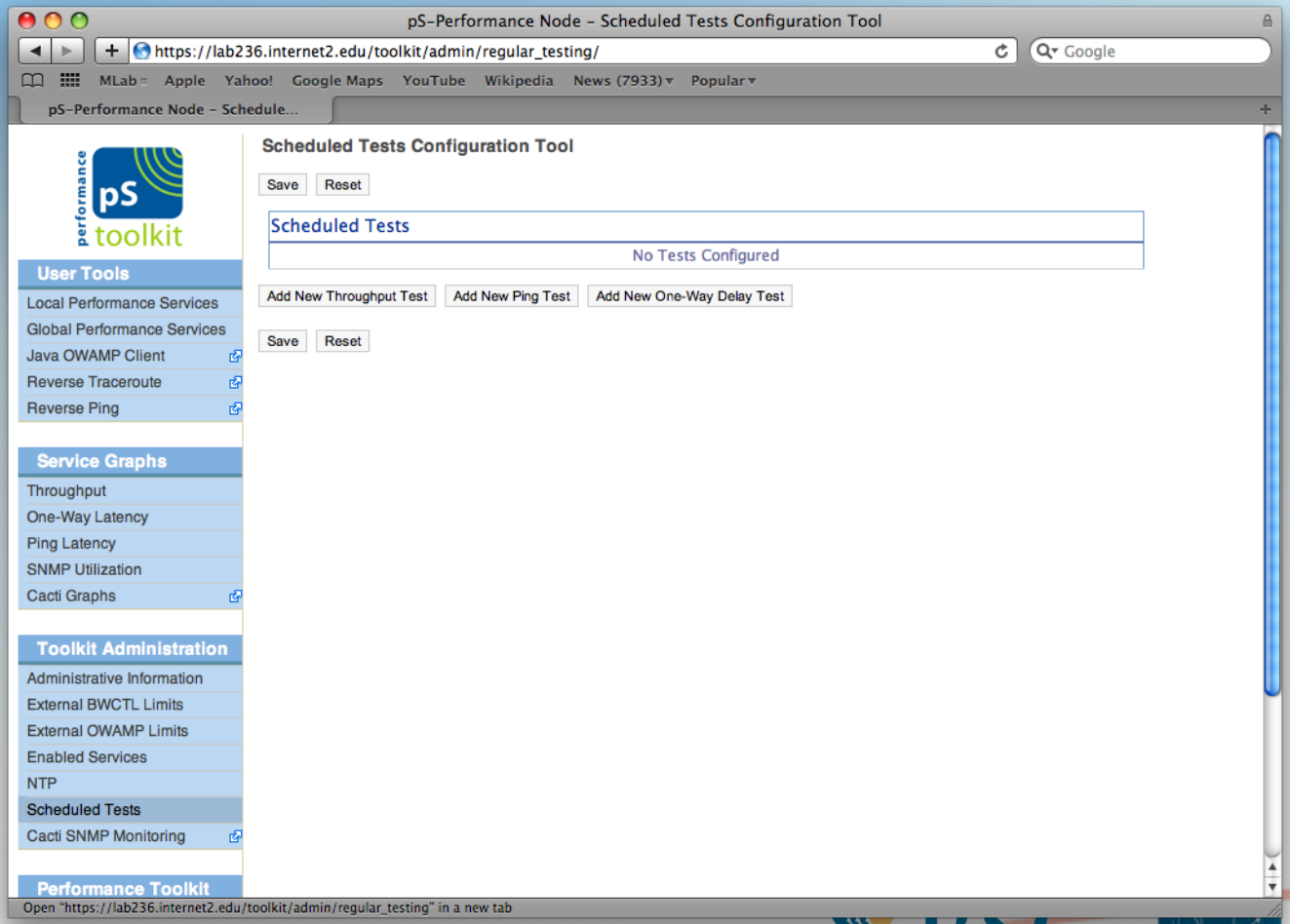
Regular Testing

- All regular testing follows the same pattern:
  - Select a Type
  - Select Parameters
  - Add Hosts
  - Save
- Will only go over BWCTL here

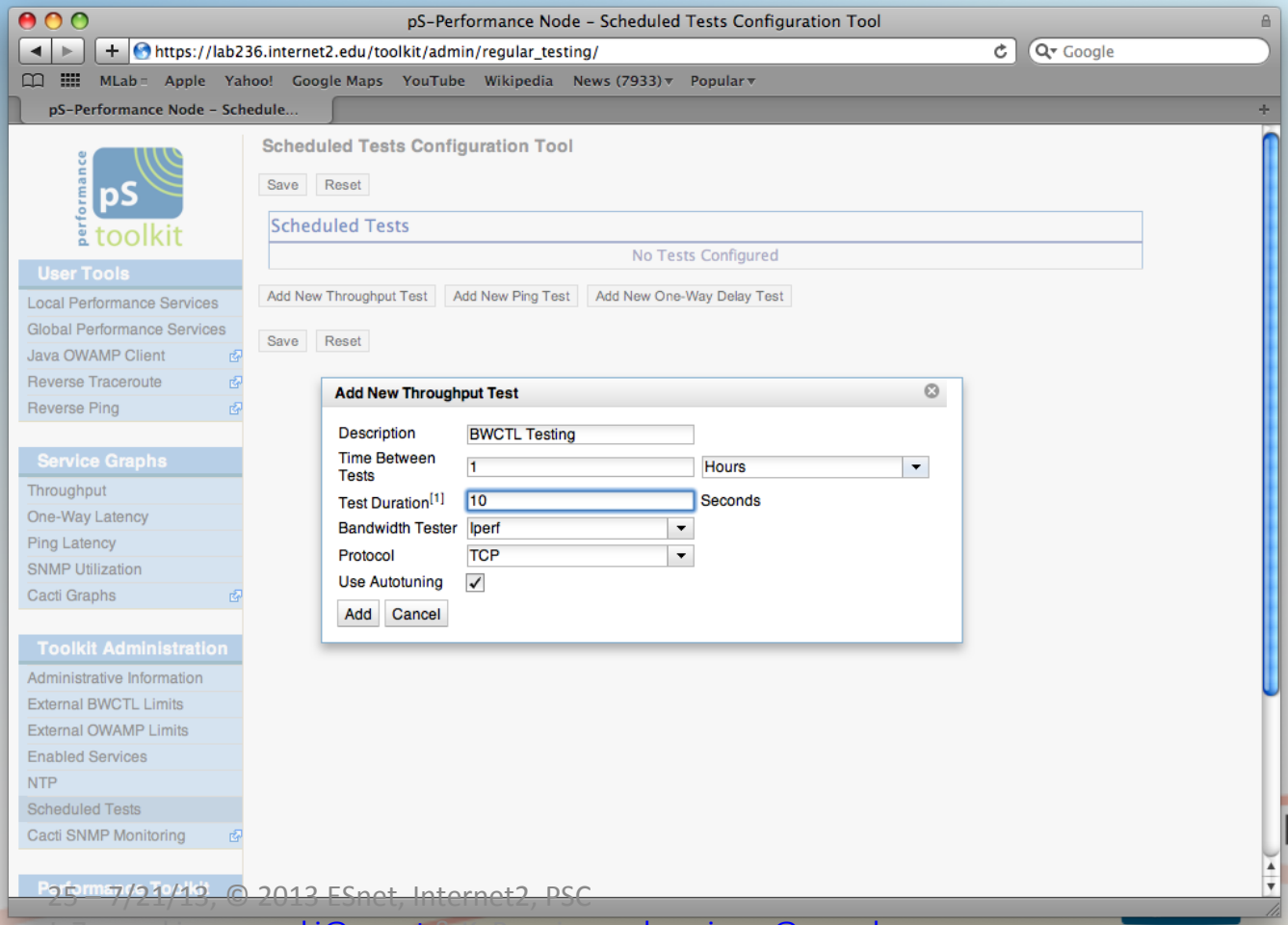
Regular Testing

- Blank Screen:



Regular Testing

- Configure parameters (for our purposes, lets do a test every 10 minutes, 20 second duration):



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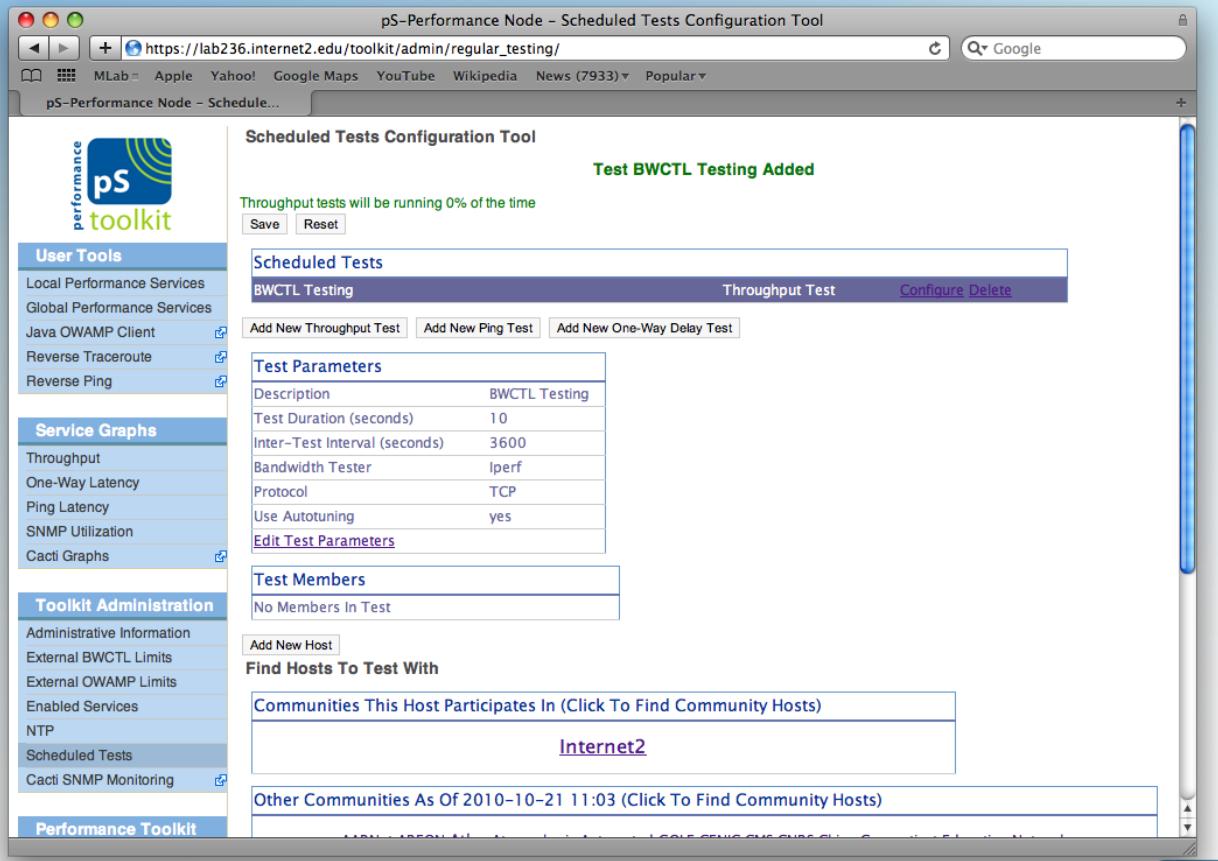
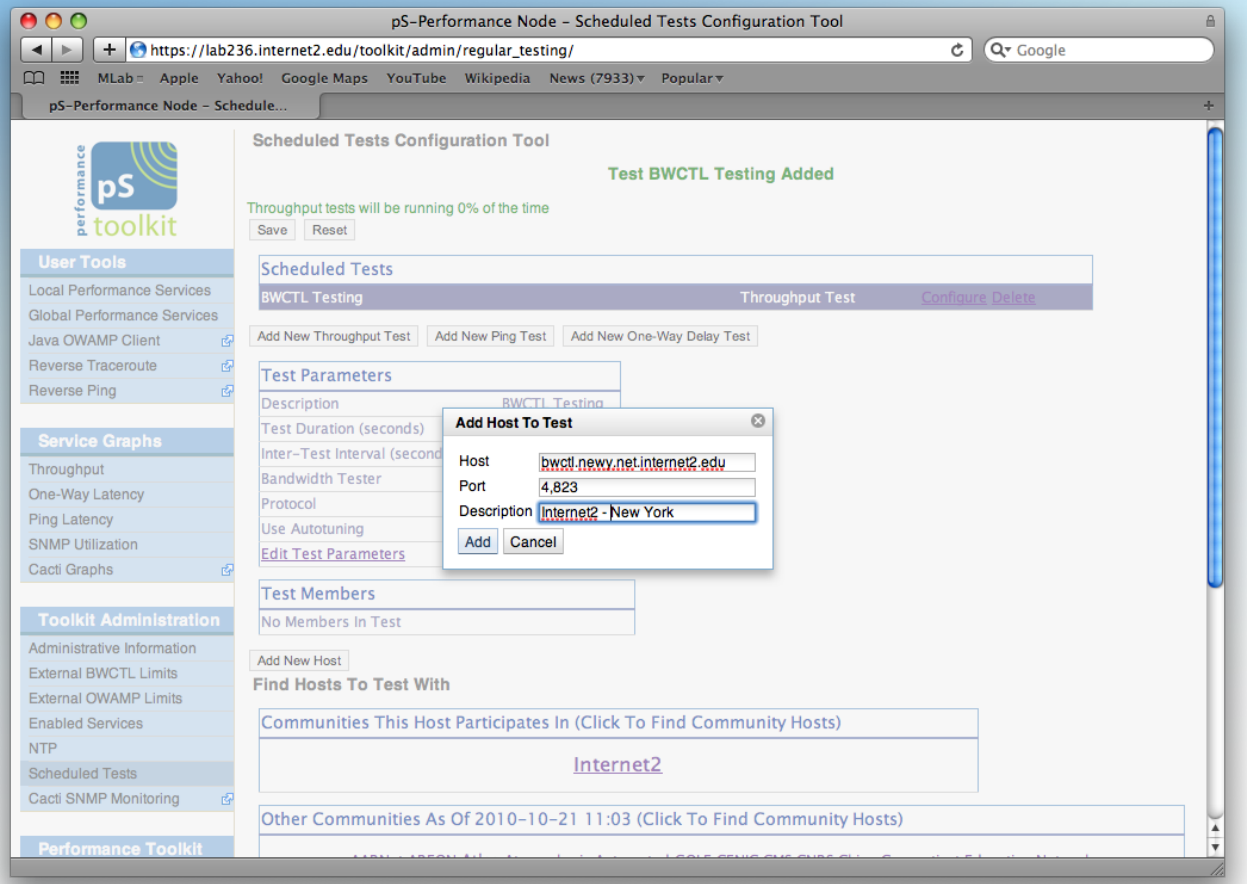
Regular Testing

- After setting up the test, now add hosts:



Regular Testing

- Manually add hosts:



Regular Testing

- Lets use these:
  - Test to 1 or 2 of your neighbors (perfsonar-ws-X.internet2.edu)
  - Test to Internet2
    - Ping/OWAMP: owamp.losa.net.internet2.edu, owamp.chic.net.internet2.edu, owamp.hous.net.internet2.edu, owamp.salt.net.internet2.edu
    - Traceroute/BWCTL: bwctl.losa.net.internet2.edu, bwctl.chic.net.internet2.edu, nms-bwctl.hous.net.internet2.edu, nms-bwctl.salt.net.internet2.edu
- Set up Latency, BW, Ping, and Traceroute tests

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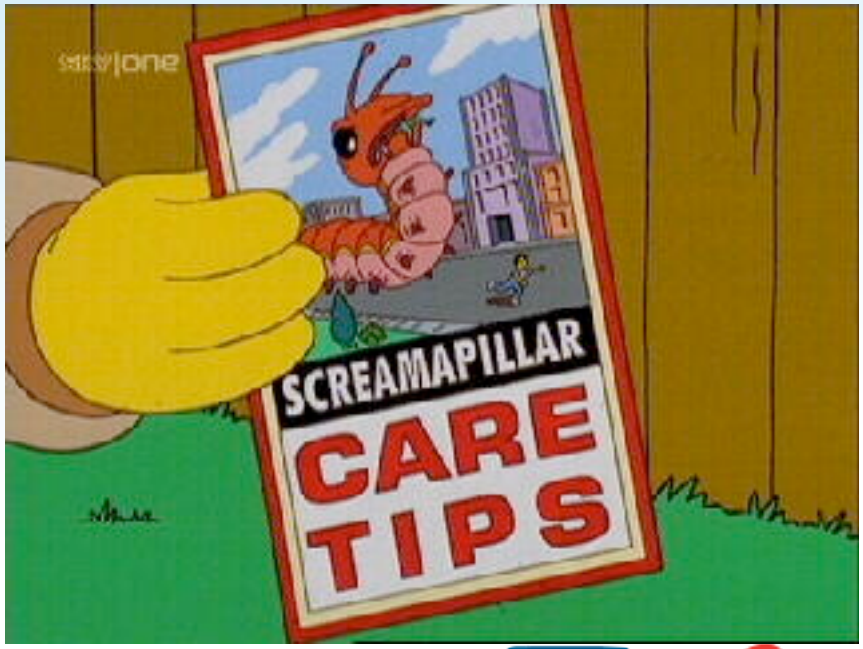
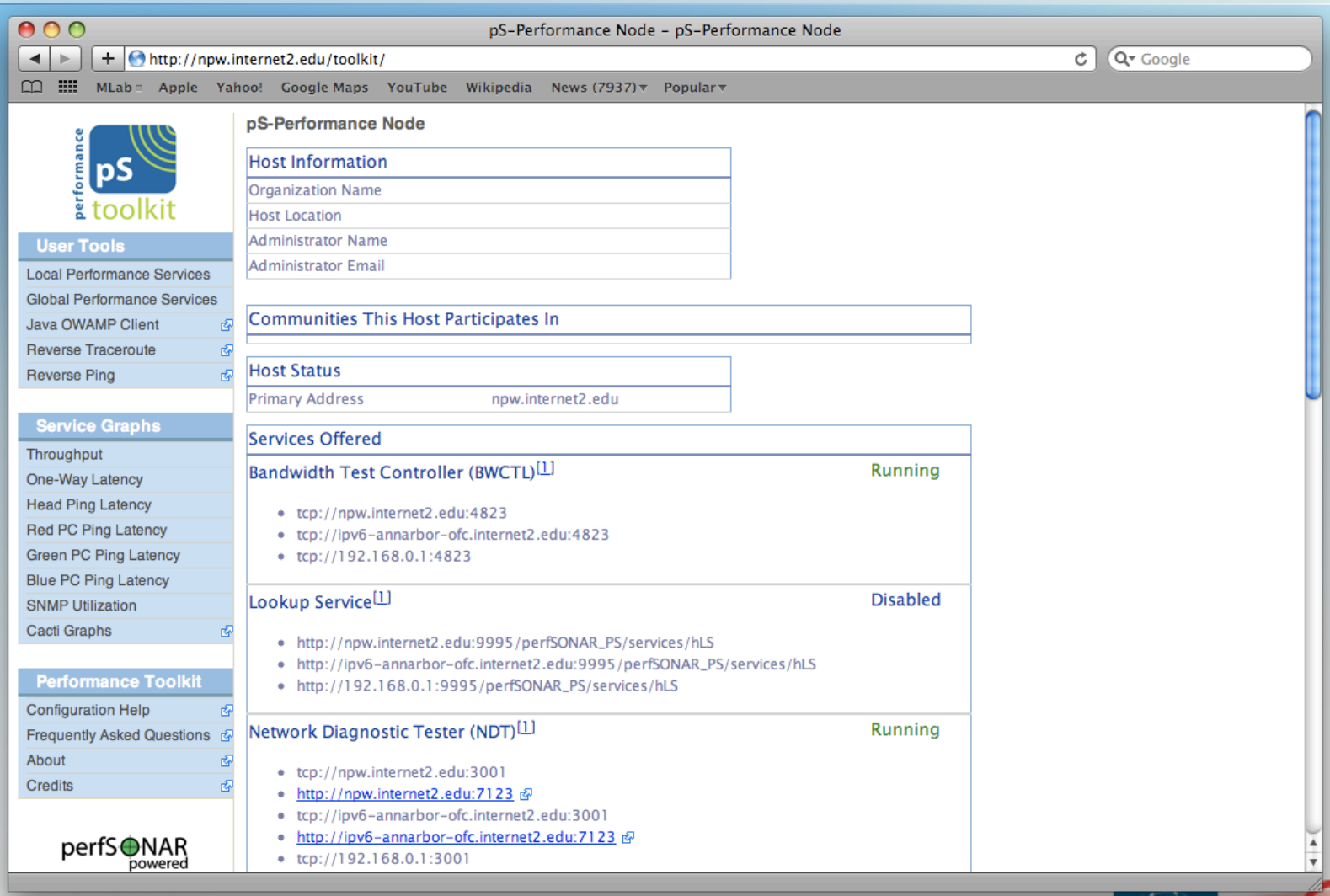
Your pSPT Deployment and You

- The pSPT nodes are designed to help two constituencies
  - Engineers – Regular monitoring to catch problems earlier
  - Users – Distributed test points to validate their own performance
- Work as a system, the following will describe:
  - The tools
  - The operations methodology
  - Maintenance steps
- Can integrate with others
  - Deployed on Backbones
  - Other regionals
  - Campuses



Home Page


pS-Performance Node – pS-Performance Node
http://npw.internet2.edu/toolkit/
Google
MLab
Apple
Yahoo!
Google Maps
YouTube
Wikipedia
News (7937)
Popular
performance pS toolkit
User Tools
Local Performance Services
Global Performance Services
Java OWAMP Client
Reverse Traceroute
Reverse Ping
Service Graphs
Throughput
One-Way Latency
Head Ping Latency
Red PC Ping Latency
Green PC Ping Latency
Blue PC Ping Latency
SNMP Utilization
Cacti Graphs
Performance Toolkit
Configuration Help
Frequently Asked Questions
About
Credits
perfSONAR powered
pS-Performance Node
Host Information
Organization Name
Host Location
Administrator Name
Administrator Email
Communities This Host Participates In
Host Status
Primary Address npw.internet2.edu
Services Offered
Bandwidth Test Controller (BWCTL)[1] Running
tcp://npw.internet2.edu:4823
tcp://ipv6-annarbor-ofc.internet2.edu:4823
tcp://192.168.0.1:4823
Lookup Service[1] Disabled
http://npw.internet2.edu:9995/perfSONAR_PS/services/hLS
http://ipv6-annarbor-ofc.internet2.edu:9995/perfSONAR_PS/services/hLS
http://192.168.0.1:9995/perfSONAR_PS/services/hLS
Network Diagnostic Tester (NDT)[1] Running
tcp://npw.internet2.edu:3001
http://npw.internet2.edu:7123
tcp://ipv6-annarbor-ofc.internet2.edu:3001
http://ipv6-annarbor-ofc.internet2.edu:7123
tcp://192.168.0.1:3001

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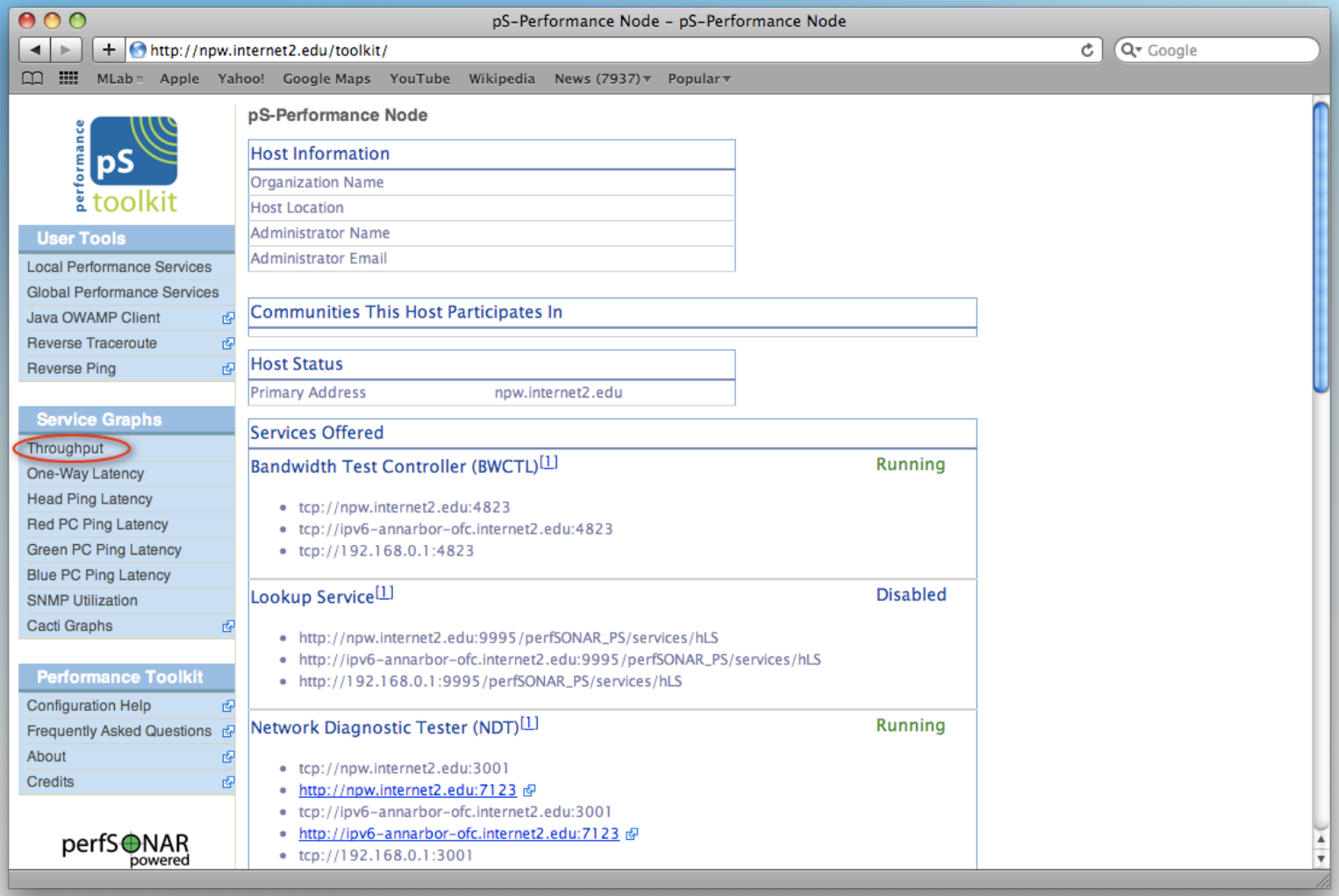
Throughput Measurements



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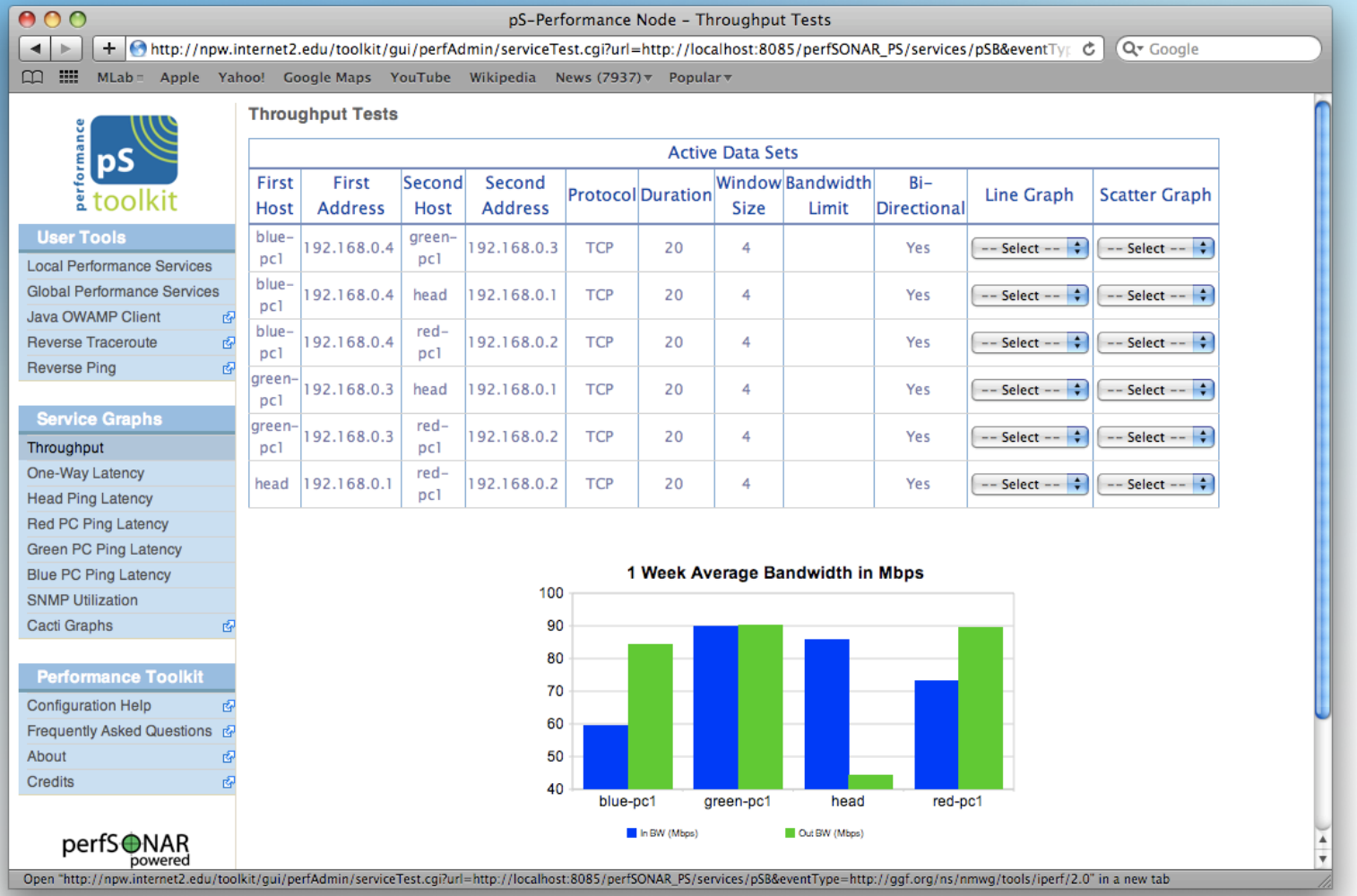
Regular testing between beacons

- TCP Testing
  - Recommend to do at least a 20 second test every 4 hours. (less duration is ok for short RTT, can test more or less often)
  - TCP is elastic, numbers should be close to capacity unless link is heavily used. If they drop it may be congestion related or real problem related
- UDP Testing
  - Be careful, not elastic. If you are going to do it, pick your peers. Set a bandwidth limit, try to mimic a UDP application (e.g. video)
- Testing from others:
  - Encourage connectors to test to a close beacon.
  - Test to Internet2/MCNC etc.

Throughput Tests



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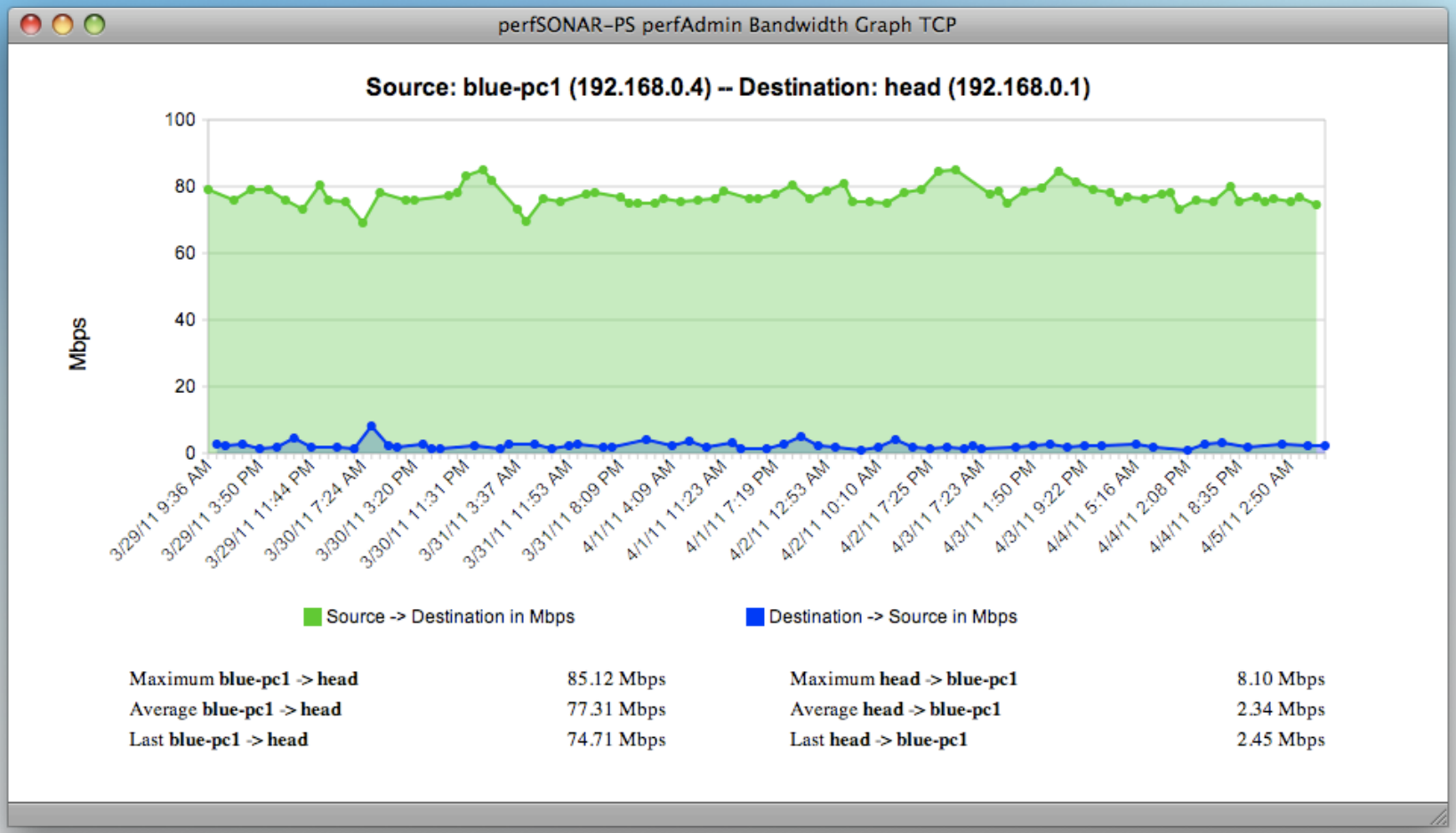
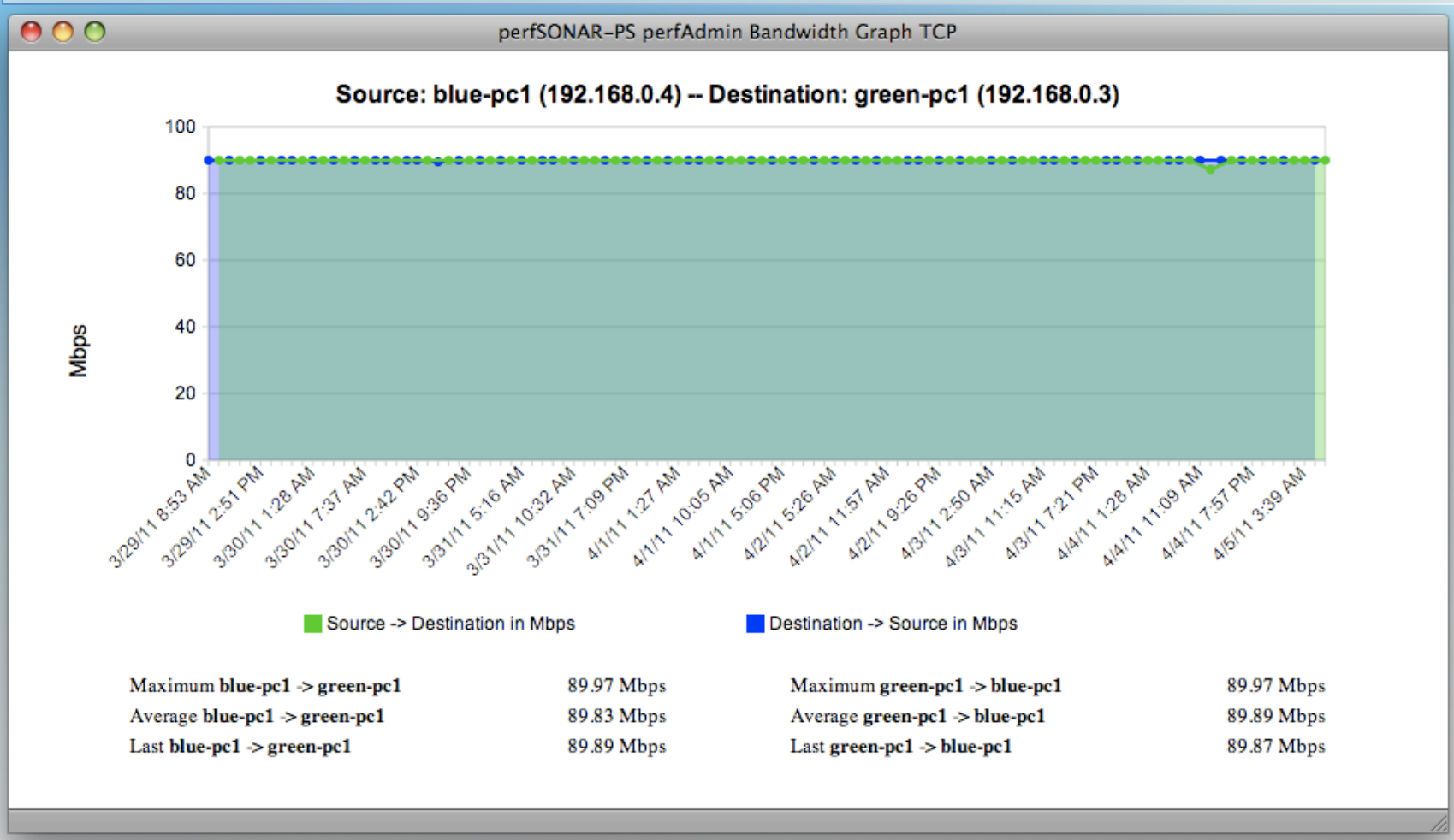
Bad Throughput … What Next?



Expected Throughput



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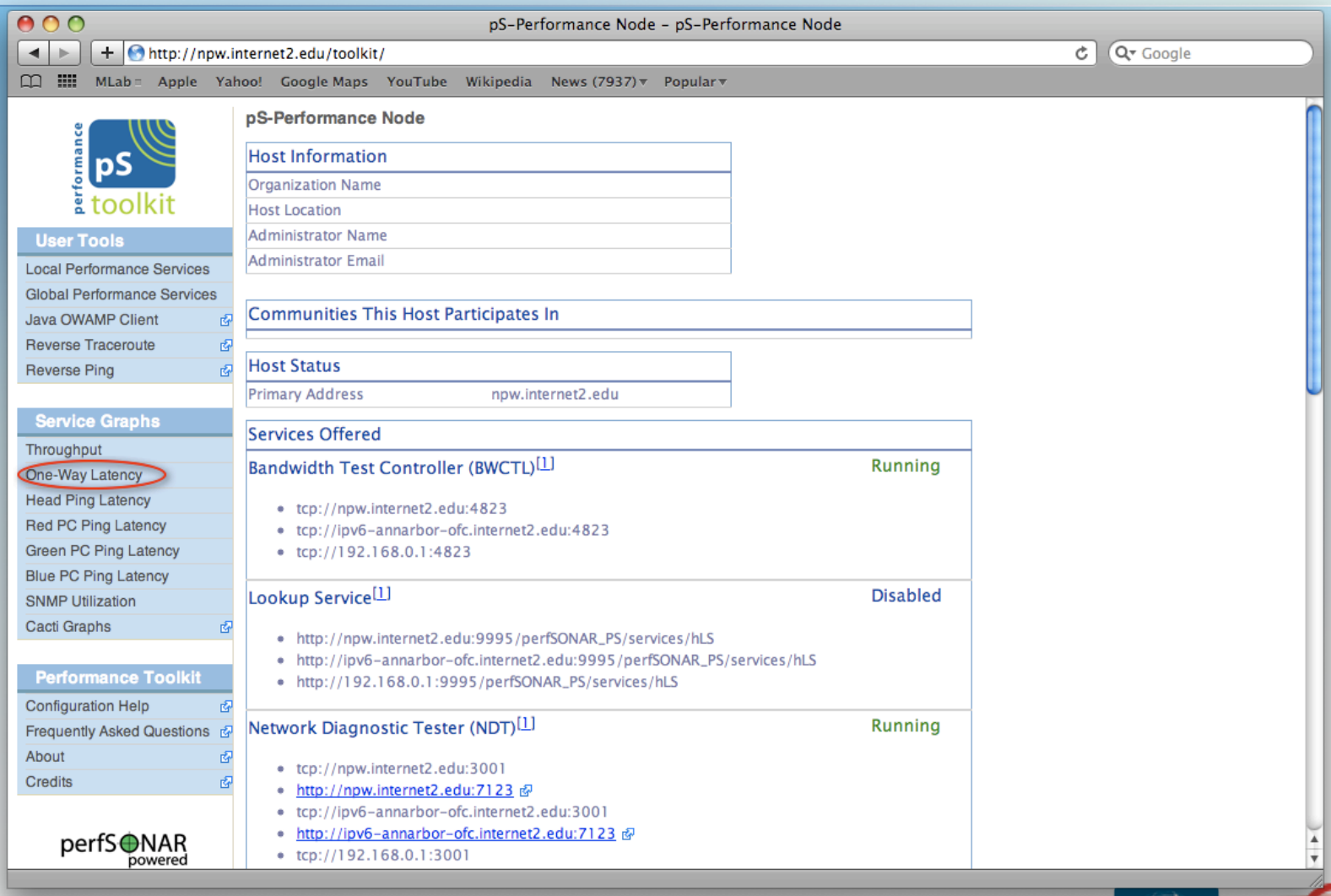
One Way Latency Tests



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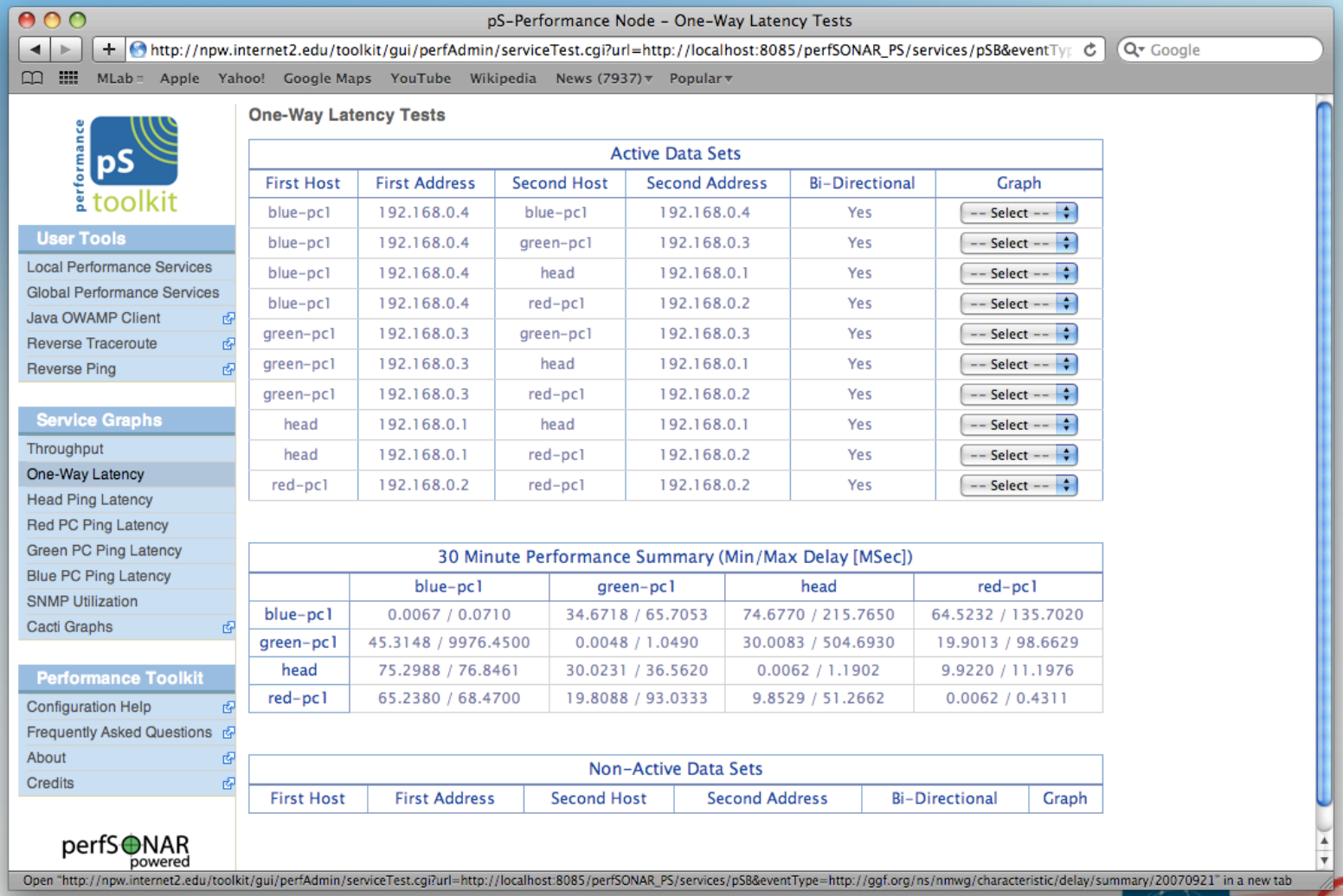
One Way Latency != Round Trip Latency

- One Way:
  - Detect problems in one direction vs the other (e.g. queueing, loss, out of order packets)
  - Helps detect “download” vs “upload” issues
- RTT:
  - Masks problems like queueing
  - ICMP packets are not respected
- OWAMP Graphs:
  - Feature two lines for each direction.
  - Very sensitive, even to NTP differences
  - Loss/duplication shows up as an event flag
  - Congestive loss as well loss caused by other reasons (equipment failures)

All OWAMP Tests



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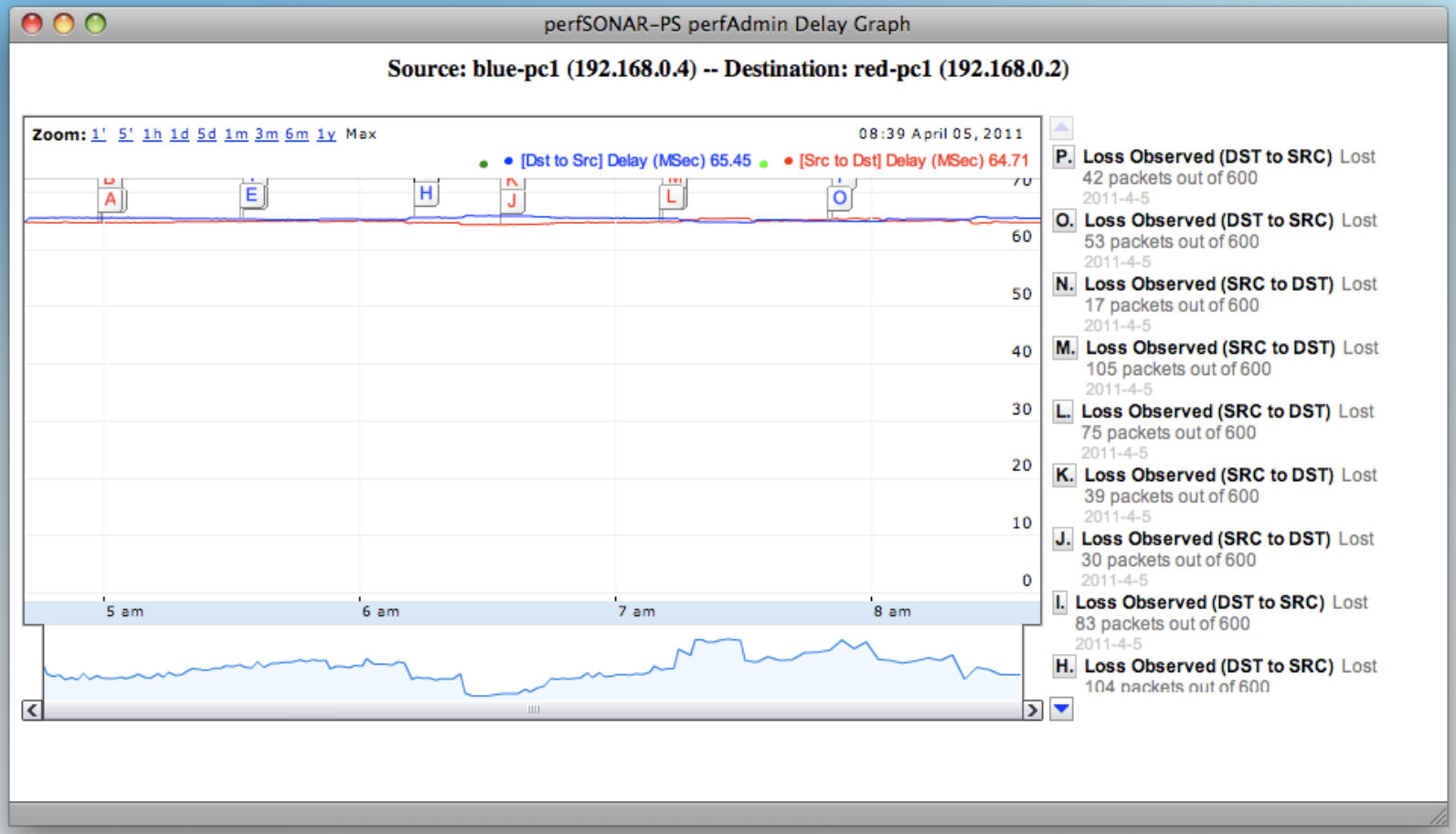
Similar Latencies, Some Loss



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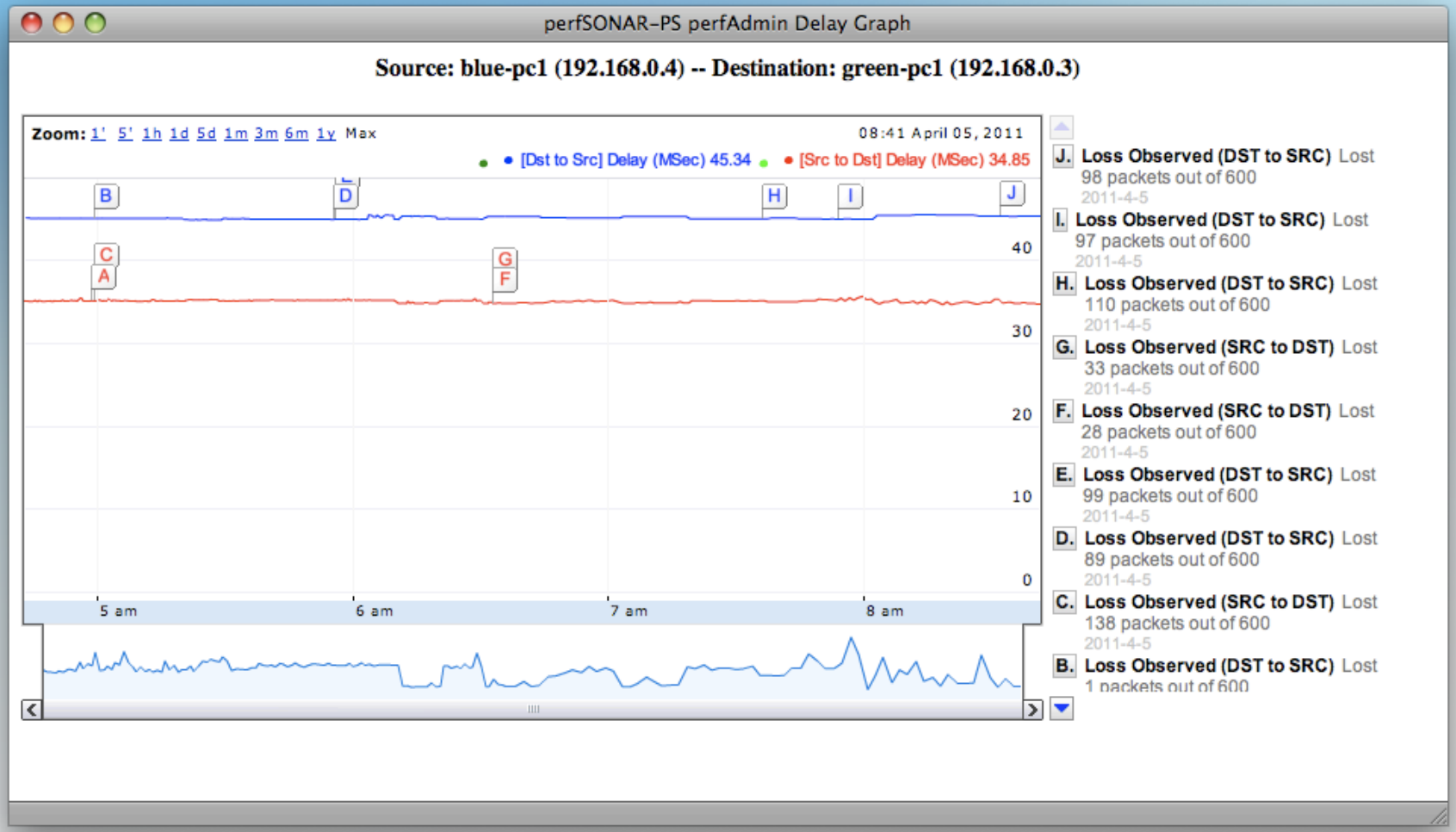
Different Latencies with pockets of Loss



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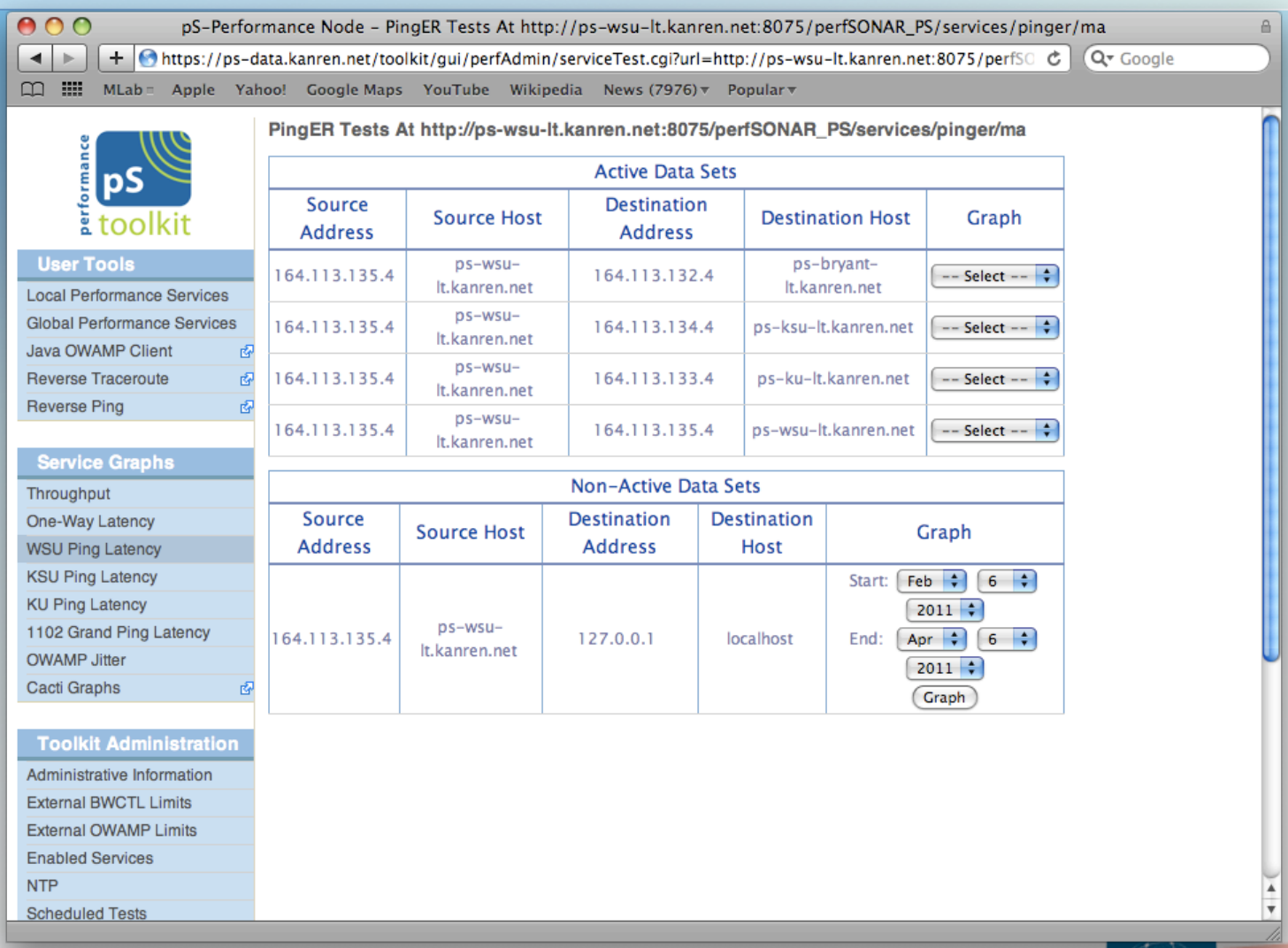
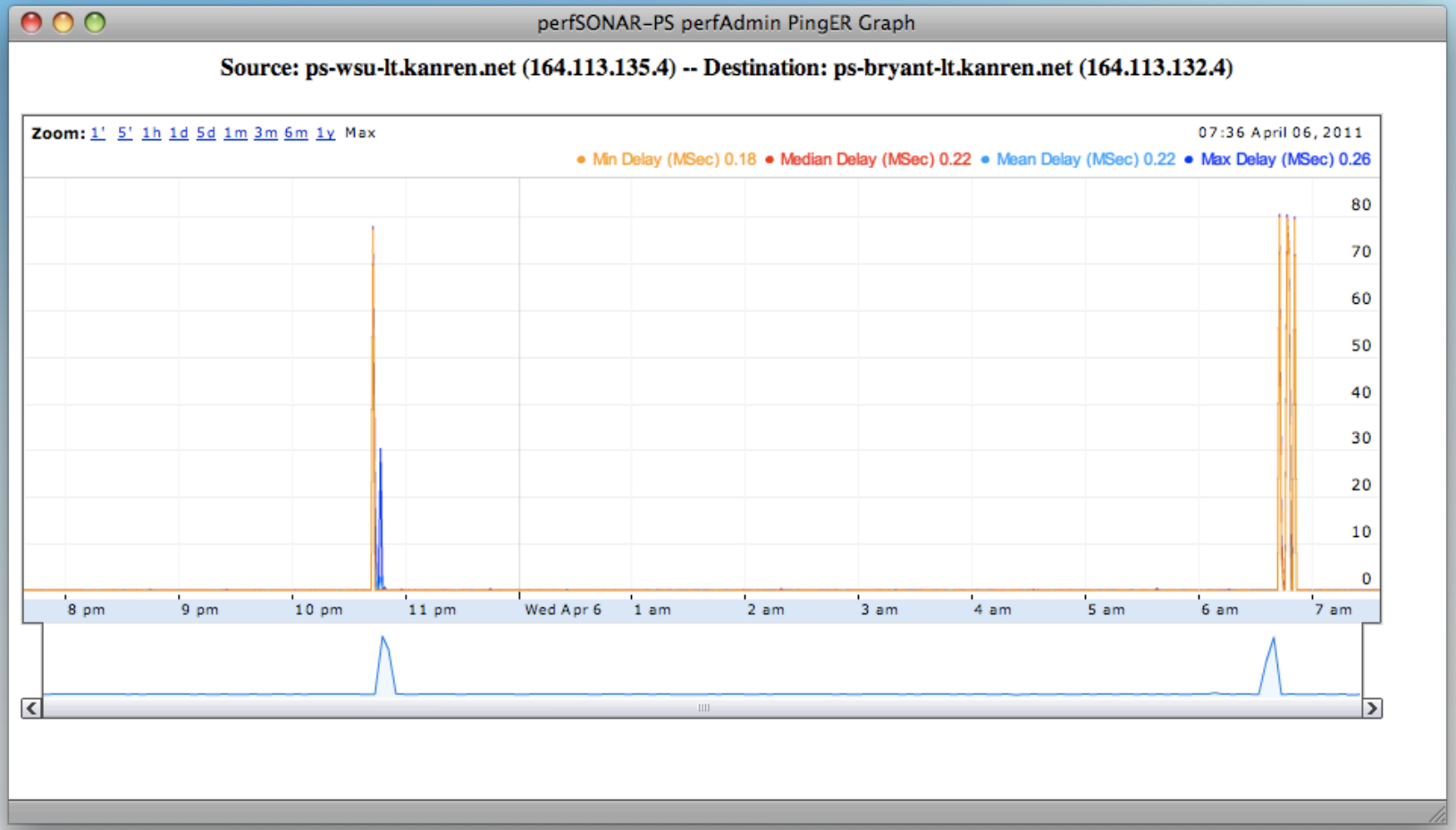
PingER Select Data



PingER Graph with spikes of activity



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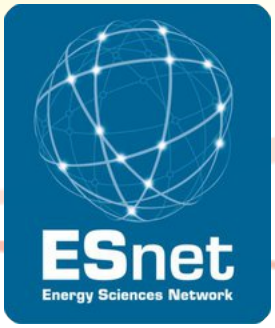

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For more information, visit http://www.internet2.edu/workshops/npw

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