OSG Site Admin Workshop – Network Performance Tutorial

Preliminaries

Users will be logging on to a "broken" network. The goal is to use the tools to discover problems in the network.

1. Connect using **`ssh`** to "npw.internet2.edu" using the username/password combination you will be given.
2. In a web browser, open http://npw.internet2.edu/toolkit
3. There are 4 Hosts on the network:
    a. head - 192.168.0.1
    b. red-pc1 - 192.168.0.2
    c. green-pc1 - 192.168.0.3
    d. blue-pc1 - 192.168.0.4
4. Determine the topology using "**`ping`**":
    a. From head, use the **`ping`** tool to measure the RTT to the other 3 hosts.
        i. Example Command: **`ping -c 5 red-pc1`**
        ii. Record the "**`avg`**" result from the statistics. Rounding is acceptable
    b. Repeat from each other node, to all others. Your user account is available on other hosts. We want to see a matrix or map of all of the RTTs between each host.

Draw your matrix or map and save for later use.

Exercises

1. OWAMP Investigation
    a. Use the "**`owping`**" tool to discover the one-way latencies between the hosts. You can find out more information on **`owping`** by running "**`man owping`**".
    b. Example Command: **`owping red-pc1`**
    c. You will get both directions when running this command. It will be necessary to **`ssh`** to the other hosts as you did in the preliminary section.
    d. Questions To Answer:
        i. Using the information from above, draw another diagram of all the hosts, and the one-way delay between each host on all link***s***. Take note of any loss or duplicate packets seen (May need to investigate by running the tool more than once, or running with a longer number of packets – e.g. **`–c 1000`**)
        ii. Based on the latency, duplicates and loss rates, which links do you think will perform best and which will perform the worst? Why?

2. BWCTL Investigation
    a. Use the "**bwctl**" tool to perform bandwidth tests between the hosts. You can find out more information on **bwctl** by running "**man bwctl**".
    b. Example Command: **bwctl –f m –t 10 -c red-pc1**
    c. Questions To Answer:
        i. Draw yet another diagram of all the hosts using the information from above, and note the bandwidth (in Mbps, use the "**–f m**" option to get this format) between each host. Did the bandwidth match your expectations based on the information you found above?
        ii. How do loss and large latency affect the overall throughput?
        iii. Which links will be more problematic for large science transfers?

3. perfSONAR Tools Investigation
    a. As a way to verify your findings, we're running regular performance tests between the various hosts, and recording the results.
    b. Browse to http://npw.internet2.edu/toolkit/
        i. Select the "One-Way Latency" option from the "Service Graphs"
        ii. Does the matrix of latencies match the one-way latency that you noticed?
        iii. Choose a link that you found had loss on it, and choose a "4 hour" graph. Does that match what you saw?
        iv. Select the "Throughput" option from the "Service Graphs". View graphs and compare.
        v. Select the "Ping Latency" option from the "Service Graphs". View graphs and compare.
    c. Direct Links:
        i. http://npw.internet2.edu/toolkit/gui/perfAdmin/serviceTest.cgi?url=http://head:8075/perfSONAR_PS/services/pinger/ma&eventType=http://ggf.org/ns/nmwg/tools/pinger/2.0/
        ii. http://npw.internet2.edu/toolkit/gui/perfAdmin/serviceTest.cgi?url=http://red-pc1:8075/perfSONAR_PS/services/pinger/ma&eventType=http://ggf.org/ns/nmwg/tools/pinger/2.0/
        iii. http://npw.internet2.edu/toolkit/gui/perfAdmin/serviceTest.cgi?url=http://green-pc1:8075/perfSONAR_PS/services/pinger/ma&eventType=http://ggf.org/ns/nmwg/tools/pinger/2.0/
        iv. http://npw.internet2.edu/toolkit/gui/perfAdmin/serviceTest.cgi?url=http://blue-pc1:8075/perfSONAR_PS/services/pinger/ma&eventType=http://ggf.org/ns/nmwg/tools/pinger/2.0/

4. NDT Command Line
    a. Use the "**`web100clt`**" tool to perform ndt tests between the hosts. You can find out more information on **`web100clt`** by running "**`man web100clt`**" or "**`web100clt -h`**".
    b. Example Command: **`web100clt –n red-pc1`**
    c. Use the "**`-d`**" and "**`-l`**" flags (sometimes more than once…) to get more information.
    d. Questions To Answer:
        i. NDT will deliver an answer on bandwidth that is similar to BWCTL, but with more information. What sort of information are you seeing, and does this agree with previous observations?
        ii. Are there any problems (e.g. buffer sizes, queuing) noted between the hosts?