Performance Area Group

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Hawaii Joint Techs
What the heck is a PAG?

• The Performance Area Group is a repurposing of the Measurement SIG
• And subsuming some of the functions of the previous End-to-End TAG (e.g., act to provide some direction, too)
• For all of the Internet2 infrastructure
What the heck is a PAG?

- A place to hash out ideas related to measurement and performance
- Primarily discussion, not presentation
- Provide input on these issues for the Internet2 Network to the NTAC
  - For example, Observatory functions; Layer 1 monitoring; things NOC should be doing
- Large, specific, issues can spawn a Working Group (need workers first!)
This is a work in progress

- Discussion started December 2006 at the Fall Member meeting in Chicago
- Some discussion in the NTAC
- This is the third meeting, and (still) somewhat disorganized at that ☺
- Feedback welcome!
Mailing list?

- Er, no. We could generate if interest
- There is also the old Measurement SIG list
Pointers to other related sessions

- Tools tutorial, last Sunday
- perfSONAR WG yesterday
- Circuits stuff this morning
- Performance & perfSONAR update Today 4:30 to 5p (and surrounding sessions)
General Topics

• Things we are doing
  • Observatory function recap
  • Ongoing monitoring
  • Resuming multi-vendor Ethernet circuit testing

• Things that could be done
  • On Internet2 Network
  • Internet2-wide

• Anyone with an interesting measurement or performance issue?

• Open floor
Existing Observatory Capabilities

- One way latency, jitter, loss
  - IPv4 and IPv6 (“owamp”)
- Regular TCP throughput tests – ~1 Gbps
  - IPv4 and IPv6; On-demand available (“bwctl”)
  - ~10GE now also possible (Myricom and Dell 1950, must ask)
- SNMP
  - Octets, packets, errors; collected 1/min
- Flow data
  - Addresses anonymized by 0-ing the low order 11 bits
- Routing updates
  - Both IGP and BGP - Measurement device participates in both
- Router configuration
  - Visible Backbone – Collect 1/hr from all routers
- Dynamic updates
  - Syslog; also alarm generation (~nagios); polling via router proxy
Observatory Physical Design Review

- For lots of detail, see the presentation at Chicago member meeting. http://events.internet2.edu/2006/fall-mm/sessionDetails.cfm?session=2995&event=258
- Some equipment deployment delayed (2/3 PCs in “optical nodes”, 3/9 PCs in (most) “router nodes”)
- Deployment (modulo Seattle) complete
- Feedback always welcome
Router Nodes (Original) Plan
<table>
<thead>
<tr>
<th>Device</th>
<th>Function</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>nms-rthr1</td>
<td>Measurement</td>
<td>BWCTL scheduled 1 Gpbs router throughput, Thrulay</td>
</tr>
<tr>
<td>nms-rthr2</td>
<td>Measurement</td>
<td>BWCTL on-demand 1 (and 10) Gbps router throughput, Thrulay: <code>bwctl.{router}.net...</code></td>
</tr>
<tr>
<td>nms-rexp</td>
<td>Experimental</td>
<td>NDT/NPAD: <code>ndt.{router}.net.internet2.edu</code></td>
</tr>
<tr>
<td>nms-rpsv</td>
<td>Measurement</td>
<td>Netflow collector</td>
</tr>
<tr>
<td>nms-rlat</td>
<td>Measurement</td>
<td>OWAMP with locally attached CDMA/GPS timing: <code>owamp.{router}.net.internet2.edu</code></td>
</tr>
<tr>
<td>nms-rpho</td>
<td>Experimental</td>
<td>Phoebus 2 x 10GE to Multiservice Switch</td>
</tr>
<tr>
<td>nms-octr</td>
<td>Management</td>
<td>Controls Multiservice Switch</td>
</tr>
<tr>
<td>nms-oexp</td>
<td>Experimental</td>
<td>NetFPGA: 4 sites to be funded by 100x100</td>
</tr>
<tr>
<td>nms-othr</td>
<td>Measurement</td>
<td>On-demand Multiservice Switch 10 Gbps throughput</td>
</tr>
</tbody>
</table>
Observatory software

• Netflow, SNMP, BGP, config: collection OK
• ISIS collection tickled Juniper bug, awaiting fix
• OWAMP working where we have good clocks
• bwctl awaiting new distribution, ad-hoc measurements working
• NDT should be working everywhere
Observatory web pages

• Working on converting new pages to new layout, remove Abilene references
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Other monitoring…

• perfSONARBOUY, just mentioned
• perfSONAR export of utilization, topology
• perfSONAR export of OSCARS info (current dynamic circuits)
• In next 6 mos or so: perfSONAR export of Ciena performance data
In addition

• NOC is working on monitoring the Ciena and Infinera gear independently, and putting that in their alerting system.
• This should give us Infinera status we can publish too.
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Circuit testing

- Would like Ethernet links originating on the Dynamic Circuit Network to be able to terminate outside the Internet2 Network.
- For example, at a European lab or university.
- A bunch of work being done by DANTE, ESnet and Internet2 to ensure interoperability
Sample Path to Europe

- Dynamic Circuit Network
  - Mainly ESLM cards in the Ciena
- MANLAN – HDXc switch (not dynamic)
  - Possible termination on OME6500
- OC192 under the Atlantic ocean
- Alcatel equipment in Europe
Many cases

- 1GE: Ciena through to Alcatel
- 10GE: Ciena through to Alcatel
- 1GE mediated through Nortel OME6500 in MANLAN
  - (so, two half-circuits rather than a complete end to end circuit, with another Ethernet in the middle)
  - Also potential for other customers of MANLAN than Internet2’s DCN
  - Works other way too, as onramp to DCN
- 10GE mediated through OME6500
1GE to Alcatel 1GE

- Have a Spirent 600 courtesy John Moore and the NC-ITEC
- Ciena to Alcatel
  - Have found losses at certain packet sizes near maximum rates, and in one direction (not max or min packet sizes, though)
  - We are working to understand this with the vendors
- Nortel to Alcatel: so far, so good
- Nortel to Ciena
10GE to Alcatel

- Only some Ciena-Alcatel testing so far
- 10GE PC’s on either side
  - Hardware not identical
- Running code by Richard Hughes-Jones of Manchester
- …and some single-stream Iperfs
- “OK”, so far, but see some PC config limitations that are working to eradicate first.
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Joe St Sauver, a while ago:

• “The traffic mix is changing due to things like the commodity peering initiative, etc. I'd be interested in any sort of pre-post analysis if the data to do that is available, although I understand that peering terms may limit visibility into that traffic.”

• … there is a lot that could be done with information already available from the observatory. Any interest?
The general question

- What information would you like to see from network monitoring?
- Consider two points of view:
  - Network Operations/Network Engineers
  - End Users
- Have recently heard would like Aggregate demand graph back
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