The Abilene Observatory

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from slide set stolen from
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(who stole a bunch from me!)

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Abilene Observatory - Summary

- A program to provide enhanced support of computer science research over Abilene
- Enthusiastic response from the Computer Science and Network Research Community
- Two components
  - Collocation Projects
  - Internet2 and NOC Measurements

- Collocation Projects
  - PlanetLab
  - The AMP Project

- Internet2 and NOC Measurements
  - Support Correlated Databases of Measurements for Network Research
  - Provide a picture of Abilene – A Day in the Life of Abilene
  - Input by Researchers – IGP, Traffic Matrix Examples

- http://abilene.internet2.edu/observatory/
Abilene Performance

The graph shows the throughput (megabits/sec) over time, with blue representing the 1 percentile throughput and green representing the 50 percentile throughput. The x-axis indicates sample time in UTC, and the y-axis shows the throughput.
New Observatory Features

- Enhancements to data storage and access facilities
- OC-192mon’s installed - Indianapolis
- Router study using OC-192mon
- Router buffer size tests
- Allowed a few high-rate SNMP tests
- Adding a new measurement server
- Outreach program to understand computer science community needs
Measurement Infrastructure

• History
  • Original Abilene racks included measurement devices
    – Included a single PC
    – Early OWAMP, surveyor measurements
    – Optical splitters at some locations

• Data collection motivation
  • Operational data – collected by the NOC
    – How is the network performing?
    – All users, other network operators to understand network
  • Some research data collected from the beginning

• Upgrade to Juniper T-640 routers and OC-192c
  • The measurement infrastructure was a fundamental part of the design
  • Two racks with one dedicated to measurement platform
  • Potential for research community to collocate equipment
Abilene router node

- Power (48VDC)
- Measurement Machines (nms)
- Space!
- Measurement (Observatory) Rack
- Out-of-band (M-5)
- Eth. Switch
- T-640
Dedicated servers at each node

- Houston Router Node
  - NMS machines
  - PlanetLab machines
Measurement Capabilities

- One way latency, jitter, loss
  - IPv4 and IPv6
- Regular TCP/UDP throughput tests – ~1 Gbps
  - IPv4 and IPv6; On-demand available (see “pipes”)
- SNMP (NOC) [octets, packets, errors; collected frequently]
  - NOC has SNMP proxy on agenda
- “Netflow” (ITEC Ohio) [anon. by 0-ing last 11 bits]
- Multicast beacon with historical data
- Routing data (BGP & IGP) [under development]
  - Zebra + mods, [Zhang Shu prompted IGP work]
- (Optical splitter taps on backbone links at select location(s))
Databases – Date Types

- Local collection, centralized storage, but highly distributed

- Databases
  - Usage Data
  - Netflow Data
  - Routing Data
    - ISIS + BGP under development
  - Latency Data (10/sec currently)
  - Throughput Data (1/hr currently, 1GE limited)
  - Router Data
  - Syslog Data
Research groups involved in the project

- Boston University
- Carnegie Mellon University
- Case Western Reserve University
- Kent State University
- University of Massachusetts Amherst
- University of Minnesota
- University of Wisconsin
- University of Wisconsin / Oregon Health & Science University

Collocation projects

- PlanetLab, AMP

See

- http://abilene.internet2.edu/observatory/research-projects.html
Abilene dedicated Facilities

- Potential for MPLS L2VPNs across Abilene – Ethernet tunnels through packet infrastructure
- Experiments – Internet2, CANARIE, GEANT, StarLight, SurfNet – 1 GigE path across variety of different infrastructures
- ITECs – dedicated MPLS L2VPN between the ITECs
- Will setup dedicated facilities for network researchers on a case by case basis
- HOPI will use such tunnels at the beginning