



Performance Measurements, Metrics, and the End-to-End Performance Initiative

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Outline

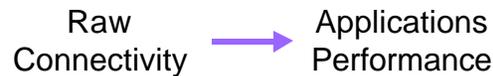
- E2E Performance Initiative Overview
- Network Measurements
- Common Performance Data Set

Switch Topics: IETF IPPM Work



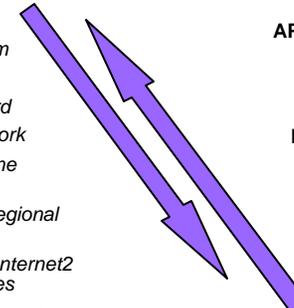
The Mission

To enable the researchers, faculty, students and staff who use high performance networks to obtain optimal performance from the current infrastructure on a consistent basis.



True End-to-End Experience

- User perception
- Application
- Operating system
- Host IP stack
- Host network card
- Local Area Network
- Campus backbone network
- Campus link to regional network/GigaPoP
- GigaPoP link to Internet2 national backbones
- International connections



EYEBALL
APPLICATION
STACK
JACK
NETWORK

...
...
...
...

INTERNET2 Areas of the Initiative

Applications
Host/OS Tuning
Measurement Infrastructure
Performance Improvement Environment (PIE)
Operations and Human Communications
Performance Evaluation and Review
Framework (PERF)

INTERNET2 Role of Internet2

We're relatively small
Capitalize on existing work
Point out holes
Provide central support where it makes sense, for example

- Backbone viewpoints
- Central knowledge repository (the "pie")

INTERNET2 Applications

Work with specific application communities to help solve their performance problems.
Use a few key, general purpose applications for performance testing.

INTERNET2 Host/OS Tuning

Provide Best Practices for getting the most from your computer.
Locate or build tools for Host/OS performance diagnostics. -> Web100
Work with computer vendors on Internet2 Performance Packages.

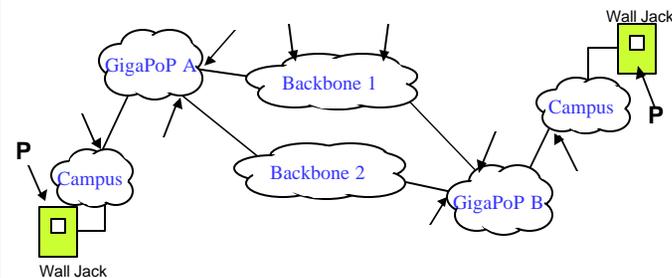
INTERNET. 2 Measurement Infrastructure

Bring together current measurement efforts and projects in the community.

Establish an End-to-End Measurement Infrastructure from the intersection of these works.

Create diagnostic tools to determine the health of the network and locate performance problems.

INTERNET. 2 The Network View



INTERNET. 2 Reference Servers

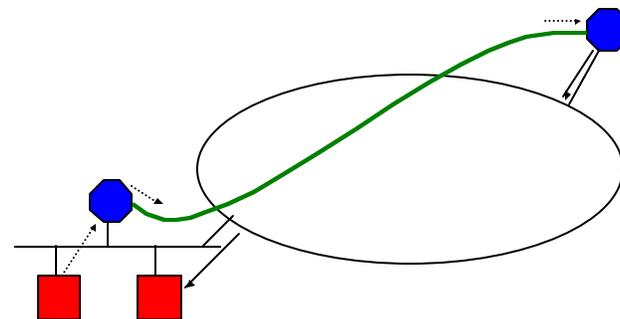
H.323 conferencing

- Goal: portable machines that tell you if system likely to work (and if not, why?)
- Moderate-rate UDP of interest
- E.g., ViDeNet Scout, <http://scout.video.unc.edu/>

(TCP) Performance debugging

- Conjecture: 80% of problems related to
 - Host tuning (mostly buffers)
 - Duplex mismatch [path]
 - Other physical connection problem [path]
 - “Hard” data from Claudia DeLuna, JPL; also hearsay

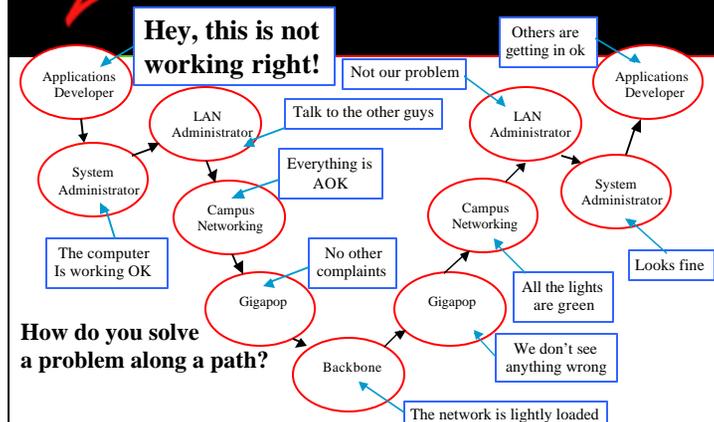
INTERNET. 2 Packet Reflector



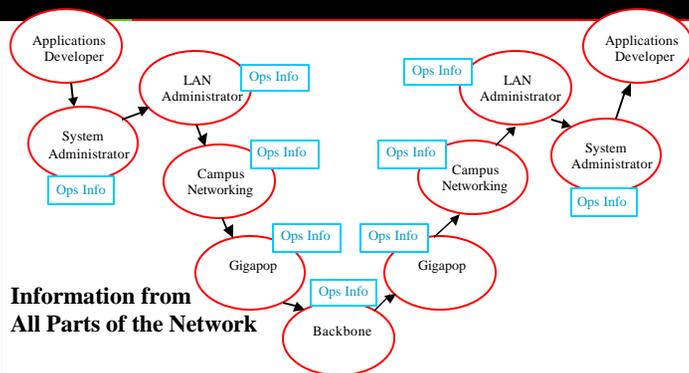
INTERNET2 Anticipated Partners

- Campuses
- Faculty and discipline communities
- GigaPoPs
- International partners
- NSF & DoE-sponsored engineering efforts
 - NLANR, www.nlanr.net
 - Web100 Project, www.web100.org
 - Net100 Project, www.net100.org
- Internet2 corporate members
- Federal labs and agencies
- GGF?

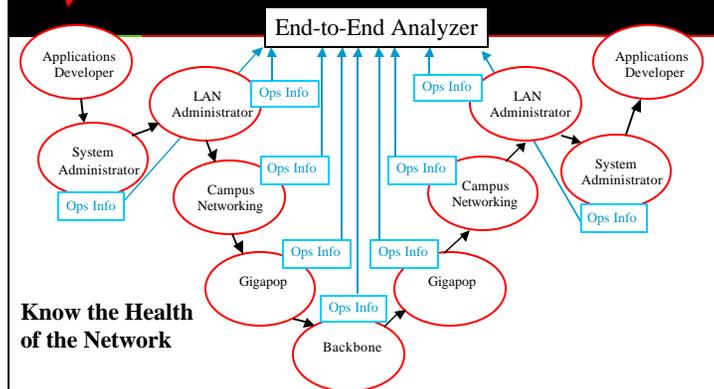
INTERNET2 The Problem



INTERNET2 Standard Operational Info



INTERNET2 Standard Operational Info



INTERNET² Common Themes

Passive measurements provide many insights; combine & correlate with occasional active measurements

Dissemination

- Moral equivalent of SNMP MIBs
- Maybe XML

Keep application communities involved

INTERNET² Next steps

Desire to keep working on common performance data sets and dissemination

Use results from existing activity (e.g., work here in GGF)

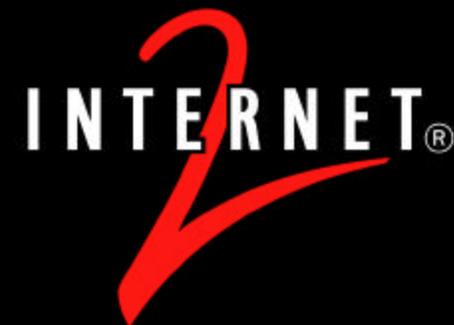
Spin up subgroups within measurement working group to fill holes (if any)

INTERNET² Contact Info

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Operations and Human Communications

Establish communications among common interest groups

- System administrators
- LAN administrators
- Campus NOCs
- GigaPoP
- Application support staff

Establish communications between groups for operations and problem resolution.



Performance Improvement Environment (PIE)

Develop a dynamic environment where collaboration and information sharing will happen.

Identify, collect and disseminate appropriate information for end-to-end related information.

Include success stories, measurement statistics, reference materials, measurement tool documentation.

Include pointers to materials already developed by other communities.



Performance Evaluation and Review Framework (PERF)

Establish a framework for resolving performance problems

- Provide known solutions by using the PIE
- Tap community knowledge by facilitating group communications
- Coordinate a team of experts to solve hard problems