

Toward a Measurement Infrastructure.

Warren Matthews (SLAC)
Presented at the e2e Workshop
Miami, FL, February 2003.

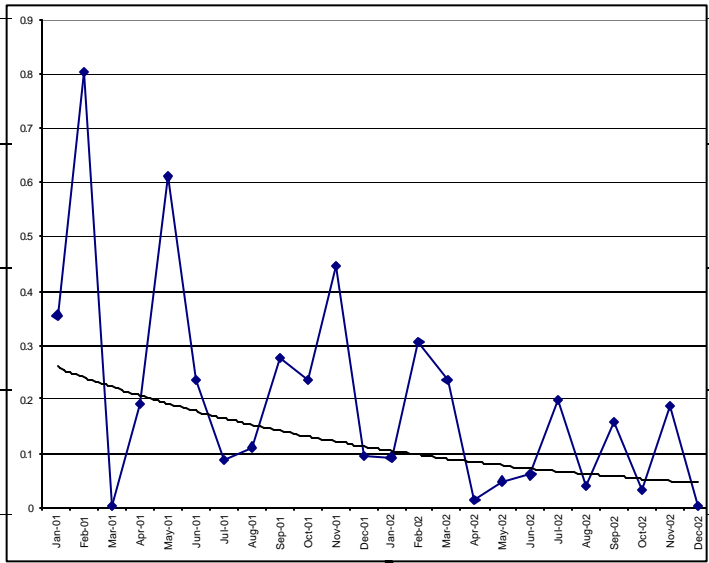
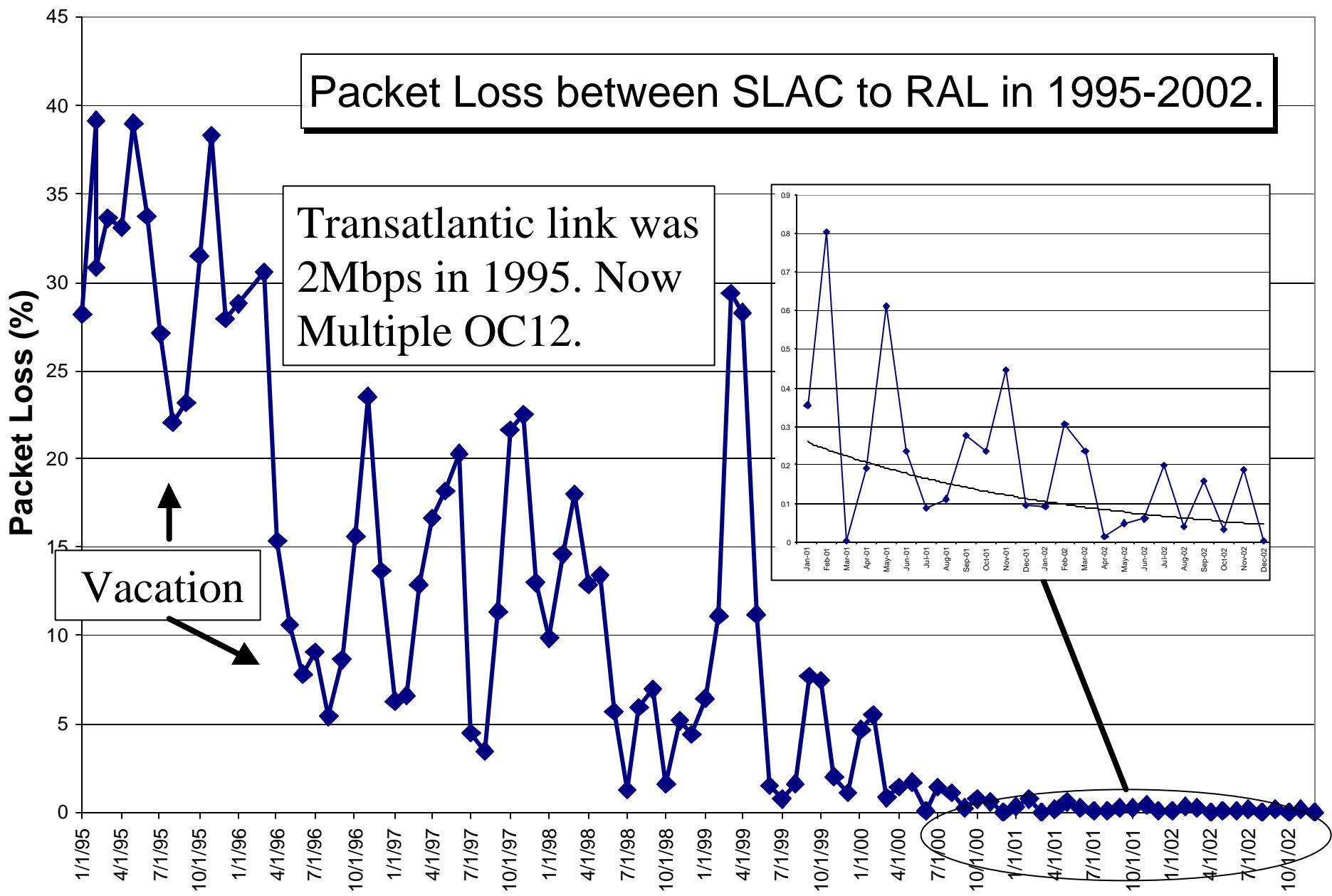
Overview

- The w/shop web page says we will focus on
 - Measurement Data Collection
 - **Tools**, Methods, Attributes, Schema
 - Data Repositories
 - Storage, **Access**, Management
 - **Data Analysis**
 - Network Capabilities, **Problem ID/Location**
- This is a workshop in progress.

Tools: PingER

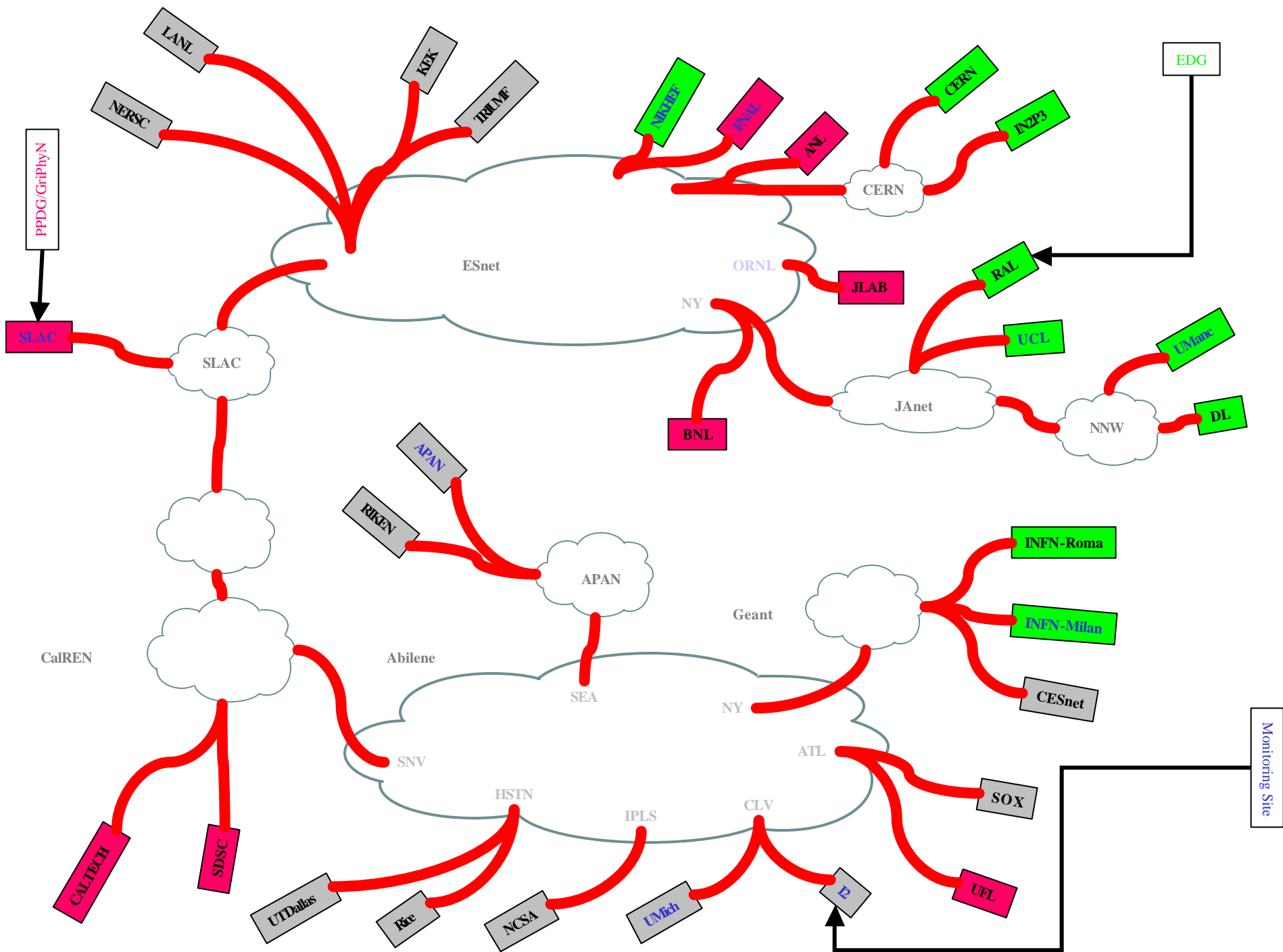
- Ping End-to-end Reporting
- 10x100 Byte pkts, 10x1000 Byte pkts
- Started in 1995
- Currently 36 monitoring sites in 14 countries
- Long term trends and short term glitches
- Continues to prove useful
 - Project with ICTP/eJDS on Digital Divide

Packet Loss between SLAC to RAL in 1995-2002.

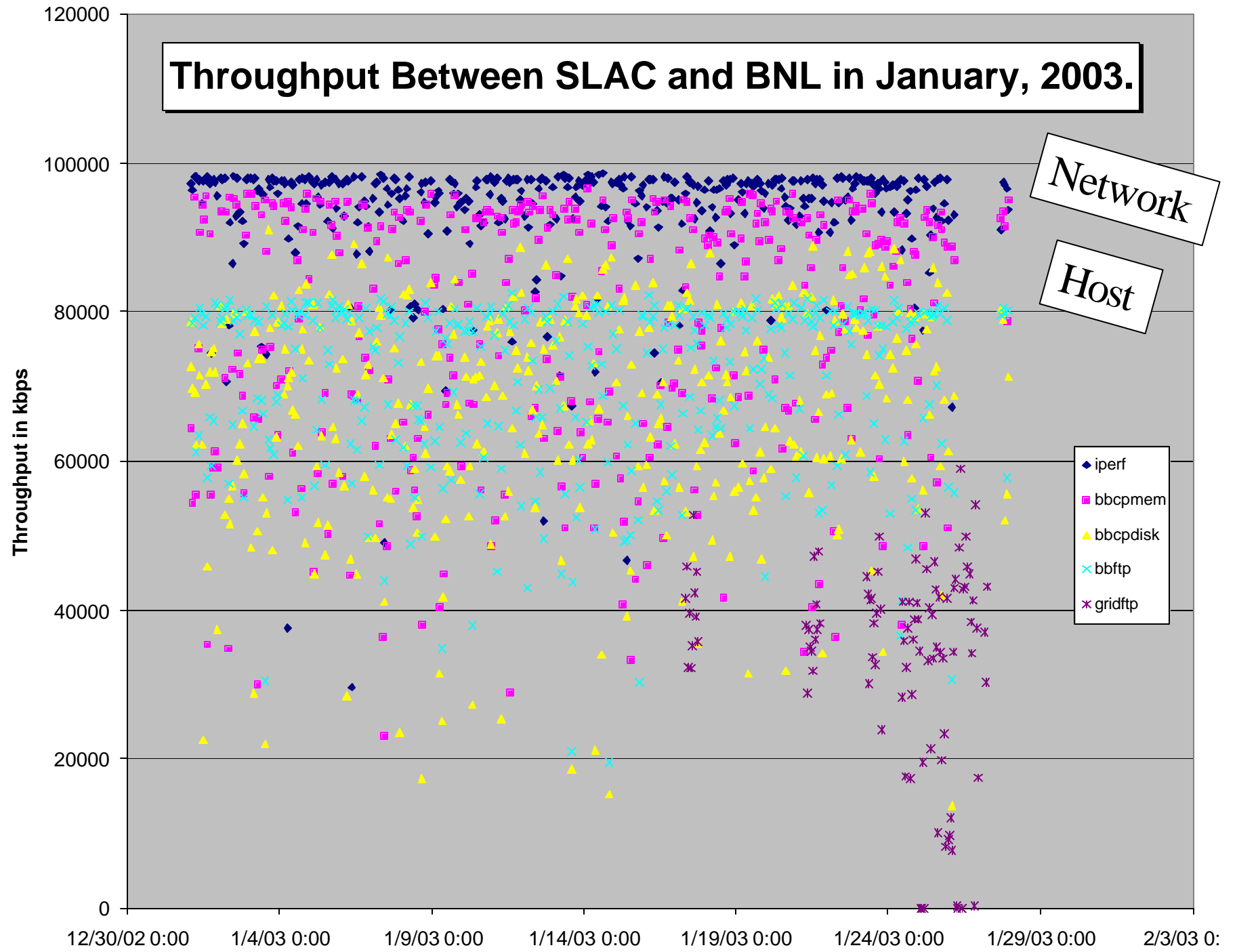


Tools: IEPM-BW/MAGGIE

- Currently 10 monitoring sites
 - North America, Europe and Asia
- 1-6 target sites each (40 at SLAC)
- Iperf, bbftp, bbcp, gridftp, udpmon
 - Network and applications
- Tools from DoE/MICS funded SCIDAC
- Measurement Infrastructure



Throughput Between SLAC and BNL in January, 2003.



Data Analysis

- Web Page based tables and graphs
 - Trends
 - Post mortems
 - Network Research
- Problem detection (later),
- Resource brokers
 - talk with the Computing/Storage Elements

Access: Publishing

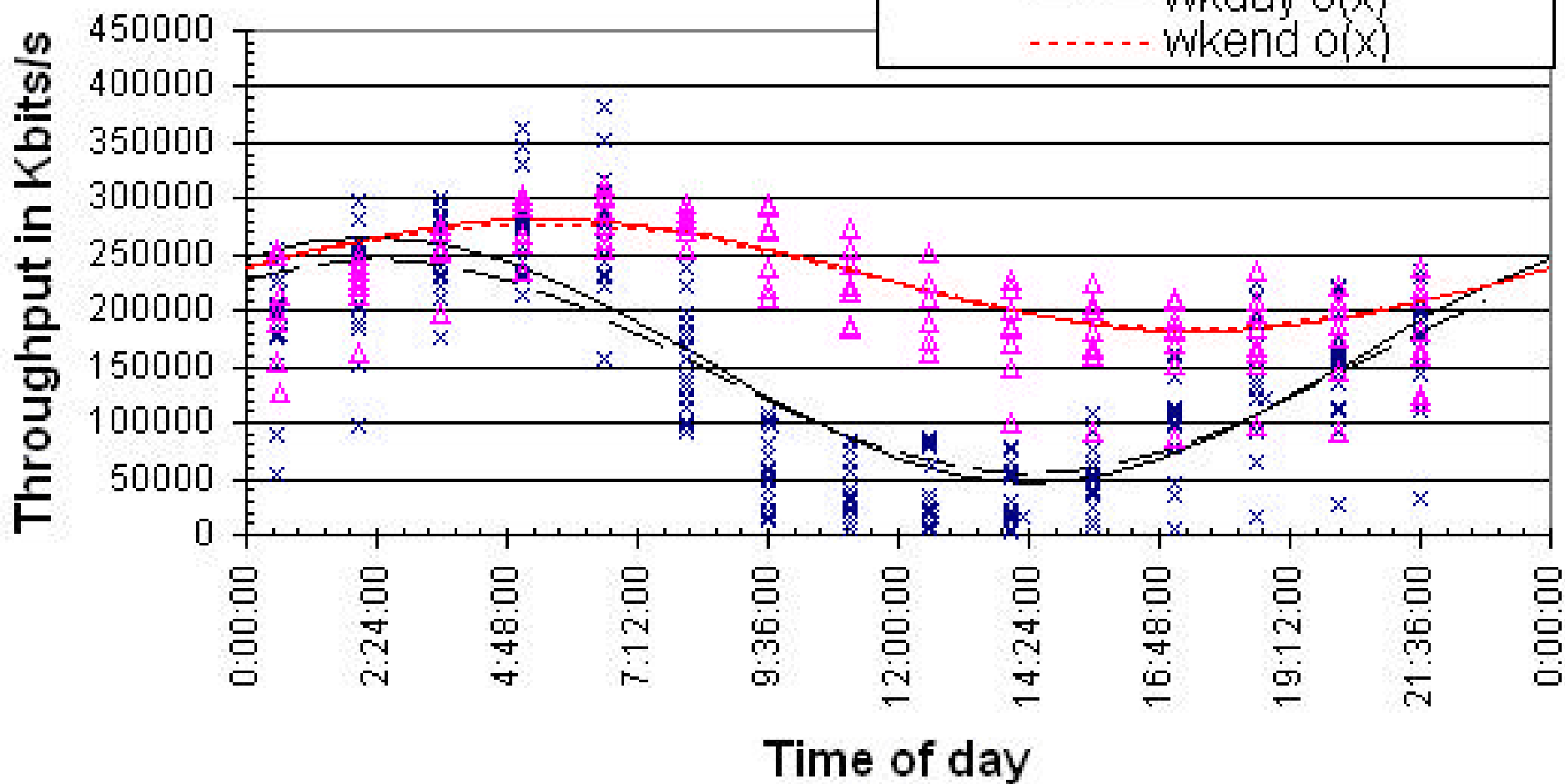
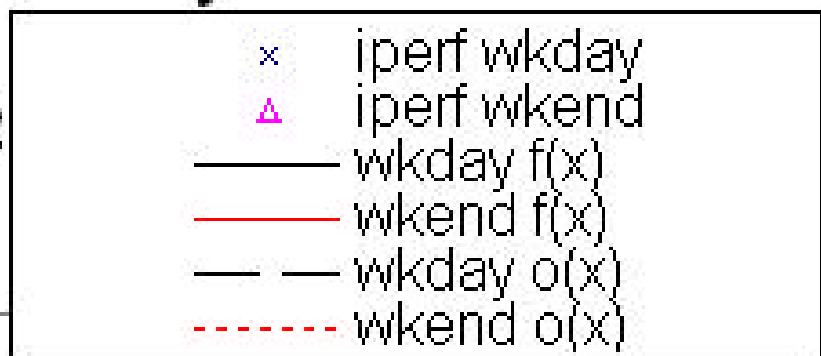
- Web Page
- MDS (Globus)
- Web Services
 - Work with GGF NMWG and GLUE
- PMP communication
 - UCL
 - Database

Problem Identification: Net Rat

- Typical Scenario
 - User complains file transfer is slow
 - Net admin runs ping, traceroute, iperf test
- Proactive
 - Problem: What do we mean by throughput ?
How do we know there was a performance hit ?
 - Our approach is diurnal changes

Iperf TCP throughput from SLAC to Caltech by hour of day

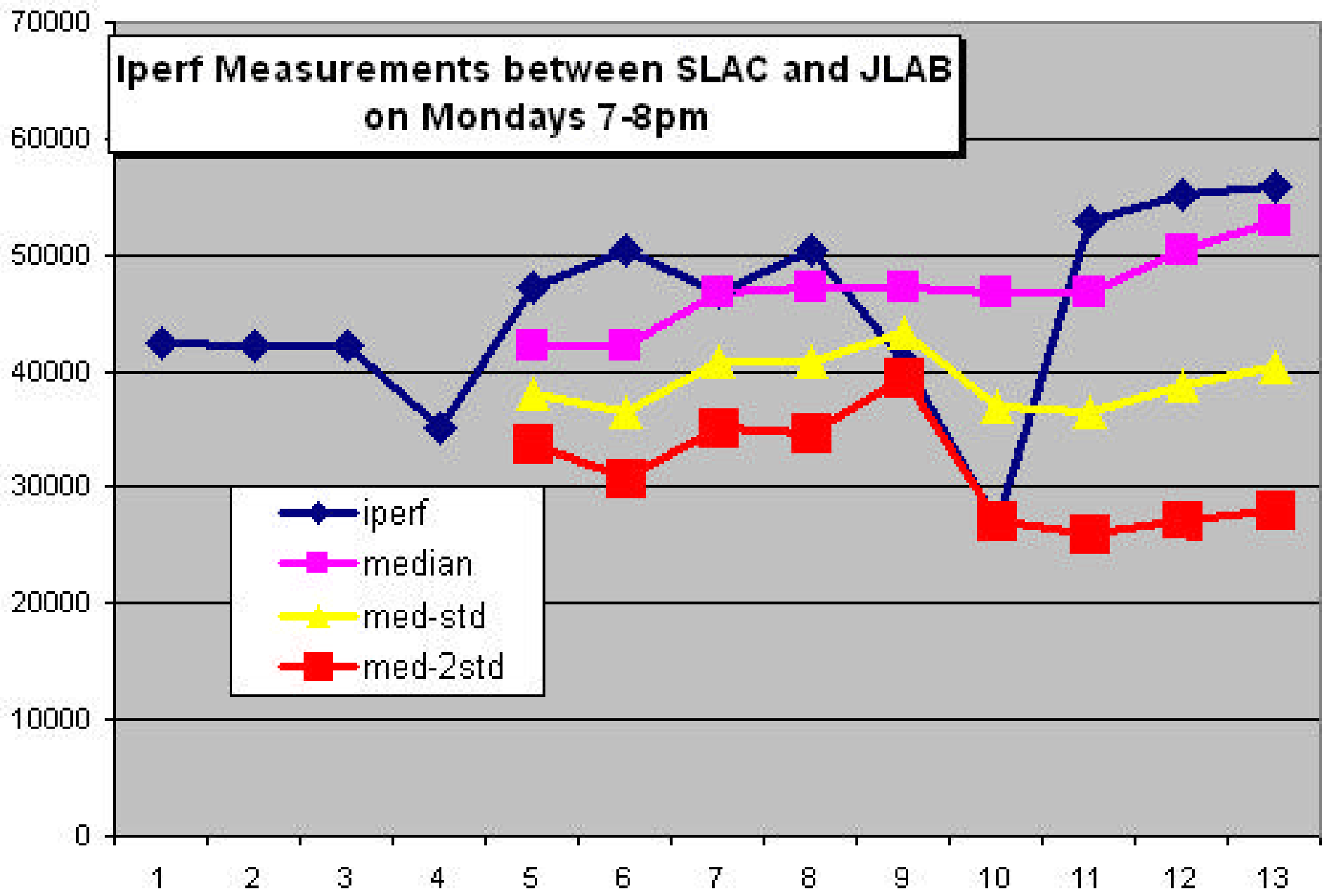
from 11 Oct - 8 Nov '02



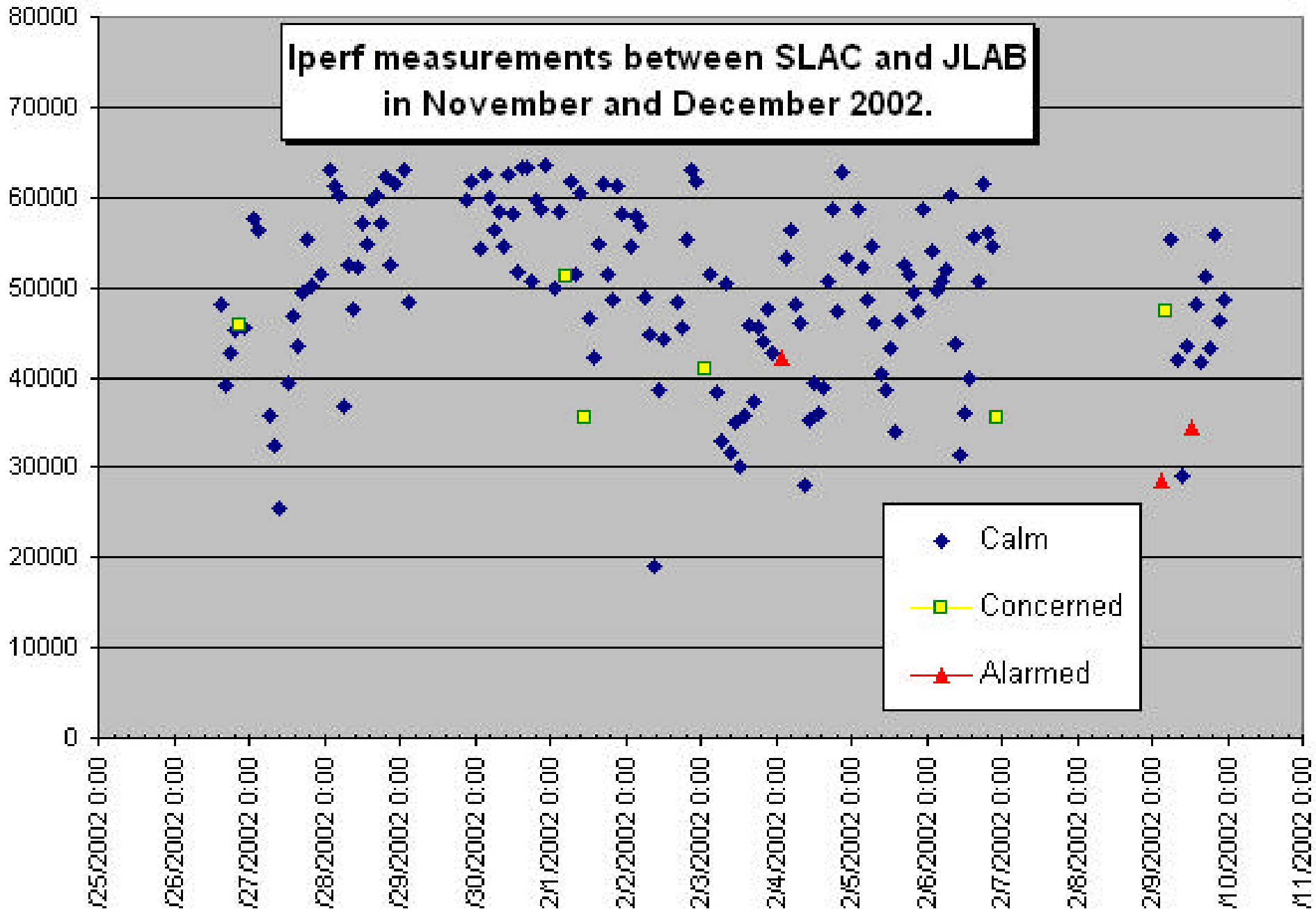
Alarms

- Too much to keep track of
- Rather not wait for complaints
- Automated Alarms
- Rolling average à la RIPE-TT
 - May not be the best approach

Iperf Measurements between SLAC and JLAB on Mondays 7-8pm



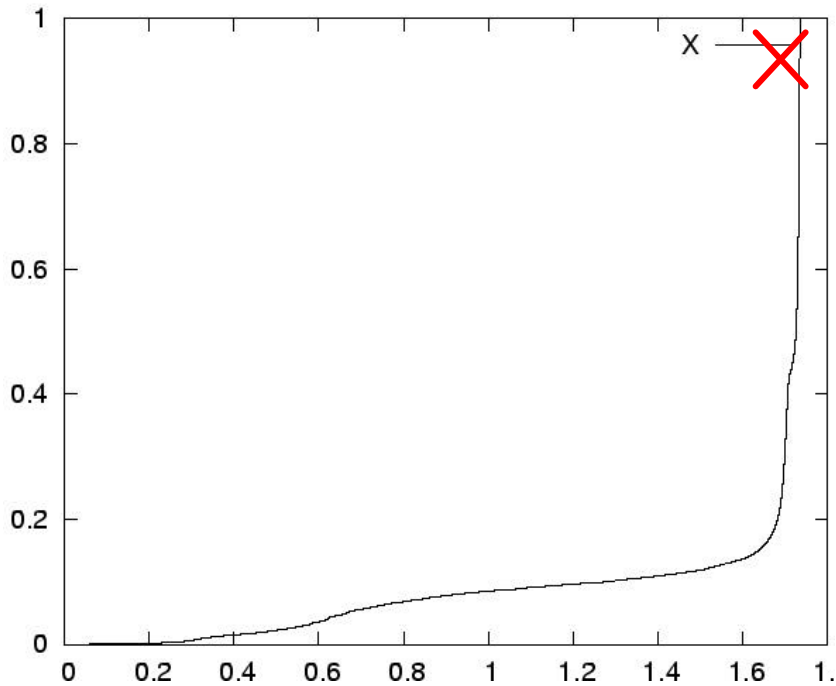
**Iperf measurements between SLAC and JLAB
in November and December 2002.**



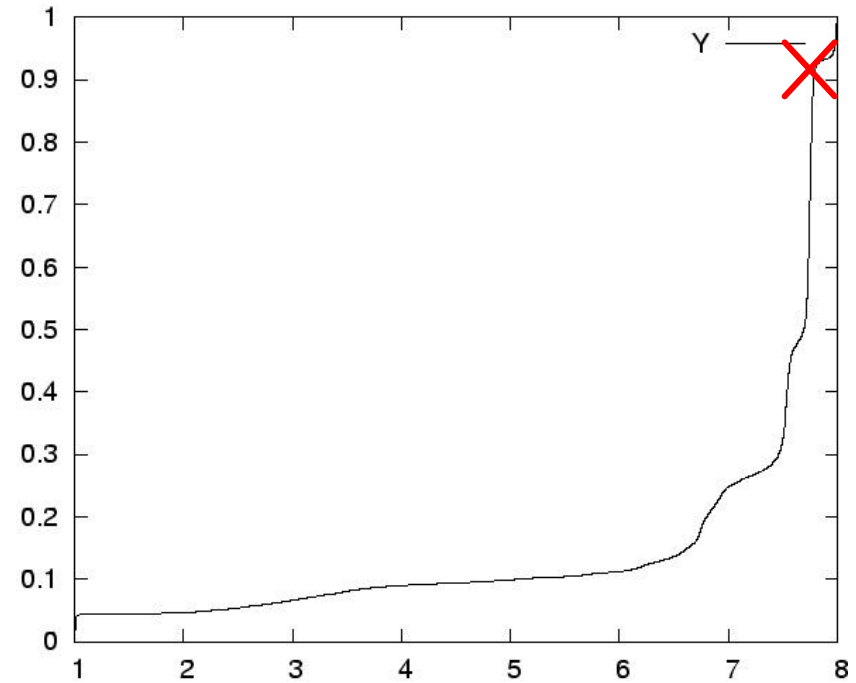
Limitations

- Could be over an hour before alarm is generated
- More frequent measurements impact the network and measurements overlap
- Low impact tools allow finer grained measurement
 - Use NWS multi-variate method
 - Use SCIDAC ABwE (PingER, OWAMP) tool

Easier to See with CDFs



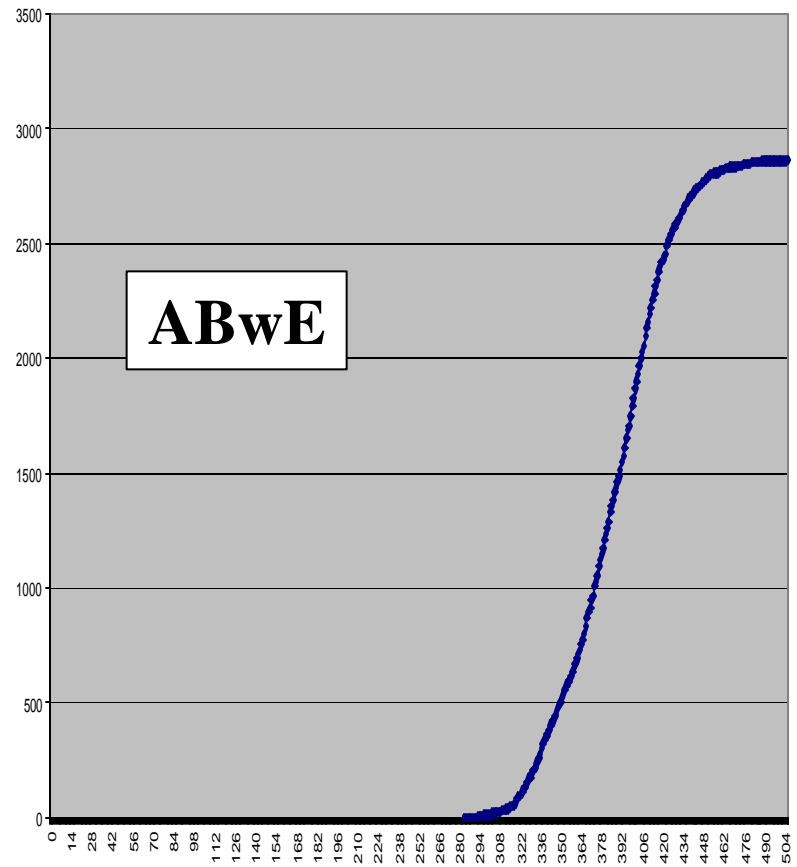
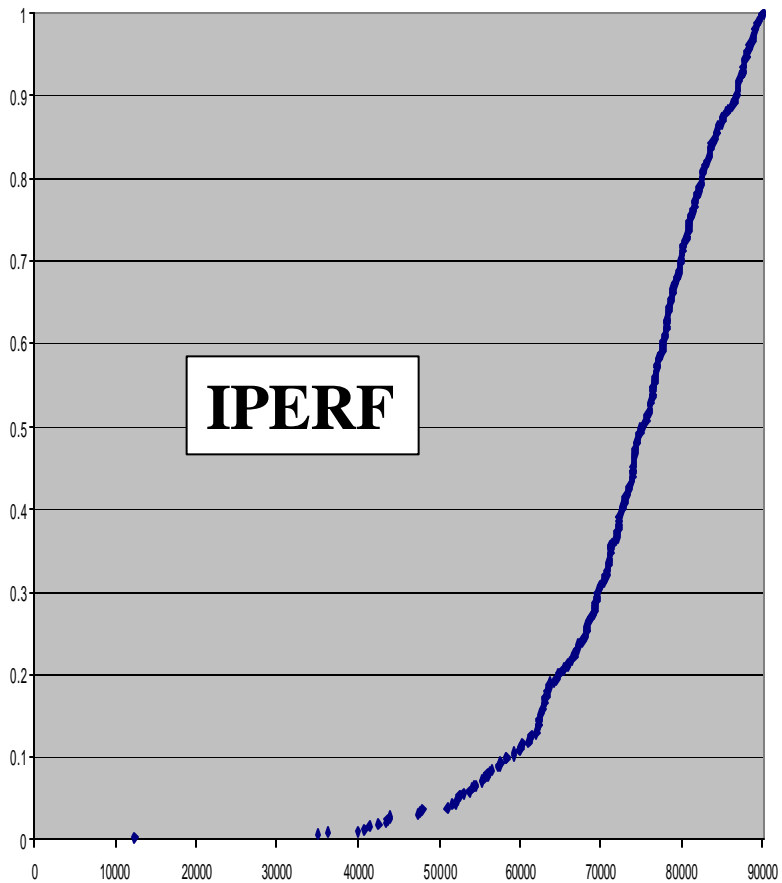
64K NWS Transfers



16M HTTP Transfers

This slide taken from Rich Wolski's talk at GGF5

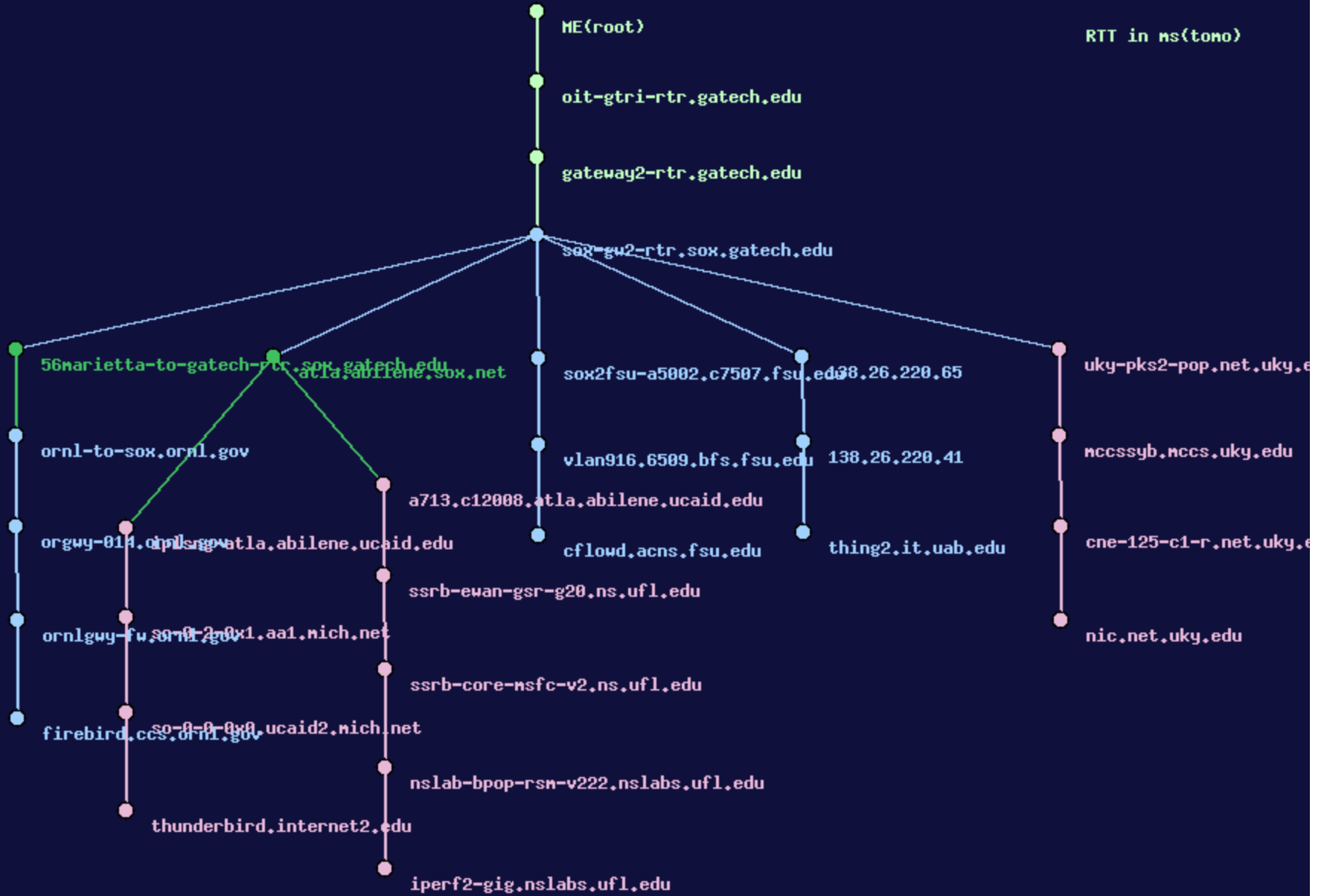
Infer Performance



Summary: Problem ID

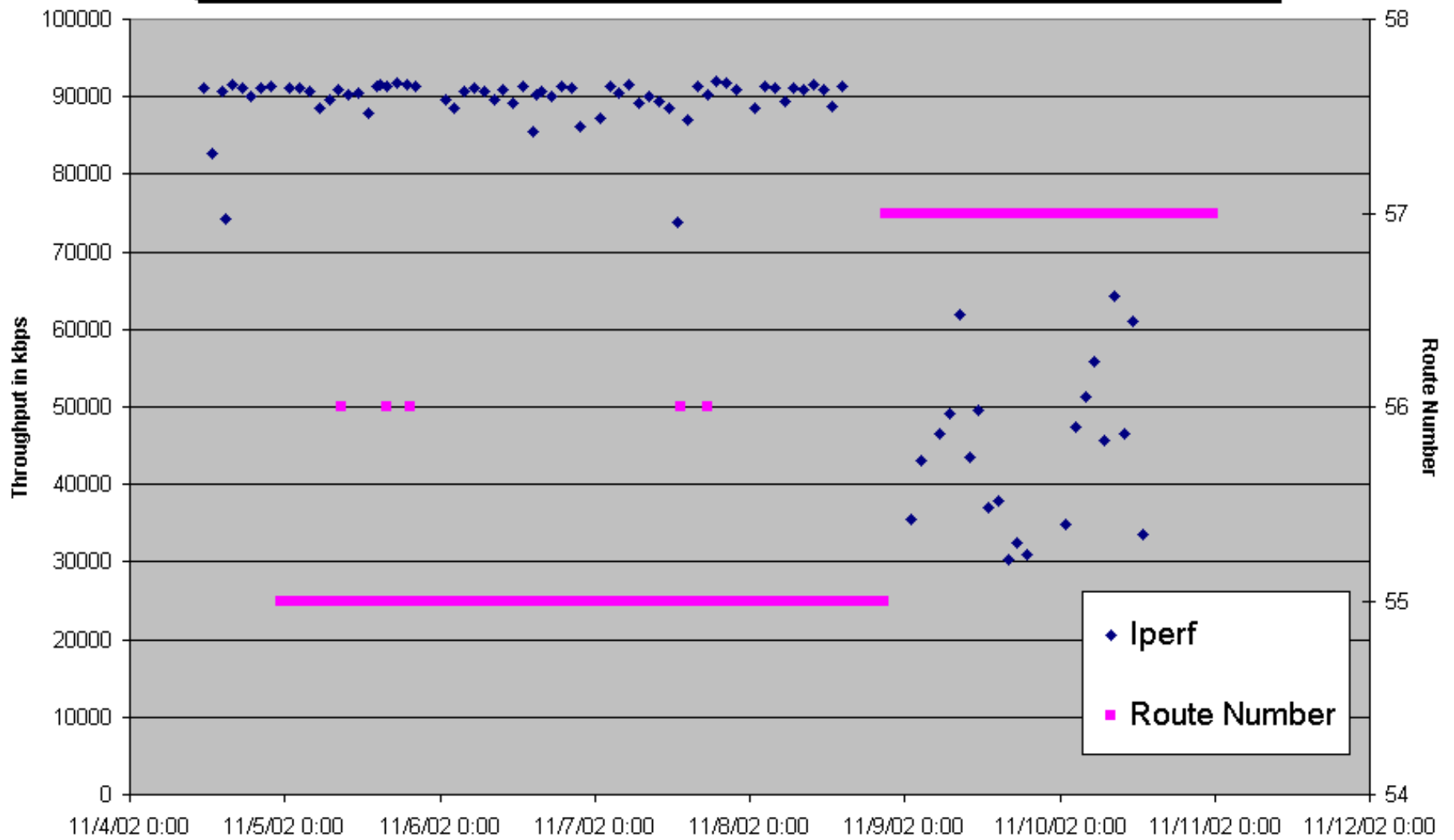
- However concern is generated
 - Compare to baseline
 - Look for changes in traceroute
 - Compare tools
 - Compare common routes
 - Cross reference other alarms

RTT in ns(tomo)



Scale colors [ns]	
Green	0.0 - 1.0
Blue	1.0 - 10.0
Purple	10.0 - 100.0
Orange	100.0 - 1000.0

Throughput achieved with Iperf and Route taken between SLAC and Internet2 in November 2002.



Toward a Monitoring Infrastructure

- Evolving
 - Certainly the need
 - DOE Science Community
 - Grid
 - Troubleshooting / E2Epi
 - Many of the ingredients
 - Many monitoring projects
 - PIPES

Summary / To-Do

- “It is widely believed that a ubiquitous monitoring infrastructure is required”.
 - So join in
- Communication
 - Define and implement
- Problem identification

Links

- [IEPM Home Page](#)
- [eJDS](#)
- [GGF NMWG](#)
- [Rich Wolski's talk at GGF5](#)
- [SCIDAC](#)
- [INCITE](#)

End

- SLAC team led by Les Cottrell
- Warren Matthews
- Connie Logg
- Jiri Navratil
- Jerrod Williams
- Fabrizio Coccoletti (INFN)
- Frank Nagy, Maxim Grigoriev (FNAL)
- And all the local administrators/supporters.
- Funding by DoE MICS / SCIDAC