Internet Delay Measurements using Test Traffic

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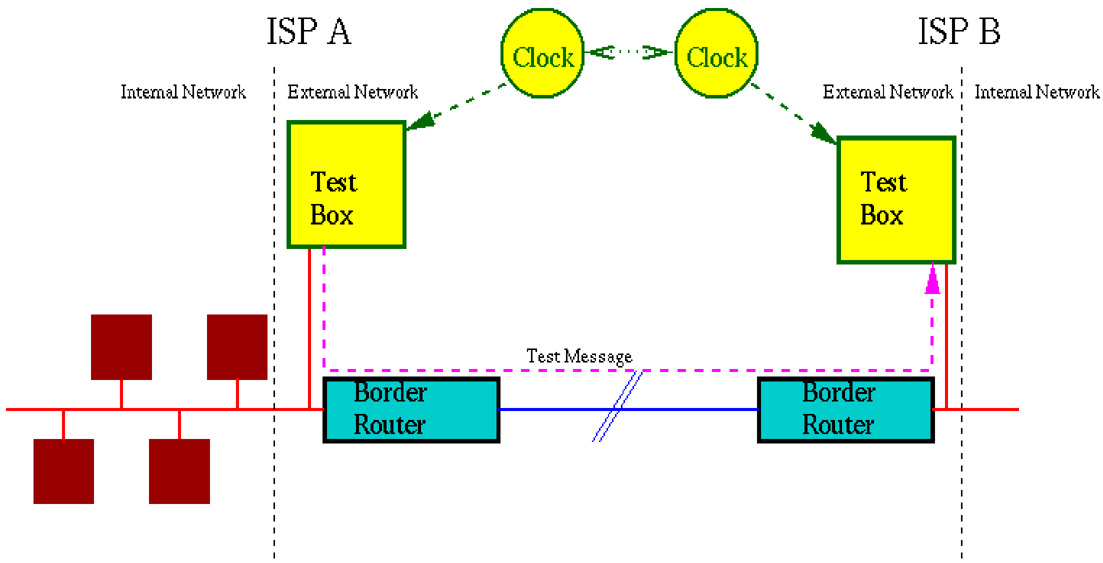
Overview

- Project proposed in RIPE-144
- Goal: Independent measurement of the delays in the network using test traffic
- Active measurements
- Focus on 1 way delay measurements and routing information
  - 2 way traffic for consistency checks only
  - Real life applications at a later stage

Test Traffic



- Test box near a border router of each ISP
- Test box sends and receives test traffic
- From the global clock, one can determine the delays
- Traceroute provides the routing information

Quantities that we measure

- Delay information
  - Time elapsed between the moment a message was sent by a test box and received by another, with an estimate of the error
- Hop Count
  - # hops between sender and receiver
- Routing Vector Information
  - Path between two points
    - Both ways
    - Packet Lost => No Connectivity
- All this information is a function of time

Experimental Set-up

- Central Machine at RIPE-NCC
  - Controls all test boxes
  - Collects data
  - Data Analysis
- Test Box at each ISP
  - “Plug and Play”
  - Comes with a GPS Clock
- Clock
  - GPS receiver wherever possible
    - Most critical component
    - Requires an antenna, can be used as a stratum-1 NTP server
  - NTP elsewhere
  - Aim for a resolution of O(1)ms or less, but at least 1 order of magnitude better than the time differences

Presentation of the Data
Non Disclosure

- 4 levels of access
  - Experts at RIPE-NCC: All data
  - Participating ISP: all data about this ISP
  - Non-participating ISP's: Global numbers
  - General public: Global numbers
- Analysis
  - At the RIPE-NCC
  - By the ISP, to analyze his system
- During the initial phase, both sides agree not to publish any data until the results have been verified and both sides agree that the results are correct

Access to the Data

- Local Test-box
  - Will return the results of the last measurement to a local machine
- Server
  - All information about an ISP, as a function of time
- Reports
  - We will use automated tools to extract summary information from the data
  - Global plots will be made accessible to everyone
  - Plots about a particular ISP will be available for that ISP only

Design Document

- Draft exists
- Copies are available for comments
- Final version expected around May 31

- Details of the implementation will be discussed in future notes

RIPE Network Coordination Centre

Schedule

- 14 April 1997: Start of Project
- End of May:
  - Finalize Design Document
- Summer'97:
  - Build small test set-up (3 boxes: 2 local, 1 remote)
  - present first results at the September Ripe Meeting
- Fall'97:
  - Analyze test results, design test boxes and build ±25 of them
- Dec'97/Jan'98:
  - Commission test-boxes
- Spring'98:
  - Collect data, include more ISP's

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Conclusions

- The project is well under way
- First results expected in September