Consumer Broadband Monitoring Feasibility Pilot Proposal v.0.3 RIPE TTM WG

Alexander Tudor
atudor@labs.agilent.com

October 10, 2005

1 Rationale

Consumer broadband penetration is increasing. Broadband voice and video are gaining marketplace acceptance. As competition heats up and prices decline consumer choices multiply. Hence measuring Internet connectivity performance becomes more important.

Quantifying performance is advantageous to both producers and consumers. The former can justify brand premium pricing with tangible metrics, whilst the later can be assured of product quality. In addition, measurement decreases the likelihood of regulatory interference.

While the advantages of measurement may be evident, it is unclear what entity should perform it. Providers have at least a perceived conflict of interests. The funding of a government agency to protect the consumer is equally unrealistic.

RIPE NCC is a member owned organization whose neutrality puts it in the unique position of being an acceptable measurement authority. Started as a mostly service provider organization, RIPE NCC's membership now includes civil, military, academic and EU government representation. Consumer organization and bulk bandwidth buyers are likely to soon follow as the economics of IP are making voice and video services more dependent on the Internet. This view is supported by both anecdotal evidence, as supplied by members of the volunteer advisory board below, and the popularity of http://www.dslreports.com, amongst others.

RIPE is a forum where policy can be discussed and made because it is not a stake holder in the bandwidth market.

The above ideas have been discussed during the RIPE 50 TTM working group meeting. Minutes (http://www.ripe.net/ripe/wg/tt/r50-minutes.html) suggest the action consensus: to initiate the next stage by formally requesting funding for a limited deployment prototype with the purpose of assessing industry & consumer acceptance, functional requirements and technical issues.

2 Initial Requirements

Since central monitoring does not scale effectively, a home device is required. The device needs to be cheap, available worldwide and amenable to complete software customization. It should preferably be a device that already exists in the home of the pilot audience and if added to the user's installation it has to be transparent to the rest of the home network.

The home device needs to work in conjunction with a subset of the existing TTM infrastructure. The system should not introduce significant processing load within the TTM node software nor should it cause architectural software changes. No new TTM nodes should be deployed as part of this effort, unless specifically purchased by a pilot participant.

Anonymized time-stamped raw measurement data should be centrally available for research.

User and provider privacy needs to be enforced. This means that users can only see their own data and that providers have no access to other providers' customer measurements. To mitigate service providers' concerns with respect to competitive comparisons - when and if such a need arises - public summary data should consist of anonymous coarse-grained scoring similar to that used by Band-X (`http://www.band-x.com`) for grading transit. It is desirable to plan for such capability from the start.

Pilot deployment preference should be given to those service providers that are willing to relocate, or newly locate a TTM node within a densely populated customer access network.

3 Measurements

All measurements are between the home device and a designated TTM node located within the user's service provider's access network.

The periodic measurements are: packet loss, delay and jitter. Bandwidth measurement should only be available on demand because of TTM node side load.

4 Non-Measurements

This system does and should not measure inter-domain performance. The test end points comprise the consumer's home and one or more TTM nodes placed within that consumer's service provider network, at a location determined by the service provider. No measurements will be taken between home devices nor to TTM nodes not expressly assigned by the service provider.

5 Approach

Few devices meet the requirement set forth above. The LinkSys WRTG54 however, (`http://www1.linksys.com/products/product.asp?prid=508&scid=35`) makes an easy choice. It is a wireless router/bridge, made by Cisco, with a market price of

under US$50. Its software is open (`http://www.sveasoft.com`), runs Linux and has an extensible soft probe and network management package (`http://www.ntop.org/ntop.html`) already running on it.

The choice of the LinkSys device should not be construed as a decision to use it for production deployment, if and when approved.

6 Deliverables

It is expected that this project will demonstrate the feasability, acceptance and usefulness of such a system, using no more than one hundred end-users and no less than two service providers. All measurements shall conform to relevant IETF IPPM specifications, where applicable. The study needs to address the following issues:

- demonstrate build and software update process on the LinkSys device
- implement one measurement and the corresponding provisioning, database and data distribution
- quantify LinkSys clock stability
- report on practical deployment and operational issues such as installation, upgrades, etc.

The hardware platform for these measurements is an ADSL router/access point. Measurement software will be added to this platform, however, the device should continue to act as an ADSL router. Before the full system is designed, a prototype will be built to show that this is possible. The prototype will also be used to get an idea of the deployment issues that one will face. The proposed hardware platform is a cheap device that will typically be run in a home environment, with large variations in room temperature. We will check if the hardware is stable enough platform for these kind of measurements. The NCC shall provide a calibration methodology for qualifying and selecting the measurement platform.

Optional specification and software deliverables shall comprise:

- TTM node scalability testing. The NCC shall provide a test methodology and plan.
- web browser based user interface for provisioning, on-demand bandwidth test, threshold e-mail alarm and 30-day trends

Stretch objectives are ICMP monitor, IPv6 measurement strategy, DNS primary & secondary server test and POP3/IMAP turn-around test. Future possible measurements are passive tests for VoIP, video and application level performance.

7 Schedule

The study would take on the order of four to six months to complete. Its timeline is as follows:

- 10/2005 - verify user requirements during RIPE 51 TTM WG
- 01/2006 - project start
- 05/2006 - NCC identifies deployment issues and costs during RIPE 52 TTM WG
- 05/2005 - Alpha rollout decision is made at RIPE 52
- 07/2006 - Alpha rollout

8 Cost

One FTE to manage deliverables, user and service provider signup and testing. Two FTEs for implementation, pilot deployment and support.

9 Volunteer Advisory Board

Laurent Bernard, France Telecom, FR `l.bernard@francetelecom.com`
Rickard Dahlstrand, Consultant, SE `rd@tilde.se`
Luca Deri, University of Pisa, IT `deri@ntop.org`
Niall O'Reilly, University College Dublin, IE `Niall.oReilly@ucd.ie`
Rainer Rudiger, Teleport Consulting and System Management, AT `rainer@tele.net`
Ad Spelt, KPN, NL `ad@kpn.net`

10 Acknowledgments

Luca Deri, University of Pisa `deri@ntop.org`
Henk Uijterwaal `henk@ripe.net`
Rene Wilhelm `rene@ripe.net`