Characterizing Broadband Services with Dasu

Zachary S. Bischof   Mario A. Sánchez   John S. Otto
John P. Rula   Fabián E. Bustamante
{zbischof, msanchez, jotto, john.rula, fabianb}@eecs.northwestern.edu
Northwestern University

We present a crowdsourced approach to broadband service benchmarking from end-systems. We describe its prototype implementation in the context of Dasu [1], a measurement experimentation platform for the Internet's edge. Our approach is based on the observation that, by leveraging minimal monitoring information from the local host and home routers, one can achieve the scale of "one-time" end host approaches with the accuracy of hardware-based solutions.

We demonstrate the broadband characterization functionality of our implementation in Dasu and showcase its user interface. We present results showing that a large scale and continuous view enabled by an end-host approach allow us to capture, among other features, the wide range of service performance experienced by users across geographic locations and over time.

Dasu support for broadband benchmarking currently includes traditional low-level metrics (such as latencies to the first public IP hop, last private IP hop, primary and secondary DNS servers, and egress points; download and upload throughput measured by NDT; packet loss; and DNS lookup performance) as well as application-level metrics including BitTorrent throughput, average throughput rates measured by YouTube, web browsing performance (page-loading time) for popular websites (ranked by Alexa.com). Measurements are extensible in terms of both their type and target. Dasu also collects passive performance metrics when available.

Dasu users are provided with summaries of and historical data about the collected measurements, including a comparison of the average performance seen by other Dasu users in the same region on alternative ISPs. Since many users have restrictions on their monthly bandwidth usage, the interface includes a history of bandwidth used by BitTorrent as well as other traffic from the localhost. When UPnP is enabled at the gateway, Dasu uses byte counters to accurately keep track of the user's total bandwidth consumption.

Poster & Demo

The poster illustrates the aggregated perspective enabled by our end-system approach to characterization, as well as the information Dasu provides to end-users. Figure 1 shows part of this interface for a particular user, focusing
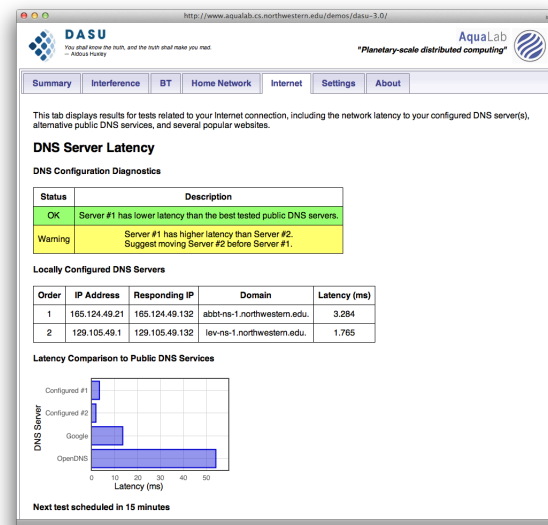

Figure 1: Sample screenshot of Dasu's summary of a user's Internet service

on DNS performance. In this case, Dasu detects that the user's DNS server configuration is suboptimal, since the secondary server has a shorter response time than the primary server. In the poster, we include other sides of the interface and examples illustrating observed issues and suggested solutions for end-users to resolve them. In addition, the poster compares performance metrics between different broadband service levels, providers, and geographic regions.

References

[1] SÁNCHEZ, M. A., OTTO, J. S., BISCHOF, Z. S., CHOFFNES, D. R., BUSTAMANTE, F. E., KRISHNAMURTHY, B., AND WILLINGER, W. Dasu: Pushing experiments to the Internet's edge. In *Proc. of USENIX NSDI* (2013).