Workshop Report: Network Operator Measurement Activity (NOMA)

June 2016.

On June 16, 2016, a group of experts from network operators came together to talk about measurement of networks. Operators have an inherent interest in finding useful ways to track their own networks, and have some point of reference to other networks' performance. Of course, it's not just the operators that have an interest in this – external users have been measuring aspects of network performance for as long as there has been a network, and regulatory bodies have gotten involved when there have been concerns about whether customers are receiving a service that lives up to the advertised claims of performance.

This workshop was convened to explore a new approach to network measurements, engaging participants in discussing what could be built by way of shared view of actual Internet performance if operators instrumented their own networks and provided some shared view of that data to the rest of the world.

Operators and Measurements Contexts

Participants discussed their experience of network measurements in three contexts:

- Third party measurements that make assumptions about the operators' networks
- Measurements operators are required to support for regulatory or industry purposes
- What operators would like to track about their own networks

Third party measurements

Workshop participants outlined some of the pitfalls they see with third party measurements. These are tools or activities that are developed for general purpose use across more than one network. Although well thought out, they must work based on assumptions of how networks are set up, and may be unable to detect particularities of how networks are actually connected.

There are popular measurement platforms available today (*e.g.,* Ookla[1]), that end-users can run to determine something about their current level of connectivity to "the Internet". However, these systems are proprietary and closed; it's hard to know what assumptions they are making about actual connections, what sites they are reaching to make their measurements, and how they are rolling that up into results. For example, because of the way the CDNs work (lots of connection points, caches), it's hard to do generalized Internet measurements today in a way that meaningfully represents the user's experience.

Required measurements activities

From time to time operators are required to support various measurements for industry regulatory purposes. This might take the form of logging and reporting various specific measurements, or providing tools for network users to monitor their experience of the network.

Again, there are issues with "one size fits all" approaches necessary to achieve some level of apparent uniformity across networks and services.

Additionally, operators expressed concerns about requirements to collect data for issues that are not business relevant, or that are for issues that are obsolete. A well-organized access network operator is already working out how to give their customers better access to the resources they want, and the solutions may involve choices (*e.g.,* business discussions with the companies running the resources users are looking for) that are not directly related to making those measurements look good for their networks.

Operators also observed issues with sharing internal data with a regulatory body, which does not have the intimate knowledge of the source network and may not have the specific technical knowledge to correctly interpret what the data say.

What operators would like to track

Participating operators expressed interest in developing and deploying a general measurement strategy that would work across networks, from the inside of the network out (as opposed to being imposed from the outside in).

One operator demonstrated the work they have done to instrument their network, with thousands of measurement points increasingly close to the end user, taking simple measurements towards established fixed points outside the

[1] https://www.ookla.com/

operator's network (*i.e.*, external services). This resonated strongly with the other operators present.

Discussion turned to the question of how close it is realistic to put such a measurement point. On the one hand, the CPE seems like the logical desired endpoint, but the reality is that the so-called "last mile" is (and is best) monitored for signal quality, and "Internet" connectivity starts to get interesting at the first "Layer 3" point of connection (which might be the DSLAM or CMTS, but might not).

Open questions to be followed up include:

- What is the right set of basic data to collect from such instruments?
- How to coordinate and manage a widescale measurement activity within a network towards unrelated, external resources (the testcase endpoints)?

Summary/takeaways

Operators see value in self-instrumentation: being able to see where there are problems with particular external services of interest, and that they can share some sort of information about their network on a level playing field. The fact that a large operator has already made progress in this direction underscores the feasibility of the opportunity.

There are problems with many of the approaches taken today to "measure" networks, especially when the measurement tools and activities are not open, and do not benefit from the understanding of the operators running their network. Putting some of the control in the hands of the operators can help address those issues

There is interest in continuing discussion to come up with some kind of general framework.

Next steps

Participants expressed interest in follow up actions and discussion:

- Share a template based on what the operator data that was shown
  - To be shared among the participants, who will share within their own organizations to socialize and gather input
- Reconvene to discuss:
  - What profile of data collection would be interesting to gather and share

- How to gather it, validate it, merge it
- Where to get the tools to do this

Appendix – Meeting participation

Attendees of the meeting are employed by a number of North American operators and industry organization (AT&T, Charter, Comcast, Internet Society, Rogers, Telus, Verizon), but they were invited, and participated, in their personal capacity as industry experts:

- Leslie Daigle, Thinking Cat Enterprises LLC/TechArk (convenor)
- John Brzozowski
- John Cowperthwaite
- Dave Michaud
- Michael Paradise
- Joe Pucik
- Phil Roberts
- David Tingley
- Clinton Work

About NOMA and TechArk

TechArk[2] is an activity of Thinking Cat Enterprises LLC, intended to foster "better Internetworking through collaboration". Too often, deployment of new and needed technologies can languish because they require a concerted effort across independent networks that span international borders. Cross-industry collaboration has important precedents, but it is rarely completely spontaneous. The intention for TechArk is to cultivate it where and when needed, empowering individual organizations to make the Internet better.

NOMA (Network Operator Measurement Activity)[3], one of the activities under the TechArk umbrella, is exploring the possibility of developing operator-driven network health measurements.

[2] http://www.techark.org
[3] http://www.techark.org/noma