LMAP BoF
1. ISP use case
2. Framework

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ISP use case

• Identifying, isolating and fixing problems in the network
  – Assist Test and Diagnostics tools
  – Identify degradations as well as failures
  – Identify issues affecting a group of customers (shared network element, equipment type, etc)
  – Test network segments, as well as access line
  – Scheduled and ad hoc tests needed

• Design and planning
  – To assist capacity planning & monitor suppliers

• Understanding the impact and operation of new devices, technology, products and services
  – IPv6, CGNAT, IPTV, new line cards...

• Understanding the quality experienced by customers
  – End-to-end service experience
LMAP characteristics from ISP use case

- **Large-scale**
  - Capable of running tests on individual lines (panel is not enough)
  - Potentially Measurement Agent in every edge and end device
- **Standardised**
  - Meaningful to compare measurements of same metric
  - Allow operators to use multiple vendors for Measurement Agents
- **Diversity**
  - Measurement Agents in different devices (home hubs, set top boxes, edge devices), from different vendors, with different capabilities (wired, wireless)
- **On-demand tests**
  - By operator and by end user
- **Measurement Agents**
  - Perform the test
- **Controller**
  - Manages MA (instructs what test to do & when; how to report results)
- **Collector**
  - Accepts results from MA
Overall measurement framework

- LMAP should be open about what metrics are measured
  - Use IPPM tests, referenced via the proposed IPPM registry
Overall measurement framework

- LMAP should be open about use of measurement results
  - After collection: used by ISP, regulator...
Technical gaps (work for LMAP)

• Define how the Controller instructs an MA about a test (Test /Report Schedule)
  – What metric to measure (with what parameters), when, what conditions, how to report (where to and when).

• Define how the MA reports results to the Collector (Report)
  – What was measured, when, the actual results

... which requires ...

• Information model: abstract definition of Test /Report Schedule and of Report
  – We want exactly one

• Data model: instantiates the information model in a particular language.
  – Eg JSON or YANG or (for the Report) IPFIX. Or non-IETF standard like XML.

  – Eg NETCONF or a RESTful interface or (for the Report) IPFIX. Or a non-IETF protocol, like TR-69
  – Reflect diversity of types of Measurement Agent
Solution Constraints

• To help meet the required characteristics
  – especially large-scale
• To simplify initial work whilst allowing future extensions
Constraint #1: Measurement system under control of one organisation

• Single organisation responsible for both data and user experience
• Inter-organisation coordination is not precluded
  – Interesting but raises additional issues (policy etc)
Constraint #2: Measurement Agent has a single Controller at any one moment

- Single Controller determines MA’s Schedule
  - So MA does not have to manage contention between multiple, conflicting Schedules
  - Simplifies MA design and deployment
- Note, an operator may have several Controllers
  - For different device types, scalability, resilience etc
Constraint #3: Measurement Agent acts autonomously

- MA operates tests and reports results without further reference to Controller (once it gets Schedule)
  - Avoids frequent checks with Controller
  - MA (on edge /end device) knows when not to run test due to user activity