IETF Measurement Standardization

LMAP (touch on IPPM)

Large-Scale Measurement of Broadband Performance

LMAP Standardization History

- Evolved out of an FCC's MBA Program - 2012
  - NMASOG (Next-Generation Measurement Architecture Standardization and Outreach Group)
  - Goal – Support for a standard's-based broad deployment broadband performance architecture, protocols, metrics and data structure.
- Equip consumer edge devices with measurement capabilities
- Spawned two concurrent standardization efforts
  - IETF – Internet Engineering Task Force
  - BBF – Broadband Forum
    - Evolved into complementary specifications

LMAP Creation

- Timeline
  - 1st BOF held in Q4 2012 in Atlanta
    - Chaired by FCC's Henning Schulzrinne and James Miller
  - 2nd BOF held Q1 of 2013
    - Chaired by Marc Linsner and Phil Eardley
  - LMAP WG created Summer 2013
- Charter
  - Specify Information Model, Data model, and extend one or more protocols

Tidbit: (L)arge-scale (M)easurement of broadband performance (A)rchitecture and (P)rotocols deemed too long

Initial Use Cases

RFC7536 - LMAP Use Cases

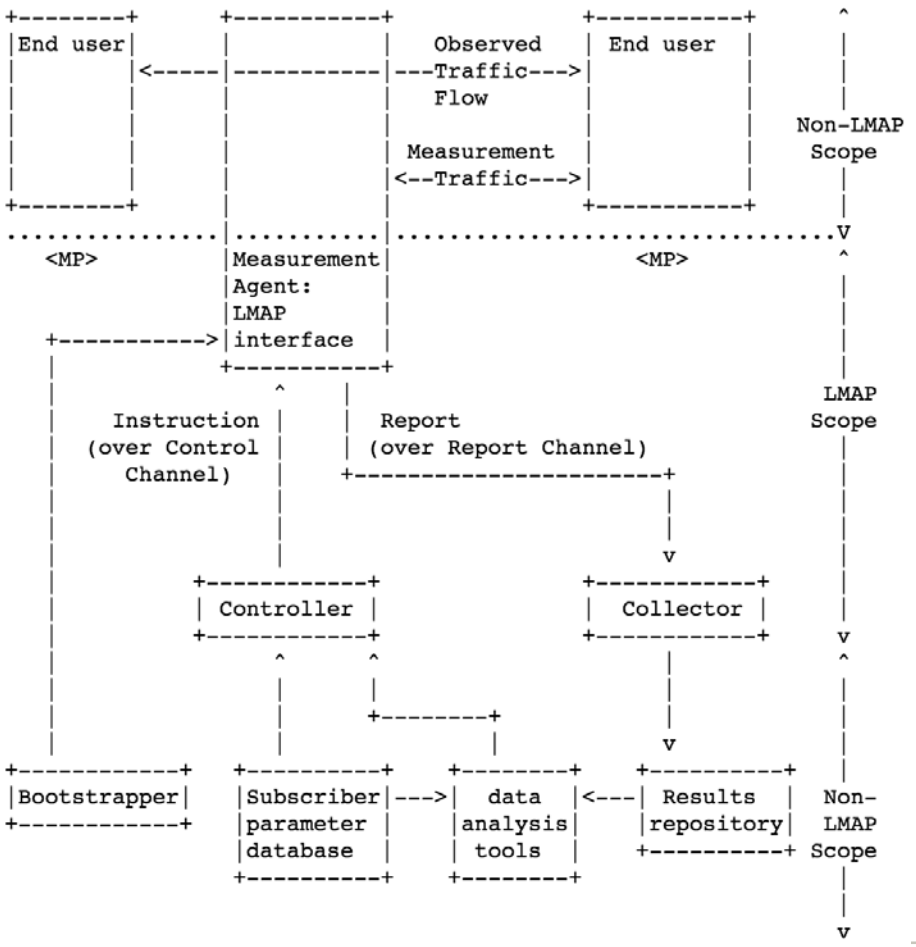
- Use Case 1: ISP
  - Fault Detection and Isolation, Troubleshooting
  - Design and Planning
  - Customer Experience
  - Impact of New Devices/Services
- Use Case 2: Regulator
  - Provide Transparent Performance Information to Consumers
  - Compare ISP Performance
  - Measure Broadband Deployment
  - Monitor Traffic Management Practices

LMAP Framework

RFC7594 – A Framework for Large-Scale Measurement of Broadband Performance

- Core Elements
  - Measurement Agent (MA)
    - Performs Measurement Tasks
      - Using Measurement Methods – How to obtain a metric
  - Controller
    - Provides Measurement Tasks to the MA
    - Provides schedule for reporting destination
  - Collector
    - Collects results from the MA

LMAP Architectural Diagram



LMAP Framework

Phases of LMAP Operation:

- Bootstrapping (out of scope)
- Control Protocol – Controller delivers Instruction Message – what, when, how
  - Configuration
  - Instruction
  - Capabilities, Failure and Logging
- Perform Measurement Tasks
  - Support for both Active and Passive Metrics
- Report Protocol
  - Multiple Destinations Supported
  - Support for Service Parameters

LMAP Framework - Instruction

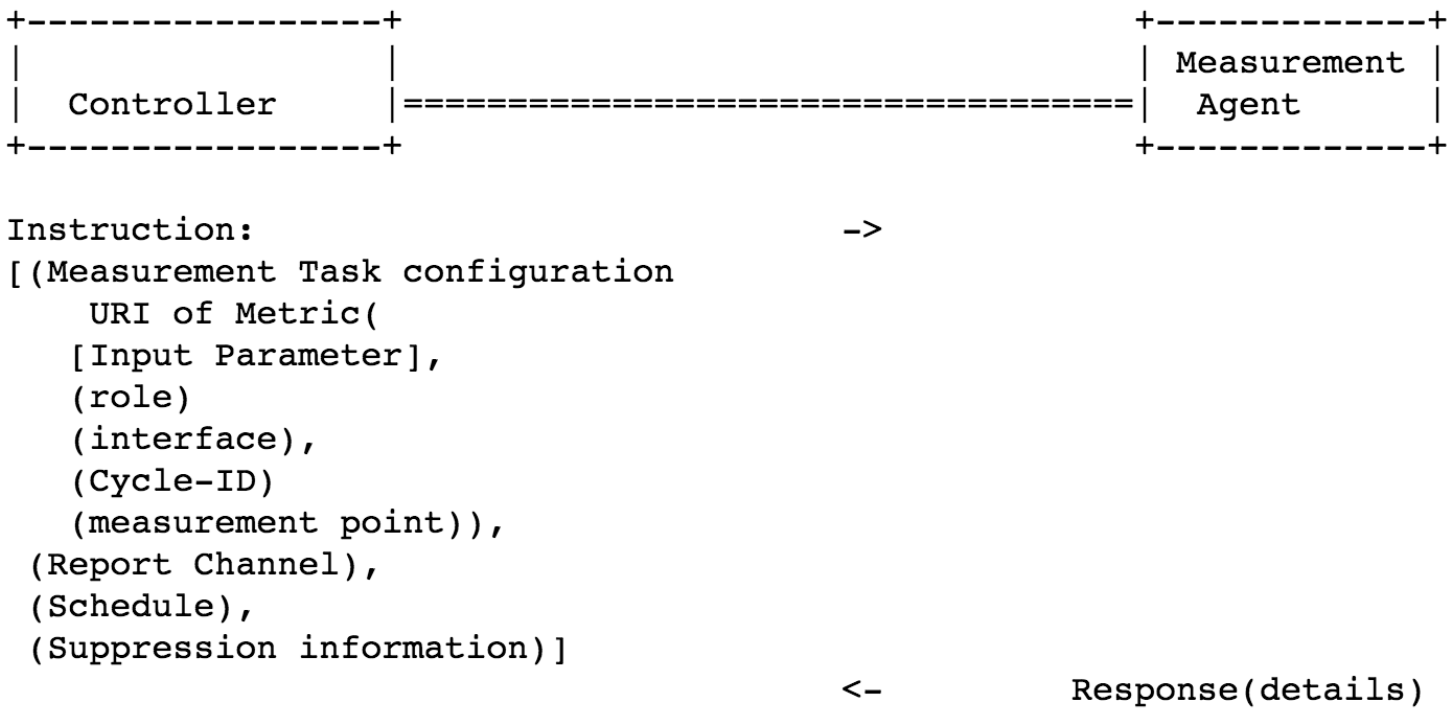


Figure 3: Outline of Instruction

LMAP Framework

- Protocols
  - Control Protocol
    - Secure protocol providing Instructions, Capabilities, Failure and Logging Info to the MA
    - Runs over the Control Channel
  - Report Protocol
    - Secure protocol delivering reports to a Collector
    - Runs over a Report Channel
- Restful Model chosen for both protocols
  - Still in the standardization process

LMAP Framework

- Scoping Constraints
  - Single organization management
  - Single controller support
- Security and Privacy
  - Concerns very well documented and incorporated into the architecture
- Suppression supported
- Consideration for end-user initiated testing
- For more information:
  - https://datatracker.ietf.org/doc/rfc7594/

LMAP Information and Data Models

- Information Model pertains to the MA needs - Control and Report Protocol and Configuration
- Divided into six sections
  - Pre-Configuration Information
  - Configuration Information
  - Instruction Information
  - Logging Information
  - Capability and Status Information
  - Reporting Information
- Data Model
  - YANG based

IPPM

- Reference Path and Measurement Points for LMAP – RFC7398
  - http://tools.ietf.org/html/rfc7398
  - Defines segments for measurement reference points
  - Inclusion in LMAP Report Protocol to enhance metric comparison
- Registry for Performance Metrics
  - Creates an IANA Registry for Performance Metrics
  - Standardizes Measurement Methods uses by LMAP MAs
  - URI in LMAP will call Standardized Metrics

IPPM

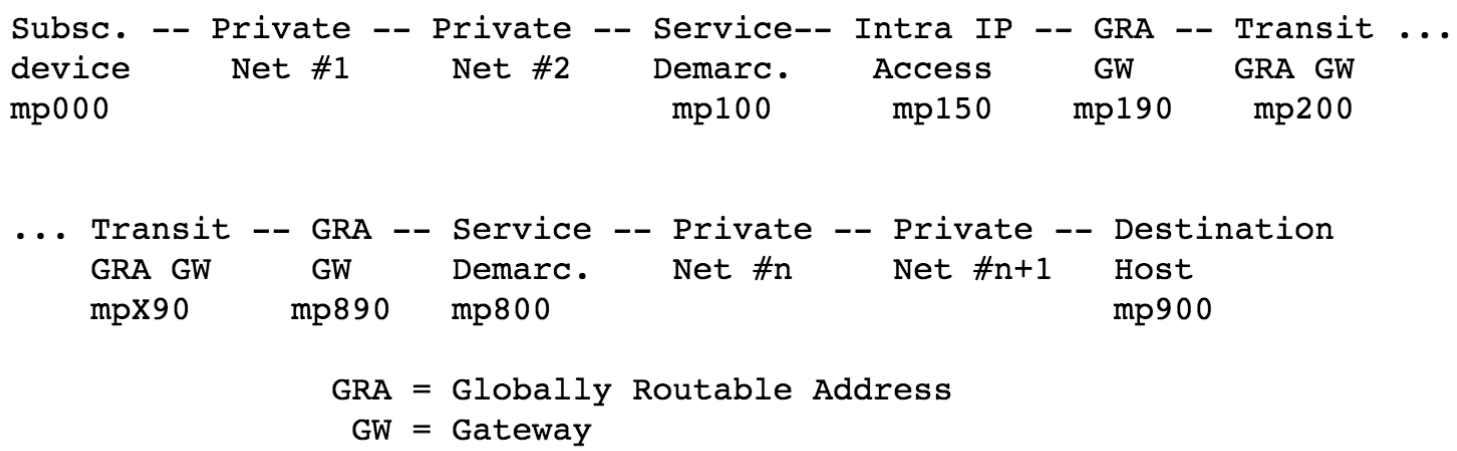


Figure 2: Reference Path with Measurement Point Designations