

# Applying IETF IP Performance Metrics to Broadband Mapping

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Mapping of Broadband Services in Europe — 1st Stakeholder Consultation Workshop  
Brussels, 8 June 2016

# Who am I?

- Senior Researcher, ETH Zürich, Switzerland
  - focus on passive/active Internet measurement
- Co-Chair, IETF IP Performance Metrics (IPPM) Working Group (WG)
  - not speaking for the working group

# Overview

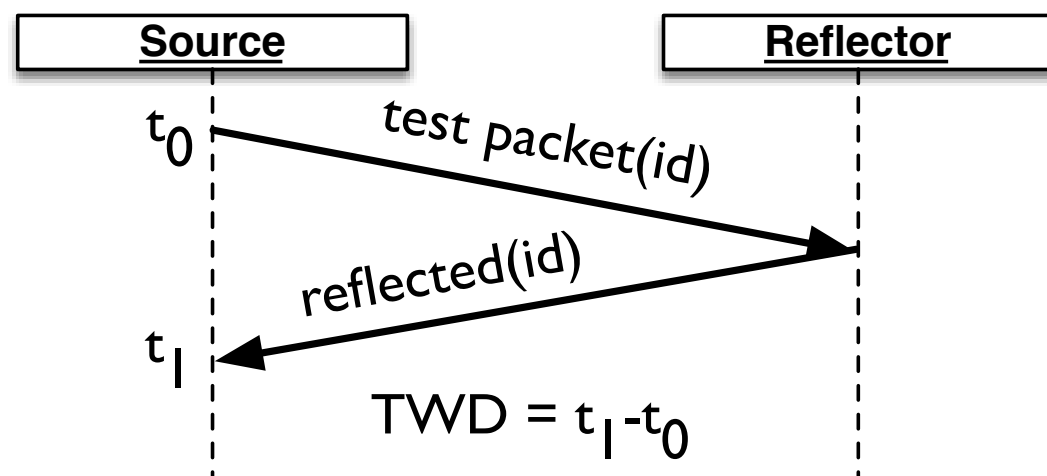
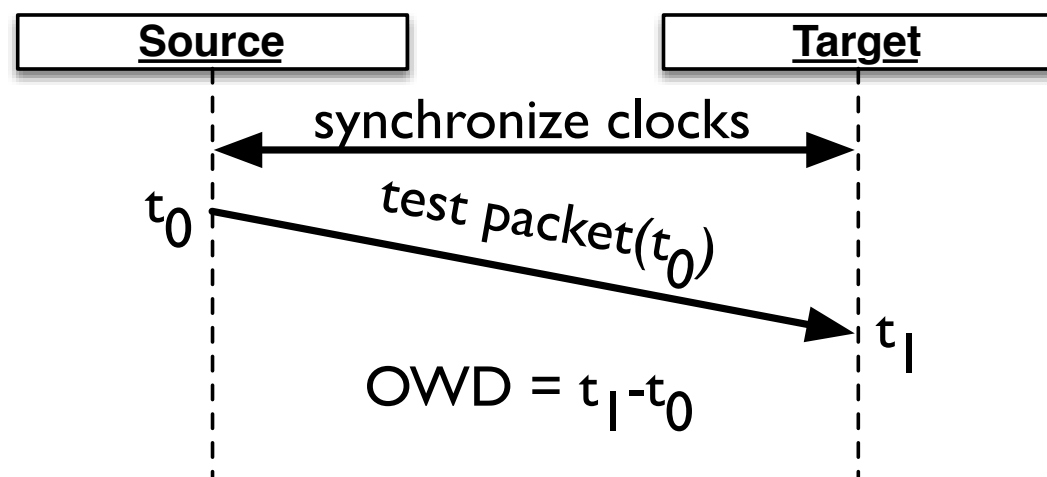
what can IPPM do for you?

- Applicable metrics and methodologies
- Active measurement protocol
- Registry of tests for broadband performance
- Experiments in better bandwidth measurement

# Applicable Metrics

- One-way packet loss (7680)
  - Measurement simple, interpretation harder
  - Cannot separate line condition from congestion
  - TCP induces loss to measure capacity
- One-way (7679) and two-way (2681) delay
  - Two-way doesn't require clock sync
- Delay variance (3393) ("jitter")

# Active delay measurement



- OWD: synchronize clocks, send timestamp, compare
- TWD: send packet, reflect, compare
- Loss: "infinite" OWD
- Jitter: derived from delay
- *Any protocol with IDs usable for TWD*

# Test Protocol

- One-way Active Measurement Protocol (OWAMP) & Two-Way Active Measurement Protocol (TWAMP)
- Arbitrary UDP packets as measurement traffic
- Control protocol between initiator and reflector
- Can be used for loss and timing on CPE to operator segment, or CPE to Internet.

# Test Registry

- Bridge gap between RFCs and recommended tests for access network measurement.
- Methodology for a few common tests, focus on comparable implementability
  - UDP two-way delay (2681)
  - UDP delay variation (3393)
  - DNS response latency (like 2681, but with DNS)
  - UDP one-way delay (7679)
- Work in progress, complete in 2016?

# What about bandwidth?

- IPPM founded in part to define bulk transfer capacity metrics, and we still haven't managed it.
  - Network links are reactive (see RFC 7312)
  - Congestion-controlled traffic is reactive
  - “send a big file with TCP” measures a mix of capacity, latency, TCP implementation of the sender.
- draft-ietf-ippm-model-based-metrics
  - pass/fail tests: “does link L support of XX Mb/s?”
  - use model of TCP to “open-loop” congestion control
  - work in progress, end 2016?



# Getting Involved

- The IETF is a non-membership, volunteer-driven, voluntary standards organization.
- Open participation on the mailing lists
  - [ippm@ietf.org](mailto:ippm@ietf.org) (IPPM WG: metrics and methods)
  - [imap@ietf.org](mailto:imap@ietf.org) (LMAP WG: control and reporting)
- IETF 96 in Berlin, 17-22 July