

# Model Based Metrics for Bulk Transport Capacity

draft-ietf-ippm-model-based-metrics-08.txt  
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# Outline

- Document status
  - Ready to go
- Concepts
  - Generic Model Based Metrics
  - Bulk Transport Capacity (TCP)
  - Avoiding self inflicted congestion
  - Location Independence

# Generic Model Based Metrics

- Derive IP tests from Transport Performance Targets
- IP tests evaluate
  - IP capacity, IP loss ratio, etc
  - Using authentic test traffic patterns and delivery criteria
  - Independent of (sub)path under test
    - (Location independence)
- Goal
  - Passing all IP tests =>  
Transport Performance Targets will be met
  - Failing any IP tests =>  
Some Targets won't be met under some conditions

# Overall Modeling Framework

Target Transport Performance  
(e.g. Target Data Rate, Target RTT and Target MTU)

↓  
mathematical models

Targeted IP Diagnostic Suite

\* \* \*

Traffic parameters

Statistical criteria

IP diagnostic tests

Traffic Generation

Delivery Evaluation

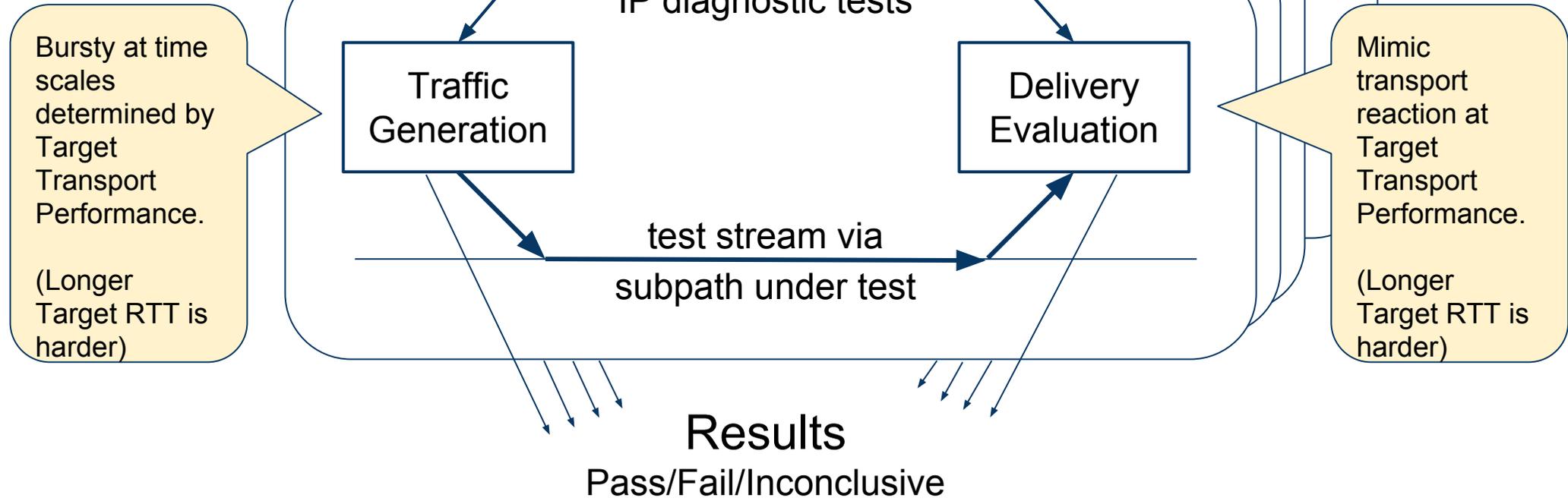
test stream via  
subpath under test

Bursty at time scales determined by Target Transport Performance.  
(Longer Target RTT is harder)

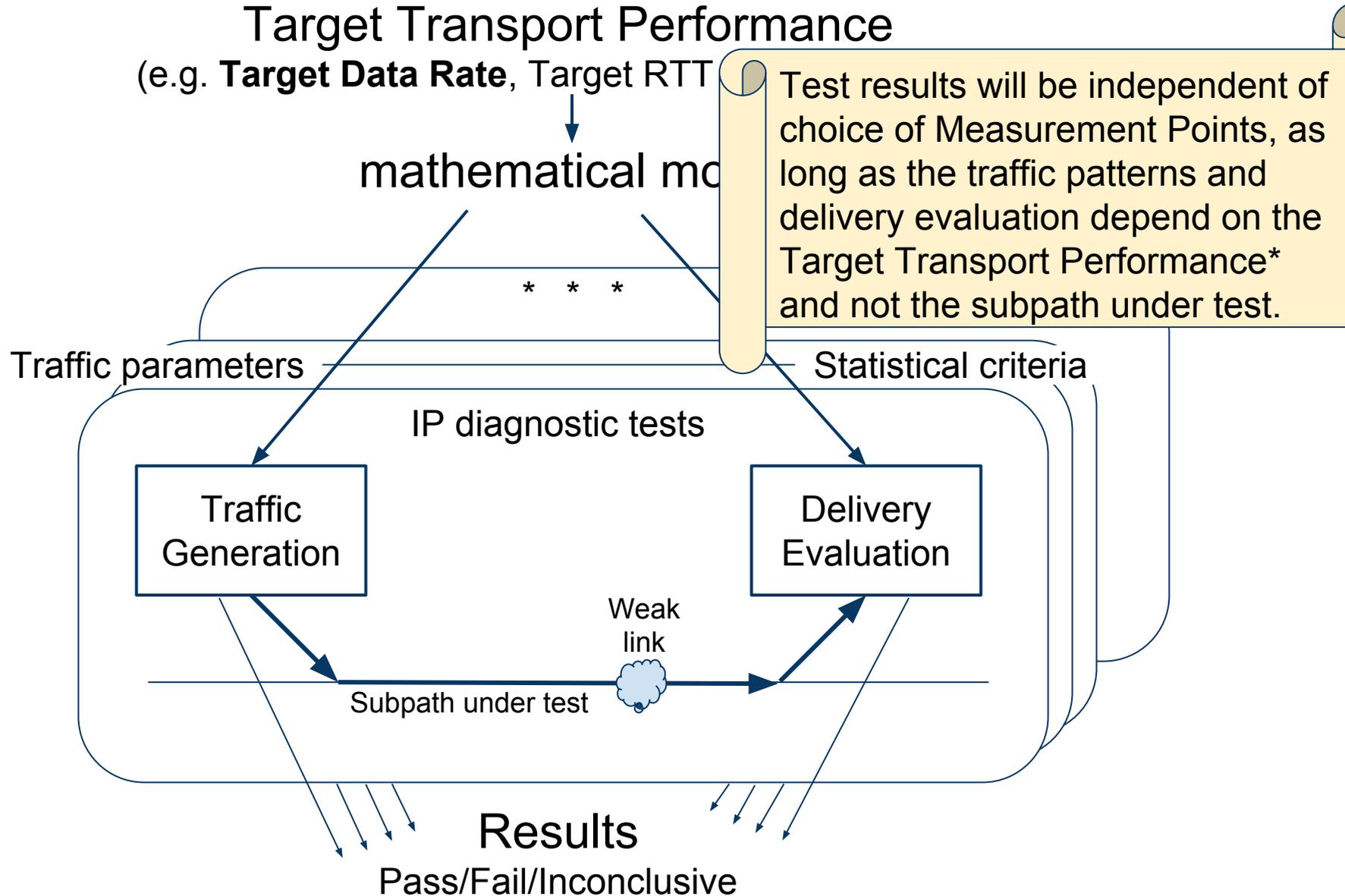
Mimic transport reaction at Target Transport Performance.  
(Longer Target RTT is harder)

Results

Pass/Fail/Inconclusive



# MBM Location Independence



\* Type-P, and other potential traffic classifiers must also be consistent

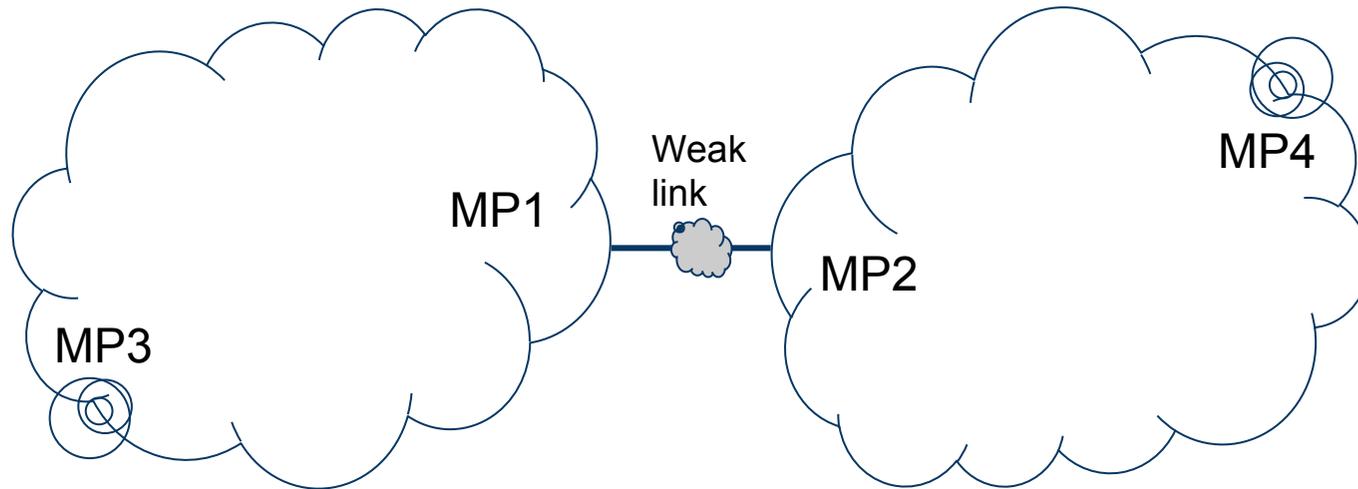
# Bulk Transport Capacity

- Basic load tests:
  - Sufficient IP capacity (including overhead)
  - Small enough (background) loss ratio
    - Suppress **self inflicted congestion**
    - Test stream throttled to Target Data Rate
- Queuing tests: tolerates bursts at 2 time scales
  - Slowstart and sender interface rate bursts
- **Engineering tests**: self clocks and congestion control
  - Example failures include:
    - Channel capture effects
    - Bufferbloat
    - Token bucket policers

# Key: suppress self inflicted congestion

- TCP congestion control is normally dynamic equilibrium
  - All parameters (rate, RTT, losses etc) affect each other
  - Measurements are not predictive unless conditions match
- Suppress congestion control using precomputed test traffic
  - Delivery evaluation has same threshold as the transport
  - State variables become open loop
  - Breaks all circular dependencies
  - Measurements are predictive for other environments

# Location Independence



- With **TCP BTC** MP1->MP2 does not predict MP3->MP4
  - No "A-frame": the dream of early IPPM work
- With **MBM BTC**, MP1->MP2 also predicts MBM BTC for:
  - MP3->MP4, MP3->MP2, and MP1->MP4
    - As long as type-P is authentic (which might be hard)
    - and "rest of path" is good enough
  - Which in turn predict bounds on TCP performance

Please read the draft  
and comment on the IPPM list

Nits & suggestions: <https://github.com/mattmathis/draft-ietf-ippm-mbm>

Thank You

Questions?

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