RTP Media Congestion Avoidance Techniques (RMCAT) Evaluation Criteria Design Team

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RMCAT Evaluation Criteria Design Team
Outline

- Background / Formation
- Testing Topology and Methodology
- Testing Status
- Open Issues & Discussion on RMCAT List
  - RTCWEB: Real-Time / Non-Real Time Interactions
  - TSVWG: Request for “new delay-adaptation” DSCP

RMCAT Design Team Background

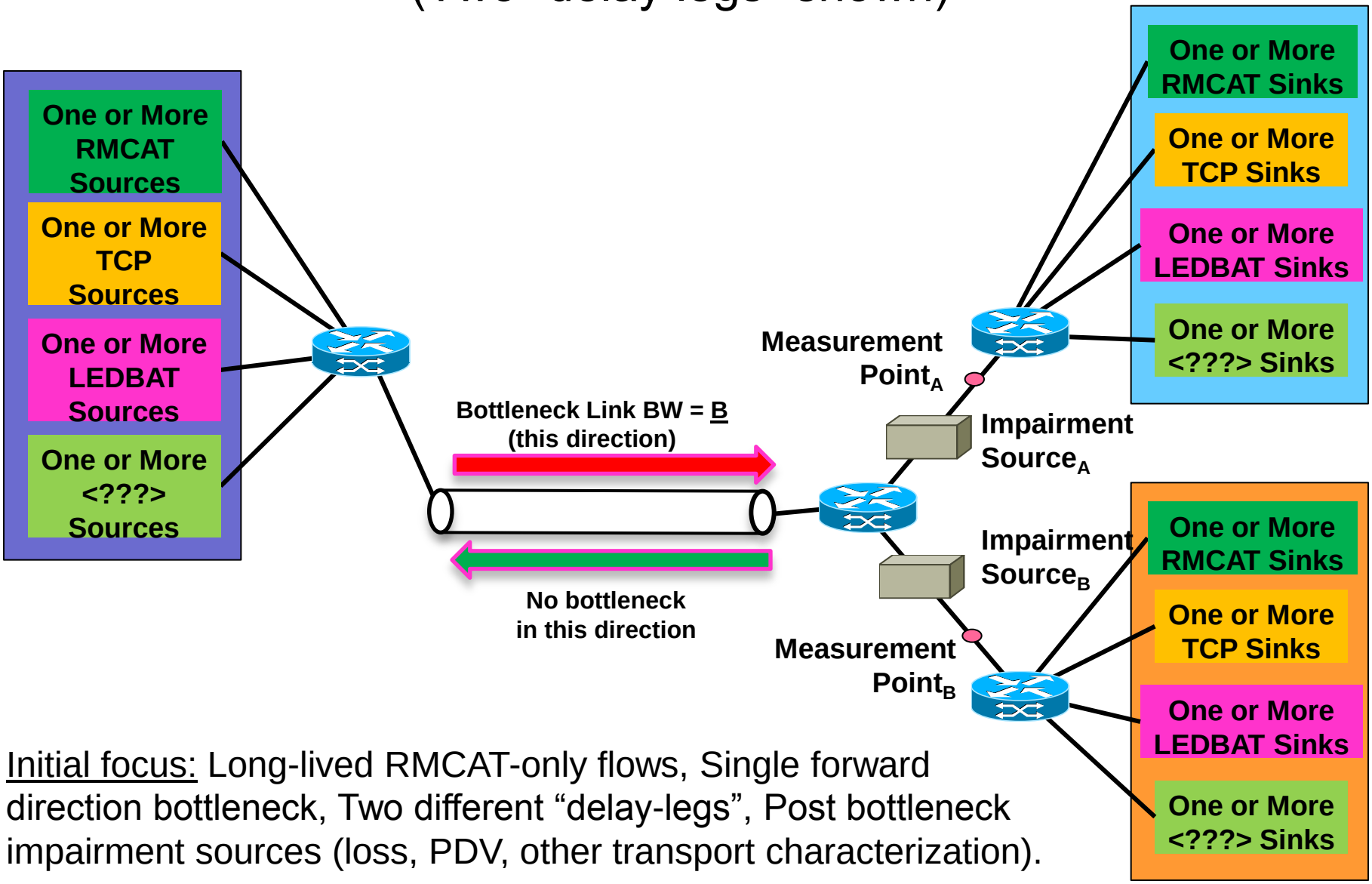
- Formed at Orlando IETF (86) to progress RMCAT deliverables.
  - Primarily requirements document and evaluation criteria.
  - Met several times via video conference since Orlando. Open to all (subscribe to rmcat list for announcements).
  - Working on the “congestion control” portion of RMCAT charter (e.g., not on application layer parts).
  - Progressed work on testing topology and methodology (next slides).
  - Documentation output now included as Appendix A in draft-singh-rmcat-cc-eval-03.

“RMCAT Protocol” Transport Design

- Important Givens & Starting Point:
  - A RMCAT flow must function in the presence of any IP traffic aggregate (e.g., alongside TCP flow aggregates).
    - Criteria to be specified in requirements and criteria deliverables.
  - To attain the best delay performance, a RMCAT flow would “prefer” to live in a traffic mix where the ***majority traffic at bottleneck*** also *adapts based on delay.*
    - Whenever dominant traffic at bottleneck adapts based on packet loss, the RMCAT packets will suffer queuing delay caused by such traffic.
  - Topologies where shared bottlenecks (RMCAT and non-RMCAT flows) are expected is a focus area of design team.
    - Example is Bufferbloated access link, where both real-time and non-real time components of a singular RTCWEB sessions traverse.
- Homogeneous RMCAT aggregates are initial focus.
  - However, topology accommodates future traffic mixes.

RMCAT Evaluation Test Topology

(Two “delay legs” shown)



Initial focus: Long-lived RMCAT-only flows, Single forward direction bottleneck, Two different “delay-legs”, Post bottleneck impairment sources (loss, PDV, other transport characterization).

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Initial Experiments (RMCAT only flows)

1 - Input Data Characteristic: Infinite amount of data to send (run “full out”).
- Short-lived flows or “Intrinsic VBR” flows (within CC envelope) to be modeled later.

2 - Output Data Characteristic: 1 pkt /100 ms min, mod pkt. size &/or freq.
- Send as much as rate estimate allows.
- Send as smoothly as possible, no less frequently than 1 packet per 100 ms.

3 - Bottleneck Link Sized for following per flow BWs (assuming equal sharing).
- 200 kbps, 800 kbps, 1.3 Mbps and 4 Mbps.

4 - Bottleneck Link Queue Type and Length.
- FIFO queue.
- Length specified in time at bottleneck link rate: 70 ms, 500 ms or 2000 ms.

5 - Number of RMCAT Flows: 1, 3, 5, 10 and 20.
- Bulk delay of 0, 50 and 150 ms used in all tests.
- Different bulk delay legs to test RTT (un)fairness in 10 & 20 flow test cases.

6 - Flow Commencement Relative to One Another (for 10 & 20 flow cases)
- Simultaneous, Random (uniform), One early and One late case.

6 – Artificial Packet Loss Impairment (i.e., additive to queuing loss).
- Packet loss of 0%, 1%, 5% and 10% in reverse path only (initially).

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Open Issues, Discussions & Future Challenges

- RMCAT Self-fairness definition (or define what “Unfairness” is).
  - Measured/determined over what time window?
  - Stalls per interval of time (Maximum stall frequency. Are zero stalls attainable for RMCAT-only case)?
  - Statistical stall criteria (can 1:N be stalled, similar to “unlucky TCP” connection)?
- Should RMCAT support cross-flow weighted fairness (however we define it)?
  - Yes, for flows on/in a given host/session (has API / ***RTCWEB*** implications – “Case 1” mailing list)
  - No, for flows on/in different hosts/sessions (presently out of scope and hard – “Case 2”)
- Modeling short-lived / bursty flows in traffic mix
  - Characterization of short-lived flows to include in modeling?
  - How should RMCAT CC react to such flows?
- Modeling mobile use cases having time-varying bottlenecks*
  - What is reasonable for time rate of change of BW to accommodate in RMCAT design?
    - Dictates limits adaptation time constants.
    - How should long RTT RMCAT flows react (RTT longer than interval of BW change)?
    - Conflicts with rate estimate smoothness desires (immediate media “squelch” via API?).
- Consider new DSCP for transport protocols that can rate adapt based on delay.
  - Request to ***TSVWG***. Idea is to have a class where queue overflow is not required for adaptation.

*** RFC 5033 (new CC) “Difficult Environments”**

Next Presentation Is:
draft-singh-rmcat-cc-eval

Please hold discussion until after next presentation.

Vielen Dank!