Bandwidth occupancy issue in draft-ietf-rmcat-coupled-cc

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Introduction

- Implemented Active FSE as defined in draft-ietf-rmcat-coupled-cc-07 in Omnet/INET

- Document does not consider application limited scenarios in case of Active FSE, but does for Passive FSE?

- Issues with multiple RTP flows with different priorities when application limited streams are present
Active FSE Algorithm

• On CC update of flow f:

  (a) It updates $S_{CR}$.

  \[ S_{CR} = S_{CR} + CC_R(f) - FSE_R(f) \]

  [\ldots]\n
  (c) It calculates the sending rates for all the flows in an FG and distributes them.

  for all flows $i$ in FG do
    \[
    FSE_R(i) = \frac{(P(i) \times S_{CR})}{S_P}
    \]
    send $FSE_R(i)$ to the flow $i$
  end for
Active FSE Algorithm

- On CC update of flow f:
  
  (a) It updates $S_{CR}$.

  $$S_{CR} = S_{CR} + CC_R(f) - FSE_R(f)$$

  [...]

  (c) It calculates the sending rates for all the flows in an FG and distributes them.

  for all flows i in FG do
  
  $$FSE_R(i) = \frac{(P(i)*S_{CR})}{S_P}$$
  
  send $FSE_R(i)$ to the flow i
  end for

  What if this is bigger than $R_{MAX}$?
Example

\[ p_1 = 1.0, \ p_2 = 0.5 / \text{BtlBdw: 4Mbps / RMAX = 1.5 Mbps} \]
Proposed fix

- On CC update of flow f:
  
  (a) It updates $S_{CR}$.

  $$S_{CR} = S_{CR} + CC_R(f) - FSE_R(f)$$

  [...] 

  (c) It calculates the sending rates for all the flows in an FG and distributes them.

  $$TLO = 0$$
  for all flows $i$ in FG do
    $$FSE_R(i) = (P(i) * S_{CR}) / S_P + TLO$$
    $$TLO = 0$$
    if $FSE_R(i) > RMAX(i)$
      $$TLO = FSE_R(i) - RMAX(i)$$
      $$FSE_R(i) = RMAX(i)$$
    end if
    send $FSE_R(i)$ to the flow $i$
  end for
Proposed fix

\[ p_1 = 1.0, \ p_2 = 0.5 \ / \ BtlBdw: \ 4Mbps \ / \ RMAX = 1.5 \ Mbps \]
Questions

• Is this an issue we should address?

• How to get RMAX to the FSE? FSE REGISTER?

• What about low-quality media sources? CC-limited vs. media-source limited?
for all flows $i$ in FG do
  \[ FSE_R(i) = \max(P(i) \cdot S_{CR})/S_P, RMAX) \]
  send $FSE_R(i)$ to the flow $i$
end for

$p_1 = 1.0$, $p_2 = 0.5$ / BtlBdw: 2.5 Mbps / RMAX = 1.5 Mbps