How YouTube coordinates with some MNOs

1. MNO (Mobile Network Operator) communicates to YouTube via an API a max_media_rate_kbps (mmrk)
    a. MNO can push updated value at any time
    b. YouTube checks at the start of each playback (from cache)
    c. API is out of band

2. YouTube applies mmrk as a ceiling in ABR logic, such that we will not automatically select a format for which the mean bitrate* exceeds mmrk (bitrate = total bytes for the format divided by total duration of video)
    a. When applying this ABR limit, YT uses a channel that MNO has provisioned that is not subject to traffic shaping/policing

3. The net effect is:
    a. The tonnage of YouTube on the MNOs network can be managed (as in policed regime) AND
    b. The Quality of Experience (QoE) of playback is improved, due to access to higher throughput
    c. Reduced retransmit rates reduce cost for both YouTube and the MNO

Impact on Quality of Experience and Network

1. Access to the faster, and unpoliced network has significant positive impact on quality of experience: (all numbers are approximate)

    a. Mean playback start time - 8%
    b. Rebuffer frequency - 4%
    c. Battery usage per hour - 5%
    d. Mean video height +1%

2. Impact on network metrics

    a. Retransmit rate: - 60%
    b. Client observed throughput +100%
    c. CDN observed data/watch hr +0.8%