Pricing User-Sanctioned Dynamic Fast-Lanes Driven by Content Providers

Hassan Habibi Gharakheili (University of New South Wales)
Arun Vishwanath (IBM Research, Australia)
Vijay Sivaraman (University of New South Wales)
Overview

- Current debate
  - static arrangement
  - users are left out
  - concerns of net-neutrality

- A different approach:
  - dynamic
  - users have control
  - More palatable to content providers, users and ISPs
fast-lanes

For:
- improved QoE
- $$ from new service

Against:
- no voice

For?
- $$ from better user engagement

Against:
- unfairness
- not open?
Dynamic fast-lanes

- Users control
  - single knob

- CPs control
  - open APIs for (any) content provider
  - on-demand: at certain level of congestion to match their business

- ISP
  - charge on admission
Economic model (Intuitive)

**Fast-lane pricing (by ISP)**
- Price = f (spare-capacity)
  - high load $\Rightarrow$ low spare-bandwidth $\Rightarrow$ high price

**Content Provider revenue**
- Revenue = f (QoE)
  - Poor QoE $\Rightarrow$ less engagement $\Rightarrow$ revenue loss

![Graph showing cost ($\rightarrow$ available bandwidth)]

![Graph showing revenue ($\rightarrow$ fraction of time with poor-QoE)]
Results: benefit for ISP/CP/User

- ISP benefits

- CP’s gain dictated by model parameters
  - maximized at moderate load at which CP calls API

- User video QoE improves
  - at no extra cost
  - no change of behaviour
Conclusions

- Different approach for fast-lanes
  - dynamic
  - user involvement

- Potential “win-win-win” for all parties involved

- Complex problem