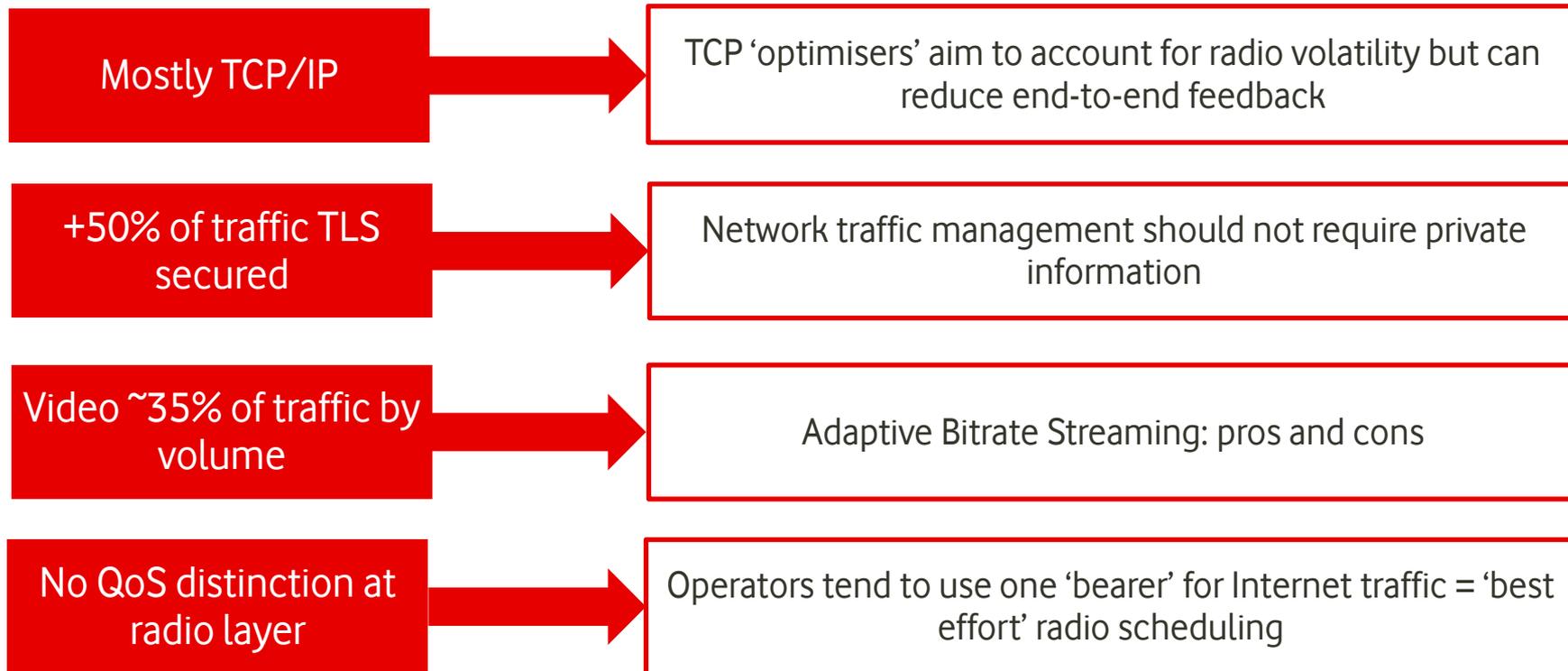


L4S applicability to mobile – without flow inspection

Kevin Smith, Vodafone R&D for IETF 96 L4S BOF July 19th 2016

Mobile traffic and network flow optimisation today (4G)



Timeline 2020-ish: 5G



4K video!



A gazillion new connections!

= Impact on traffic
'shape' and network
buffering



Ultra low latency VR services!



More mobility handover!

So: can L4S show benefits across 4 and 5G mobile networks?

- ✓ Transport-layer independent (growth of QUIC/UDP)
- ✓ Does not breach encryption
- ✓ Increasing capacity alone does not solve latency ('getting up to speed' quickly)
- ✓ Accounts for blend of latency and loss sensitive traffic (from VR to sporadic IoT updates)
- ✓ L4S "low delay for all" more Net Neutral than e.g. DiffServ "low delay for a few"
- ? ECN not widely utilised today (but this may encourage uptake)
- ? Comparison to e.g. FlowQueue- CoDel on 3GPP network
- ✓ Potential for L4S to optimise buffering at radio layer...



Optimising buffers for radio access

Big buffers good!

- **Radio efficiency:** make use of resources as they become available
- Accounts for **volatility in bandwidth** (queue during mobility/signal fading)
- Good for **bursts** – as long as there's space



Big buffers bad!

- **Impacts TCP congestion control and flow control**– adds to jitter and latency
- Reduces **throughput**
- More chance of **packet loss at handover**



L4S promises to empty queues quickly, leaving room for bursts and with low loss – for all traffic.

See Ingemar's test results for details!