

South Asian Broadband (BB) Service Quality: Diagnosing bottlenecks

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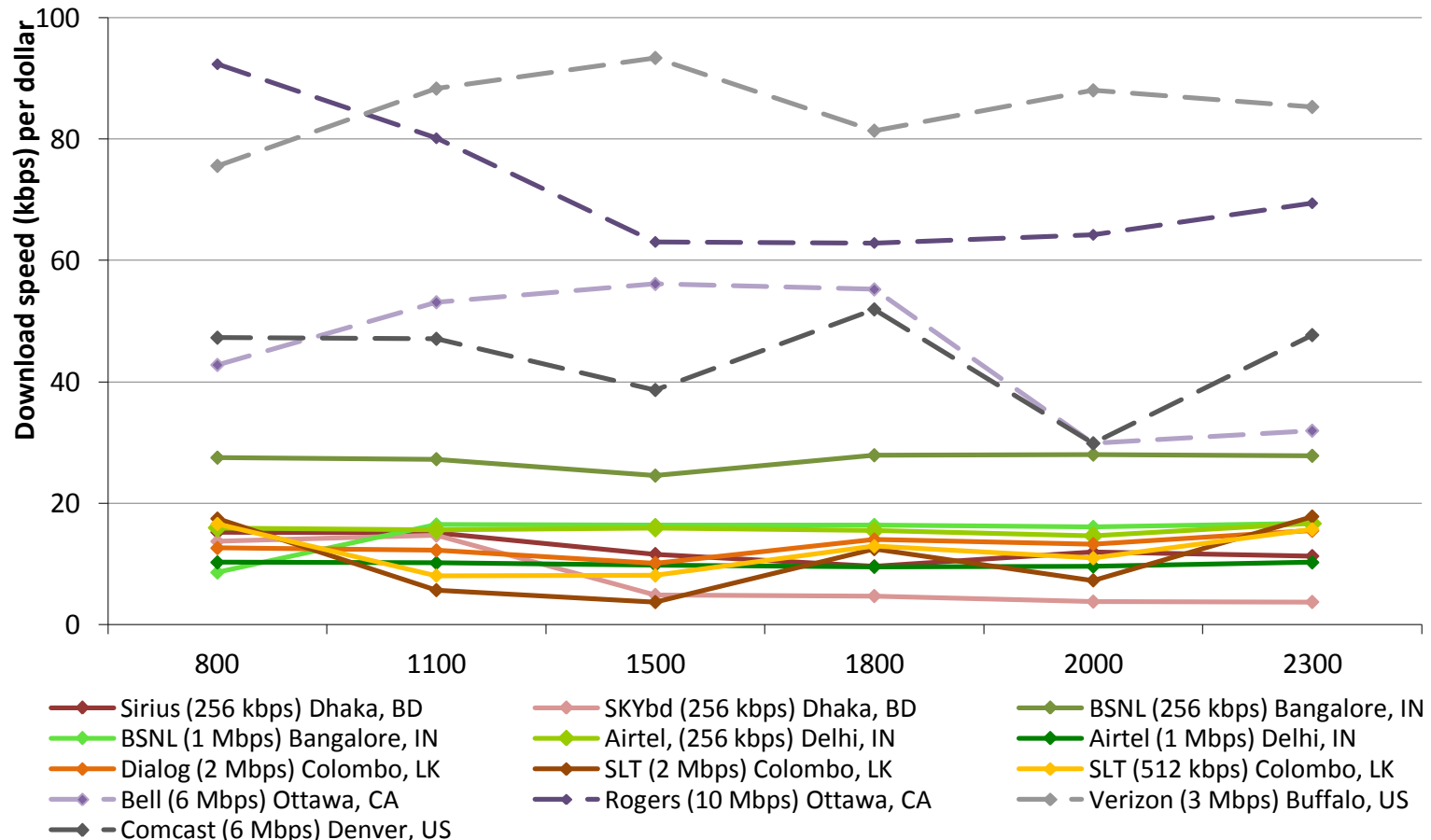
This work was carried out with the aid of a grant from the International Development Research Centre, Canada and UKaid from the Department for International Development, UK.

Methodology for testing/measuring QoSE

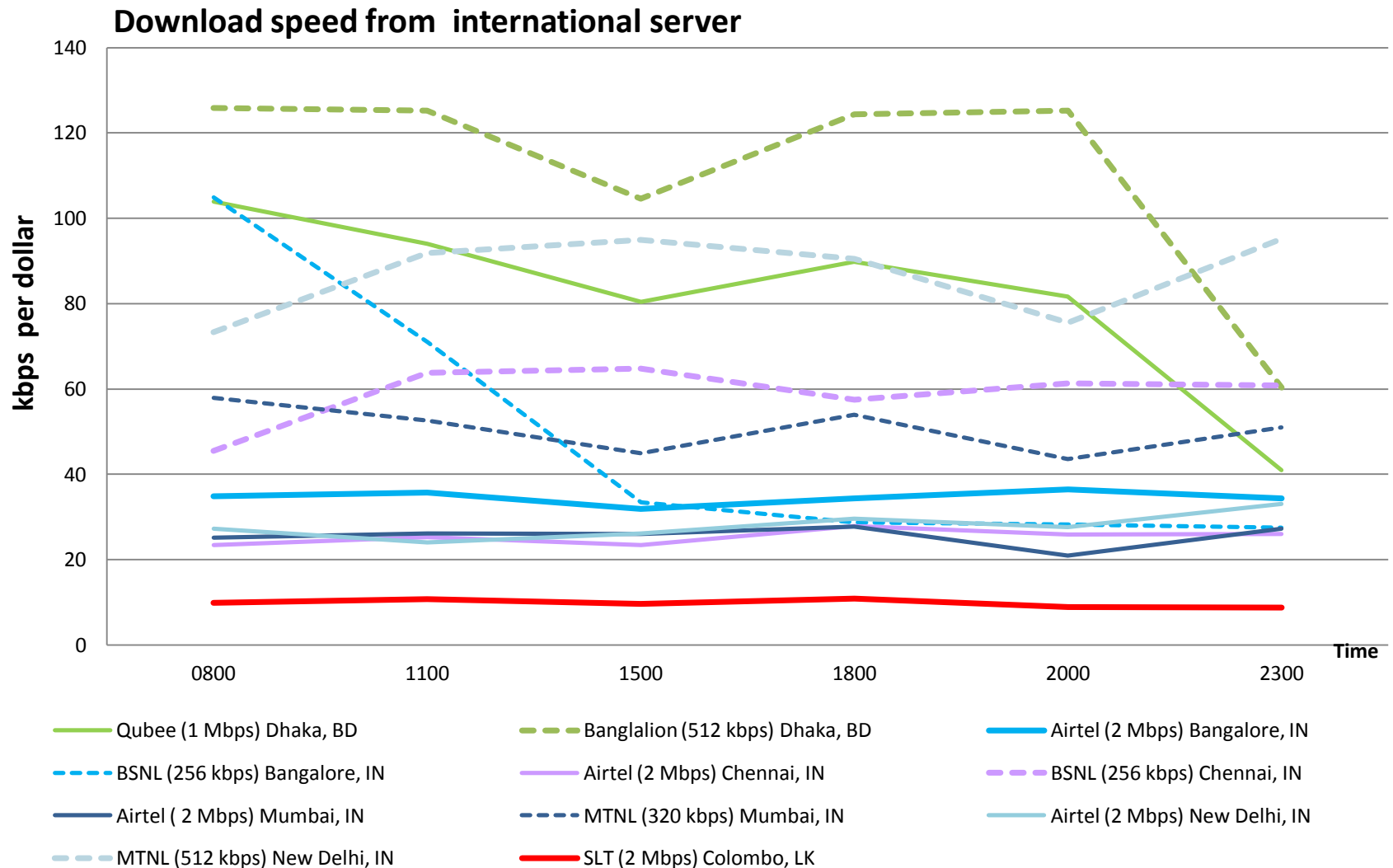
- Indicators that measure BB QoSE
 - Upload speed, download speed, round trip time, packet loss, jitter
- Measured multiple times a day (peak, off-peak)
- Measured multiple times (to leave out outliers)
- Measured in multiple locations in a city and country
- Averages reported on www.broadbandasia.info (software also available for free)
- [Details in Gonsalves, T. A. (2009)]

Results: S. Asian users get lower value for money than North American users

Download speeds (kbps) per dollar from International Server

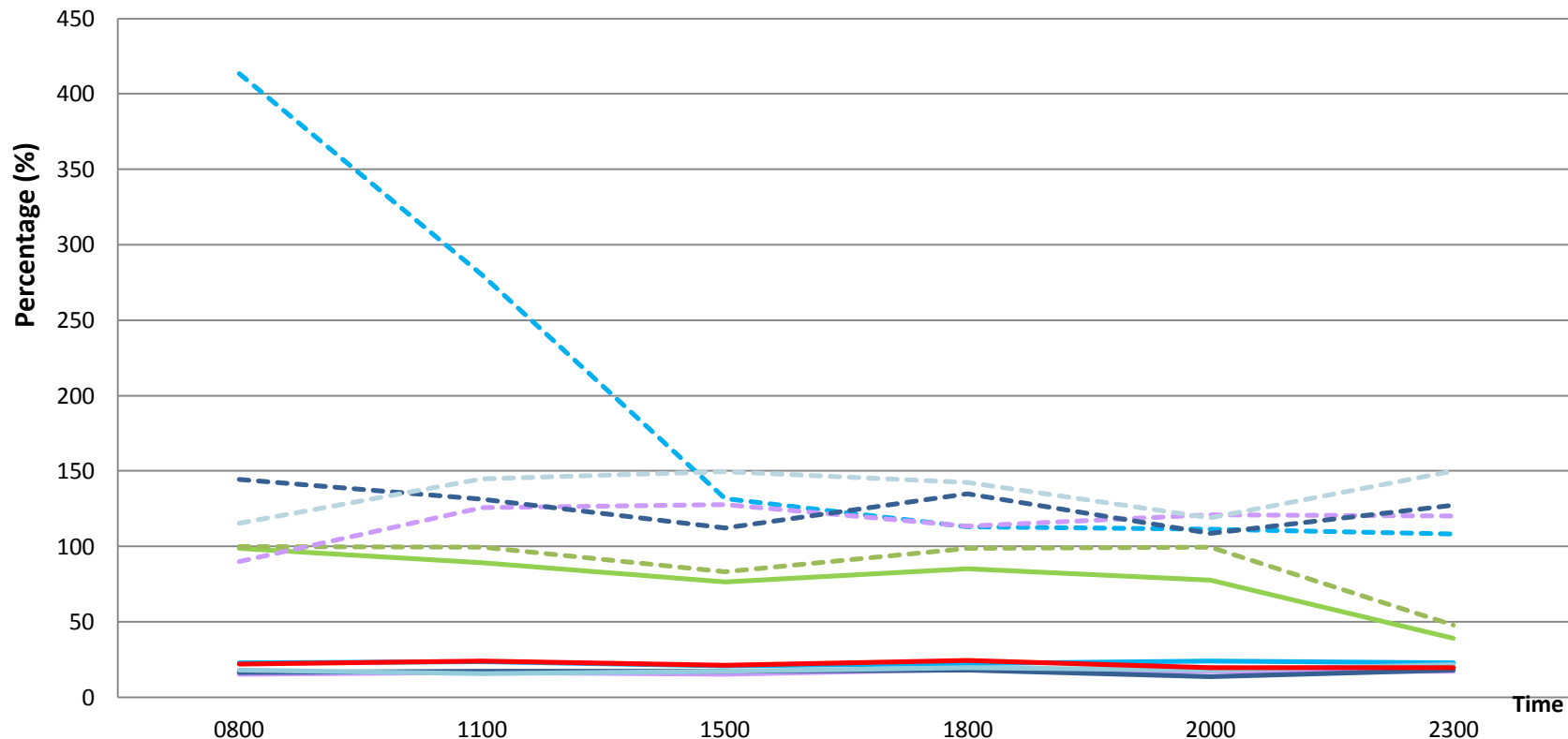


Results: Within the region, highly variable value for money



Results: Uneven delivery against what is promised/advertised

Download from International server-delivered as % of stated /advertised



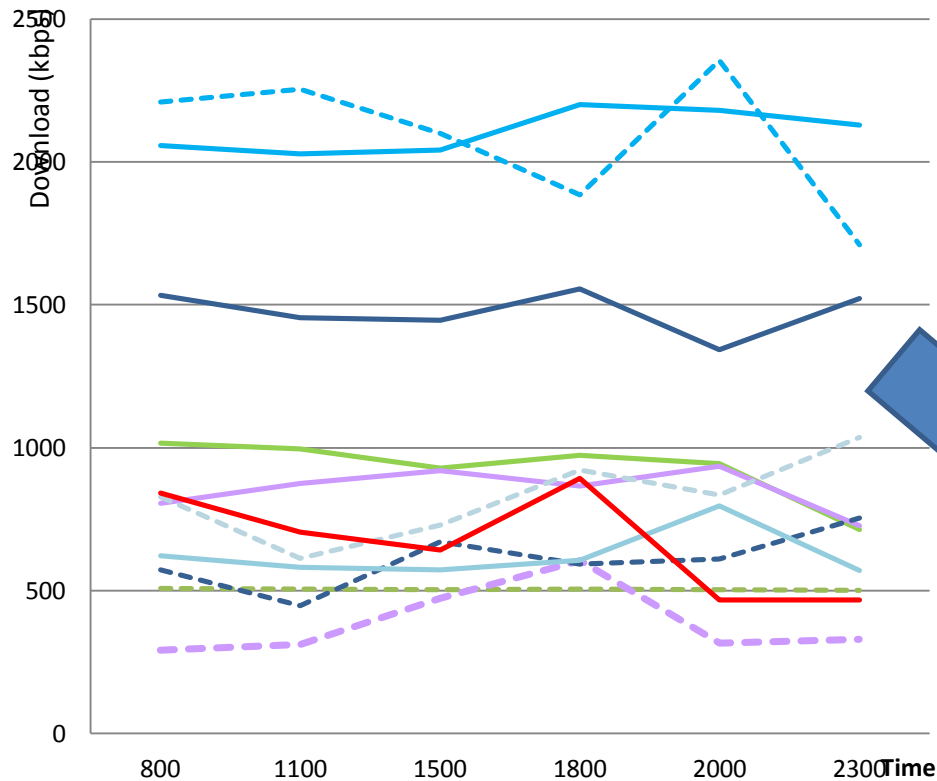
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- Banglalion (512 kbps) Dhaka, BD
- Airtel (2 Mbps) Bangalore, IN
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- SLT (2 Mbps) Colombo, LK

There IS a problem. But where?

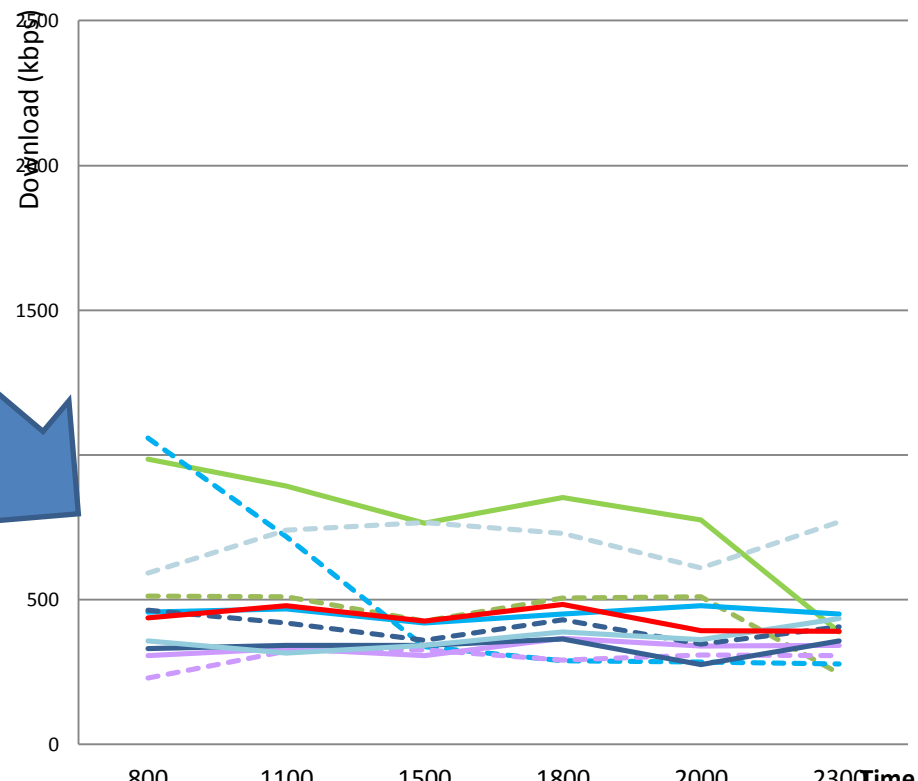
- Methodology (and software) enables testing performance in different parts of the network
 - ISP domain (uploading/downloading data hosted on users own ISP)
 - National domain (data hosted in-country, but on a different ISP from that of user)
 - International domain (in another country – the USA in our testing)

Results: Users in BD, IN, LK get lower speeds when downloading international content

Download from ISP



Download from International Server



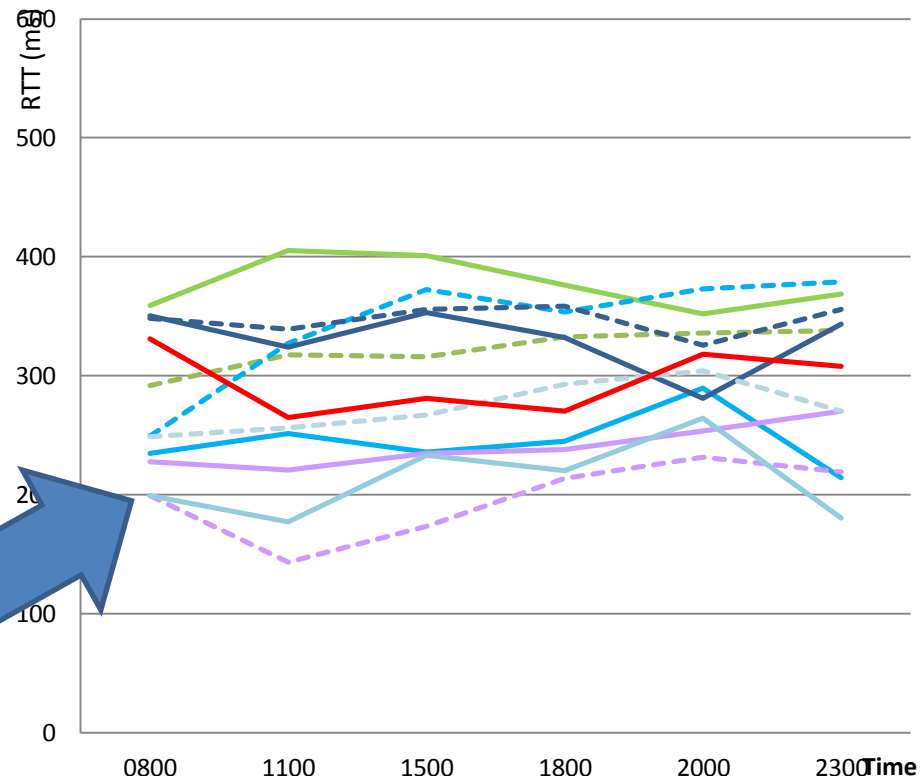
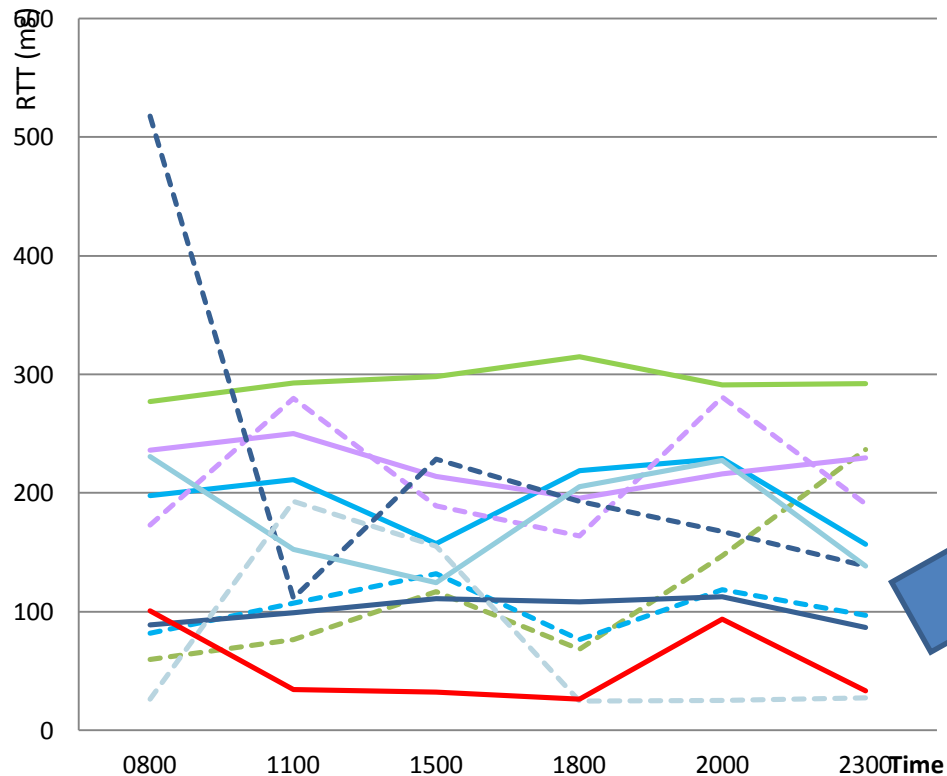
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..and round trip time deteriorates (increases) also when going international

RTT when pinged to ISP server

RTT when pinged to International server



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International Bandwidth is a bottleneck.

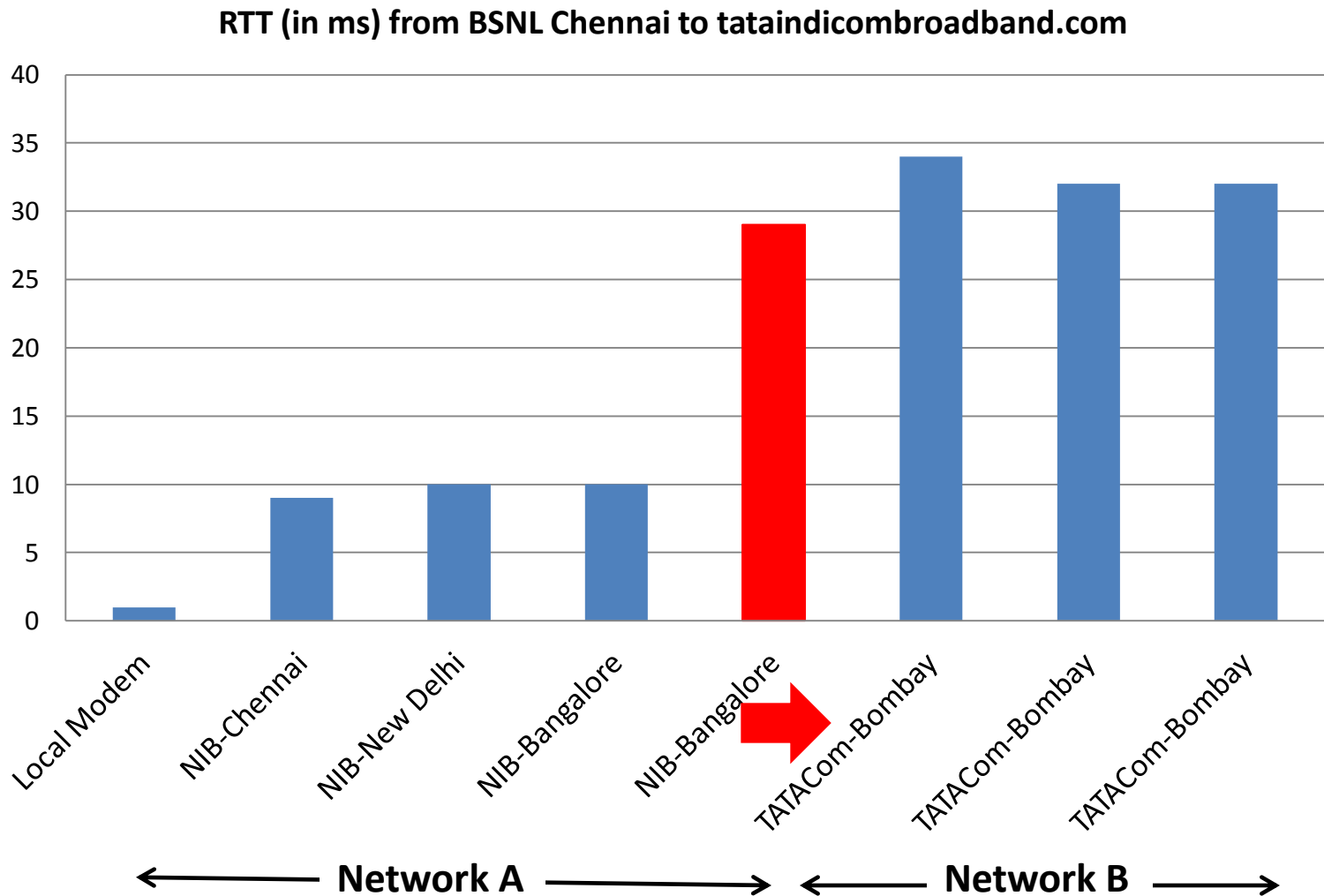
- Why?
- What can be done?

Next panelist: Rohan Samarajiva, PhD

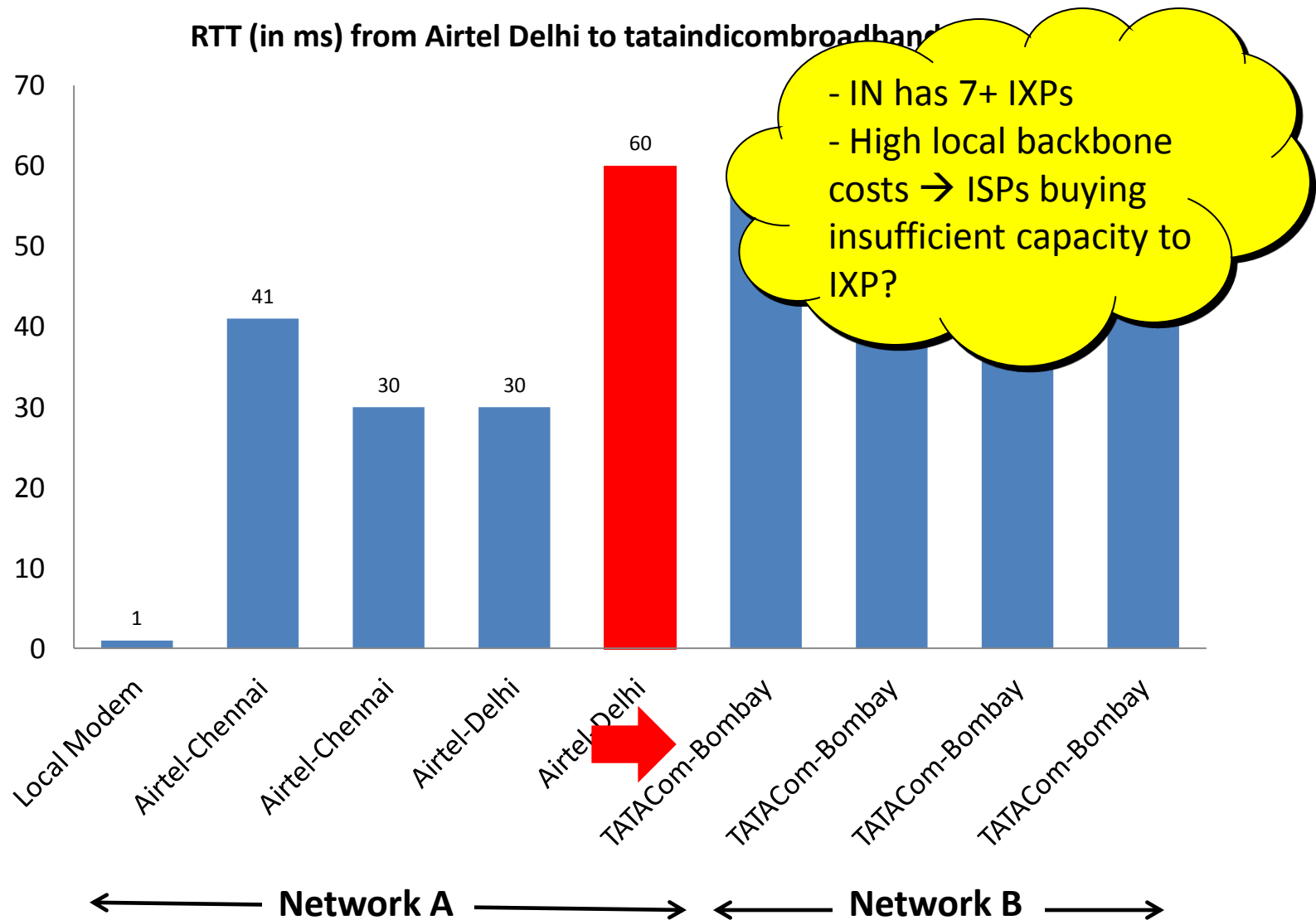
Country-level IXPs/NAPs keep local traffic local, and limit demand for int'l bandwidth

- NAP/IXPs: where 2 or more networks exchange traffic
- Successful IXPs work as non-for-profit entities, established by operators
 - Perverse incentives (sp. Incumbent)
- Feb 2011: 80 countries have an IXP; 158 don't
 - IN, PK, BD had; others didn't
- IXP will keep in-country traffic in country
 - Reduce demand for int'l bandwidth

But IXPs can act as a bottleneck, according to our test results from Chennai, India

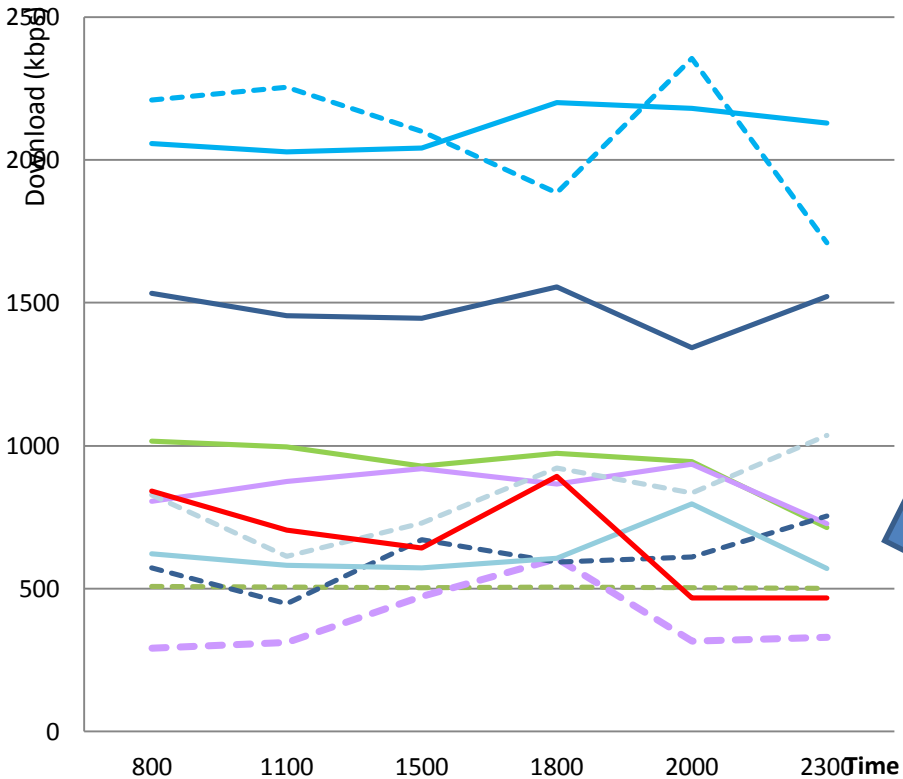


...and Delhi, India

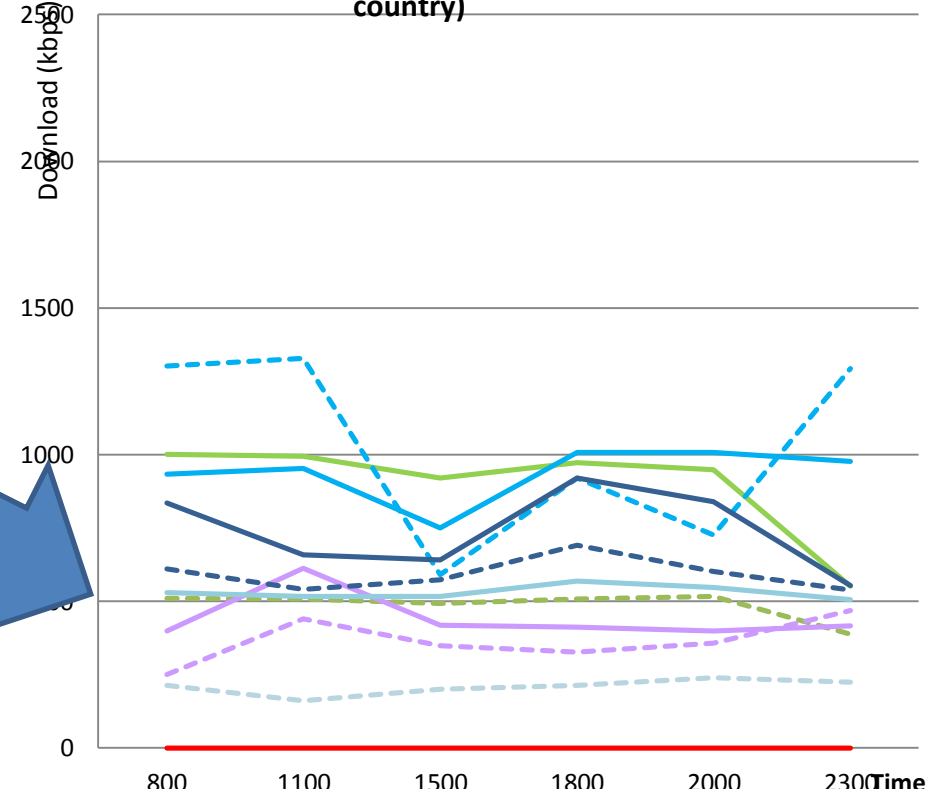


IXP/NAP bottleneck also seen in download speeds in LK, BD and most IN packages .

Download from ISP server



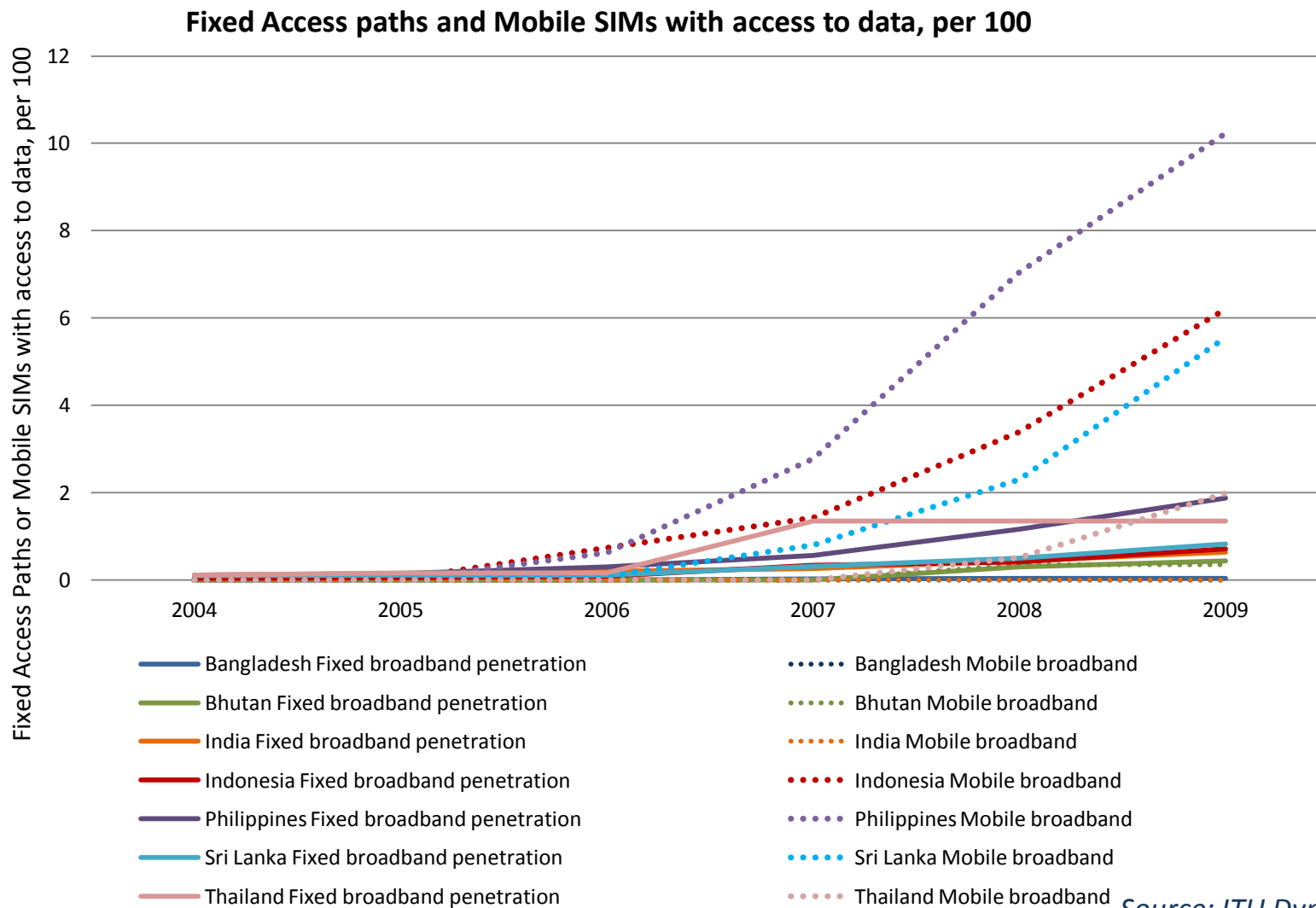
Download from National Server (other ISP in country)



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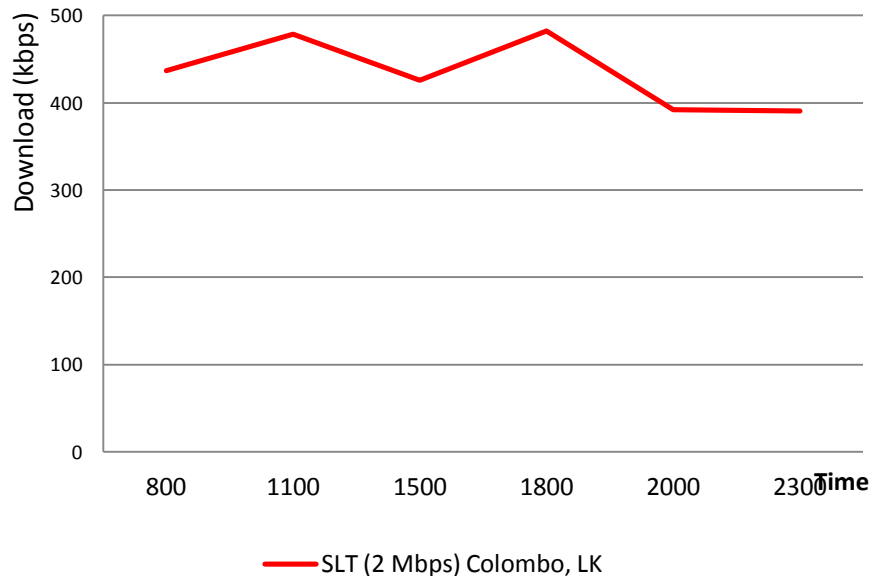
Next, is spectrum a bottleneck? Specially if trend in wireless data growth continues?



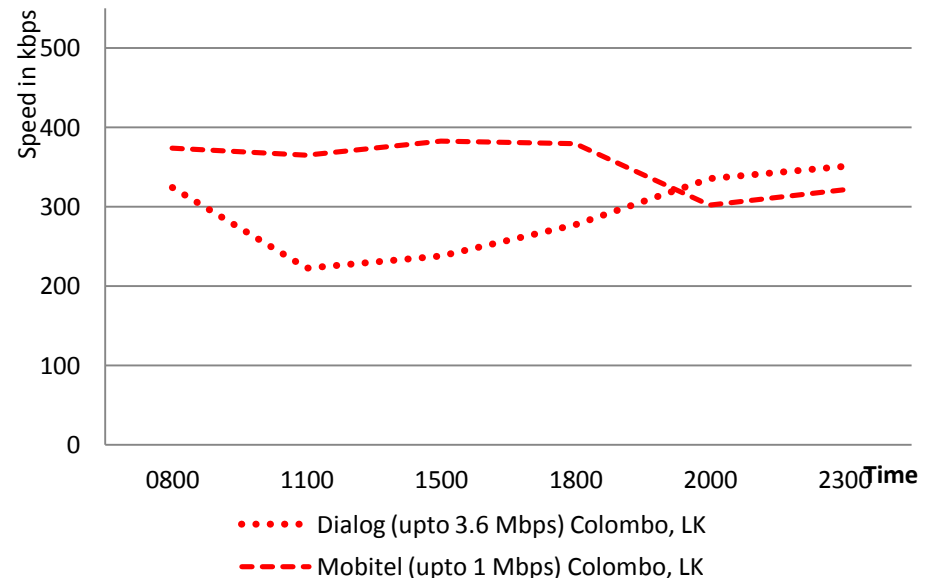
Difficult to compare fixed with mobile packages, but indications are that mobile is slower

- E.g. In Sri Lanka, 3G mobile quality is lower on average than fixed

Fixed BB - Download from International

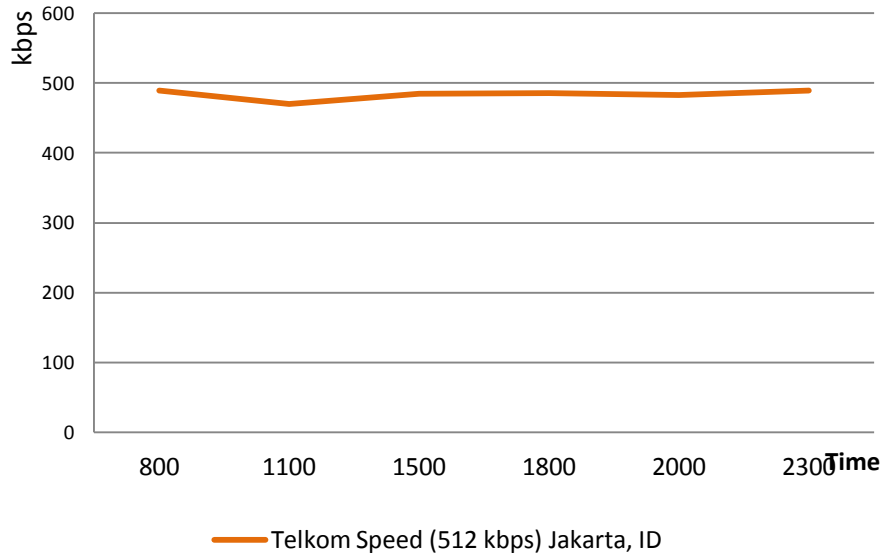


Mobile BB - Download from International

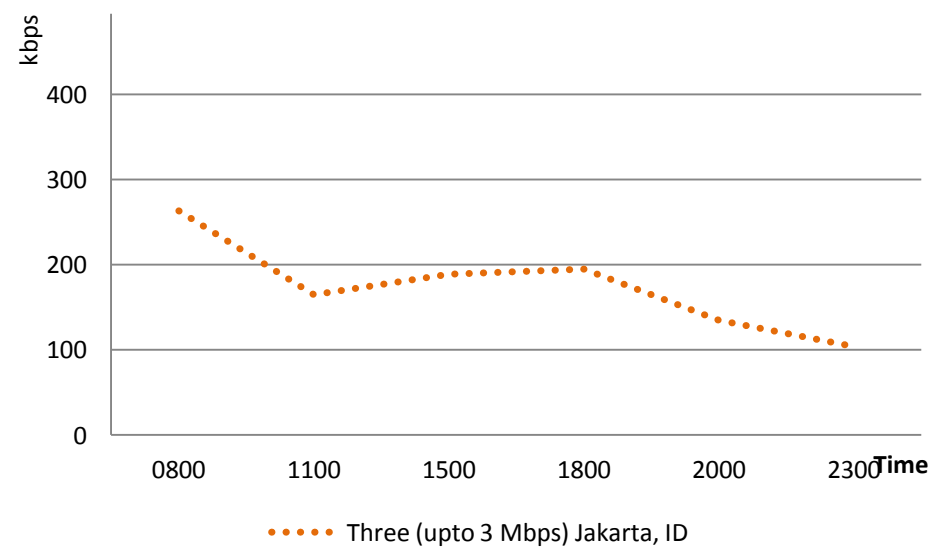


- And similarly in Indonesia, the two packages tested showed the same trend

Fixed BB - Download from International Server



Mobile BB: Download from International Server



Further deterioration with smart phones use increasing ?

- Smart phones consume a lot more bandwidth (in the background) compared to feature phones
- Smart phone share of the market is increasing in all countries (faster in some, like Indonesia)
- So we can expect demand on spectrum to increase
- Note: Our BB QoSE data cannot directly confirm if mobile data is faster/slower for a host of reasons (e.g. packages are not directly comparable)

Third panelist: Prof Payal Malik

Finally, the user: build it and they will come?

- Quality is not the only problem from the point of view of users.
- What other problems?
- What are user perceptions about availability and usefulness of data services
- What opportunities?

Final panelist: Sriganesh Lokanathan

Thank you