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TITLE: Approaches to Measuring Broadband Quality of Service Experience (QoSE)

Approaches to Measuring Broadband Quality of Service Experience (QoSE)

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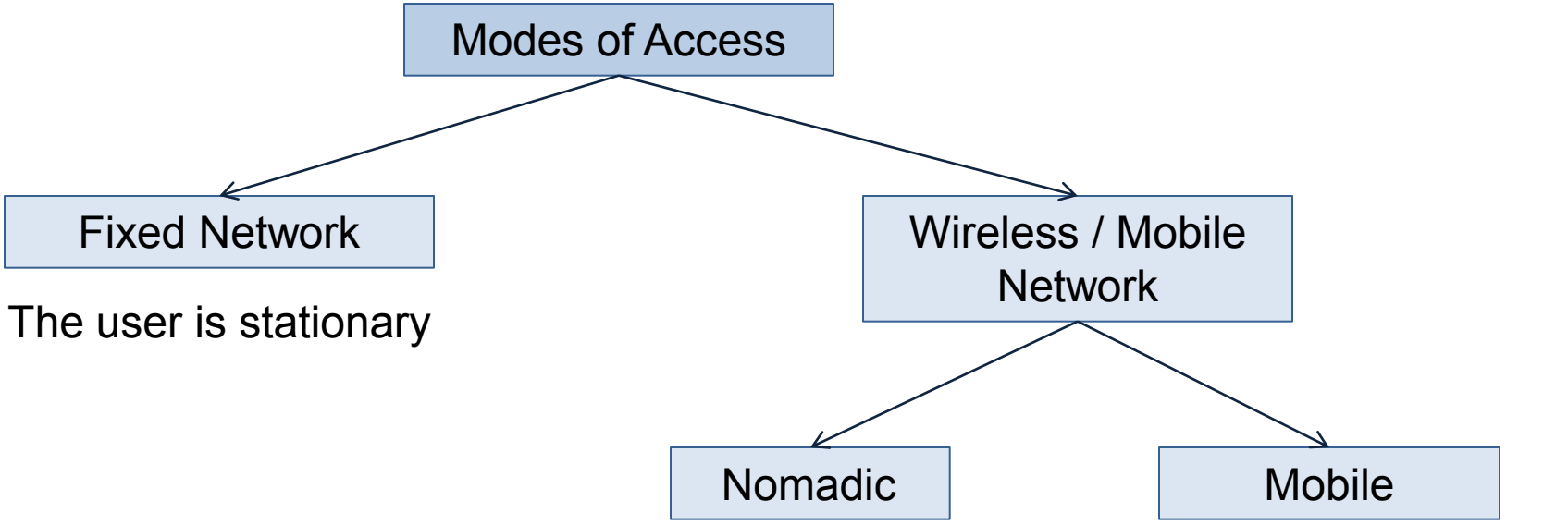
UKaid from the Department for International Development

Canada

Defining broadband access



LIRNE*asia* tests QoSE for Fixed and Nomadic use

Defining test parameters

Parameters	Definitions	Method	Threshold / Benchmarks
Download	The rate at which data is received from a server	Min. file size 1MB; Max. time 3 mins.	-
Upload	The rate at which data is sent to a server	2 MB file	-
Latency (RTT; Round Trip Time)	The time taken for a packet to reach its destination and back	The average of 10 pings (each ping provides 3 sets of results)	< 300 ms (e.g. India, Singapore)
Jitter	The variation of latency (RTT)		< 50 ms
Packet loss	The fraction of packets that fail to reach its destination		< 3% (e.g. India, Singapore)
Availability	The number of times the broadband link can be accessed within a given time frame = (1-F/T) x 100% [where T = total number of attempts; F = number of failed attempts]		> 98% (e.g. India)

It's not just about download speeds

Service	Download (kbps)	Upload (kbps)	Latency (Round Trip Time, RTT) (ms)	Jitter (ms)	Packet Loss (%)
Browsing (Text)	++	-	++	-	-
Browsing (Media)	+++	-	++	+	+
Downloading	+++	-	-	-	-
Transactions	-	-	++	+	-
Streaming media	+++	-	++	++	++
VOIP	+	+	+++	+++	+++
Games	+	+	+++	++	++

+++ Highly relevant; ++ Very relevant; + Relevant; - Irrelevant

RTT has implications on client-server interactive systems
- **Jitter** adds to the 'noise' of the transmission
- **Packet Loss** affects streaming media

LIRNEasia
www.lirneasia.net

Source: Gonsalves, T.A & Bharadwaj, A. (2009)

Multiple domains; multiple times

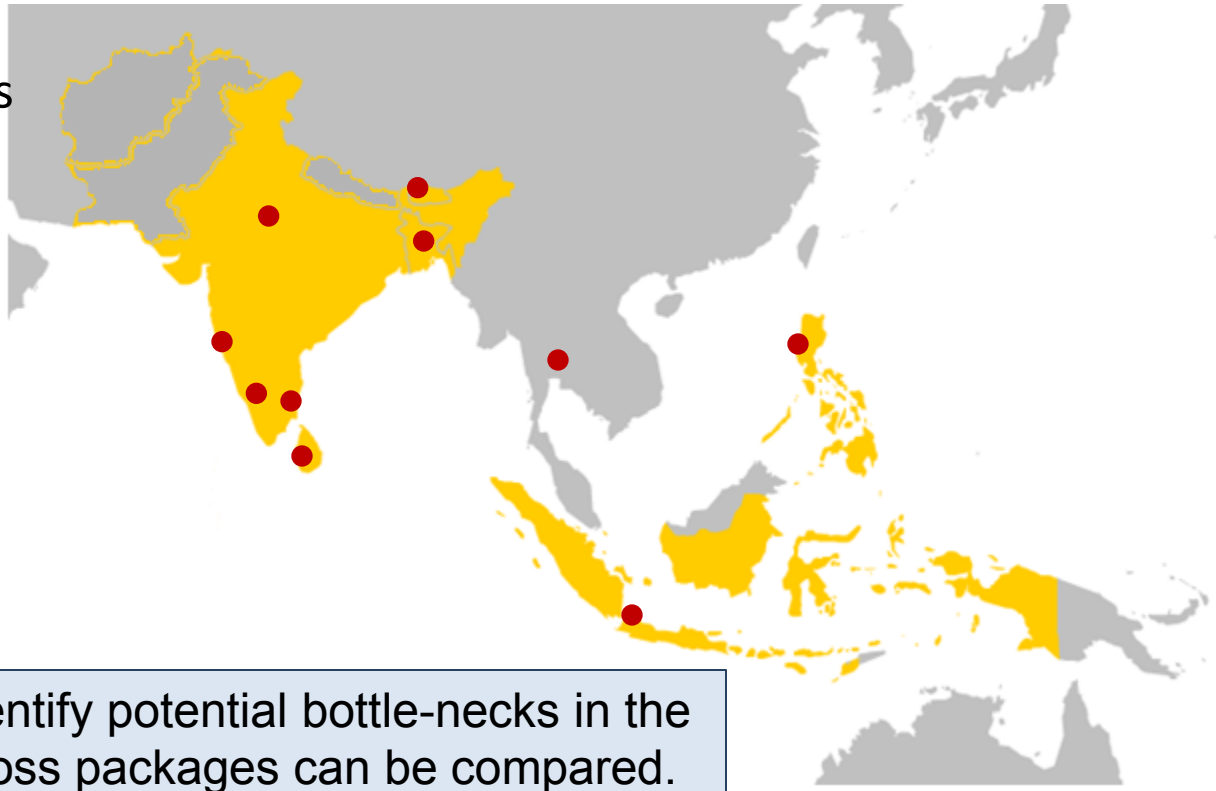
1. 6 Parameters: Download, Upload, RTT, Jitter, Packet Loss & Availability

2. Multiple days: during the week and on weekends

3. At six time slots: 0800, 1100, 1500, 1800, 2000, 2300 hrs (3 readings per slot)

4. Averages of multiple readings for each time slot

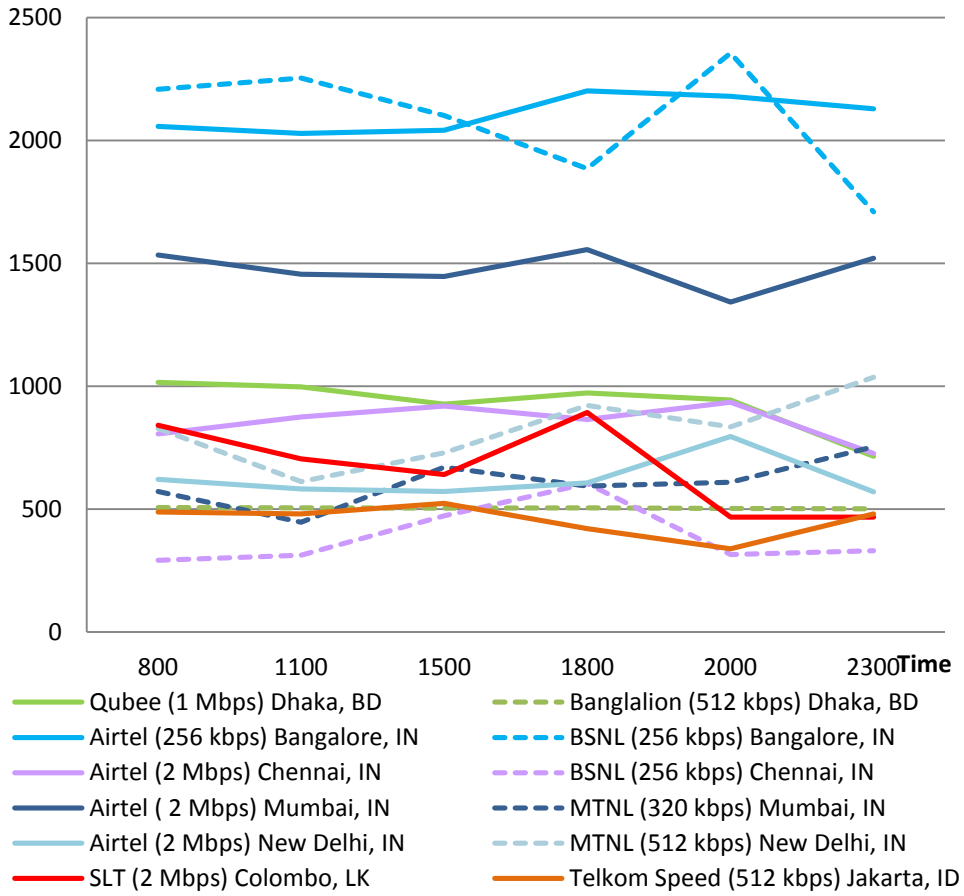
5. Varying server locations
   - ISP domain
   - International domain
   - National domain



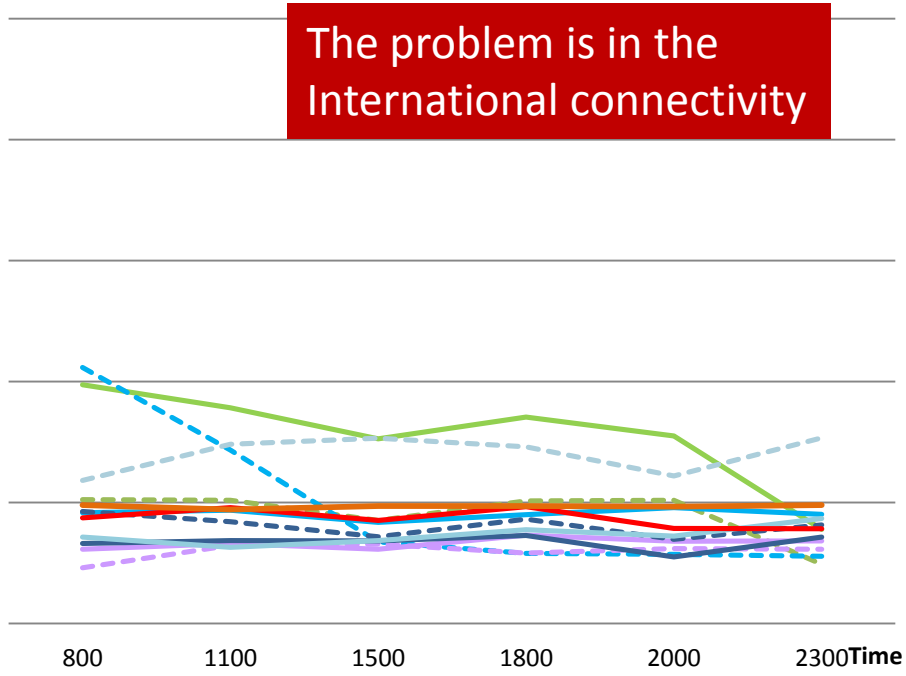
Diagnostics can be used to identify potential bottle-necks in the network. Value for money across packages can be compared. Consumer protection can be enhanced based on data

Identifying bottlenecks in the network using the results

Download from ISP Domain



Download from International Domain



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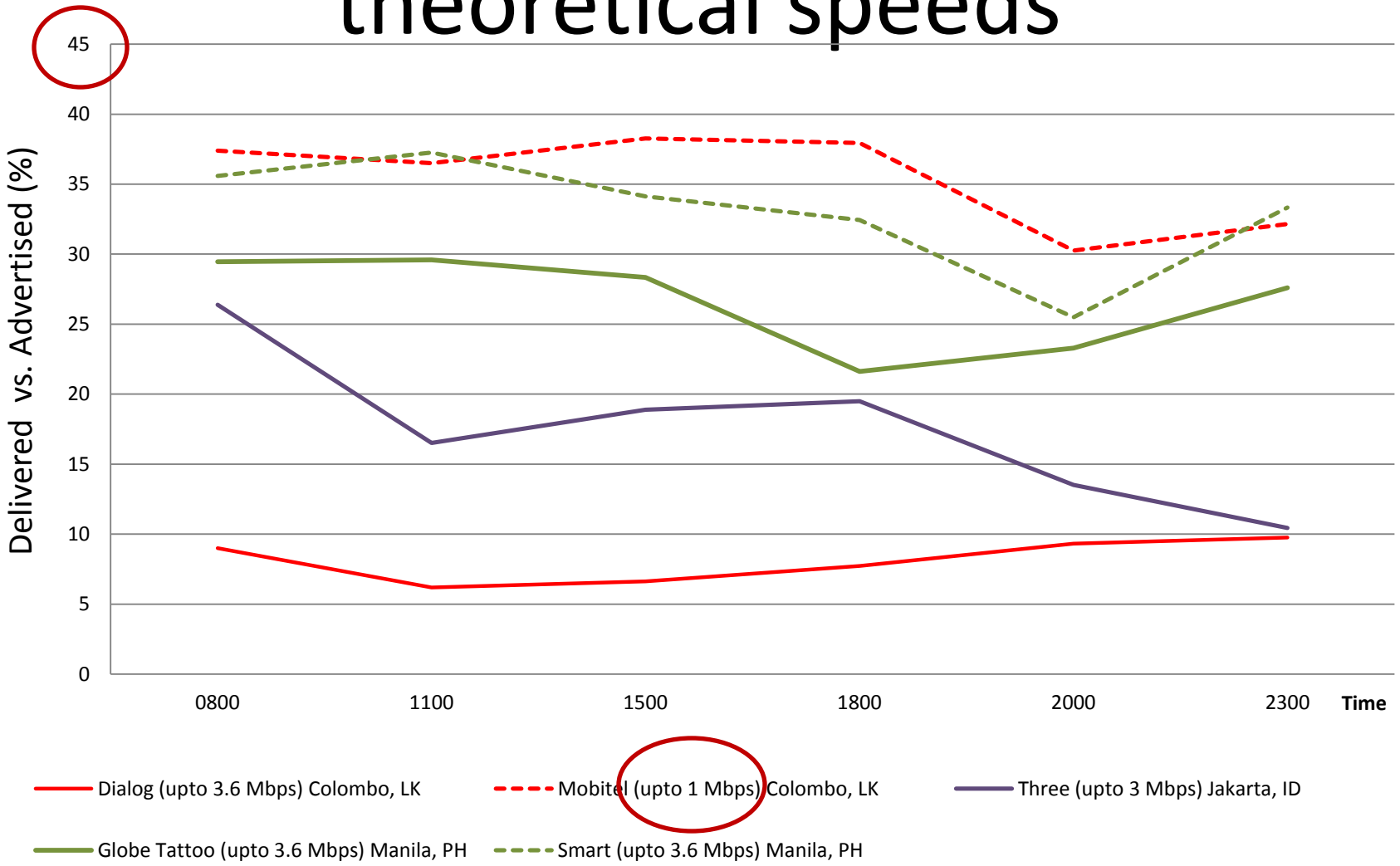
The trouble with advertising theoretical speeds



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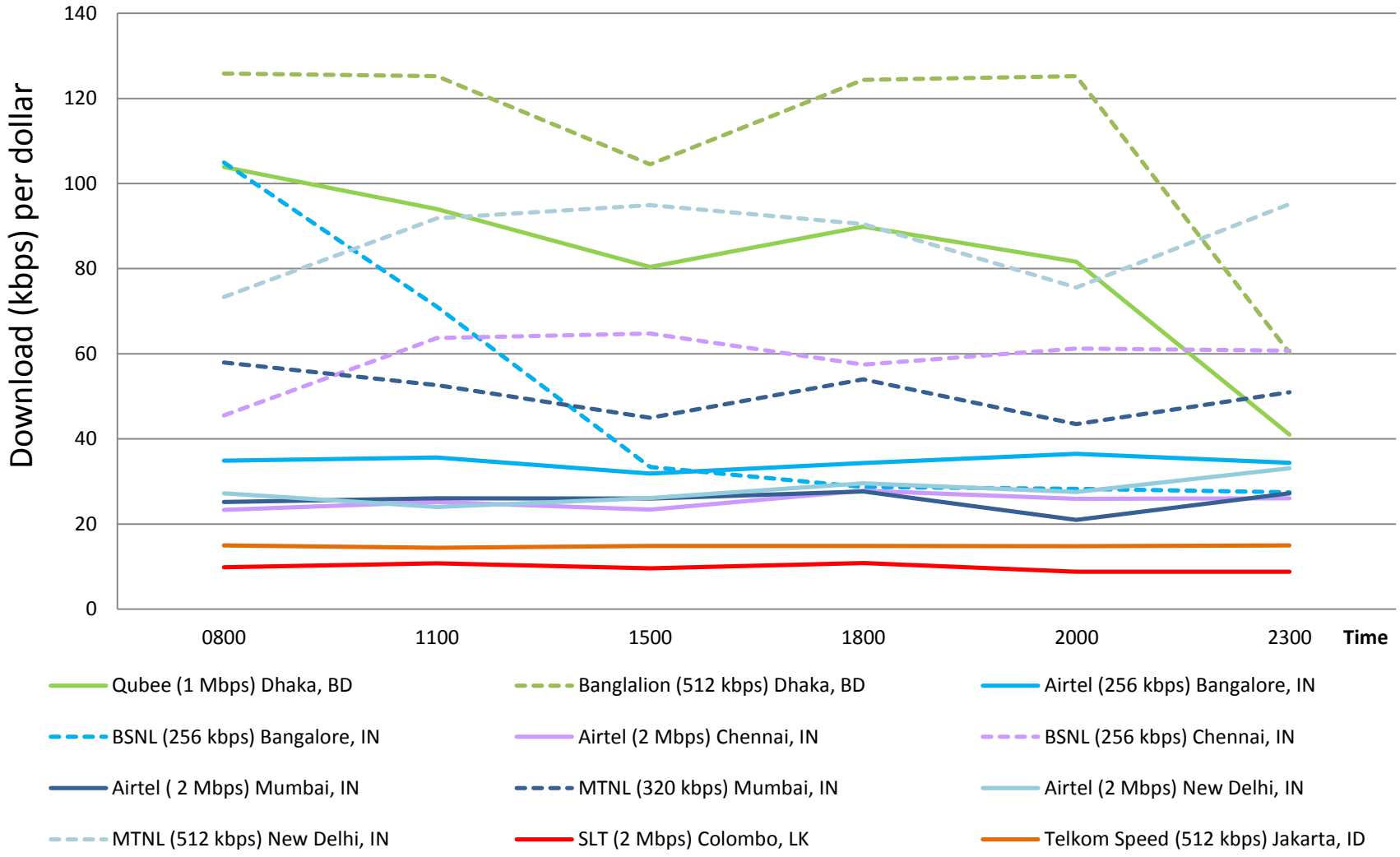
Value for money



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Source: September 2011, LIRNE*asia*

Possible ways to monitor quality

	Self regulation by operators	Direct monitoring by regulators	User satisfaction surveys	Demand-side (user) testing
Intrusiveness on network	+	+++/+	-	+
Regulator participation	++/+/-	+++	Depends on survey	-
Operator participation	+++	+++	Depends on survey	-
User participation	-	-	+++	+++
Subjectivity of results	++/+/-	+	+++	+

+++ High ++ Medium + low - none

Implementing QoSE indicators

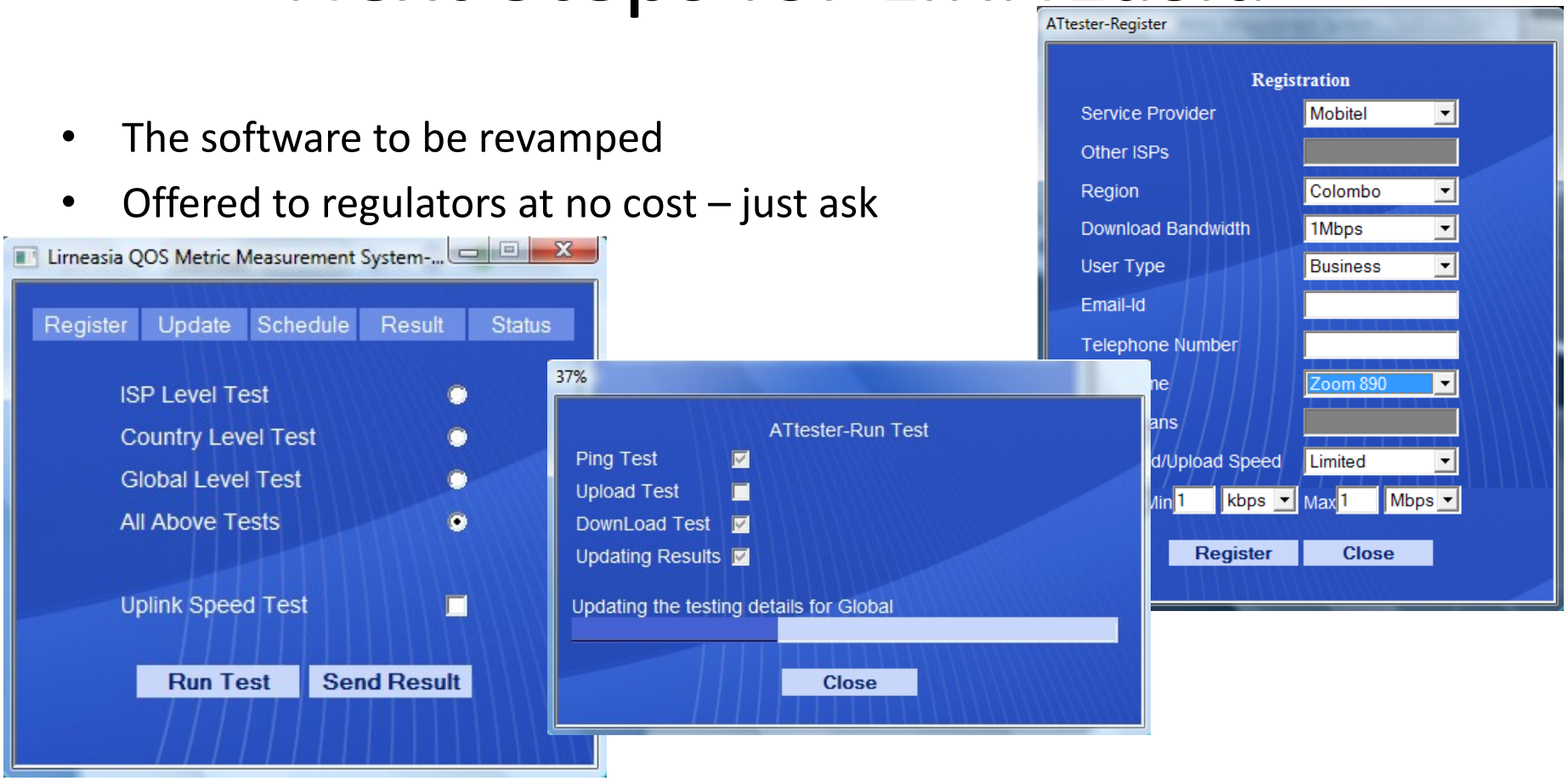
- Ideally co-ordinated by regulators
- Follow one methodology so that results are comparative
- Undisclosed locations (*not* from the office)
- Publicly available results → consumers can make informed decisions
- Policies can be based on diagnostics

Regulator's efforts in South Asia

Regulator	Consultancy?	Method Published?	Reports Published?	Test frequency	Parameters				
					Availability	Throughput	Latency (RTT)	Jitter	Packet Loss
ATRA (AF)	The indicators page is inaccessible – www.atra.gov.af								
BTRC (BD)	✓	-	-	-	✓	-	✓	-	✓
BICMA	-	-	-	-	-	-	-	-	-
TRAI (IN)	✓	-	✓	Quarterly	✓	✓	-	-	✓
CAM (MV)	Website cannot be found								
NTA	-	-	✓	-	✓	✓	-	-	-
PTA	✓	✓	-	-	✓	✓	✓	✓	✓
TRC (LK)	-	-	✓	Monthly	-	✓	✓	-	-

Next Steps for LIRNE*asia*

- The software to be revamped
- Offered to regulators at no cost – just ask



LIRNE*asia*'s QoSE Diagnostic Tool (Beta):
www.broadbandasia.info

Key Takeaways

- There are other metrics apart from download speed that affect a user's broadband experience
- These metrics (such as RTT, Jitter and Packet Loss) become more important when one goes beyond simply browsing the web
- Diagnostics should ideally be coordinated by regulators; not from a known location
- Results should be made public to benefit consumers

Thank You

More Info: www.lirneasia.net

Keywords: Benchmarks, ICT Indicators, Broadband QoSE

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