

Indo-European dialogue on ICT standards & Emerging Technologies

(Growth, Profitability & Nation Building)

13-14th March 2014 • New Delhi, INDIA



What India wants from 5G

Dr. Kumar N. Sivarajan Chairman, TSDSI & CTO, Tejas Networks

Broadband Scenario in India is Poor

Only 15.2 million broadband connections (June 2013), which covers a mere 5% of the homes

Need to add at least 250 million broadband connections over the next 5 years

Only wireless technology can provide this coverage quickly



Can 4G or 5G technologies help India?

Sr. No.	4G or 5G Technology	Benefit	Comments
1	Full Duplex	Doubles capacity	On-going work
2	Higher frequency band	Available, allows close packing of antennae	Poor penetration
3	Carrier Aggregation	Increase band width	Throwing more bandwidth for higher rate
4	MIMO	More layers, resiliency, reach/coverage	Cannot use in low frequency bands
5	HetNet or Cell Splitting	Better frequency reuse	Increases interference
6	Spectral efficiency	More data using the same bandwidth	More focus is needed here as it enhances all of the above



India's Requirements from 5G

5G must factor in the Indian requirement for DSL-like connectivity:
Always ON, low latency, affordable cost

To minimize cost, 5G must avoid using many more BTS sites, or much more spectrum, and focus on spectral efficiency

5G should allow virtual network operations enabling multiple operators to use the same physical network infrastructure

5G infrastructure must be green—not just the CPEs or handsets—since we lack good grid connectivity

5G must work well in Indian propagation characteristics—dense, concrete buildings

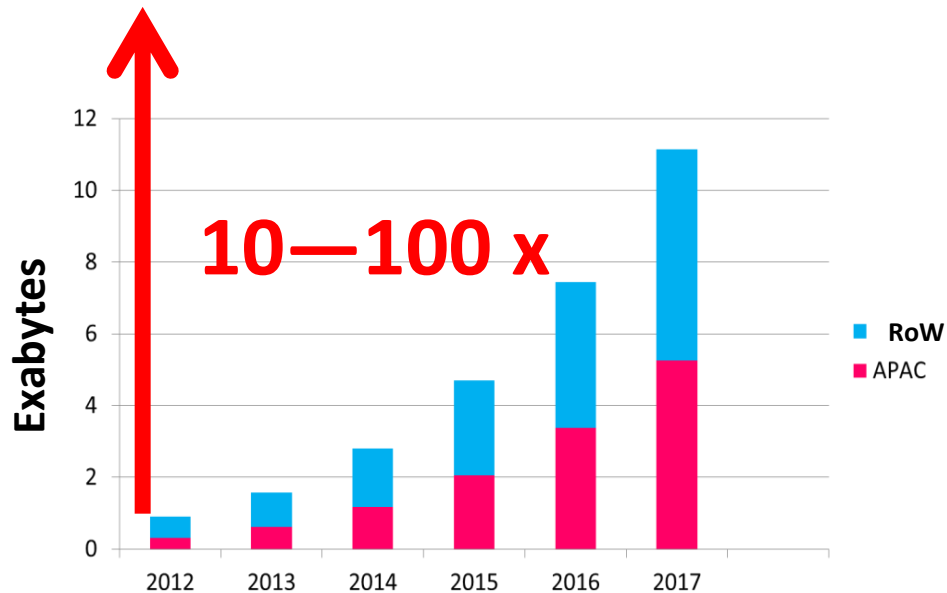
We want TV on our mobiles to watch cricket at work!



India's 5G Traffic can be 10x of projected global mobile traffic

India needs primary broadband connectivity to 250 M homes, for 250 GB/month at 2.5 Mbps

Translates to 100 Exabytes per month for India alone which is 10x the expected global mobile traffic by 2017



EXABYTE growth (66% CAGR)

Source: Cisco VNI 2013



What 5G Must Avoid or Need Not Support

Avoid new BTS roll outs

- We have 740,000 BTSes (all macro) already in India
- We have 3,700 BTSes in Mumbai alone

Avoid need for new/more spectrum

- Cost is transferred to end-customer
- Makes the solution unaffordable

High-speed mobility (300 km/h) need not be supported

- Traffic crawls in cities; 80 km/h on highways

Need not address multiple device connectivity

- Crying need is for primary broadband connectivity

Long reach radio solution for rural coverage may not be needed

- Village Panchayats have fiber and GPON, thanks to NOFN

We need a focussed and cost-effective solution!



Summary: India Needs from 5G a \$5/month “DSL-like” Mobile Broadband



\$100 Laptop



\$35 Tablet

Primary broadband connectivity to 250 million households at a cost point of Rs. 250 p.m. for 250 GB/month at an assured rate of 2.5 Mbps by 2017



QUESTIONS...



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