Improving Broadband Internet Through Infrastructure Sharing

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Presented by:

Clifford W. Beek

INTRODUCTION

- Physical characteristics of developing countries often increase the challenges for broadband network infrastructure
    - Backbone network (long haul)
    - Metro rings (middle mile)
    - Building access facilities (last mile)

- The high cost of optical network expansion and operating expenditures also present a significant obstacle
    - Layer 1 Physical (Dark Fiber)
    - Layer 2 Transport (Optical Routing)
    - Layer 3 Services (Private Network)

- Internet connectivity is a proven contributor for accelerating information and progressing economic productivity in developing countries

- These effects have been studied widely – increasing broadband penetration by 10% can offer a 1.40% increase in GDP per capita growth (World Bank)
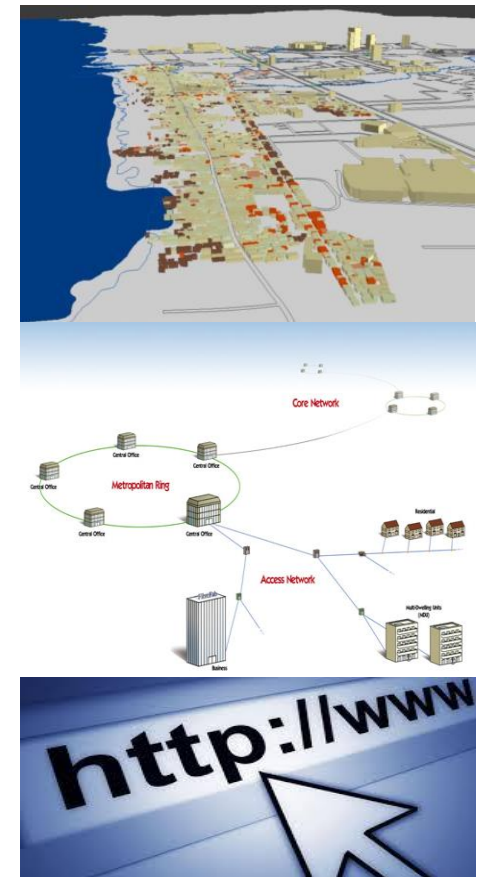
Reduce the Cost For Inputs to Do More with Less

WHAT IS INFRASTRUCTURE SHARING?

- Infrastructure sharing involves the enabling of public or private assets among two of more entities as a means to reduce costs, avail access rights, and facilitate cooperation
- Infrastructure sharing presents an effective way to improve Internet connectivity in countries
- Many utilities invested in Internet infrastructure for supervisory control and data acquisition (SCADA)

WHY IS IT SIGNIFICANT?

- Typical Utility Network
  - Savings in Capital Cost (CAPEX)
  - Savings in Operational Costs (OPEX)
 - Complementary for commercial data
  - Revenue opportunity

Source © 2012 Exal Communications Inc
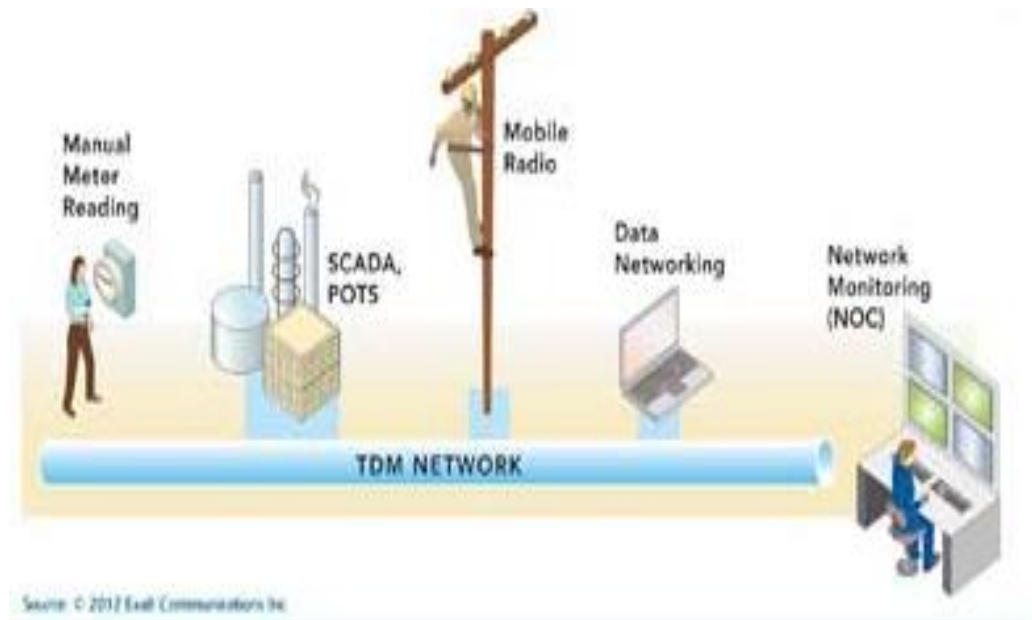
UTILIZING POWER'S FIBER NETWORK INFRASTRUCTURE

- National Utilities present a desirable option for shared cross-sector infrastructure
  - "Network Ready" telecom assets
  - Utility Poles can hold multiple cables "Overlash."
  - Ability to use Existing Infrastructure
  - Improved completion time
  - Reduces CapEx costs and increases utilization of poles
  - Estimated US$13,00 to $20,000 per kilometer (CTC Engineering & Analysis September 2009)
  - Existing Rights of way

Existing power line

Existing phone cables

Aerial overlash
No "Make-Ready" required

Utility poles
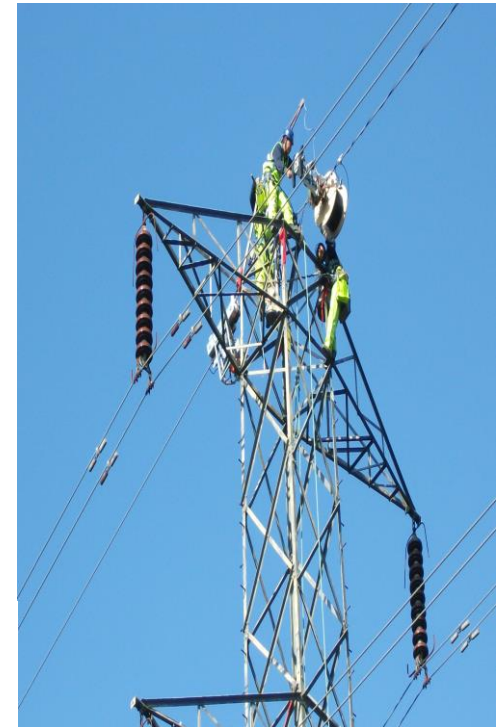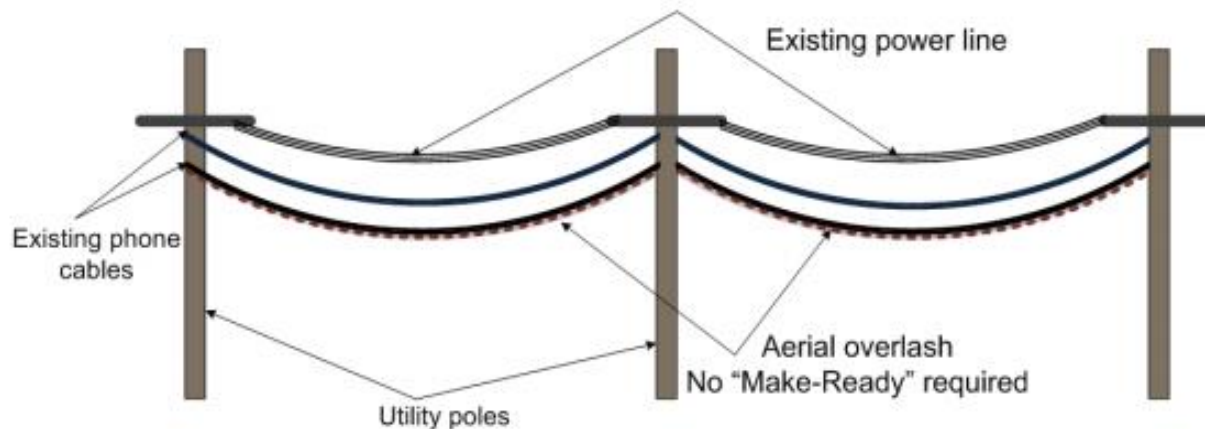
LAST MILE CHALLENGE / ENSURING ADEQUATE BROADBAND

- The broadband "standard" is 25Mbps down / 3 Mbps up
  - Ability to support video streams, participate in an online class, and download files simultaneously
- Within a local network there are several components:
  - i) a loop (or drop) which is the connection from user location to first entry point into the broadband network; ii) the network interface point (or multiplexer) where several connections combine traffic and are consolidated, and 3) the Point of Presence which is the ultimate consolidation point for a regional area.
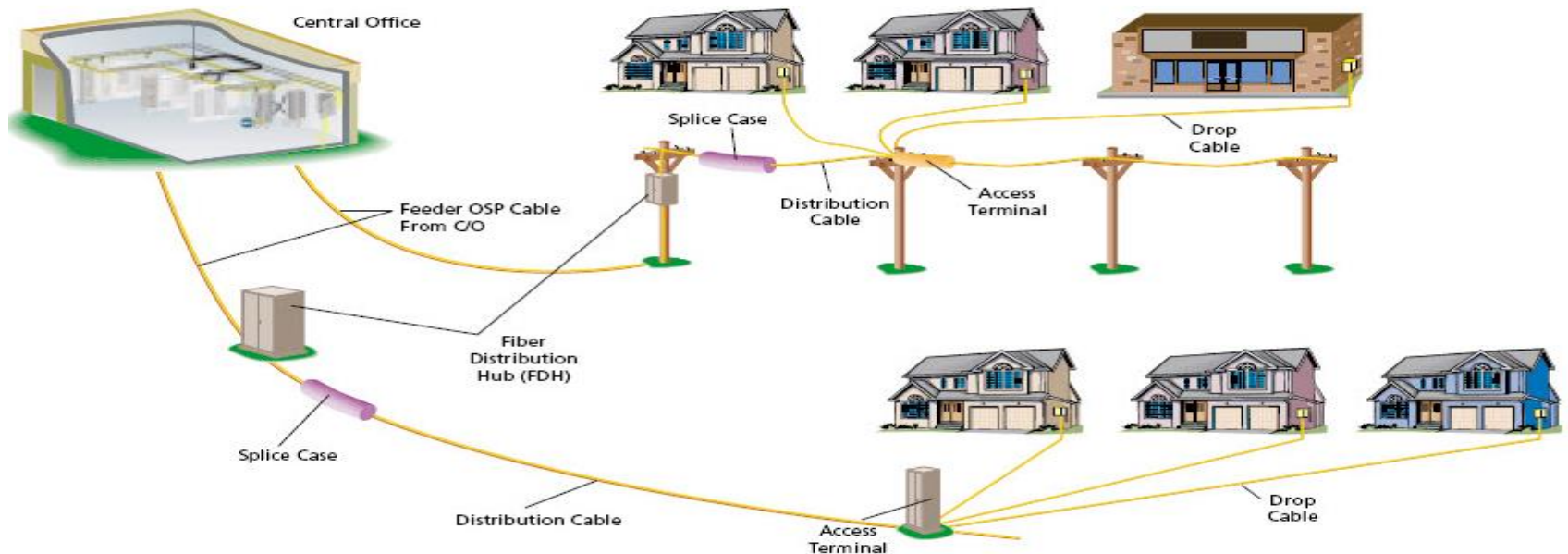
BANGLADESH: EXAMPLE OF INFRASTRUCTURE SHARING

- Telecom backbone network operators:
  - Bangladesh Telecommunications (BTCL)
  - Power Grid Company of Bangladesh (PGCB)
  - Bangladesh Railway (BR)
  - Nationwide Telecommunications Transmission Network (NTTN)
- Operators deployed an estimated 15,000km optical fiber backbone
- Telecom regulator issued "Infrastructure Sharing Guidelines"
  - PGCB Fiber Lease Transactions

Distance KM	Monthly Recurring Charge (BDT/Capacity/ KM)	Discount (%)	Terms
0-50	250	If Capacity = E1 (2Mbps: Discount 0% of MRC	Minimum 20 KM or BDT 5,000
51-100	200	If Capacity = STM-1 (155 Mbps): Discount = 20% of STM-1 capacity	In addition with above plus 50 KM
101-200	160	If Capacity = STM-4 (622 Mbps): Discount = 20% of STM-1 capacity	In addition to above plus 100 KM
201-300	130	If Capacity = STM-16 (2.5 Gbps): Discount = 20% of STM-4 capacity	In addition to above plus 200 KM

INDIA: EXAMPLE OF INFRASTRUCTURE SHARING

State-owned Firms

National Optical Fibre Network Project

- State owned networks (RailTel, GailTel and PowerGrid) lease out their fiber optic network (**105,000 kms** along railway tracks, power transmission lines and gas pipelines) to telecom operators

- In February 2012, Bharat Broadband Nigam Limited (BBNL), an SPV, was created to execute the NOFN Project, the largest rural connectivity project, aimed at providing internet access to 200,000 villages. The NOFN Project is being executed by state owned firms.

- As of 06 December 2015, **76,624 kilometers of optic fiber** have been laid. 1 state and 2 union territories (Kerala, Pondicherry and Chandigarh) are fully connected to the network

- As of 31 October 2015, **USD 456M** has been released by the Universal Service Obligation Fund to BBNL. Total cost is estimated to be USD 10.866B.

- Challenges:
  - Right of way (approval from states to put down fibre)
  - Incentivizing private firms to use the network [The project deploys backhaul (core) but the access network/last mile must be built by the service provider]

Private Firms

Reliance jio

Own fiber optic networks (in 100s to 1000s of kms)

RK INFRATEL
Way to Win Technology

RANK INFRATEL

LEASE OUT their network
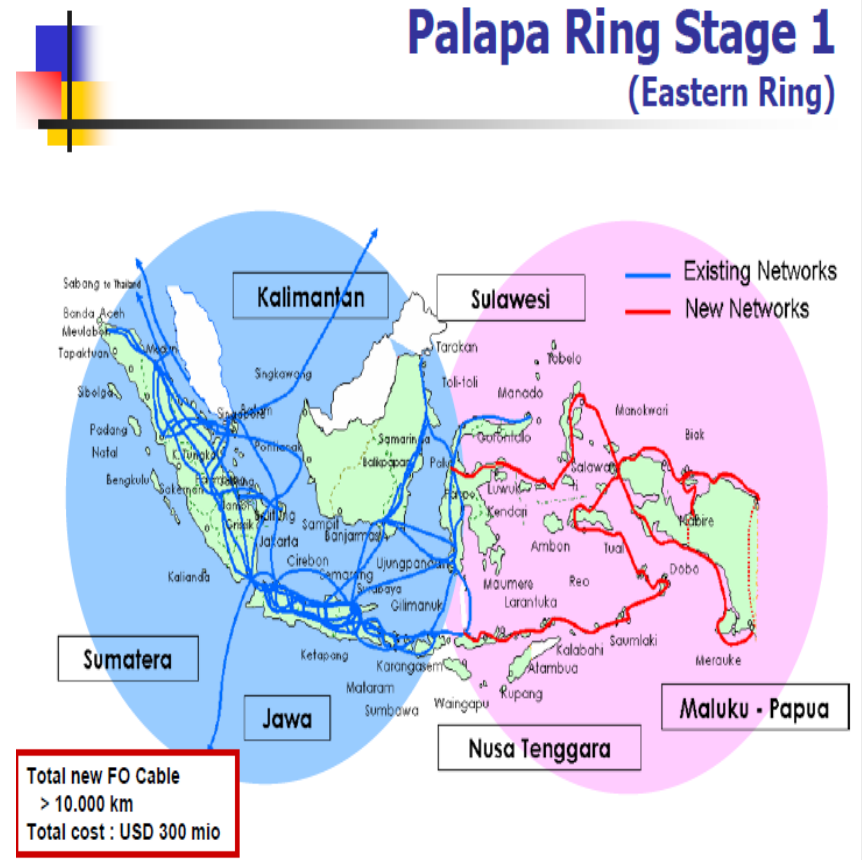to telcos and/or broadband operators

OR **PROVIDE** broadband service

indus TOWERS

- JV created by **3 leading telcos**: Bharti Group, Vodafone India and Aditya Birla Telecom
- **118,687 towers** in 15 circles around India
- Offers **passive infrastructure services** to all telecom operators and other wireless service providers
- 7 other tower companies, together with Indus manage close to 300,000 towers
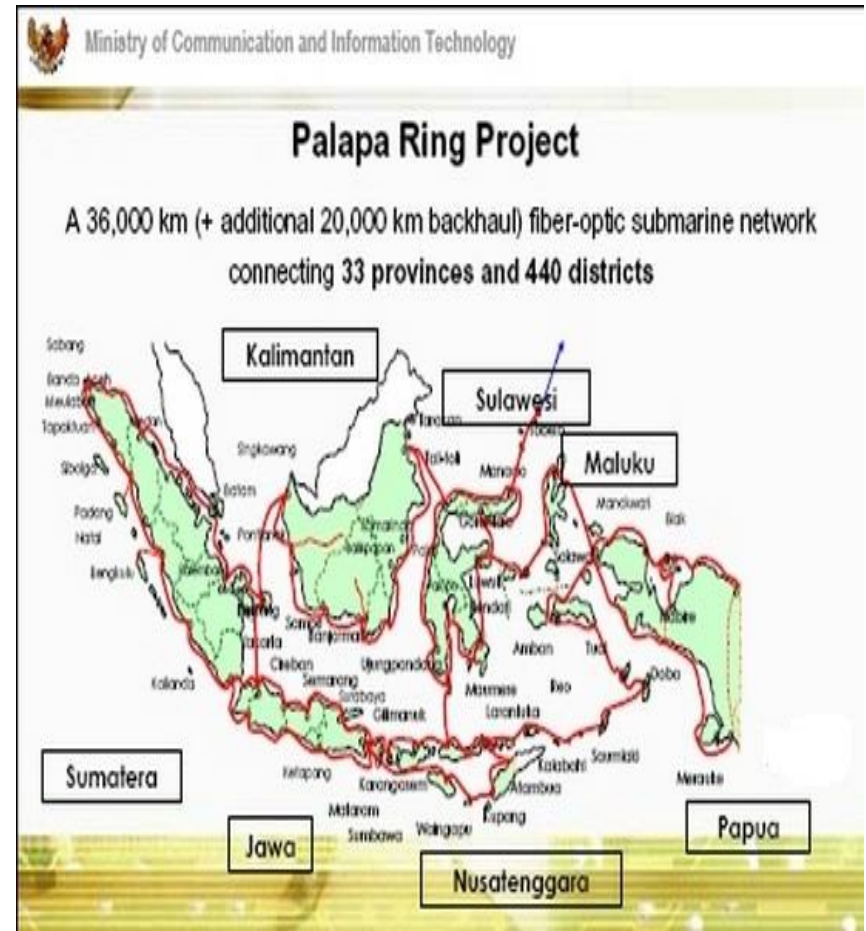
INDONESIA: EXAMPLE OF INFRASTRUCTURE SHARING

- Existing optic fiber networks are privately owned.

- In 2008, the Ministry of CIT enacted the Tower Decree, mandating tower sharing by telecom operators [AT Kearney]

- In 2009, the government launched the **Palapa Ring project**, a PPP initiative to provide the backbone for Internet with an estimated **submarine cable length of 35,200 km** and **inland cable length of 21,807 km**

- The Palapa Ring project was carried out by a **consortium of 7 telco providers** (Bakrie Telecom, Excelcomindo Pratama, Indosat, Infokom Elektrindo, Macca System Infocom, Powertek Utama Internusa and Telkom)

- Palapa Ring Phase 1 was completed in **2013**.

Palapa Ring Stage 1
(Eastern Ring)

Existing Networks
New Networks

Total new FO Cable > 10.000 km
Total cost : USD 300 mio

INDONESIA: EXAMPLE OF INFRASTRUCTURE SHARING

- In 2015, the **Palapa Ring II Project** was initiated, with the objective of laying out a total **of 8,395 kms of undersea fiber optic cables**

- Investment will be mainly financed from the non-tax revenue generated from ICT sectors, namely the USO fund and the sharing fund from frequency fees.

- With the exception in the non-commercial area, the deployment of the broadband infrastructure will be tendered by the government where the winner will be the one needing the least subsidy from the government.

- **Challenges**
  - Synchronization between existing and new projects
  - Credibility of BP3TI, the funding agency, needs to be rectified
  - Different market structures, before and after the Indonesian Broadband Plan initiative

Ministry of Communication and Information Technology

Palapa Ring Project

A 36,000 km (+ additional 20,000 km backhaul) fiber-optic submarine network connecting 33 provinces and 440 districts

PHILIPPINES

Project Initiative is to support the Philippine government in determining the most cost-effective and sustainable option with strongest impact that would enhance Internet Connectivity
- DOST-ICTO
- NPGC
- Private Operators

Transmission Backbone Networks

- PLDT Digital Fiber Optic Network (DFON)
- Globe Telecom Fiber Optic Backbone Network (FOBN)
- TelicPhil (BayanTel) Nationwide Digital Transmission Network (NDTN)

Cable Landing Stations

- Ballesteros, Cagayan
- Tanza, Cavite
- Nasugbu, Batangas
- Bauang, La Union

Key Takeaways

- Fiber optic networks are developed and operated by **both public and private** firms, and the networks are more efficiently built along existing gas/rail/power lines

- There is a pattern of government-backed initiatives to create a **country-wide fiber optic network** in providing broadband internet connectivity, with strong support from the private sector

- **Tower sharing** among telecom operators is common. Degree of sharing depends on regulatory and competitive environment in the country

- **Universal Services Obligation Fund**, sourced from telcos, have been used to fund ICT development in rural areas.
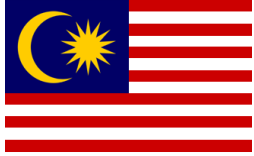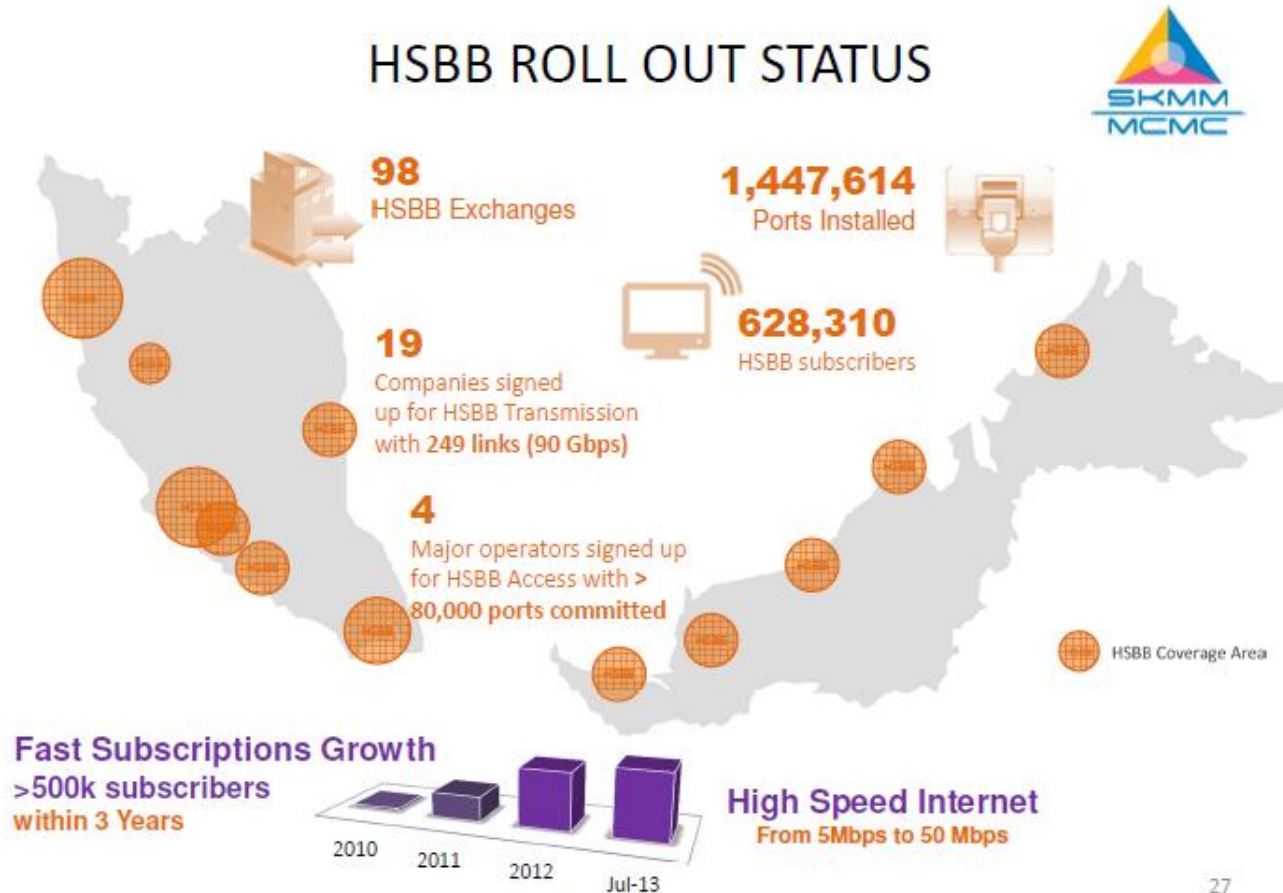
MALAYSIA: EXAMPLE OF INFRASTRUCTURE SHARING

- State-owned (Fiberrail) and private firms (SHTech and Time Dotcom) own, operate and lease out optical fiber networks
  - *i.e.* Fiberrail owns 4800km network of fiber optic cables running along gas and power corridors
- Tower sharing among telecom operators is common, both formally and informally [AT Kearney]

- In 2010, the Malaysian PM announced the **National Broadband Initiative**, a government programme designed to make high-speed Internet accessible and affordable to the country's citizens, with special emphasis on rural areas, children and the poor.
- The resulting High Speed Broadband Network Project was a resounding success:
  - 19 companies signed for transmission services to enhance their own backhaul network
  - 4 major operators signed up for access
  - Fastest subscription growth, >500,000 within 3 years
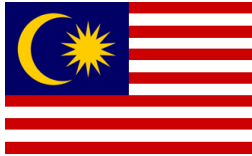
Source: Malaysia's Broadband Initiatives and Future Plans, September 2013