Breaking the barriers of Broadband in Asia-Pacific

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Global growth indicators

• Flow of people  
  1.6x in 11 years  
  • 2002-2013

• Flow of services  
  3.1x in 12 years  
  • 2002-2014

• Flow of goods  
  10.5x in 34 years  
  • 1980-2014

Source: UN World Tourism Organization; UNCTAD; McKinsey Global Institute analysis
Bandwidth grew 45x in 9 years

<table>
<thead>
<tr>
<th>Regions</th>
<th>NA United States and Canada</th>
<th>EU Europe</th>
<th>AS Asia</th>
<th>LA Latin America</th>
<th>ME Middle East</th>
<th>AF Africa</th>
<th>OC Oceania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td>----</td>
<td>---</td>
<td>100–500</td>
<td>500–1,000</td>
<td>1,000–5,000</td>
<td>5,000–20,000</td>
<td>&gt;20,000</td>
</tr>
<tr>
<td>Gigabits per second (Gbps)</td>
<td>&lt;50</td>
<td>50–100</td>
<td>100–500</td>
<td>500–1,000</td>
<td>1,000–5,000</td>
<td>5,000–20,000</td>
<td>&gt;20,000</td>
</tr>
</tbody>
</table>

2005¹
100% = 4.7 Terabits per second (Tbps)

2014
100% = 211.3 Tbps

NOTE: Lines represent interregional bandwidth (e.g., between Europe and North America) but exclude intraregional cross-border bandwidth (e.g., connecting European nations with one another).

Source: TeleGeography; McKinsey Global Institute analysis
"It’s a big deal."

- Nearly 300 submarine cables spanning over 500,000 miles across the world’s seabed are the primary pipeline of transcontinental Internet.

- They are also responsible for $10 trillion worth of transactional value every day.

- It is greater than the GDP of Japan, Germany, and Australia combined.

Source: TeleGeography

Global Submarine Cable Map

U.S. Federal Communications Commission Commissioner Jessica Rosenworcel's statement on September 17, 2015
Broadband divide within Asia


- **Average speed (Mbps)**
  - Philippines: 5.5
  - India: 6.5
  - Indonesia: 7.2
  - China: 7.6
  - Sri Lanka: 8.5
  - Malaysia: 8.9
  - Vietnam: 9.5
  - Australia: 11.0
  - New Zealand: 14.7
  - Thailand: 16.0
  - Taiwan: 16.9
  - Japan: 20.2
  - Singapore: 20.3
  - Hong Kong: 21.9
  - South Korea: 28.6

- **>4 Mbps**
  - Philippines: 39%
  - India: 42%
  - Malaysia: 72%
  - Indonesia: 76%
  - Australia: 81%
  - China: 81%
  - Sri Lanka: 82%
  - Vietnam: 86%
  - New Zealand: 91%
  - Japan: 93%
  - Hong Kong: 94%
  - Singapore: 94%
  - Taiwan: 95%
  - Thailand: 97%
  - South Korea: 98%

- **>10 Mbps**
  - Philippines: 11.0%
  - India: 18.0%
  - Indonesia: 19.0%
  - China: 20.0%
  - Sri Lanka: 22.0%
  - Malaysia: 32%
  - Australia: 35%
  - New Zealand: 37.0%
  - Taiwan: 52%
  - Hong Kong: 65%
  - Singapore: 71%
  - Thailand: 72%
  - Japan: 72%
  - South Korea: 73%

- **>15 Mbps**
  - Philippines: 5.0%
  - India: 6.2%
  - Indonesia: 10.0%
  - China: 11.0%
  - Sri Lanka: 11.0%
  - Malaysia: 14.0%
  - Australia: 19.0%
  - New Zealand: 32.0%
  - Taiwan: 38.0%
  - Thailand: 43.0%
  - Singapore: 51.0%
  - Japan: 52.0%
  - Hong Kong: 54.0%
  - South Korea: 69.0%
Continental drift

Average speed in Asia (Mbps)

<table>
<thead>
<tr>
<th>Country</th>
<th>Speed (Mbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines</td>
<td>5.5</td>
</tr>
<tr>
<td>India</td>
<td>6.5</td>
</tr>
<tr>
<td>Indonesia</td>
<td>7.2</td>
</tr>
<tr>
<td>China</td>
<td>7.6</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>8.5</td>
</tr>
<tr>
<td>Malaysia</td>
<td>8.9</td>
</tr>
<tr>
<td>Vietnam</td>
<td>9.5</td>
</tr>
<tr>
<td>Australia</td>
<td>11.0</td>
</tr>
<tr>
<td>New Zealand</td>
<td>14.7</td>
</tr>
<tr>
<td>Thailand</td>
<td>16.0</td>
</tr>
<tr>
<td>Taiwan</td>
<td>16.9</td>
</tr>
<tr>
<td>Japan</td>
<td>20.2</td>
</tr>
<tr>
<td>Singapore</td>
<td>20.3</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>21.9</td>
</tr>
<tr>
<td>South Korea</td>
<td>28.6</td>
</tr>
</tbody>
</table>

Average speed in Europe (Mbps)

<table>
<thead>
<tr>
<th>Country</th>
<th>Speed (Mbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>15.3</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>15.5</td>
</tr>
<tr>
<td>Spain</td>
<td>15.5</td>
</tr>
<tr>
<td>Ireland</td>
<td>15.6</td>
</tr>
<tr>
<td>Belgium</td>
<td>16.3</td>
</tr>
<tr>
<td>Latvia</td>
<td>16.6</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>16.9</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>16.9</td>
</tr>
<tr>
<td>Romania</td>
<td>17.0</td>
</tr>
<tr>
<td>Netherlands</td>
<td>17.4</td>
</tr>
<tr>
<td>Denmark</td>
<td>20.1</td>
</tr>
<tr>
<td>Finland</td>
<td>20.5</td>
</tr>
<tr>
<td>Switzerland</td>
<td>21.7</td>
</tr>
<tr>
<td>Sweden</td>
<td>22.5</td>
</tr>
<tr>
<td>Norway</td>
<td>23.5</td>
</tr>
</tbody>
</table>

The State of the Internet / Q1 2017, Akamai.
Slower or faster than European counterparts

Average speed in Mbps

Weighted Median Monthly IP Transit Prices per Mbps:
Asia’s highest (Bangkok) is 12x pricier than Europe’s highest (Istanbul)

Source: TeleGeography. Data derived from Q2 of 2017
Cost of bandwidth depends on infrastructure.

Median 100 Gbps Prices on Key International Routes, 2013-16

- **Terrestrial cables**
  - Frankfurt-London
  - Chicago-New York
  - London-New York
  - Los Angeles-Tokyo

- **Submarine cables**

*Curtesy: Brianna Boudreau, Senior Analyst, TeleGeography.*
Fierce competition
• Coast-coast terrestrial TX

Poor competition

Broadband’s biggest barrier

Very good competition
• Terrestrial & submarine TX

Issues keeping Asia’s bandwidth pricier
Submarine Cable repair 2008-2015: Worldwide average repairs/year

Source: International Cable Protection Committee
Submarine Cable repair 2008-2015: Average time to begin repair

Source: International Cable Protection Committee
Submarine networks = Terrestrial networks

Evolution of technology = Evolution of policy

Courtesy: Ciena
• 145,000 km meshed across 32 countries (12 landlocked).
• Seamlessly connects Asia and Europe.
Prime Minister Sheikh Hasina has approved the proposed amendments to Asian Highway agreement on August 13, 2016.

It paves the way to deploy optical fiber using 145,000 km right-of-way to digitally interlink Asia and plug the continent with Europe.
Bangladesh has proposed

**Annex II (ASIAN HIGHWAY CLASSIFICATION AND DESIGN STANDARDS)**

*Insert as paragraph 11: Co-habitation of optical fiber for strengthened ICT connectivity*

"There is an opportunity to leverage synergies between the *concomitant* deployment of optical fibre cables with the construction or maintenance of the Asian Highway Network. Such co-deployment would create additional cross-country Internet transmission routes which would contribute to the reduction of the digital divide in the ESCAP region.

In this regard, parties shall endeavour to utilize the right-of-way of the Asian Highway Network for the co-deployment of optical fiber cables across and within countries."
**concomitant**

*noun [C] · UK /kənˈkɒm.ɪ.tənt/ US /kənˈkɑː.mə.tənt/ FORMAL*

Something that happens with something else and is connected with it:
Bangladesh has proposed

- **Annex II** (ASIAN HIGHWAY CLASSIFICATION AND DESIGN STANDARDS)

*Insert as paragraph 11: Co-habitation of optical fiber for strengthened ICT connectivity*

"There is an opportunity to leverage synergies between the concomitant deployment of optical fibre cables with the construction or maintenance of the Asian Highway Network. Such co-deployment would create additional cross-country Internet transmission routes which would contribute to the reduction of the digital divide in the ESCAP region.

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Each country’s share in Asian Highway

<table>
<thead>
<tr>
<th>Country</th>
<th>Length (km)</th>
<th>Country</th>
<th>Length (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Afghanistan*</td>
<td>4,247</td>
<td>17. Malaysia</td>
<td>1,595</td>
</tr>
<tr>
<td>2. Armenia</td>
<td>966</td>
<td>18. Mongolia*</td>
<td>4,286</td>
</tr>
<tr>
<td>3. Azerbaijan</td>
<td>1,462</td>
<td>19. Myanmar</td>
<td>3,003</td>
</tr>
<tr>
<td>4. Bangladesh</td>
<td>1,768</td>
<td>20. Nepal*</td>
<td>1,314</td>
</tr>
<tr>
<td>6. Cambodia</td>
<td>1,335</td>
<td>22. Philippines</td>
<td>3,517</td>
</tr>
<tr>
<td>7. China</td>
<td>26,181</td>
<td>23. South Korea</td>
<td>907</td>
</tr>
<tr>
<td>8. DPR Korea</td>
<td>1,462</td>
<td>24. Russia</td>
<td>17,046</td>
</tr>
<tr>
<td>9. Georgia</td>
<td>1,101</td>
<td>25. Singapore</td>
<td>19</td>
</tr>
<tr>
<td>10. India</td>
<td>11,650</td>
<td>26. Sri Lanka</td>
<td>650</td>
</tr>
<tr>
<td>11. Indonesia</td>
<td>3,970</td>
<td>27. Tajikistan*</td>
<td>1,925</td>
</tr>
<tr>
<td>12. Iran</td>
<td>11,153</td>
<td>28. Thailand</td>
<td>5,110</td>
</tr>
<tr>
<td>13. Japan</td>
<td>1,111</td>
<td>29. Turkey</td>
<td>5,245</td>
</tr>
<tr>
<td>14. Kazakhstan*</td>
<td>12,856</td>
<td>30. Turkmenistan*</td>
<td>2,204</td>
</tr>
<tr>
<td>15. Kyrgyzstan*</td>
<td>1,695</td>
<td>31. Uzbekistan*</td>
<td>2,966</td>
</tr>
<tr>
<td>16. Lao PDR*</td>
<td>2,317</td>
<td>32. Viet Nam</td>
<td>2,631</td>
</tr>
</tbody>
</table>

Source: ESCAP

*Landlocked developing country (LLDC)
Roads and ICT: Collaborate, Co-deploy and Coexist
Distance is a philosophical issue.
Asian Highway is the preferred right of way for Asia Pacific Information Superhighway (AP-IS)

- >$16 Trillion economies.
- >60% global population.
- Internet is in very bad shape.
A bilateral move that is shaping global trade
FORGING THE NEW SILK ROAD WITH CHINA-TURKEY RAIL LINK

DHL's Southern rail corridor spans five countries and two sea transit segments along China's Silk Road Economic Belt. Trade via the corridor is expected to further bolster not only Turkey's economic status as a trading hub, but also benefit the transport and freight industries of Kazakhstan, Azerbaijan, and Georgia.
CN 10/10/17

Beijing

- **UPS** rolls out service enhancements across 20 Chinese cities to better assist more businesses in connecting with global markets
- The investment comes as China seeks to strengthen and solidify its position in the global economy and manufacturing industries through projects such as “Made in China 2025” and the “Belt and Road Initiative”

Inquiries

For more information about this press release, contact:

Janice Chen
**Best effort by Asia Africa Europe-1 (AAE-1) cable**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>25000 Km</td>
<td>Submarine cable</td>
</tr>
<tr>
<td>4/5</td>
<td>Number of Fiber Pair</td>
</tr>
<tr>
<td>100Gbps</td>
<td>Wavelength Technology</td>
</tr>
<tr>
<td>80 A</td>
<td>Initial Design WL per FP</td>
</tr>
<tr>
<td>40 Tbps</td>
<td>Initial System Design Capacity</td>
</tr>
</tbody>
</table>

Owners: [China Unicom](#), Telecom Egypt, Etisalat, Omantel, Djibouti Telecom, OTEGLOBE, Pakistan Telecommunications Company Ltd., PCCW, Ooredoo, Mobily, Viettel Corporation, TeleYemen, Chuan Wei, Retelit, Reliance Jio Infocom.
China Unicom takes a giant leap AAE-1 via Pakistan and Myanmar

Source: People’s Daily online (March 2, 2016)
• 145,000 km meshed across 32 countries (12 landlocked).
• Seamlessly connects Asia and Europe.
“Factories” and “Warehouses” of Internet in Asia-Pacific

Major Content Provider Data Center Locations, 2017
Thank you! Questions?