Singapore’s Approach to Broadband Connectivity

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Scope

- International connectivity
- Domestic connectivity
- Data centres
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International Connectivity
Importance of Submarine Cables

- More than 95% of Singapore’s international telecom traffic carried via submarine cables
- Demand for international bandwidth set to grow:
  - Deployment of high speed broadband networks, both wired and wireless, in Singapore and the region
  - Development of new applications and services:
    • Feature-rich web content, high definition streaming video
    • Interactive TV and video conferencing services
    • Cloud computing services
Submarine Cables in Singapore

- Singapore is well-connected by submarine cables
- 16 submarine cable systems, with total max capacity of over 183.41 Tbps
Landing of Submarine Cables

- IDA acts as a One-Stop contact for regulatory approvals
  - Coordinates with other Government agencies to facilitate landing and repair of submarine cable systems
  - Removes the need for operators to approach agencies individually

- IDA issued guidelines on the landing of submarine cable systems
  - provide guidance to interested parties and facilitates the process for applying for the necessary permits

- Regular reviews to ensure availability of landing sites
Protection and Facilitating Repair

- Laws protect submarine cables from being damaged in Singapore waters:
  - Telecommunications Act, MPA Act
- Co-operation between government agencies to reduce unauthorised anchoring activities
- IDA issued guidelines on repair of submarine cable system and facilitate cable repairs
  - Pre-clearance of cable ships and crew by maritime authorities
Regional Initiatives

- Increasingly critical for governments to:
  - Facilitate laying and prompt repair of submarine cable systems
  - Take measures to protect submarine cable systems

- APEC:
  - Workshop in October 2013 with the submarine telecommunications cable industry:
    - To identify and discuss barriers to submarine telecommunications cable resilience, promote practical measures to mitigate disruptions, and discuss the benefits of business-government partnerships
    - Develop a Better Practice Guide for Enhancing Submarine Telecommunications Cable Resilience

- ASEAN:
  - Workshop in 2012 to highlight the possible threats to submarine cables, current situation and impact of the threats, best practices from the industry and ways in which the government can provide assistance
    - Aimed to develop the framework on submarine connectivity protection and risk mitigation plan for ASEAN countries
Domestic Connectivity
Next Gen NBN Industry Structure

**Network Company (NetCo)**
Responsible for the design, build and operation of the Network’s passive infrastructure.

**Operating Companies (OpCos)**
Responsible for the design, build and operation of the Network’s active infrastructure.

**Retail Service Providers**
Purchase bandwidth from OpCos and provide competitive and innovative services.

**End-Users**
Consumers / Businesses
Desired Outcomes of the Next Gen NBN

- High level of adoption of high-speed broadband
- Competitive and Vibrant Infocomm industry through Open Access
- High level of coverage of high-speed broadband
- Competitive and affordable broadband pricing
Vibrant Next Gen NBN Landscape

- NBN deployed to 95% of homes and businesses by June 2012
- Low barriers to entry and non-discriminatory access have attracted new service providers and provided new business opportunities
- To date:
  - More than 500,000 fibre broadband subscribers
    - Growing proportion of end users on 100Mbps plans or higher
## Competitive Pricing

- Prices of NBN services typically **lower than non-NBN equivalent**
  - Between $30 to $50 for 100 Mbps residential fibre plans compared to $70 to $100 for non-NBN 100 Mbps products previously
  - Competition from service providers has driven further price reduction for residential fibre plans

### Promotional Prices at IT Fairs

<table>
<thead>
<tr>
<th>Operator</th>
<th>Sep 2013</th>
<th>Nov 2013</th>
<th>Feb 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>SingTel</td>
<td>200/300/500 Mbps at $49.90/$59.90/$79.90 (Bundled)</td>
<td>100-300 Mbps at $34.95 - $42.45 (Bundled)</td>
<td>200/300/500 Mbps at $39.50/$47.45/$59.95 (Bundled)</td>
</tr>
<tr>
<td>StarHub</td>
<td>100 - 300 Mbps from $39.90 - $59.90 (Bundled)</td>
<td>100 - 300 Mbps from $29.93 - $59.90 (Bundled)</td>
<td>100 /300/500 Mbps at $34.91/$43.66/$69.90 (Bundled)</td>
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<tr>
<td>M1</td>
<td>200/300 Mbps at $39.00/$49.00 (Bundled)</td>
<td>200/300 Mbps at $29.25/$42.88 (Bundled)</td>
<td>200/300 Mbps at $34.13/$42.88 (Bundled)</td>
</tr>
<tr>
<td>Viewqwest</td>
<td>200/400 Mbps at $65.00/$89.95 (Bundled)</td>
<td>100/200/400 Mbps at $48.95/$65.00/$89.95 (Bundled)</td>
<td>200/300/500Mbps at $39/$65/$89.95 (Bundled)</td>
</tr>
<tr>
<td>MyRepublic</td>
<td>100/150 Mbps * at $59.00/$65.00 (Bundled)</td>
<td>100/150 Mbps * at $38.88/$48.88 (Bundled)</td>
<td>1Gbps at $49.99 (Bundled)</td>
</tr>
</tbody>
</table>

*Though the MRC is higher, the installation fee is waived*
Backhaul – Access to Submarine Cable Landing Stations

- Facilities-based operators free to deploy own infrastructure, or lease from other operators
  - More than 14 FBOs provide backhaul as a service

- Removed barriers – facilitate access to Dominant Licensee’s submarine cable landing stations
  - Mandated co-location (2001) and connection services (2002) at SingTel’s submarine cable landing stations
  - Allow any operator who owns submarine capacity landed at Dominant Licensee’s landing stations at approved terms and conditions and at cost-based prices
Backhaul - Access to Submarine Cable Landing Stations

- Allow operators who have deployed infrastructure to SCLS:
  - To provide **backhaul service** for any third party’s capacity on any submarine cable system that lands at that SCLS (2004)
  - To provide **transit service** to enable a third party to transit traffic between submarine cable systems landed in Singapore (2004)
  - Irrespective of whether the operator owns capacity in the submarine cable system which it seeks to provide backhaul and transit services (2011)
Interconnection Related Services

- SingTel required to provide tail local leased circuits at cost-based rates since 2006
- Fibre connectivity using the Next Gen NBN:
  - Nationwide Fibre Network:
    - Unbundled regulated services;
    - Able to purchase dark fibre in segments to all buildings, including Submarine Cable Landing Stations
Data Centres
Singapore’s Competitive Advantages in Attracting DCs

- Proximity to markets
- Accessibility
- Good intellectual property protection
- Skilled labour
- Reliable power
- Excellent connectivity
- Resilience to natural disasters

Singapore is well-positioned to attract premium Data Centres
Singapore’s proximity to Asian / ASEAN markets serves as natural point of presence

Key value propositions:

• Good international connectivity via multiple submarine cables
• Safe and secure environment with clear regulatory frameworks
• No earthquakes and other natural disasters

“...majority of companies have cited Security as the most important reason for expansion.”
- 2012, DataCenter Dynamics on DC Demand Growth

“The most important factor in choosing a location is Security.”
- 2013, DRT’s survey result on preferred DC location

1) Survey was conducted with 300+ participants from companies with at least US$500M annual revenues
2) Survey conducted using 100 IT decision-makers from Australia, Hong Kong, Japan and Singapore companies based in Singapore
59 DCs accounted for in Singapore

Total Space:
More than 260,000sqm

<table>
<thead>
<tr>
<th>Company</th>
<th>No. of DCs</th>
<th>Est. Space (sqm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SingTel</td>
<td>5</td>
<td>46,452</td>
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<tr>
<td>Digital Realty</td>
<td>1</td>
<td>34,000</td>
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<tr>
<td>Equinix</td>
<td>2</td>
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<td>Global Switch</td>
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<tr>
<td>Keppel T&amp;T</td>
<td>2</td>
<td>24,023</td>
</tr>
<tr>
<td>NCS</td>
<td>5</td>
<td>12,007</td>
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Other DCs

<table>
<thead>
<tr>
<th>1-Net</th>
<th>Indosat</th>
<th>HP/EDS</th>
<th>Atos Origin</th>
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<tbody>
<tr>
<td>Pacnet</td>
<td>Savvis</td>
<td>T-Systems</td>
<td>Epsilon</td>
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<tr>
<td>ST Electronics</td>
<td>AT&amp;T</td>
<td>ICONZ-Webvisions</td>
<td>Telin Singapore</td>
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<tr>
<td>Verizon Business</td>
<td>StarHub</td>
<td>M1 Limited</td>
<td>Crimson Logic</td>
</tr>
<tr>
<td>NTT Com</td>
<td>Fujitsu</td>
<td>KDDI</td>
<td>CITIC</td>
</tr>
<tr>
<td>Tata Communications</td>
<td>BT Global Services</td>
<td>Telstra International</td>
<td>Ascenix</td>
</tr>
<tr>
<td>Viewquest</td>
<td>China Telecom</td>
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Source: Broadgroup 2013 report
Thank you