Content

• The value of NGBN
• NGBN Challenges
• Case Study
NGBN is the essential national assets

“I believe that America should lead the world in broadband penetration”
Barack Obama, USA President

“Next generation broadband will be critical enabler to build new capabilities and transform our industries”
Lee Hsien Loong, PM Singapore

“Universal Broadband Access is crucial for Britain’s economy”
Gordon Brown, UK PM

“Just announced biggest ever investment in Australian broadband-really exciting, infrastructure for the future”
Kevin Rudd, Australian PM

To achieve the target of Vision 2020, economy of Malaysia is required to transform ...
DATO’ SRI MOHD NAJIB TUN ABDUL RAZAK
Prime Minister of Malaysia

Appetite for bandwidth is unlimited. It leads to two consequences
(1) Fixed network remains competitive
(2) Strong growth in new services
Lars Nybergu,
President and CEO of TeliaSonera

NGBN is valuable for the economy, society and industry.

Government’s investment accelerates for the GDP contribution, competitiveness, job creation and social benefit

<table>
<thead>
<tr>
<th>National Broadband Networks Deployment Impact on GDP</th>
<th>Socio-Economic Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garnter (USA)</td>
<td>• Innovation</td>
</tr>
<tr>
<td>CEBR (Scotland)</td>
<td>• Labor Productivity</td>
</tr>
<tr>
<td>Government (Korea)</td>
<td>• National Competitiveness</td>
</tr>
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<td>Government (Australia)</td>
<td>• Resources Utilization</td>
</tr>
<tr>
<td>Criterion Study (US)</td>
<td>• Social Inclusion</td>
</tr>
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<td>Brooking Institute (US)</td>
<td>• Lifestyle</td>
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<td>EIU (NZ)</td>
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</table>

(% increases within five years)

| Source: Booz & Company analysis                  |

For every 1% increase in BB penetration, employment rate increased 0.2-0.3%;
For every $1 Investment in BB, the whole society got 10 times return
BB helped the manufacturing sector increase 5%, services sector increase 10% in labor productivity
### Government strategies to support NGBN

<table>
<thead>
<tr>
<th>NGBN projects</th>
<th>Singapore</th>
<th>Malaysia</th>
<th>Australia</th>
<th>Japan</th>
<th>UK</th>
<th>Qatar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment</td>
<td>S$1bn</td>
<td>US$0.7bn</td>
<td>A$43 bn</td>
<td>US$1 bn</td>
<td>€2.1 bn</td>
<td>~QAR1 bn</td>
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<tr>
<td>Gov. Strategies</td>
<td>iN2015</td>
<td>HSBB</td>
<td>NBN</td>
<td>U-Japan</td>
<td>NGA</td>
<td>Q.NGN</td>
</tr>
<tr>
<td>Organization</td>
<td>OpenNet (NetCo)</td>
<td>Nucleus Connect (OpCo)</td>
<td>TM</td>
<td>NBNCo</td>
<td>NTT</td>
<td>BT</td>
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<thead>
<tr>
<th>State Investment</th>
<th>State major owner</th>
<th>State Subsidy</th>
<th>State major owner</th>
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### Three modes of NGBN construction and operation

<table>
<thead>
<tr>
<th>Mode</th>
<th>Government</th>
<th>Operator</th>
<th>Third Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>State subsidy mode</td>
<td>• Setup stratagem target</td>
<td>• Be absorbed in service innovation and user management</td>
<td>• Construct network, bandwidth wholesale</td>
</tr>
<tr>
<td></td>
<td>• Provide policy support</td>
<td></td>
<td>• Hold network assets</td>
</tr>
<tr>
<td></td>
<td>• Subsection financing allowance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State major owner mode</td>
<td>• Setup stratagem target</td>
<td>• Be absorbed in service innovation and user management</td>
<td>• Hold network assets</td>
</tr>
<tr>
<td></td>
<td>• Share found public-operated corporation and construct network</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Insure open access</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hold network assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third party construction mode</td>
<td>• Setup stratagem target</td>
<td>• Be absorbed in service innovation and user management</td>
<td>• Construct network, bandwidth wholesale</td>
</tr>
<tr>
<td></td>
<td>• Supervise third party operation</td>
<td></td>
<td>• Hold network assets</td>
</tr>
<tr>
<td></td>
<td>• Insure open access</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Provide part of capital support</td>
<td></td>
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**Sample:**
- Japan i-Japan plan
- Malaysia HSBB project
- UK BT NGA project
- Australia NBN project
- Qatar Q.NGN project
- Singapore NGNBN project
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NGBN is Coming

- Video and P2P are major drives of metro and backbone expansion.
- MBB traffic goes up to 66 times in next 5 years, mobile operator also face similar issues
- 20M~100M ultra broadband era is coming in next 3 years.
Healthy ecosystem realizes the whole NGBN picture

Key elements of NGBN

1. Regulation
   - Universal coverage, Open access policy
   - Fair competition
   - Investment stimulation

2. Network Construction & Operation
   - Plan
   - EOT (Establish, Operate, Transfer)
   - Joint GTM

3. Service Enabler & Bandwidth cost
   - Open – APRU
   - Fast – Bandwidth
   - Affordable – Cost
Regulation – NGBN’s new challenges

Diversified Net Neutral models

<table>
<thead>
<tr>
<th>Retail Service Providers</th>
<th>Active Network</th>
<th>Passive Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>UK</td>
<td>Italy</td>
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</table>

Regulator’s considerations

- Infrastructure separation
- Open access method (SLU, LLU, Bit stream, Duct sharing…)
- Wholesale pricing
- Rates of Investment Return
- Technology evolution …

How to ensure fair competition and stimulate investment?

Huawei’s Contribution

- Define and deploy L2 bitstream solution
- Synchronize fiber open solution with schedule
- Define physical FTTH open solution
- Define L2 FTTx open solution

“Scissors Gap” is major challenge

Voice Era | Broadband Era | Ultra Broadband Era
---|---|---
**B** | **Post-Moore’s Growth** | **Curve B: Bandwidth**
How to keep the technology in line with bandwidth increase?

**A** | **Sustainable Margin** | **Curve A: ARPU**
How to generate new revenue?

**C** | **Worse Margin** | **Curve C: Cost**
How to restrain the cost?

Value per Bit
- SMS
- Voice
- Leased line
- Internet
- MBB
- IPTV
- HDTV
- Long tail applications

Killer Applications | Long Tail Applications
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Case Study: Singapore NGBN Target & Plan

Dr. Lee Boon Yang: Minister of Information, communication and the Arts.

“New business model, solution and innovation of new service will make Singapore more competitive in international environment, promote economic development and remove the digital divide.”

<table>
<thead>
<tr>
<th>Target Market</th>
<th>User development plan by 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Residential 50M-1G</td>
<td>Residential: 330'000</td>
</tr>
<tr>
<td>2. Enterprise100M-1G</td>
<td>Commercial: 80'000</td>
</tr>
<tr>
<td>3. Public</td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Coverage Plan</th>
<th>Sep 09</th>
<th>Dec 10</th>
<th>Jun 12</th>
</tr>
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<tbody>
<tr>
<td>5%</td>
<td>60%</td>
<td>95%</td>
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<th>S$1bn support from Government</th>
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Source: IDA Singapore
NGBN spurs industry development

Objectives of Singapore iN2015

1. in the world in infocomm value adding to economy & Society
2. increase in Infocomm value to S$26bn
3. increase in Infocomm export to S$6bn

- 80,000 additional Jobs
- 90% home using BB
- 100% PC Penetration

Objectives of China FTTX in 2012

- >80M fiber-optic broadband port
- 8M Bandwidth (bps) in city
- 2M Bandwidth (bps) in rural area
- 100M Bandwidth (bps) in business building
- >150B Investment in FTTX (RMB)
- >50M New added BB users

Thank you
www.huawei.com