Pricing, billing and interconnection in an Next Generation Networks (NGN) environment

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Agenda: NGN Interconnection

- **Why NGN?**
  - What is a Next Generation Network?
  - Why should we migrate from today’s networks to tomorrow’s NGN?

- **Basic Interconnection principles**
  - Traditional interconnection models
  - Traditional billing and revenue-sharing models
  - The trend towards bundling and flat-rate pricing

- **Getting to there from here**
  - Complexity versus simplicity
  - Mobile versus fixed termination
  - IP versus PSTN call termination
**What is an Next Generation Network?**

<table>
<thead>
<tr>
<th>Today’s PSTN network</th>
<th>Next Generation Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Circuit-switched.</td>
<td>• Packet-based, based on Internet Protocol (IP).</td>
</tr>
<tr>
<td>• Limited mobility of end-user services.</td>
<td>• Broad-based ‘generalised mobility’.</td>
</tr>
<tr>
<td>• Vertical integration of application and call control layers, with dedicated networks.</td>
<td>• Horizontally-integrated control layers, with simultaneous delivery of applications. Service-related functions independent of transport-related technologies.</td>
</tr>
<tr>
<td>• Non-responsive network.</td>
<td>• NGN will be able to identify and adapt to user needs in real-time.</td>
</tr>
</tbody>
</table>

Source: ITU Internet Reports 2005: The Internet of Things
NGN migration implies integration and a “portable” user environment

Today:
Fragmented B2C relationships

Content/applications
Payment system
Network services
End-user devices

Tomorrow:
Bundling of all relevant B2C relationships and optimal supply of services, content and applications

Integrated Provider
- Content
- Applications
- Payment
- Communication
- Access
- End-user devices

Service partner
Content partner
Application partner
Device supplier

A NGN is a packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.
But, doubts persist over NGN

- NGN represents the marriage of the Telco and IP worlds. But will it be a collision?
- Is the NGN just another a telco attempt to recreate an “Intelligent Network” with centralised intelligence?
- Is the NGN primarily an overlay or a new-build?
- Is it just a clever marketing name?
- Who pays for what, where, when and to whom in an NGN environment?
The NGN vision?

One ring to rule them all …
The NGN reality: a world divided ...
The NGN reality: a world divided ...
The NGN reality: a world divided ...
The NGN reality: a world divided...
So, what might be the benefits of a Next Generation Network?

**For the Operator:**
- Lower costs in having a single IP-based network to invest in and maintain
- Single billing contact with the customer ("internet with billing")
- Possibility to act as gateway for billing for content and applications from 3rd party providers
- Reduced costs of legacy network maintenance

**For the customer:**
- Possibility to use the same customised environment between different platforms
- Possibility of lower prices through bundled service offerings
- Integration of own content (e.g., photos, music and video library, website) with that of service provider
What is driving NGN developments?

- **Financial performance**
  - Revenue growth & margin protection
  - Reduced OPEX and CAPEX

- **Operational issues**
  - Obsolescence & modernization
  - Reliability, resilience & quality
  - Capacity & scalability
  - Simpler and faster provision of new service roll-out

- **Convergence issues**
  - Fixed/mobile convergence
  - Voice/data convergence
  - Telecoms/broadcasting convergence
  - Shifting from narrowband to broadband

Network Transformation
Interconnection possibilities

- **Traditional international accounting rates**
  - Symmetrical, negotiated bilateral arrangements for jointly-provided, switched telecommunication service

- **Interconnection**
  - Asymmetric rates for call termination/roaming
  - Fixed-to-fixed; fixed-to-mobile, mobile-to-fixed etc

- **Peering**
  - A bilateral arrangement to accept and terminate traffic (usually IP-based), generally without financial compensation

- **Transit**
  - An agreement to accept and terminate traffic on behalf of other carriers, for a price

- **Sender keeps all (Bill and Keep)**
  - Sending and receiving traffic without payment and (usually) without requirement for prior arrangements
### International interconnection: Then and now

<table>
<thead>
<tr>
<th>Accounting rates</th>
<th>International interconnection rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normally symmetric (accounting rate split 50/50)</td>
<td>Asymmetric (charges may vary between countries)</td>
</tr>
<tr>
<td>Bilaterally negotiated</td>
<td>Set unilaterally, but subject to trade discipline</td>
</tr>
<tr>
<td>Discriminatory by country of origin of call, but not by fixed/mobile</td>
<td>Discriminatory between fixed and mobile traffic, but not by country of origin of call</td>
</tr>
<tr>
<td>Half-circuit regime (not normally unbundled)</td>
<td>Full-circuit regime (can be unbundled)</td>
</tr>
</tbody>
</table>
International voice traffic
(in billions of minutes)

Source: ITU.
International voice traffic trends
Revenue (US$bn) and price per min (cents)

Source: ITU World Telecom Indicators Database.
Is the crisis over now?

Int’l traffic growth and price decline, 1998-2004

Based on total traffic and average price, derived from revenue per minute. Note, inverted scale for price declines.
Revenue sharing and billing

- **Settlement rates**
  - Agreement to split wholesale accounting rate between carriers, usually on a 50/50 basis

- **Interconnection**
  - Charges levied for call termination, usually on a per-minute basis

- **Transit**
  - Charges levied for carrying traffic, usually on a capacity basis

- **Calling Party Pays (CPP)**
  - Call originating party pays full retail cost of the call

- **Receiving Party Pays (RPP)**
  - Both call originating and call receiving parties pay a share of the retail cost of the call
The trend towards bundling

UK households taking bundled packages

Source: OFCOM
The trend towards flat-rate pricing

Global trends in broadband pricing schemes

Note: Data" refers to price packages with bit caps. “Time” refers to time-metering . “Both” refers to packages with both data and time caps. “Fl rate” implies unlimited monthly use.

Trends in broadband pricing, global

- International survey of broadband prices
  - Based on 133 economies that had broadband as early as 2004
- Methodology
  - Based on price in US$ per 100 kbit/s
- Price trends
  - Median price has fallen by 41% p.a.
  - Median speed has risen by 66% p.a.
  - Faster than Moore’s Law

Growth in broadband speeds

### Prices in top 15 broadband economies

<table>
<thead>
<tr>
<th>Economy</th>
<th>Company</th>
<th>Speed Mbit/s</th>
<th>Price per month USD</th>
<th>Price per 100 kbit/s</th>
<th>Change 2005-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Japan</td>
<td>Yahoo! BB</td>
<td>51.2</td>
<td>31.19</td>
<td>0.07</td>
<td>-12.5%</td>
</tr>
<tr>
<td>2 Rep. of Korea</td>
<td>Hanaro</td>
<td>51.2</td>
<td>40.59</td>
<td>0.08</td>
<td>...</td>
</tr>
<tr>
<td>3 Netherlands</td>
<td>Internet Access</td>
<td>20.4</td>
<td>27.97</td>
<td>0.14</td>
<td>-81.3%</td>
</tr>
<tr>
<td>4 Taiwan, China</td>
<td>Chunghwa</td>
<td>12.3</td>
<td>22.67</td>
<td>0.18</td>
<td>...</td>
</tr>
<tr>
<td>5 Sweden</td>
<td></td>
<td>24.6</td>
<td>56.08</td>
<td>0.23</td>
<td>-6.5%</td>
</tr>
<tr>
<td>6 Singapore</td>
<td>Starhub</td>
<td>30.7</td>
<td>73.17</td>
<td>0.24</td>
<td>-85.0%</td>
</tr>
<tr>
<td>7 Italy</td>
<td>Libero</td>
<td>12.3</td>
<td>37.23</td>
<td>0.30</td>
<td>-73.8%</td>
</tr>
<tr>
<td>8 Finland</td>
<td>Elisa</td>
<td>24.6</td>
<td>85.64</td>
<td>0.36</td>
<td>-51.4%</td>
</tr>
<tr>
<td>9 France</td>
<td>Free</td>
<td>10.2</td>
<td>37.29</td>
<td>0.36</td>
<td>-90.1%</td>
</tr>
<tr>
<td>10 United States</td>
<td>Comcast</td>
<td>4.1</td>
<td>20.00</td>
<td>0.49</td>
<td>...</td>
</tr>
<tr>
<td>11 Germany</td>
<td>Freenet.de</td>
<td>6.0</td>
<td>30.95</td>
<td>0.52</td>
<td>...</td>
</tr>
<tr>
<td>12 United Kingdom</td>
<td>Pipex</td>
<td>8.1</td>
<td>50.89</td>
<td>0.63</td>
<td>-53.6%</td>
</tr>
<tr>
<td>13 Hong Kong, China</td>
<td>Netvigator</td>
<td>6.1</td>
<td>51.17</td>
<td>0.83</td>
<td>...</td>
</tr>
<tr>
<td>14 Portugal</td>
<td>Sapo</td>
<td>8.1</td>
<td>75.82</td>
<td>0.93</td>
<td>...</td>
</tr>
<tr>
<td>15 Canada</td>
<td>Bell</td>
<td>4.0</td>
<td>41.26</td>
<td>1.01</td>
<td>-3.9%</td>
</tr>
<tr>
<td><strong>Unweighted Average</strong></td>
<td></td>
<td><strong>18.3</strong></td>
<td><strong>44.33</strong></td>
<td><strong>0.42</strong></td>
<td><strong>-50.8%</strong></td>
</tr>
</tbody>
</table>

NGN interconnection options

**Towards complexity**
- Differentiate between different traffic streams with different QoS
- Differentiate between different user terminal devices (e.g., fixed, wireless, portable)
- Provide interconnection options based on per-minute, per-volume, per-service type and per-content type

**Towards simplicity**
- Sender keeps all (bill and keep)
- Arrangements based on interconnection capacity
Termination rates worldwide

<table>
<thead>
<tr>
<th>Region</th>
<th>Average fixed rate</th>
<th>Average mobile rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia-Pacific</td>
<td>11.69</td>
<td>16.58</td>
</tr>
<tr>
<td>Africa</td>
<td>13.62</td>
<td>20.57</td>
</tr>
<tr>
<td>Europe and Mediterranean</td>
<td>3.11</td>
<td>32.86</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>4.88</td>
<td>16.43</td>
</tr>
<tr>
<td>North America</td>
<td>2.81</td>
<td>6.07</td>
</tr>
<tr>
<td><strong>Global average</strong></td>
<td><strong>5.77</strong></td>
<td><strong>21.76</strong></td>
</tr>
</tbody>
</table>

Source: ITU-T, based on survey of regional tariff groups.
### Spot the odd one out ....

<table>
<thead>
<tr>
<th>Region</th>
<th>Ratio between fixed and mobile call termination rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia-Pacific</td>
<td>1.42</td>
</tr>
<tr>
<td>Africa</td>
<td>1.51</td>
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<tr>
<td>Europe and Mediterranean Basin</td>
<td>10.57</td>
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<td>Global average</td>
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Source: ITU-T, based on survey of regional tariff groups.
Conclusions

- Inter-operator settlements remain important (but become more complex) in a converged or NGN environment
- **Short-term:** Per-minute settlement is preferred choice for carriers, but hard to sustain. Rates are dropping.
- **Longer term:** shift towards capacity-based pricing and/or towards “Sender Keeps All”
- Trends toward bundling and flat-rate pricing in retail market will be mirrored by capacity-based pricing in wholesale market
- **But,** migration to NGN will not make concerns over Significant Market Power (SMP) disappear
Thank you.

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