Global Bandwidth & IP Pricing Trends

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Top Pricing Trends of 2016

• What you pay, depends on how you buy
• Global bandwidth prices are converging
• Subsea capacity isn’t always your largest cost
• 100G is the new 10G
• As transport goes, transit follows
What You Pay, Depends on How You Buy
Prices Vary in the Sales Channel
Median & Price Range for 10 Gbps Wavelength MRC on Los Angeles-Tokyo, 2013-16

![Graph showing median and price range for 10 Gbps wavelength MRC on Los Angeles-Tokyo, 2013-16.](image-url)
For Transit Too

Median & Price Range for 10 GigE IP Transit in Key Cities, 2016

$ per Mbps per Month (USD)

| City          | Median
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>$5</td>
</tr>
<tr>
<td>London</td>
<td>$2</td>
</tr>
<tr>
<td>Singapore</td>
<td>$8</td>
</tr>
<tr>
<td>Mumbai</td>
<td>$15</td>
</tr>
<tr>
<td>Kuala Lumpur</td>
<td>$20</td>
</tr>
</tbody>
</table>
Global Bandwidth Prices are Converging
Geographic Differences Do Persist....
But Global Prices Are Converging


- Johannesburg-London
- London-Singapore
- Miami-Sao Paulo
- Los Angeles-Tokyo
- London-New York = 1

Transatlantic Price Multiple

Why Have Prices Converged?

• Prices on high growth routes have declined more than established routes.
• More cables coming into service on underdeveloped routes fuel price erosion.
• Technology advancements lower unit costs.
Subsea Capacity isn’t Always Your Biggest Cost
Backhaul Contributes to Cost

PoP-to-PoP 10 Gbps Price Components, 2016

Percent of PoP-to-PoP Price

<table>
<thead>
<tr>
<th>Route</th>
<th>Wet Capacity</th>
<th>Backhaul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dubai-London</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Mumbai-Singapore</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Tokyo-Singapore</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>L.A.-Tokyo</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>London-Singapore</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>
Local Access Can Contribute More

End-to-End T1/E-1 Leased Line Connection Cost Components, 2016

- Long-Haul Contribution
- City B Access Contribution
- City A Access Contribution

Graph showing the contribution of local access to the total cost of end-to-end T1/E-1 leased line connections for various cities in 2016.
10 Mbps Local Access, 0-5 Km, Country Median Price, H2 2015
100G is the New 10G
100G Prices are Falling

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

- Frankfurt-London
- Chicago-New York
- London-New York
- Los Angeles-Tokyo

Monthly Lease Price (USD)

[Bar chart showing monthly lease prices for different routes in 2013 and 2016]
Providing More Value per Unit Cost

Median 10 Gbps and 100 Gbps Prices, 2016

- **10 Gbps**
- **100 Gbps**
- **100G/10G Price Multiple**

<table>
<thead>
<tr>
<th>Location</th>
<th>Median Monthly Lease Price (USD)</th>
<th>Price Multiple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frankfurt-London</td>
<td>$20,000</td>
<td>0</td>
</tr>
<tr>
<td>Chicago-NY</td>
<td>$30,000</td>
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<tr>
<td>London-NY</td>
<td>$40,000</td>
<td>1.5</td>
</tr>
<tr>
<td>L.A.-Tokyo</td>
<td>$60,000</td>
<td>2</td>
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</table>
As Transport Goes, Transit Follows
10 GigE Global IP Transit Prices Vary
IP Transit Prices Are Still Falling
Median 10 GigE IP Transit Prices in Key Cities, 2013-16

The chart shows the median 10 GigE IP Transit Prices in key cities from 2013 to 2016. The prices are indicated in $/Mbps per Month (USD) and the cities include Sydney, Mumbai, São Paulo, Singapore, New York, and London. The prices have generally decreased over the years, with some fluctuations.
Some Convergence Amongst Hubs

10 GigE IP Transit Prices Relative to London, 2013-16
Outlook: Bandwidth Market Anxiety

• Content buyers adamantly not reselling
  – But how do their investments affect the market?

• Incentive to buy big and buy early
  – Helps secure lowest price, but can lead to excess capacity
  – Risk of distressed selling “below cost”

• How to sustain abundant, cheap capacity and ROI?
Outlook: Bandwidth Market Optimism

• Demand growth is as reliable as price erosion
  – More content & new applications consuming more bandwidth
  – Growing penetration and bandwidth per user
    • Emerging markets opportunity for content and carrier
    – Lowest layers of the network benefit

• New technology, such as SDN, will enable more agile commercial models