Why Smart People Do Stupid Things:

Submarine Cables, Network Oversupply, and the Inexorable Decline of IP Transit Prices

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NANOG 62
Introduction

• Hello.
• My name is Tim.
• I come in peace.

(Alien)
How Carriers See the Internet

Internet

Customer Touchpoint

Solutions!

Stakeholder
How Carriers See the Internet
Topics to Cover

• Where is new infrastructure investment occurring?
• *Why* is there new cable investment occurring?
  – Is it truly a case of people doing stupid things?
• Will this new investment push down prices?
• Will we ever reach a global bandwidth "singularity" in which transport and IPT will be priced the same no matter the location?
From a 10G to a 100G World

Potential Capacity per Fiber Pair on FALCON Cable
Lots of Investment ... in Old Cables
Trans-Atlantic Potential Capacity

Potential Capacity as Currently Announced by Operators
Trans-Atlantic Potential Capacity

Potential Capacity if 100 x 100G Wavelengths per Fiber Pair

Capacity (Tbps)


Lit Capacity Requirements

Potential Capacity
So No One is Bothering to Build New Cables ... Right?

Wrong.
Construction Cost of New Submarine Cables by Region, 2012-2015
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Why Build *New* Cables?

- **The Dumb Reasons**
  - National pride
  - Corporate pride (for some companies, leasing capacity is not "cool")
  - 3rd-party developers look at a cable map and see empty space without any lines
Why Build *New* Cables? (cont’d)

- The Not-Dumb Reasons
  - Capacity exhaustion
  - Connecting new markets
  - Providing physical diversity
  - Supplying niche markets (trans-Atlantic financials, oil/gas, mining)
  - Economies of scale of ownership

- Microeconomic logic ≠ macroeconomic logic
  - A company may want to build a cable of its own even if there's plenty of spare capacity in the market.
Planned Cables: Brazil-Europe
Planned Cables: Hibernia Express
Planned Cables: Trident
Planned Cables: FASTER
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Are Transport Prices Falling? [Yep.]

Monthly 10 Gbps Wavelength Lease Price, 2004-2013
Regional Price Differences Narrow

10 Gbps Wavelength Price Multiples over London-New York

- Los Angeles-Tokyo
- Miami-Sao Paulo

Price Multiple over London-New York

2004 vs 2013
What About Convergence Elsewhere?

10 Gbps Wavelength Price Multiples over London-New York

# Let’s Not Get Carried Away

Median 10 Gbps Wavelength Prices per Month, Q4 2013

<table>
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<tr>
<th>Route</th>
<th>Price</th>
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<tr>
<td>London-New York</td>
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<tr>
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IPT vs. Transport Prices: Americas

Monthly Price per Mbps for 10GigE Port and 10 Gbps Wavelength
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Singularity in Sight?.... Not Exactly

10 GigE IP Transit Price Multiples Frankfurt
IPT Convergence (or Lack Thereof)

10 GigE IP Transit Price, 2010-2014 (Log Scale)
How Long till Price Convergence?

[For Fun] What Happens if We Apply 2010-2014 CAGR to Future Years?
What Factors Prevent IPT Price Convergence?

- IPT prices often reflect the cost of transport to a hub country
  - Higher transport prices $\rightarrow$ higher IPT prices
- Lack of IP backbone provider competition
  - IPT providers offering low-price service do not exist in each city
- Unfavorable regulatory environments
- Expensive backhaul/cross-connects
Conclusions

- Lots of new cables, capacity on their way
  - Some built for “stupid” reasons (e.g., national pride)
  - Most built for solid corporate reasons (e.g., carriers/ISP/content providers building to handle internal traffic)

- Prices faster falling as a result
  - IPT price declines roughly match transport price declines
  - Prices falling everywhere, but we are not moving to a single, universal price
A Quote to Inspire

MataHmeH maSachnIS.
—Ancient Klingon Proverb

“To survive, we must expand.”
Thanks for Listening

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