THE PROMISES OF SILICON PHOTONICS:
CURRENT STATUS AND FUTURE TRENDS

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WHAT HAPPENED???
EVOLUTION OF TOP 500 COMPUTERS

PERFORMANCE DEVELOPMENT

PROJECTED

http://www.top500.org (Jun. 2012)
EVOLUTION OF TOP 500 COMPUTERS

Optical links & Low Cost → Silicon Photonics

PERFORMANCE DEVELOPMENT

PROJECTED

Top #1 in 2012
16 PFLOP/S
8MW ➔ 2 GFLOP/S/W

Projection in 2018/2022:
1 EFLOP/S
500MW (2GFLOP/S/W)
20MW ➔ 50 GFLOP/S/W

Unmanageable

More realistic

Optical links & Low Cost → Silicon Photonics

Si photonic products

- First Si photonic products were introduced on the market by Kotura in 2006
- Many more should soon follow!

Production is expected to ramp-up in the next years.
Si photonics 2013-2014 market forecast in US$M

- Silicon photonics devices market will grow from less than US$25M in 2013 to more than US$700M in 2024 with a 38% CAGR.
  - Emerging optical data centers from big Internet companies (Google, Facebook …) will be triggering the market grow in 2018.
## Almost $1B transactions for photonics in datacenter!

<table>
<thead>
<tr>
<th>Company</th>
<th>Date</th>
<th>Product Description</th>
<th>Transaction value</th>
<th>Acquirer</th>
<th>Rationale for transaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightwire (US)</td>
<td>February 2010</td>
<td>Silicon CMOS optoelectronics interconnects / optical transceivers.</td>
<td>US$271M</td>
<td>Cisco (US)</td>
<td>To face with increasing traffic in data centers / service providers</td>
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<td>Luxtera AOC line (US)</td>
<td>January 2011</td>
<td>AOC line</td>
<td>US$20M</td>
<td>Molex (US)</td>
<td>Luxtera may be changing strategy to become an IP licensing company. Molex had AOC product line for 12-channel AOCs with a product from Furukawa/Fitel based on a 1060nm InGaAs VCSEL.</td>
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<tr>
<td>COGO Optronics (CAN)</td>
<td>March 2013</td>
<td>InP modulators &amp; lasers.</td>
<td>Est. &lt; $30M</td>
<td>TeraXion (CAN)</td>
<td>To access 100Gb InP modulator technology.</td>
</tr>
<tr>
<td>Cyoptics (US)</td>
<td>April 2013</td>
<td>InP-based photonic components.</td>
<td>US$400M</td>
<td>Avago (US)</td>
<td>To strengthen products portfolio for 40Gb &amp; 100Gb data centers applications.</td>
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<td>Kotura (US)</td>
<td>May 2013</td>
<td>Si photonics &amp; VOAs for data center.</td>
<td>$82M</td>
<td>Mellanox (US)</td>
<td>To access 100Gb optical engine for data centers.</td>
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<td>IPTronics (US)</td>
<td>June 2013</td>
<td>IC for parallel optical interconnects (drivers).</td>
<td>$47M</td>
<td>Mellanox (US)</td>
<td>To access products / technologies for 100Gb optical engine.</td>
</tr>
<tr>
<td>Caliopa (BE)</td>
<td>September 2013</td>
<td>Si-based optical transceivers for datacoms.</td>
<td>$20M</td>
<td>Huawei (CHINA)</td>
<td>To develop European-based R&amp;D in Si photonics.</td>
</tr>
</tbody>
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**TOTAL: ~US$900M**  
Est. 2013 Market < US$30M