Investment Trends and Opportunities in Optical Network Technology

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What is the talk about

1) A new era of data consumption

Consumer  Enterprise

2) Optical network market overview

3) Technology and market trends

4) M&A and investment market activity
Who we are

- Global Investment Bank – Bay Area and London
  - M&A International

- Cross-border M&A and corporate finance advisory
  - Hardware – Photonics, Communications, Semiconductors and Materials
  - Software and Internet Services
  - Life Sciences

- Founded in 2001: over $10 billion in transaction value
  - 5 fiber communications deals in the last 2 years

- WCP Research – providing research on Enterprise IT and Communications to institutional clients
What is driving dataflow

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TMT sector is responding to deliver voice, data and video in real time to their end-users, no matter where they are and no matter on what device.
Performance drivers

- Increasing bandwidth (no upper limit)
- Significant increase in backhaul (no upper limit)
- Network utilization improvement
- Quality of service (buffering not a universal solution)
- Low latency
What does the network look like

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Transport ecosystem

- **Optical Transport Network (OTN)**: Allows for data structuring, monitoring and sub-lambda aggregation over DWDM.
- **Packet-based network layers**: Static and dynamic control.
- **Management Control Plane**
  - **NMS SDN**
  - **Packet Integration (ETH, MPLS)**

Source: Ericsson AB 2013
The physical network

Optical Transceivers Market reached $3.4 bn in 2012 *

* Optical Communications Market Forecast 2013 - LightCounting
How is the data monetized

- **Enterprise**
  - Monthly rental of big pipe bidirectional connections low latency
  - Monthly rental for mobile connection on the move payments - roaming pay what you eat
  - Monthly Wifi access bundles
  - Pay per consume for cloud services

- **Consumer**
  - Monthly mobile
  - Monthly rental big pipe access (affluent areas) - still asymmetric and undefined latency
  - Access and content bundles (i.e. BT, Virgin)
  - Consumption payment for services
  - Advertising, consumer profiling
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IP traffic is growing at 23% p.a.

- Consumers / Enterprise
- Massive increase in datacentre storage
- Significant increase in wireless connection

### Consumer and Enterprise IP Traffic

- **CAGR: 23%**

**Source:** Cisco VNI, 2013

**Graph:**
- **2012A**
  - Mobile data
  - Managed IP
  - Internet
- **2013F**
  - Mobile data
  - Managed IP
  - Internet
- **2014E**
  - Mobile data
  - Managed IP
  - Internet
- **2015E**
  - Mobile data
  - Managed IP
  - Internet
- **2016E**
  - Mobile data
  - Managed IP
  - Internet
- **2017E**
  - Mobile data
  - Managed IP
  - Internet

**Notes:**
- Massive increase in datacentre storage
- Significant increase in wireless connection
- Consumers / Enterprise

**Legend:**
- Green: Mobile data
- Dark Green: Managed IP
- Black: Internet
Consumer traffic growth drivers

Global Consumer Internet Traffic (by sub-segment)

Source: Cisco VNI, 2013
No more cost reduction from move to low-cost labour countries

Network is infrastructure-intensive. Each infrastructure decision locks-in a technology for 10 years or longer, with only backwardly compatible upgrades possible
Themes for fiber optics

- To become as ubiquitous as digital electronics and RF
- Port volumes scaling to millions per month volumes
- Network efficiency
- Higher data rates everywhere
- Size reduction
- Less power consumption
- Survive the heat of nearby processors and drivers
- Software control layer improvements
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M&A trends

- Verticalisation of the OEMs to control key technology
- Legacy component provider shake-out
- Emergence of Software Defined Network (SDN) and Storage techniques
- Technology sweet spots
  - Hybrid integration
  - Si-Photonics
  - Tuneable photonics
  - Software control
Exit return drivers

- Ideating
- Patents
- Prototype
- Product launch
- Market acceptance & validation

Value vs. Time

Strategic Value

Financial Value

Scaling
Return to M&A value

- Consolidation/divestiture
- Acquisition of key defensible technology driven by high strategic value
- Both trends likely to continue growing

Asian companies looking to acquire IP and off-shore
European entities often have strong political dimension
US companies still dominant acquirers

Optical Components for Communications # of M&A Transactions

Distressed consolidation
Acquisition of strategic value

Optical Components M&A Deal Size Break-down

- 36%
- 22%
- 42%
M&A in Si Photonics

- Replication of high value components in Si
  - Sort of interesting

- Higher levels of integration. Reduced cost, footprint, power. Enables existing network architectures to be extended
  - More interesting

- Wafer scale integration actives and passives. All current devices effectuated in or on Silicon
  - Properly interesting

- New device types that are not available today. Will enable new connection architectures.
  - Transformative.
Thank you

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