Supercharging the Network

OFC Investor Briefing
March 13, 2018
David Heard & Dave Welch
Safe Harbor

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This presentation includes certain non-GAAP financial measures. Pursuant to Regulation G, we have provided a reconciliation of these non-GAAP financial measures to the most directly-comparable GAAP financial measures in its fourth quarter earnings release and CFO Commentary, which are available on the Investor Relations section of our website. Revenue guidance is provided using ASC 605. We will adopt ASC 606 for Q1 2018, and intend to provide an ASC 606 to ASC 605 reconciliation when we report first quarter results.
Infinera – Value in Differentiation

SUPERIOR PRODUCTS & SERVICE
Industry pioneers of optical leadership
Most reliable, high-performance products
Driving lower customer TCO

AGILE BUSINESS MODELS
Customer-friendly usage-based billing unique to Infinera’s technologies (e.g. Instant Network)

VERTICAL INTEGRATION LEADERS
Defining our innovation destiny
Driving lower cost structure for Infinera

Technology Leadership = Differentiated Operating Model = Financial Leverage
Syncing with Optical Market Trends

- Optical Engine Investment
- Software Investment
- Instant Network

OPTICAL IN SYSTEMS, APPLIANCES, MODULES
AUTOMATION & SDN
TECHNOLOGY INTENSIFIED
CLOUD DRIVEN ARCHITECTURE
DENSIFICATION OF METRO
Expanding Infinera’s Addressable Market

2018 MARKET (TAM=$13B)  
Opportunities to Expand

Currently Addressing

\- Long-haul/Subsea/DCI/Metro
\- CSPs, ICPs
\- North America/EMEA-Centric

Expansion Potential

2021 MARKET (TAM=$16B)  
Expanded Opportunities, Growing Market

\- ICE4/XTM II + ICE5/ICE6
\- Aggressive GTM, Open ICE
\- New Applications – Fiber Deep, 5G

$1-2B Incremental Opportunity

5% CAGR

Average Worldwide Market Size (IHS, ACG, Dell’Oro, Cignal AI, Ovum)
Positioned to Repeat Past Success

**Next 3 years**

- **NEAR TERM TRACTION**
  - ICE4 20% revenue in Q4-17
  - Recovery from customer M&A

- **MARKET EXPANSION POTENTIAL**
  - New products drive new customer wins
  - Enhanced GTM and operational efficiency

- **FASTER OPTICAL ENGINE CADENCE**
  - Drives sustainable financial performance
  - Each new engine has lower cost structure

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**FY18-20**

- **Grow faster than market**
- **GM% leverage**

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue ( Millions )</th>
<th>Gross Margin</th>
<th>GM%</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY12</td>
<td>$438</td>
<td></td>
<td>38%</td>
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<tr>
<td>FY13</td>
<td>$544</td>
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<td>42%</td>
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<tr>
<td>FY14</td>
<td>$668</td>
<td></td>
<td>44%</td>
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<tr>
<td>FY15</td>
<td>$888</td>
<td></td>
<td>48%</td>
</tr>
<tr>
<td>FY16</td>
<td>$871</td>
<td></td>
<td>48%</td>
</tr>
<tr>
<td>FY17</td>
<td>$741</td>
<td></td>
<td>39%</td>
</tr>
</tbody>
</table>

Gross margin is non-GAAP

Revenue and Gross Margin chart:

- Blue bars represent revenue.
- Green line represents gross margin.
Syncing Cadence with Customer Adoption

New Optical Engine Development Timeline

- Smoother product delivery
- Matches customer pace
- Sustainable revenue/margins

**TELECOM (CSP)**
Gradual adoption with comprehensive build-outs

**WEB SCALE**
ICPs, Cable, Wholesale
Faster adoption with purpose-built tech

ICE4: Strong platform to launch new Optical Engine Development Strategy

48 Months
24 Months
24 Months

24 Months
Strengthening the Business Model

**INCREASE GTM REACH**
- New Markets
- Partnership Opportunities

**OPEN ARCHITECTURES**
- Open ICE
- Appliances

**NEW ARCHITECTURES**
- 5G
- Cable Densification (Remote PHY)

**OPERATIONAL EXCELLENCE**
- Restructuring/Investment Prioritization
- Optical Engine Investment up >20%
- New Team Members

**HIGHER GROWTH, DIVERSIFIED MIX**

**ACCELERATES NEW DESIGN WINS**

**$1-2B INCREMENTAL OPPORTUNITY**

**OPERATING LEVERAGE**
Sustainable Growth Trajectory

Diversified end markets + Faster technology cadence = More Sustainable Growth

- ICP spend remains strong
- Mobile operators drive 5G
- Cable/MSO Fiber Deep in Metro Access
- Open architectures increasingly embraced
Supercharging the Network: Delivering Optical Leadership

OFC – March 13, 2018

Dave Welch
Optical Leadership in Perspective

What matters to customers

Infinera helps its customers win in their markets

- Lower total cost of ownership (TCO)
- Maximize fiber capacity
- Accelerate time to revenue (TTR), speed to service

How we deliver

Optical Performance

- Photonic Integration (PIC), Advanced Coherent (DSP)
- Drive cost & power per bit, capacity-reach

Cloud Scale

- Instant Bandwidth, Instant Network
- Sliceable super-channels, Open ICE, Automation

The Infinera Experience

- Time as a Weapon, World-class quality
- Customer-centric focus, Simplicity & ease of use
# ICE Optical Leadership That Counts With Customers

<table>
<thead>
<tr>
<th>Promise</th>
<th>Progress</th>
</tr>
</thead>
</table>
| ICE4 differentiated performance and value | • Record-setting performance  
• Broad adoption, short haul to subsea  
• Growing faster than the market |
| ICE5 and ICE6 on new cadence, rapidly advancing capacity per wave and capacity-reach | • ICE5 engine already running – live demo at OFC  
• First to 64QAM/66Gbaud  
• ICE6 tech demonstrations ahead of industry  
• Unique advantages to get to higher baud rate |
ICE4 Leading Performance Across Segments

Record 16QAM Fiber Capacity
27.6 Tb/s

Record Spectral Efficiency
18.2 Tb/s over 10,000 km

- 50% more capacity than others
- Showcases the whole ICE4 PIC + DSP toolkit

PIC Tx Performance
High Dispersion Comp

PIC Rx Performance
Nyquist Subcarriers

Tight Channel Spacing
Nonlinear Comp

Flexible Mod & Baud
FEC Gain Sharing

Next Step: C+L
ICE4 C+L Solution
Doubles Fiber Capacity to 50T+

Tight channel spacing
(34.375 GHz)
Only achievable with ICE4

Four Nyquist subcarriers per wavelength

Four Nyquist subcarriers per wavelength
ICE4 Leading Performance Across Segments

Record Lightning Tolerance
100% protection

• Thousands of outages/year
• Impacts all types of operators
• Worse at higher QAM
• Infinera unique 100% protection, based on Nyquist subcarriers

Trials with ICPs, Tier 1 CSPs, Wholesale CSPs

Angular Velocity [rad/s]
Open ICE Opens New Opportunities

Open ICE
ICE4 over Any Network

European wholesaler, low latency service

- ICE4 won on reach, latency performance
- Open ICE allows deployment anywhere, optimizes cost

Demos & trials EMEA, APAC, Americas
ICE5: World’s First Integrated 2.4T Engine

- 600G/wave in integrated 2.4T engine
  - 5th Generation Optical Engine (PIC + DSP)
- Fine-grained 100G-600G/wave
  - 600G metro reach with 64QAM, 66Gbaud
  - 400G over 1500 km
- Built-in support for 400 GbE, encryption
- Targeted for scale-optimized networks

*Live at OFC*

Fully integrated ICE5 optical engine using *go-to-market* PIC modules and DSP
ICE5 Optimized for Cloud Scale & Fiber-deep Networks

<table>
<thead>
<tr>
<th>ICPs Scale-optimized</th>
<th>Metro DCI</th>
<th>Long Haul DCI</th>
<th>Subsea DCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSPs Scale-optimized</td>
<td>Fiber-deep, high capacity</td>
<td>L0 overlay</td>
<td>Subsea multi-service</td>
</tr>
<tr>
<td>CSPs Service-optimized</td>
<td>L2-L3 aggregation</td>
<td>L1-L2 bandwidth management</td>
<td>Subsea bandwidth management</td>
</tr>
</tbody>
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Shifting Focus to High Baud Rate, Integration

Unique Infinera optical engine integration
- PIC+DSP tightly integrated
- co-design/co-packaging

Unique Infinera advantages:
- photonic integration
- super-channels

Fiber capacity near Shannon limit: diminishing returns from modulation

Constellation shaping (CS) for extended reach – effective CS requires next Si node
ICE6: 800G/wave Leadership

Highly Integrated Optical Engine

- New FlexCoherent DSP
- Built on existing coherent toolkit
- Advanced modulation, constellation shaping

PIC
- 6th Generation PIC
- Built on 5th generation
- Prototype devices already in test

Advanced integration and packaging

- Leading the push to 88-100 Gbaud through superior integration
- 800G+/wave for metro DCI, 2X industry standard target
“Silicon Photonics”

1 Channel

- Widely Tunable Laser
  - ~0.8mm² per channel
  - 5 Integrated Functions

- SiP 33Gb/s Coherent Modulator
  - ~18mm² per channel
  - ~50 Integrated Functions

10 Channels

- 500 Gb/s Transmit PIC
  - ~3mm² per channel
  - ~440 Integrated Functions

Chip Sizes To Scale
Requirements at 100Gbaud+

RF signal integrity exponentially hard. Requires:

- **Femtosecond** timing:
  Tolerance must be $<100$ fs ($10^{-13}$ sec)

- **Millimeter** interconnects:
  Inter-device interconnects must be more robust, shrink to few mm

Conclusion

- DSP & PIC must be co-developed with co-packaging in mind
- Full vertical integration is required
- Infinera is best positioned to succeed

*Integrate all optical engine components*
Integration & Packaging for High Speed

Electronics

- **DSP**
- **RF**
- **TIA**

PIC Module

- **MZMD**
- **RF**
- **PIC**

Optical Engine

**33 Gbaud**

- **ICE4**
- **wirebonding**

**66 Gbaud**

- **ICE5**
- **Interposer, >1000 interconnects**
- **First commercial III-V (InP) IC flip-chip**

**88+ Gbaud**

- **ICE6**

DSP + PIC

**Co-designed, co-packaged, tightly integrated module**
ICE6 & Beyond: Progress & Proof Points (2017)

Leading 100 Gbaud Milestones

- 100 Gbaud 16QAM link 600G over 1400 km
  
100 Gbaud 16QAM link 600G over 1400 km

- 100GBaud 32QAM 800G with path to 1T
  
100GBaud 32QAM 800G with path to 1T

Achieved with ICE6 prototype PICs

Leading-edge Constellation Shaping: CS-1024QAM

- 1.32Tb/s: highest coded bit rate ever reported
- Moving ever closer to Shannon limit
- Effective CS requires next Si node (ICE6 target)
## High Speed Checklist: Advantage Infinera

<table>
<thead>
<tr>
<th>Building Blocks In House</th>
<th>Module Suppliers</th>
<th>System Vendors</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Advanced Coherent DSP</td>
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<tr>
<td>Optical engine module packaging</td>
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<tr>
<td>InP optics</td>
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<td></td>
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<tr>
<td>InP photonic integration</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>III-IV IC flip chip</td>
<td>✓</td>
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</table>
Infinera Optical Leadership: Customers Win

Leading Optical Performance
- ICE4 proven performance in the field
- ICE5 leading 600G, world’s only 2.4T engine
- ICE6 on track, Infinera positioned to lead

Cloud Scale
Instant Bandwidth, Instant Network
Sliceable super-channels, Open ICE, Automation,

The Infinera Experience
Time as a Weapon, World-class quality
Customer-centric focus, Simplicity & ease of use

TCO + Capacity = TTR

Customers Win
Thank You

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