Optical Network Hardware

Vendor Scorecard Excerpt
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Top takeaways

The only report of its kind, this Scorecard evaluates the top optical network equipment vendors on criteria using concrete data and metrics, including direct feedback from buyers, vendor market share, market share momentum, financials, brand recognition, reputation for innovation, and other benchmarks. This approach eliminates subjectivity and ensures vendors are assessed accurately and fairly.

There are well over a dozen of vendors around the globe that make and sell optical network equipment. The 10 vendors profiled in this Scorecard—ADVA, Ciena, Cisco, Coriant, ECI, Fujitsu, Huawei, Infinera, Nokia, and ZTE—were selected because they are the top revenue producers for optical network equipment. The purpose of this Scorecard is to analyze the relative strengths among these vendors.

The “Leadership Landscape Graph” (Exhibit 1) shows at a glance where each vendor fits in among the top players in the overall optical network equipment market.

This document is an excerpt; please contact IHS Markit for the full report including all vendor profiles.

In this Scorecard, we classify vendors as leader, established, or challenger depending on their overall score; the 10 profiled vendors are grouped as follows:

- **Leaders**: Ciena, Cisco, Huawei, Nokia
- **Challengers**: ADVA, Coriant, ECI, Fujitsu, Infinera, ZTE

**Bottom line:**

The optical equipment vendor landscape is diverse and continually evolving. There is a definite stratification between the top “$1B+ club” vendors and the small to mid-sized players. Regionalization of the industry will continue to provide opportunity, as will growth markets including DCI and metro optical applications. In-house coherent ASIC design continues to be a strategy for driving competitive advantage for the larger players. Vendors of all sizes are exploring vertical integration as yet another path forward to solution differentiation and competitive advantage. Further consolidation is possible for this market, but the natural diversity in regional requirements, technologies, and target applications will continue to provide opportunity for a range of optical equipment vendors.
Scoring system

This Scorecard addresses the need in the market for vendor evaluation based on objective data and metrics. Our methodology produces scores that tell a nuanced story of the vendor landscape, one that conveys each player’s strengths and challenges. Based on actual data and metrics, the scores consist of two overall categories:

- **Market presence**, which we define as a vendor’s position in the market, including size, brand recognition, reputation, and financials. For scores in this category, we consider each vendor’s market share, financials, and buyer feedback, including buyer ratings of vendors’ product reliability and service and support.

- **Market momentum**, which we define as a vendor’s potential, including growth, reputation for innovation, and development of next generation technologies. For scores in this category, we consider each vendor’s market share momentum, growth intensity, and buyer feedback, including buyer ratings of vendors’ technology innovation.

Please see “Methodology” (excerpted methodology is at the end of this document; the full version, with a more detailed description of the scoring process, is available from IHS Markit).

Portfolio and market segments covered

The optical portfolio and market segments analyzed for this Scorecard include:

- **Optical network systems**: hardware and associated software used to build WDM- and SONET/SDH-based optical transport networks

- **Packet-optical transport systems (P-OTS)**: subset of the optical equipment market; systems that are designed and used for hybrid circuit and packet-based optical transport

- **Optical data center interconnect (DCI) equipment**: subset of the optical equipment market used to connect data centers over WDM transport

Detailed scorecard analysis

The next chart summarizes the 10 vendors’ scores in market presence and market momentum and places them into one of 3 categories: leaders, established players, and challengers. The presence and momentum scores range between a minimum of 1.0 and maximum of 5.0; the average score is 3.0.

- **Leaders** perform strongly across all evaluation criteria and vectors. Leaders have established a significant presence in the market and have positive momentum, which means they are likely to cement and expand their leadership positions in the future.

- **Established** players perform strongly in the market presence vector. Though established players have lower market momentum than leaders, their significant presence indicates strong adoption of their solutions.

- **Challengers** perform strongly in the market momentum vector. Though challengers have lower market presence than leaders, their positive momentum indicates they are in a good position to grow their market presence in the future.
This excerpt profiles Cisco only—contact IHS Markit to obtain the full report.
Vendor profiles: Cisco

Cisco is one of the best-known telecom and datacom equipment manufacturers globally, targeting service providers, enterprises of all sizes, and consumers. Enterprise is its largest segment, and most telecom-related revenue is for products like service provider routing and switching. The foundation of Cisco’s optical business was built through its 1999 acquisitions of metro optical–focused Cerent and a division of Pirelli focused on DWDM transport equipment. Cisco continued to add key products and technologies to the business, acquiring optical DSP designer CoreOptics in 2010 and silicon photonics developer Lightwire in 2012. In 2017, Cisco was the #5 optical equipment vendor worldwide by revenue with just over 5% market share.

### Exhibit 3 Cisco optical profile summary

<table>
<thead>
<tr>
<th>Optical Equipment Revenue</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>$726M</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Market presence: 3.3</td>
</tr>
<tr>
<td></td>
<td>Market momentum: 4.1</td>
</tr>
</tbody>
</table>

#### Strengths
- Bulletproof balance sheet
- IP expertise

#### Challenges
- Customer perception
- Optical market presence

Note: The market presence and market momentum scores are described fully in “Methodology.”

Source: IHS Markit © 2018 IHS Markit

Portfolio

Cisco focuses primarily on the metro optical market with its current Network Convergence Series (NCS) portfolio. The NCS is split into three main product lines: the NCS 4000 converged packet-optical switching platform with an agnostic (Ethernet or OTN) switching fabric, support for IP/MPLS, and a full suite of coherent DWDM interfaces; the NCS 2000, which is primarily a ROADM system with support for amplifiers, transponder, and muxponder blades; and the NCS 1000, the newest addition to the portfolio, which includes open and disaggregated transponder and line system shelves designed specifically for DCI applications and DC operational environments.

A good part of Cisco’s resurgence in market share in 2017 has been due to the success of the NCS 1000 portfolio. The NCS 1002 transponder platform was announced in 2015 and supports up to 2T of line-side capacity in a 2RU platform. The NCS 1001 complements the NCS 1002 as a 1RU line system providing amplifiers, channel power monitoring, and protection switching capability. The latest addition to the family, the NCS 1004, was announced in March 2018. When available, the NCS 1004 will support 4.8T of line-side capacity in a 2RU platform with up to eight 600G line-side ports and 48 100GbE client ports. The platform will also support long haul and subsea applications.
Verizon’s selection of Cisco as one of two vendors for its 100G metro-packet optical project was a key win for the business. It is also providing a marquee opportunity to showcase a key strength of Cisco’s—its dominance and understanding of IP networking. One result of the project is the introduction of the 4200 family of platforms for TDM to packet transformation, bringing legacy TDM services into the new metro network using circuit emulation over MPLS. Though this is a different approach as compared to other optical vendors proposing TDM service migration via OTN, success at Verizon will lead to interest from other operators and a potentially new lucrative revenue stream for Cisco.

Cisco has also had good success in the North American market serving smaller rural carriers and larger competitive providers that have turned to Cisco for solutions not specifically designed for larger service providers. The company has also brought new thinking to how layer 2 networks are constructed for cable/MSOs and has leveraged its presence in these accounts to introduce new opportunities for its optical portfolio.

**Market presence and market momentum highlights**

Cisco leads the field this year in market share momentum as NCS 1000 sales to the web-scale community combined with the start of Verizon metro deployments give company revenues a boost. The company was recognized by our survey respondents for technology innovation, achieving the second-highest score overall on this criterion. Cisco also delivered an above average score in our growth intensity criteria by virtue of its strong focus on packet-optical and its growing business in optical DCI.

While a mid-sized player by revenues in the optical equipment market, Cisco has a bulletproof balance sheet that it is using aggressively for acquisitions and vendor financing, something none of its peers can match. It has respectable market share in its regions and areas of focus, and customers view it favorably in terms of service and support.

**Bottom line**

Cisco is a massive company with its optical networking business remaining only a small part. Although it is a mid-sized player in traditional optical networking, its deep balance sheet, broad portfolio of assets including data center, software, routing, and transport, and investment in open and disaggregated optical transport systems provide it with a unique opportunity as the industry evolves to next-generation optical infrastructure. Overall, Cisco achieves a leader rating for this edition of our Scorecard.
Methodology

Portfolio and market segments covered
The optical portfolio and market segments analyzed for this Scorecard include:

- **Optical network systems**: hardware and associated software used to build WDM- and SONET/SDH-based optical transport networks
- **Packet-optical transport systems (P-OTS)**: subset of the optical equipment market; systems that are designed and used for hybrid circuit and packet-based optical transport
- **Optical data center interconnect (DCI) equipment**: subset of the optical equipment market used to connect data centers over WDM transport

Scorecard criteria
This Scorecard includes the 10 top optical vendors as ranked by 2017 optical networking equipment sales, each with $250M or more in annual revenue in this segment. We did not include the next tier of players, such as NEC, Padtec, Juniper, or Ekinops. The methods used to address mergers and acquisitions over the year are outlined at the end of this section.

Our criteria are based on actual data and metrics. For each criterion, we scored vendors on a 5-point scale; 1 is the lowest possible score, 3 is an average score, and 5 is a perfect score. Specifically, we evaluate vendors on market presence and market momentum.

**Market presence**: a vendor’s current position in the market, including size, brand recognition, reputation, and financials. The market presence score is calculated using these criteria:

- **Market share**: a vendor’s percentage share of optical equipment revenue
- **Financials**: an analysis of a vendor’s financials; a strong financial position improves long-term viability and allows a company to stay ahead of the competition by investing in R&D and/or acquiring other companies/technologies; this score is based on the Altman Z-score non-manufacturing model
- **Buyer feedback**: an assessment of a vendor’s performance by optical equipment purchase decision-makers, based on interviews we conduct with global service providers every year
  - **Product reliability**: buyers’ assessments of a vendor’s product reliability
  - **Service and support**: buyers’ assessments of a vendor’s service and support

**Market momentum**: a vendor’s potential, including growth, reputation for innovation, and development of next generation technologies. The market momentum score is calculated using these criteria:

- **Market share momentum**: a vendor’s growth in optical equipment market share
- **Growth intensity**: measures the percentage of a vendor's product portfolio designed to meet the evolving requirements of customers and whether the vendor is capitalizing on new, high-growth market segments
- **Buyer feedback on technology innovation**: an assessment of a vendor’s performance by optical purchase decision-makers, based on interviews we conduct with global service providers every year

Based on the scores for each of the 7 criteria, we created 2 composite vendor scores, one for market presence and the other for market momentum, using the same 5-point scale, and weight the individual criterion based on its importance in the buying process.
Reports used
The information in this Scorecard is based on findings from multiple IHS Markit services, including:

- Market trackers
  - Optical Network Hardware
  - DCI, Packet-Optical and OTN Hardware
- Survey-based research
  - Optical Equipment Vendor Leadership
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